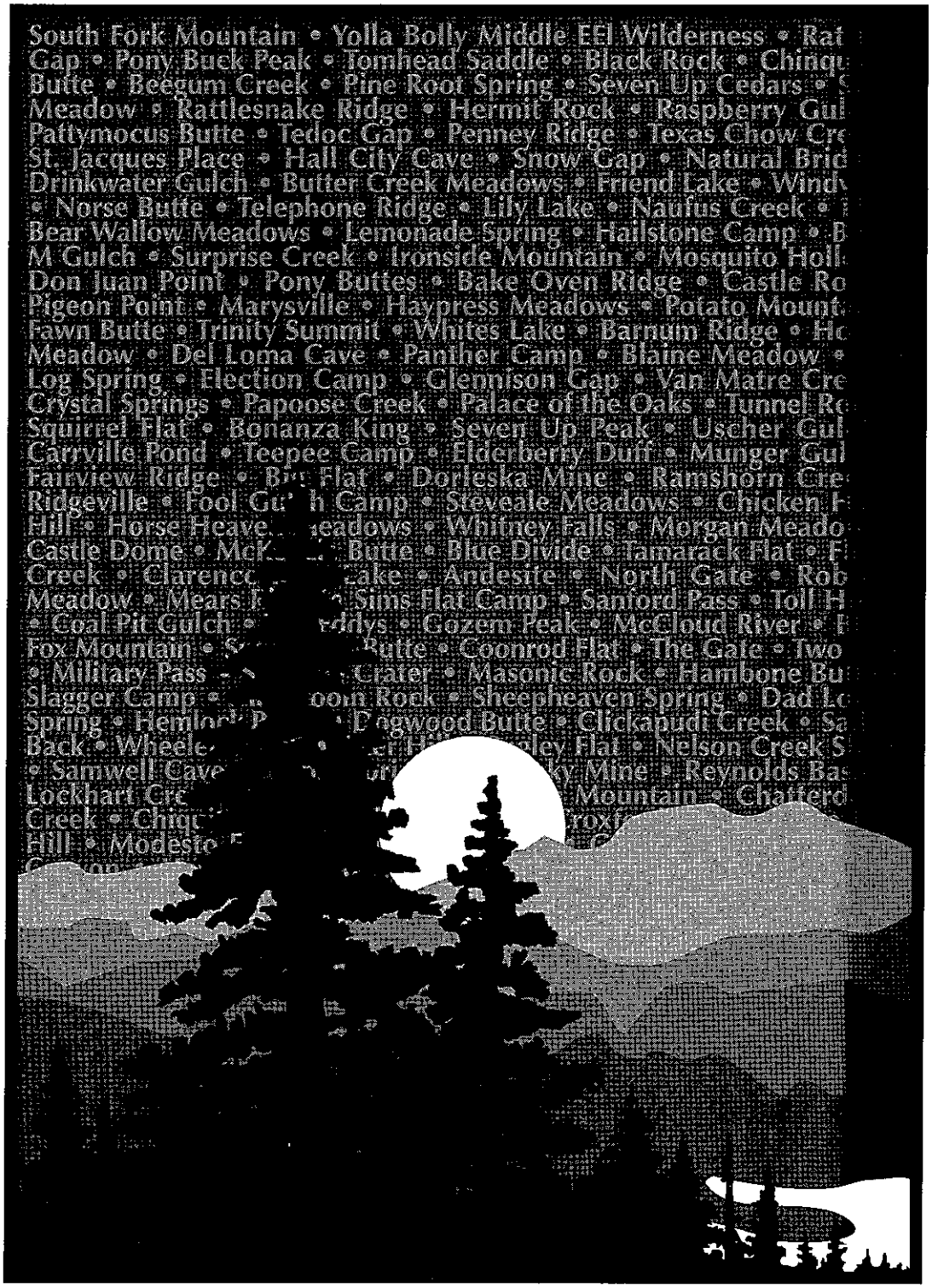
United States
Department of
Agriculture

Forest
Service

Pacific
Southwest
Region

Final Environmental Impact Statement

Land and Resource Management Plan



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Shasta • Trinity National Forests

Final Environmental Impact Statement

Shasta-Trinity National Forests
land and Resource Management Plan
1994

Humboldt, Modoc, Shasta, Siskiyou, Tehama and Trinity Counties, California

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Abr act: This nal Environment, npact Statement (Final EIS) documents e resu of an analysis four alternatives which were developed for possible management of the 2 1 million acre Shasta-Trinity National Forests The alternatives are (PRF) balanced combination of commodity and amenity production, (RPA) commodity emphasis, (CUR) continuation of present management direction with no change in the level of outputs or activlties, and (CBF) developed in conjunction with the Citizens for Better Forestry a balance between resource use and restoration Alternative PRF is the preferred alternative, and is the basis for the Land and Resource Management Plan (Forest Plan) which accompanies this document Upon arrival, the Forest Plan will guide management of the Forests for the next 10 to 15 yean

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Final Environmental Impact Statement (Final EIS)

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Summary for the Final EIS

Summary for the Final Environmental Impact Statement (FEIS) Shasta-Trinity National Forests

Summary Contents. This summary condenses the most important chapters in the Final EIS (Chapters I through IV) Refer to the individual chapters in that document for an in depth discussion of the public issues that emerged and the four alternatives that were developed Refer to the *Appendix K* for summary of public comment and response

Chapter I - Purpose and Need

Chapter Contents. This chapter briefly describes the National Forest Land Management Planning process and addresses the public issues which were identified during the public participation process

Summary Description of Chapter I

National Forest planning is required by the Multiple-use Sustained Yield Act of 1960 and the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), as amended by the National Forest Management Act of 1976 (NFMA) National, Regional. and Forest Planning is an integrated three-tiered process When completed, the Shasta-Trinity National Forests Land and Resource Management Plan (Forest Plan) will provide overall direction for management of National Forest lands and resources

The Final EIS examines four alternatives in detail These alternatives were formulated to aid in the development of a comprehensive land and resource management program for the Shasta-Trinity National Forests The Final EIS assesses the environmental consequences of the Preferred Alternative (PRF), as well as the other three alternatives, as required by the National Environmental Policy Act of 1969 (NEPA) The Preferred Alternative is the basis for the Forest Plan This document was prepared in conjunction with the Final EIS to meet NEPA requirements

The goal of Forest planning is to develop a Forest Plan that provides for the multiple use and sustained yield of goods and services in a way that maximizes long term net public benefits in an environmentally sound manner

The basic question behind the Forest planning process is "What should be the management direction for the next 10 years?" The first step in addressing this question was to identify public issues specific to the Shasta-Trinity National Forests.

A Draft EIS and proposed Forest Plan were made available to the public on August 16, 1986. Although these documents were withdrawn by the Regional Forester a month later, the public comment period was completed and more than 1,300 responses were received These responses were then sorted and substantive comments were categorized Subsequently, these comments were used to determine the issues to be addressed in this document A subsequent draft was issued in 1990 Based on the response to that draft, the issues were further refined

Twenty-one public issues emerged as a result of the above process

The last Draft EIS and proposed Forest Plan were made available to the public on September *29,* 1993 Public comment period was completed and more than *400* responses were received These responses were then sorted and substantive comments were categorized Based on comments received one issue was incorporated into the Final EIS - downhill skiing on Mt Shasta

However, eight of these issues are especially important, they are discussed throughout this summary These eight issues are

How much of the older vegetative seral stages existing on the Forests should be retained? (Issue #3)

How should watersheds be managed to maintain or enhance water quality and fisheries? (Issue #6)

What activities and outputs should be provided to maintain community stability? (Issue #7)

What should the timber harvest level or allowable sale quantity be? (Issue # 16)

What harvest methods, including clearcutting, should be used to meet management objectives? (Issue #18)

How and where should visual quality be protected and enhanced? (Issue #19)

What river segments should be recommended for inclusion in the Federal Wild and Scenic Rivers System? (Issue #20)

How should the Forests' roadless areas be managed, including the Mt. Eddy Further Planning Area? (Issue # 21)

In addition to the above, another important issue emerged

Should herbicides be used to control vegetation in order to meet timber management objectives? (Issue #15).

However, this issue is being addressed at the Pacific Southwest Region level This issue was resolved through a Regional Environmental Impact Statement (EIS) on Vegetation Management for Reforestation and will not be discussed further in this summary The Forest Plan will tier to the Vegetation Management EIS

Chapter II - Alternatives Including the Preferred Alternative

Chapter Contents. In this chapter each alternative is examined in detail Four alternatives were developed for analysis and discussion

Summary Description of Chapter II

Alternative PRF (Preferred Alternative). This alternative proposes a combination of commodity and amenity outputs, goods, and services in response to balancing national goals wth local issues

Old-growth Protection and maintenance of habttat for a variety of wildlife species dependent on early and late seral stages are important considerations Older over-mature/late-successional habltat will increase by the 5th decade (year 2040)

Water Quality A primary objective will be to maintain the qualrty of water at or above State objectives This will be accomplished through implementation of supplemental management objectives for appropriate management areas (refer to Chapter 4 of the Forest Plan) and through the use of Best Management Practices (BMPs) See Rparian Areas section for a discussion of Riparian Reserves No scheduled timber harvest will be allowed within an average width of 600 feet (300 feet on each side) along fish- bearing streams, within an average width of 300 feet (150 feet on each side) along permanently flowing non-fish-bearing streams, within 150 feet along constructed ponds and reservoirs, wetlands greater than 1 acre and wthin 300 feet of lakes and natural ponds, and wthin an average width of 200 feet (100 feet on each side) along seasonally flowing streams, wetlands less than 1 acre and unstable areas The condition of many of the watersheds will improve by the 5th decade (year 2040)

Community Stability Communty stabilty for those dependent on wood products will not be maintained County receipts produced by this alternative will average less than historic levels, and employment will decrease

Timber Harvest levels Timber management activties will be conducted to achieve a wide variety of resource objectives Timber sell volumes will be 35 percent of the average of the last decade The sutable land base will decline signlficantly from historic levels and the number of acres available for timber management will decline appreciably

Clearcutting The practice of removing all vegetation from a harvested site by clearcutting is permitted but not scheduled, and is expected to be almost none

Visual Quality Visual qualrty will be emphasized along candidate State scenic highways, in the Whiskeytown-Shasta-Trinity National Recreation Area, on Mt Shasta. around most developed recreation sites, and in some key dispersed recreation areas Visual quality will also be emphasized in the foreground of sensitive travel corridors, wild and scenic nvers, and special emphasis areas Wildernesses will be managed to preserve the characteristic landscape In the remainder of the Forests. management activities will not dominate the landscape Overall, visual qualty will increase from the present level

Wild and Scenic Rivers Five nvers will be recommended for designation

Beegum Creek (Wild segments)
Canyon Creek (Wild and Recreation segments)
North Fork Trinity River (Wild segments)
South Fork Trinity Rver (Wild, Scenic and Recreation segments)
Virgin Creek (Wild segments)

Roadless Areas Vegetation manipulation will be excluded from about E I percent of all roadless area acres.

Alternative RPA *(1990* RPA Program Emphasis). This alternative portrays how the 1990 RPA program could best be implemented for the Shasta-Trinity National Forests

Old-growth This alternative will place more emphasis on wildlife species dependent upon early seral stages (i e , deer), but like Alternative PRF will provide for increased levels of late seral stage habrtat Older over-mature habrtat will increase by the 5th decade

water *Quality* A primary objective will be to maintain the quality of water at or above State objectives This will be accomplished through implementation of supplemental management objectives for appropriate management areas (refer to Chapter 4 of the Forest Plan) and through the use of Best Management Practices (BMPs) See Riparian Areas section for a discussion of riparian management zones (RMZs) No scheduled timber harvest will be allowed within an average width of 600 feet (300 feet on each side) along Class I and 2 streams or within an average of 300 feet (I50 feet on each side) along Class 3 streams Only modified harvest will be allowed within an average width of 200 feet (I00 feet on each side) along Class 4 streams The condition of many of the watersheds will improve by the 5th decade

Community Stability Community stability for those dependent on the wood products industry will not be maintained, but will be greater than Alternative PRF County receipts and employment produced by this alternative will be less than historic levels, but will be greater than PRF

Timber Harvest Levels Timber harvest levels will come as close as possible to the 1990 RPA timber targets as constrained by the listing of the northern spotted owl The suitable land base will decline from histonc levels but will be higher than Alternative PRF

Clearcutting The practice of removing all vegetation from a harvested site by clearcutting will decrease significantly from historic levels Less than half of the total acres harvested will be by this practice

Visual Quality Visual quality will be emphasized along candidate State scenic highways, in the Whiskeytown-Shasta-Trinity National Recreation Area, on Mt Shasta, around most developed recreation sttes, and in the foreground of sensitive travel corndon Existing wild and scenic rivers and special interest areas will continue to be managed in the foreground to protect scenic qualrty Wildernesses will be managed to preserve the characteristic landscape In the remainder of the Forests, management activities will not dominate but might be noticeable on the landscape Overall, visual quality will increase slightly from the present level

Wild and Scenic Rivers No additional rivers will be recommended for designation

Roadless Areas Vegetation manipulation will be excluded from 7I percent of all roadless area acres

Alternative CUR (No Action/No Change). Under this alternative the current level and mix of outputs. based on land allocations, directions, policies and practices, will continue Goods and services will be provided at 1989 levels to the extent possible given recent threatened and endangered species listings

Old-growth Wildlife species dependent upon early to mid-seral stages will be emphasized, to less of a degree than Alternative PRF but greater than Alternative RPA Older over-mature habltat will increase by the 5th decade

Water Quality A pnmary objective will be to maintain the quality of water at or above State objectives This will be accomplished through implementation of supplemental management objectives for appropriate management areas (refer to Chapter 4 of the Forest Plan) and through the use of Best Management Practices (BMPs) *See* Riparian Areas section for a discussion of npanan management zones (RMZs) No scheduled timber harvest will be allowed within an average width of 600 feet (300 feet on each side) along Class I and 2 streams or an average width of 300 feet (I 50 feet on each side) along Class 3 streams Only modlfied harvest will be allowed within an average width of 200 feet (I00 feet on each side) along Class 4 streams The condition of many of the watersheds will mprove by the 5th decade

Community Stability Community stability for those dependent on the wood products industry will not be maintained County receipts and employment will decrease from historic levels, but will be greater than Alternative PRF and less than Alternative RPA

Timber Harvest levels Timber management activities will be conducted to achieve the current level of timber outputs, based on management direction from existing Multiple-use Plans and Timber Management Plans although timber outputs will be greatly reduced from historic levels The suitable land base and the number of acres available for

timber management will be signficantly reduced from histonc levels

Clearcutting The practice of removing all vegetation from a harvested site by clearcutting will decrease significantly from historic levels About one-third of the total acres harvested will be by this practice

Visual Quality Visual quallty will be emphasized along candidate State scenic highways, in the Whiskeytown-Shasta-Trinity National Recreation Area, on Mt Shasta, in developed recreation stes, and in the foreground of most sensitive travel comdors Existing wild and scenic rivers and special interest areas will be managed in the foreground to provide special emphasis for scenic quality Wildernesses will be managed to preserve the characteristic landscape Forest management activities will dominate the landscape only on a small portion of the land base that emphasizes wood fiber production Overall, visual qualrty will increase slightly from the present level

Wild and Scenic Rivers No additional rivers will be recommended for designation

Roadless Areas Vegetation manipulation will be excluded from 70 percent of all roadless area acres

Alternative CBF (Citizens for Better Forestry). This alternative was developed in conjunction with the "Citizens for Better Forestry", a regional coalition of environmental groups The goal of this alternative is to strike a balance between resource use and resource restoration

Old-growth The importance of maintaining habitat for wildlife species dependent upon late seral stages is stressed in this alternative Older over-mature habitat will increase by the 5th decade

Water Quality A primary objective will be to maintain the qualty of water at or above State objectives This will be accomplished through implementation of supplemental management objectives for appropriate management areas (refer to Chapter 4 of the Forest Plan) and through the use of Best Management Practices (BMPs) See Riparian Areas section for a discussion of riparian management zones (RMZs) No scheduled timber harvest will be allowed wthin an average width of 600 feet (300 feet on each side) along Class I and 2 streams or an average width of 300 feet (150 on each side) along Class 3 streams Only modlfied harvest will be allowed within an average width of 200 feet (100 feet on each side) along Class 4 streams The condtion of many of the watersheds will improve by the 5th decade

Community Stability Community stability for those dependent on the wood products industry will decline signlficantly County receipts and employment will decrease below all the other alternatives

Timber Harvest levels Timber outputs will be less than 30 percent of historic levels The sutable land base will decline substantially below current and historic levels The number of acres available for timber management will be the least of all the alternatives

Clearcutting The practice of removing all vegetation from a harvested site by clearcutting will not be used in this alternative Emphasis will be placed on uneven-aged systems including single tree and group selection

Visual Quality Visual quality will be emphasized in the Whiskeytown-Shasta-Trinity National Recreation Area, on Mt Shasta, in the McCloud River area, wthin the proposed Trinity Divide Biolink, and around most developed recreation sites An expanded wild and scenic rivers system will be managed to provide protection for scenic quality Wildernesses will be managed to preserve the characteristic landscape Forest management activities will dominate the landscape only on a small portion of the land base that emphasizes wood fiber production Overall, visual qualrty will increase slightly from the present level

Wild and Scenic Rivers Nine rivers. and a portion of another one, will be recommended for designation

Beegum Creek (Wild segments)
Canyon Creek (Wild and Recreation segments)
Hayfork Creek (Scenic segments)
Lower McCloud Rver (Wild and Scenic segments)
Upper McCloud River (Recreation segments)
North Fork Trinity River (Wild segments)
South Fork Trinty River (Wild, Scenic and Recreation segments)
Sacramento Rver (Recreation segments)
Squaw Valley Creek (Wild and Scenic segments)
Virgin Creek (Wild segments)

Chapter III - Affected Environment

Chapter Contents. This chapter descnbes the Forests' resources and the environment which will be affected by implementation of the Forest Plan

Summary Description of Chapter III

The 2 I million acre Shasta-Trinity National Forests lie in the heart of Northern California. Approximately 700,000 acresofotherownerships liewrthinthe Forests' boundary, The Forests are located within Humboldt, Modoc, Shasta, Siskiyou, Tnnity and Tehama counties Within the Forests' boundaries are a diverse and complex array of soil and vegetation types representing portions of at least four major physiographic provinces (I) the Cascade Mountains, (2) the Klamath Mountains, (3) the Coast Range, and (4) the Sacramento Valley

The Shasta-Trinity National Forests are located within four hours driving time *of* the San Francisco Bay area and Sacramento population centers The boundaries are afew minutes drive from Redding, a city of almost 70,000 people Other populationcenterswithinthe Forests'zone of influence include Burney, McCloud, Mt Shasta City, Dunsmuir, Weed, Hayfork, and Weaverville

Because of their geographic location and physiographic variety, the Shasta-Trinity National Forests contain a diverse array of economic, social, and resource situations

Old-growth. The management of old-growth/late-successional (older over-mature habitat) coniferous forests is a topic that has received much public debate The spotted owl is considered to be a species which depends on older over-mature habtat for its survival Some are concerned that insufficient acreage is being maintained while others argue that the economic value of the timber dictates that less acreage should be maintained No universally accepted definition has been developed for old-growth by forest type Most concerns focus on large, old conifer stands that have a high level of decadence For tracking in the alternatives this situation is described **as** 4C-older These older over-mature stands make up about I3 percent (263,000 acres) of the vegetation on the Shasta-Trinrty National Forests

Water Quality. Management objectives within identified riparian areas are directed toward maintaining the riparian ecosystem and protecting streamcourses and water quality These areas are important to fisheries and wildlife habitat The publication 'Water Quality Management for National Forest System Lands in California" includes several Best Management Practices (BMPs) specific to management *of* nparian areas

In order to protect water quality and, subsequently, riparian areas, one BMP requires that riparian managementzones (RMZs) be defined in terms of boundaries and appropnate management activities Timber management restricted are prohibited and RMZ widths vary according to site conditions. For instance, is the stream perennial, intermittent or ephemeral, and is there a potential for surface erosion and mass wasting? Accordingly, RMZs can vary from I50 feet of a channel to 300 feet of a channel.

Watershed condition is a description of the health of a watershed, or portion thereof, in terms of the factors which effect hydrologic function and soil productivity Watershed condrtion can be classified by evaluating the cumulative watershed impacts. This method calculates soil disturbance and compaction from road building and timber harvest activities in equivalent road acres (ERAs) A watershed's sensitivity is evaluated and classified and a threshold of concern (TOC) value is assigned This value is expressed in percent ERA, with lower sensrtivrty watersheds having a higher TOC than the highly sensitive watersheds The TCC value is meant to indicate a point where, if approached or exceeded, the risk of watershed degradation is considered significant and mitigation measures should be implemented to lessen the hazard

Watershed condition classes are defined in terms of level of ERAs for individual watersheds with respect to the individual TCC Class I (good to excellent condition) is defined as ERA levels of less than 40 percent of TOC, Class 2 (fair to good condition) is 40 to 80 percent of TOC, and Class 3 (fair to poor condition) is greater than 80 percent TOC

Sixty-one watersheds have been identified within the Forests Most of these are in good condition, but seven watersheds are in poor condition

Community Stability Resource management activties on the Forests have considerable economic impact on Shasta, Siskiyou, and Trinity counties Minor impacts occur in Tehama county The shared receipts (otherwise known **as** "25 percent receipts") are almost a direct result of timber harvest levels and the amount of National Forest land in each county Timber harvest, recreation visitor days, grazing, and total Forest Service expenditures are the driving forces in generating income and employment

Over the last four years county receipts have averaged about 9 million dollars Payments to the counties will be lower if based solely on actual receipts and not computed under the I991, 1992, and I993 Appropnations **Acts.** Future 25 percent county receipts will be signficantly lower due to mqor reductions in timber harvests Total employment generated by the Shasta-Tnnrty National Forests historically is estimated at 6,517 jobs within the

four counties Current outputs will generate an estimated 3,682 lobs

Timber Harvest levels The annual programmed harvest level under the 1975 Timber Management Plan was about 242 million board feet (MMBF) after adjustments were made for the California Wilderness Act This harvest level was based on a sultable timber land base of about 1,074,000 acres

The actual volume sold between 1975 and 1992 averaged about 200 MMBF per year The actual sell volume was less than the programmed harvest level due pnmanly to budget limltations, poor timber markets dunng the early 1980s, and certain restrictions on the timber land base (such as herbicides and roadless areas)

The listing of the northern spotted owl under the Federal Endangered Species Act (ESA) and subsequent implementation of the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Wrthin the Range of the Northern Spotted Owl have further reduced the Forests' timber sale program The actual volume of timber sold between 1990 and 1992 averaged about 90 MMBF per year and for 1993 the volume sold was 55 MMBF

Of the 2 1 million acres of Nabonal Forest land on the Forests, about 76 percent, or 1,629,000 acres, is forested with commercial conifers Of that amount about 1,077,775 acres are classified as tentatively surtable and available for timber production About half of this amount, 502,800 acres, is being managed for modlfied and occasionally intensive timber. 133,000 acres are managed for minimal timber, and 442,000 acres for unsuitable for timber production

Clearcutting The 1975 Timber Management Plan and Environmental Impact Statement selected even-aged management as the preferred method for the Plan penod (1975 to present) Clearcutting was the primary method used to regenerate stands under that Plan. During the period from 1984 through 1990, about 49 percent of the acres harvested were clearcut

Visual Quality Lands wlthin the Forests have been divided into three variety classes These variety classes are a measure of the scenic attributes of the landscape, such as landform, water, and vegetative pattern The three vanety classes are Distinctive (Variety Class A), Common (Variety Class B), and Minimal (Variety Class C) Over time. landscapes wrthin the above vanety classes undergo vanous amounts of physical alteration due to activlties like road building, timber harvesting, campground construction, mining, etc The existing visual condition is a measure and classlfication of the degree of physical alteration. The six visual condition classes vary from Class I areas that are unaltered to Class VI areas which are physically altered on a large scale

Class I (Untouched) is equivalent to a visual quality objective (VQO) of preservation, Class II (Unnoticed) - VQO of retention. Class III (Minor Disturbances) - VQO of partial retention: Class IV (Disturbed) - VQO of modification: Class V (Major Disturbance) - VQO of maximum modification: and Class VI (Drastic Disturbance) - VQO of unacceptable modification.

Presently, 43 percent of the Forests' total land base is considered Untouched, 47 percent Unnoticed, 6 percent Minor Disturbances, 3 percent Disturbed and one percent Major Disturbances

Wild and Scenic Rivers Approximately 106 4 miles of the Trinity River system are designated as part of the Federal Wild and Scenic Rven system on the Shasta-Trinity Nattonal Forests

Ten addltional rivers and streams have been identlfied as having the potential for Wild and Scenic Rver designation These include Beegum Creek (17.0 miles), Canyon Creek (21 5 miles), Hayfork Creek (11 5 miles), Upper McCloud Rver (14.7 miles), Lower McCloud Rver (6 1 miles), Upper North Fork Trinity River (11 7 miles) upper section of the South Fork Tnnity Rver (24 8 miles), Sacramento Rver (6 1 miles), Squaw Valley Creek (10 0 miles), and Virgin Creek (11 7 miles).

Designation will maintain the outstandingly remarkable values of these rivers Other management activities, such as timber harvesting, including those on intermingled pnvate lands, could be restricted.

Roadless Areas. There are five Wildernesses, totaling 498,776 acres, on the Shasta-Tnnity National Forests. These are Castle Crags (10,483 acres), Chanchelulla (7,800 acres), Mt Shasta (38,560 acres), Trinity Alps (405,128), and Yolla Bolly-Middle Eel (36,805 acres)

There is one further planning area, Mt Eddy, which totals 7,720 acres Areas in the further planning category are to be considered for both wilderness and non-wilderness options during the Forest planning process

The 1984 Calrfornia Wilderness Act released 29 roadless areas to be managed for multiple-uses other than wilderness. These *areas* total 306,060 acres

Chapter IV - Environmental Consequences

Chapter Contents. This chapter discloses the potential consequences or impacts of each of the alternatives described in Chapter II. The intent is to provide an analytical and scientific basis on which to compare the alternatives

Summary Description of Chapter IV

Under each alternative a dtfferent combination of theme and resource program direction produces different resource outputs and uses Although the consequences of each alternative fall within certain limits due to the inclusion of a common set of management requirements and practices, each altemative will result in distinct environmental consequences The environmental consequences, as well as the relative ranking of each alternative to eight major issues, follows

Alternative PRF (Preferred Alternative).

Old-growth By the 5th decade about 368,000 acres of older over-mature habitat will exist This alternative ranks slightly higher than Alternatives CUR and RPA and almost equal to Alternative CBF in maintaining and providing acres of older over-mature habitat

Water Quality By the end of the first decade 41 watersheds will be in good to excellent condtion, 19 in fair to good condition, and 1 in fair to poor condition This alternative ranks first in maintaining and enhancing watershed condition

Community Stability In the 1st decade (ten years from present) receipts to the counties will be an established 5 million dollars a year and 3,633 jobs will be maintained or created This alternative ranks third in producing county receipts and in employment

Timber Harvest levels Average annual timber sale volume will be 82 million board feet (MMBF) from a suitable land base of 530,000 acres On this suitable land base, modified and occasionally intensive timber management will be applied on 434,600 acres and minimal timber harvest on 95,400 acres This alternative ranks third in timber volume offered for sale and the number of acres available for timber management Approximately 547,800 surtable acres will not be available for timber management due to land allocations to other uses

Clearcutting This practice is permitted, but is not scheduled on any acres Clearcutting is estimated to compose less than 1 percent of the total acres harvested This alternative ranks third in percent of acres clearcut

Visual Quality Management activities are constrained to such a small portion of the landbase that there is essentially no difference between alternatives Visual quality will improve significantly under all alternatives

Wild and Scenic Rivers A total of 79 7 miles will be recommended for designation as follows

Wild segments	48 5 miles
Scenic segments	17 3 miles
Recreabon segments	13 9 miles

This alternative ranks second in the number of miles of river recommended for designation

Roadless Areos A total of 247,909 acres of the 29 released roadless areas will remain undeveloped This alternative ranks second in the number of acres of released roadless areas that remain undeveloped

Alternative RPA (*1990* RPA Program Emphasis).

Old-growth By the 5th decade about 358,000 acres of older over-mature habtat will exist This alternative ranks slightly lower than the other Alternatives in maintaining and providing acres of older over-mature habrtat

Water Quality By the end of the first decade 36 watersheds will be in good to excellent condition, 23 in fair to good condtion, and 2 in fair to poor condition This alternative ranks last in maintaining and enhancing watershed condition

Community Stability In the 1st decade (ten years from present) receipts to counties will be 8 million dollan a year and 3,888 jobs will be maintained or created This alternative ranks first in producing county receipts and employment

Timber Harvest levels Average annual timber sale volume will be 112.4 MMBF feet from a suitable land base of 638,100 acres On this suitable land base intensive and modified timber management will be applied on 537,700 acres and minimal timber harvest on 100,400 acres This alternative ranks first in timber volume offered for sale and the number of acres available for any timber management Approximately 439,700 surtable acres will not be available

for timber management due to land allocations to other uses.

Clearcutting This practice will occur on 3,8 IO acres per year and compose 62 percent ofthe total acres harvested This alternative ranks first in percent of acres clearcut

Visual Quality Management activrties are constrained to such a small portion of the landbase that there is essentially no difference between alternatives Visual qualrty will improve signdcantly under all alternatives

wild and Scenic Rivers No addtional miles will be recommended for designahon.

Roadless Areas A total of 2 17,303 acres of the 29 released roadless areas will remain undeveloped This alternative ranks last in the number of acres of released roadless areas that remain undeveloped

Alternative CUR (No Action/No Change)

Old-growth By the 5th decade about 364,000 acres of older over-mature habltat will exist. This alternative ranks slightly higher than Alternative **RPA** and slightly less than Alternatives CBF and PRF in maintaining and providing acres of older over-mature habrtat

Water Quality By the end of the first decade 39 watersheds will be in good condrtion, 2 I in fair condition, and I in poor condrtion This altemative ranks third in maintaining and enhancing watershed condrtion

Community Stability In the Ist decade (ten years from present) receipts to the counties will be 7 million dollan a year and 3,682 jobs will be maintained or created This altemative ranks second in producing county receipts and employment

Timber Harvest levels Average annual timber sale volume will be 105 8 MMBF from a surtable land base of 635,800 acres On this sultable land base intensive and modfied timber management will be applied on 502,800 acres and minimal timber harvest on 133,000 acres. This altemative ranks second in timber volume offered for sale and the number of acres available for timber management Approximately 442,000 suitable acres will not be available for timber management due to land allocatrons to other uses

Clearcutting This practice will occur on 3, I60 acres per year and compose 40 percent of the total acres harvested This alternative ranks second in percent of acres clearcut.

Visual Quality Management activties are constrained to such a small portion of the landbase that there is essentially no difference between altematives Visual **qualrty** will improve signficantly under all alternatives

wild and Scenic Rivers No addrtional miles will be recommended for designation,

Roadless Areas A total of 220,363 acres of the 29 released roadless areas will remain undeveloped This alternative ranks third in the number of acres of released roadless areas that remain undeveloped.

Alternative CBF (Citizens for Better Forestry)

Old-growth By the 5th decade 370,000 acres of older over-mature habitat will exist, less than I percent more than PRF and slightly higher than Altematives RPA and CUR in maintaining and providing acres of older over-mature habrtat

Water Quality By the end of the first decade 37 watersheds will be in good condrtion, 22 in fair condrtion, and 2 in poor condrtion This alternative ranks third in maintaining and enhancing watershed condition

Community Stability In the Ist decade (ten years from present) receipts to the counties will be 4 million dollars a year and 3,208 jobs will be maintained or created This altemahve ranks last in producing county receipts and employment

Timber Harvest levels Average annual timber sale volume will be 65 3 MMBF from a suitable land base of 495,400 acres. On this surtable land base modded and occasionally intensive timber management will be applied on 372,700 acres and minimal timber harvest on 122,700 acres. This alternative ranks last in timber volume offered for sale and last in the surtable land base available for timber management Approximately 582,400 surtable acres will not be available for timber management due to land allocations to other uses

Clearcutting No clearcutting will occur under this altemative This altemative ranks last but almost even wrth PRF in percent of acres clearcut. While this alternative does not permrt clearcutting, PRF permits but has no schedule for any clearcutting.

Visual Quality Management activities are constrained to such a small portion of the landbase that there is essentially no difference between alternatives Visual quality will improve significantly under all alternatives

Wild and Scenic Rivers A total of 1 16 6 miles will be recommended for designation as follows

Wild segments	56 8 miles
Scenic segments	25 1 miles
Recreation segments	34 7 miles

This alternative ranks first in the number of miles of river recommended for designation

Roadless Areas A total of 269,333 acres of the 29 released roadless areas will remain undeveloped. This alternative ranks first in the number of acres of released roadless areas that remain undeveloped

Comparison of Alternatives

Figures S-1 through **S-9** display how the alternatives and the comparison of the *1989* base year relate to the eight major public issues

Figure S-1
Old-Growth
(late-Successional Habitat)
(5th Decade - Year 2040)

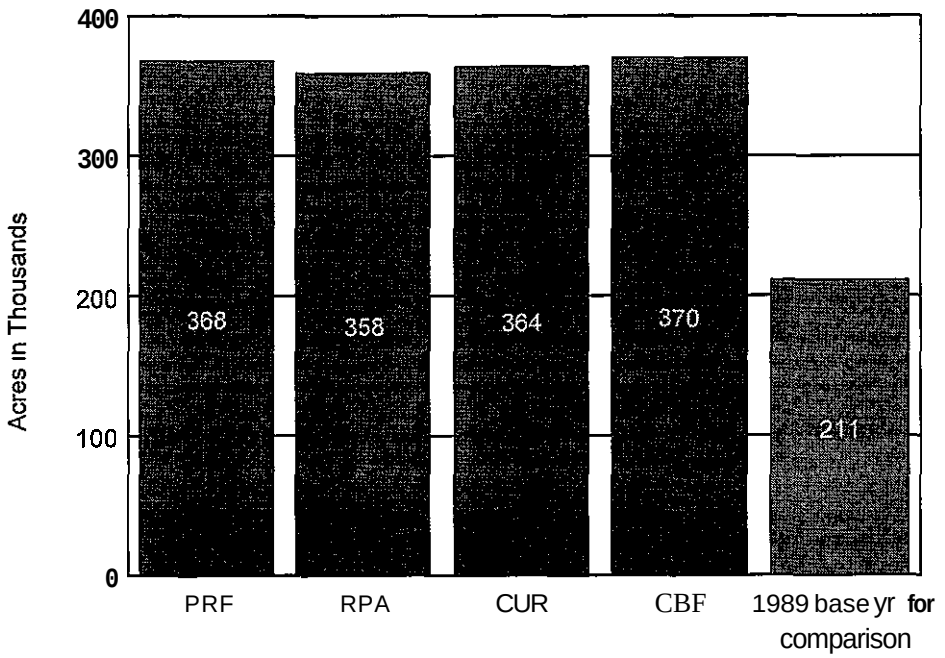


Figure S-2
Water Quality
(Watershed Condition Classes)
(5th Decade - Year 2040)

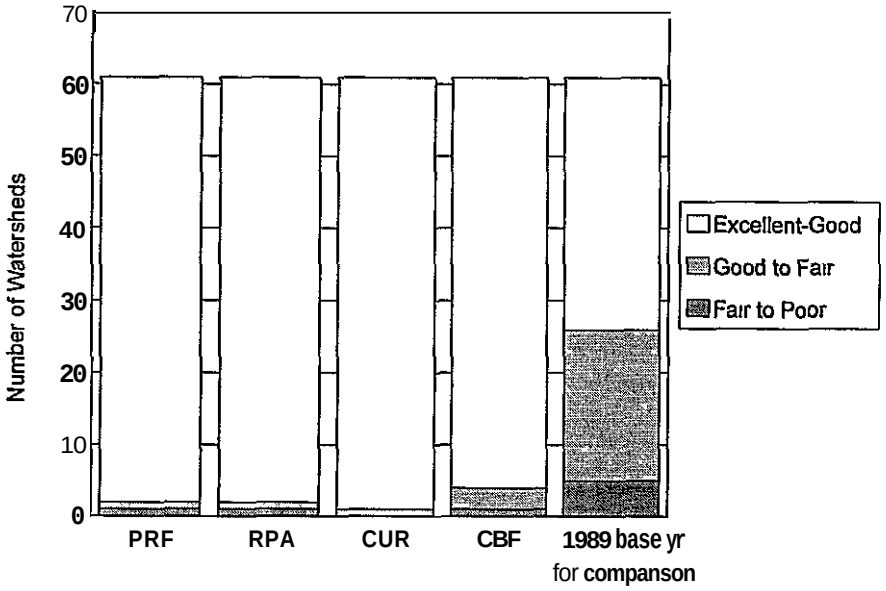


Figure S-3
Community Stability
(County Receipts)
(Average Annual for Ist Decade)

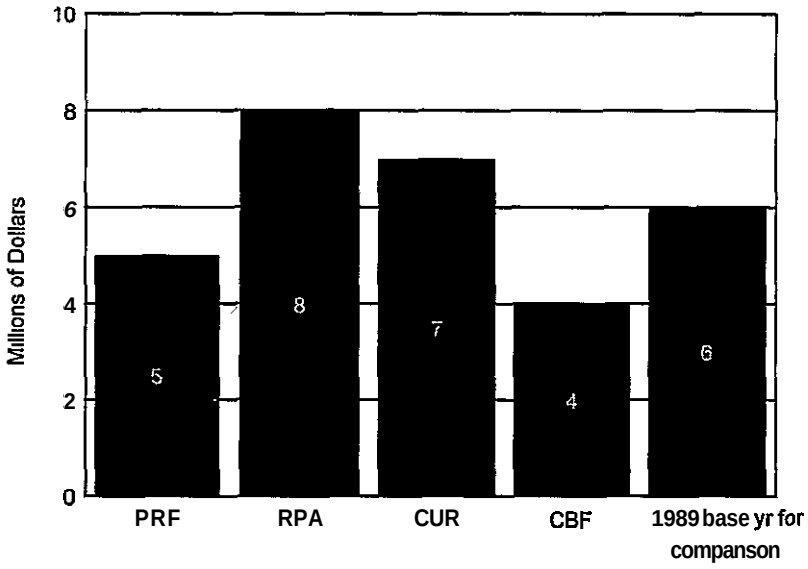


Figure S-4
Community Stability
(Employment)
(Average Annual for lst Decade)

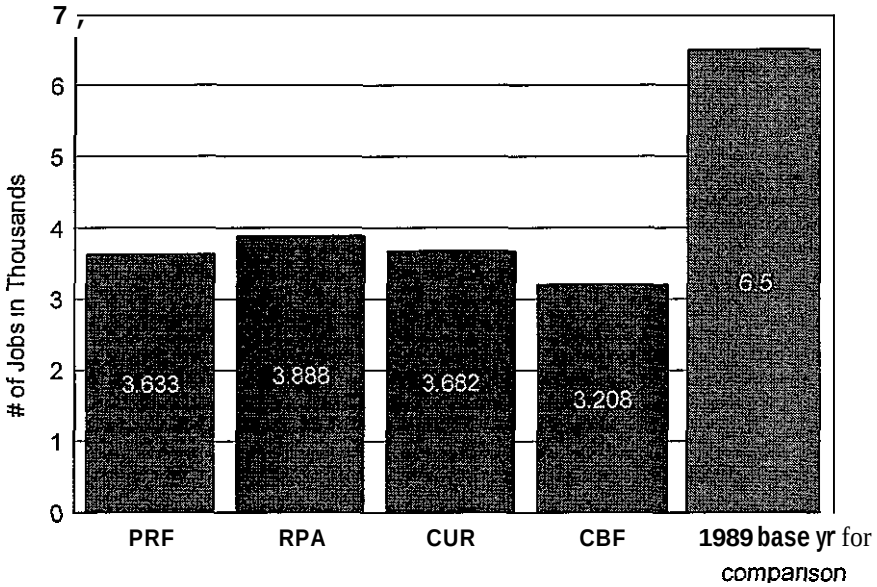


Figure S-5
Timber Harvest level
(Average Annual for the lst Decade)

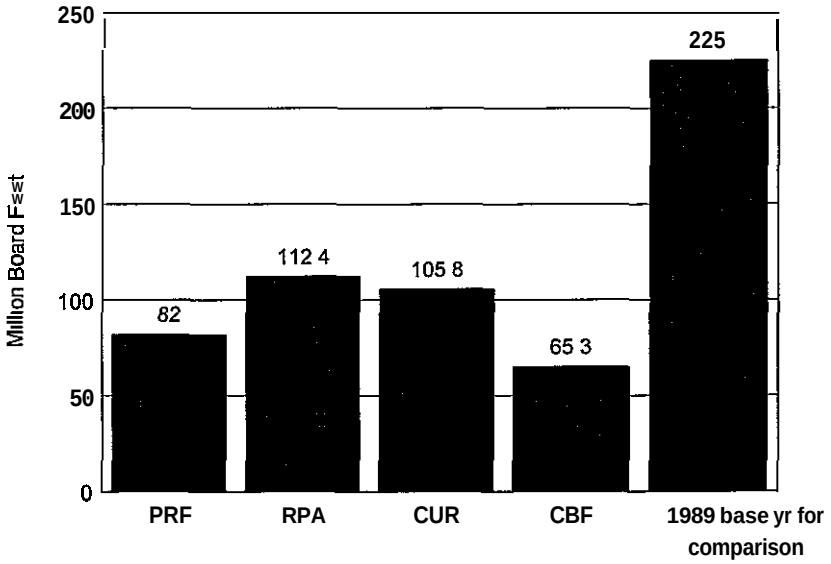


Figure S-6
Timber Harvest level
(Suitable land Base by Timber Intensity)

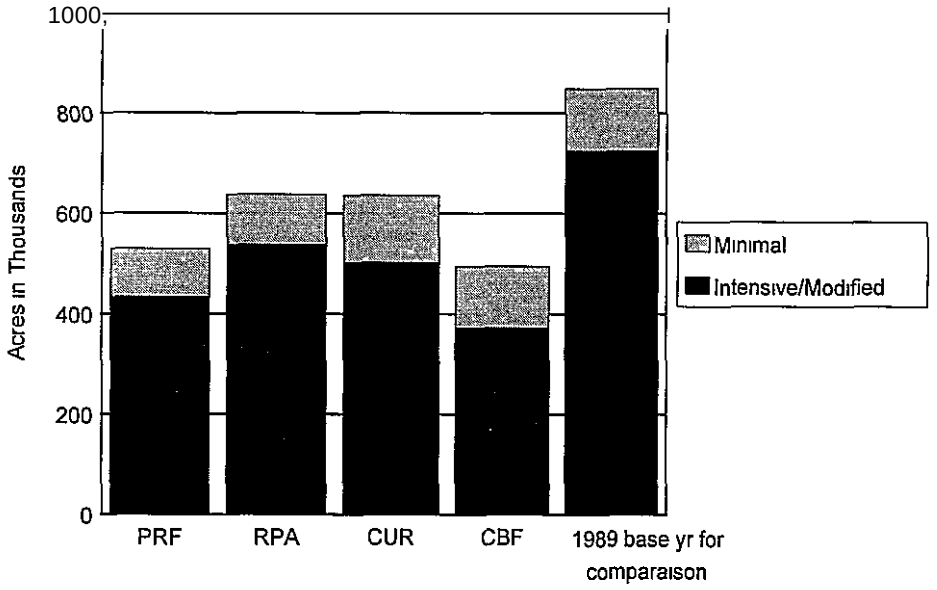


Figure S-7
Clearcutting (Acres Harvested)
(Ist Decade - Ten Years from Present)

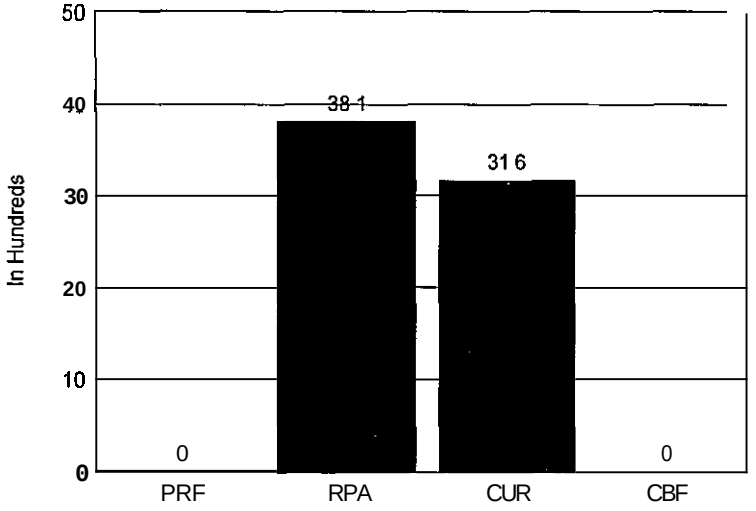


Figure S-8
Wild and Scenic Rivers
(Rivers Re commended for Designation)

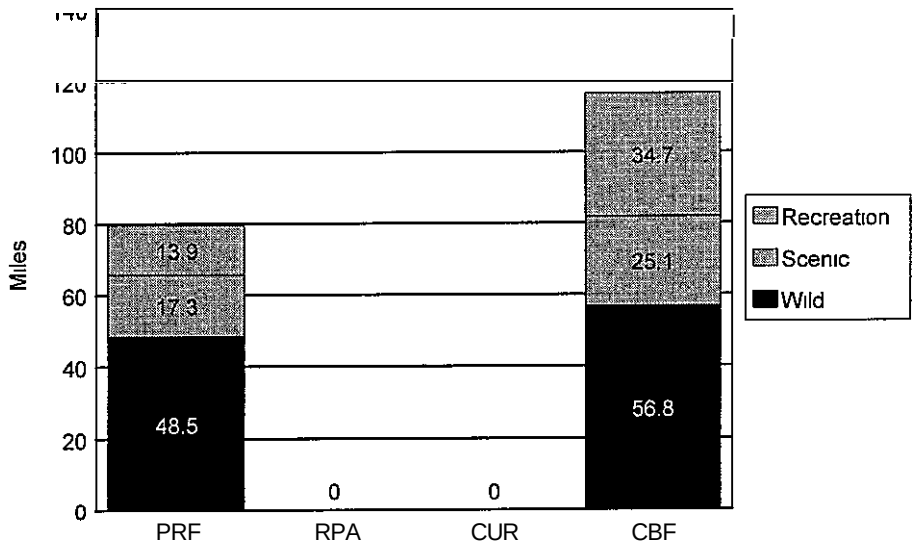
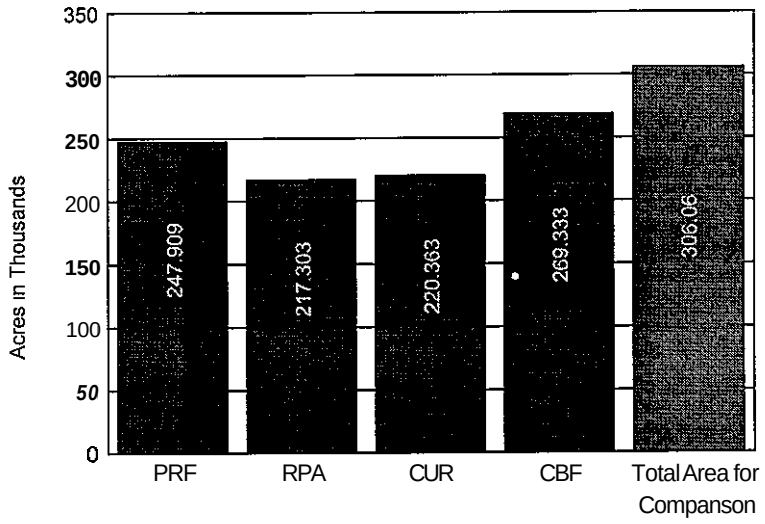


Figure S-9
Roadless Areas
(Released Roadless Areas to Remain Undeveloped)



Chapter

Purpose and Need

Chapter Contents

Chapter I - Purpose and Need

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CHAPTER I
Purpose and Need

Introduction and Background

A

This chapter introduces the development of a Land and Resource Management Plan for the Shasta-Trinity National Forests Specifically, Chapter I identifies the public issues that have guided the long-range planning process In addrtion, this chapter discusses the legislative framework enacted for long range planning, it identifies which plans will be replaced by and/or incorporated into the Forest Plan, it outlines the planning process including the inter-relationship of National, Regional, and Forest planning: and it identtfies the geographic area covered

A Draft Environmental Impact Statement (Draft EIS) and Proposed Forest Land and Resource Management Plan (proposed Forest Plan) were issued for public review and comment in February, 1990 A 120-day comment penod was provided During the public comment penod, the northern spotted owl was listed (on June 22, 1990), as "threatened" throughout its range, which includes the Shasta-Tnnity National Forests This listing was undertaken by the USDI Fish and Wildlife Service (F&WS) in accordance with the Endangered Species Act of 1973, as amended Subsequently, on September 30, 1990, existing management direction for the northern spotted owl was halted, including the Spotted Owl Habltat Areas (SOHAs)

At the same time, it was decided that the Forest Service would conduct land and resource management activrties that were not inconsistent with the recommendations of the "Inter-agency Scientrfic Committee to Address the Conservation of the Northern Spotted Owl", pending (1) enactment of new legislation, (2) any applicable action by the Endangered Species Committee, (3) adoption of a recovery plan by the F&WS, or (4) the results of further consultation between the Forest Service and the F&WS

Since the above spotted owl actions came after the issuance of the Shasta-Trinity National Forests' 1990 Draft EIS and proposed Forest Plan, those documents did not address the changes that would occur to the range of management opportunities available In particular, the Inter-agency Scientrfic Committee recommended the establishment of habitat conservation areas (HCAs) which were not (and could not be) addressed by the 1990 documents. Therefore, those documents were withdrawn

In October of 1993 a new Draft EIS and proposed Forest Plan were published that incorporated concepts from both the ISC report and the Fish and Wildlife Service Draft Recovery Plan for the Northern Spotted Owl Just before the release of the Shasta-Trinity National Forests DEIS and proposed Forest Plan the President's Plan (Draft Supplemental EIS for the Late Successional Related Species within the range of the northern Spotted Owl) was released in July, 1993 The President's Plan was produced because of the Forest Conference in Portland, OR on April 2, 1993 Its goals are to develop and carry out an ecological approach to managing federal lands within the range of the northern spotted owl The plan adopted land allocations and standards and guidelines for the range of the spotted owl These allocations and standards will provide viability for the northern spotted owl, protect other old-growth dependent species and protect riparian values The President's Plan became final with the signing of the Record of Decision (ROD) on April 13, 1993

The President's Plan incorporated many concepts that were key components of the Shasta-Trinity Draft Forest Plan such as old-growth reserves, riparian standards, habltat connectivity and an ecosystem management approach This was not an accident because many concepts that formed the foundation for the Shasta-Trinity National Forests' Plan were also basic to the formulation of the President's Plan These previous analyses include the Inter-agency Scientific Committee Report (ISC), the Scientific Analysis Team Report (SAT), and the FWS Draft Recovery Plan. This revised Final EIS and Forest Plan incorporate all requirements of the President's Plan plus those allocations and S&G's from the Draft Forest Plan preferred alternative that were not superseded by the President's Plan

legislative Framework

B

In 1974 Congress responded to the need for coordinated. long-range planning of resource uses within the National Forests by enacting the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA) RPA was amended by the National Forest Management Act of 1976 (NFMA).

These acts require that comprehensive. long-range Forest Plans replace separate and often uncoordinated resource management plans that had tradrtionally been used on the National Forests

The National Environmental Policy Act of 1969 (NEPA) requires that Forests, before developing a completed Forest Plan, investigate and make public the following

1 alternative approaches which could be used in developing the Forest Plan,

2 the environment to be affected by that Plan, and

3 anticipated environmental consequences of the alternatives considered in detail

Addtionally, Council on Environmental Qualrty (CEQ) regulations. including the document format established in 40 Code of Federal Regulations (CFR) 1502 10, have been followed

C The Forest Plan

From among the four altemative management approaches described in the EIS, one is identified as the preferred alternative The preferred akemative is the basis for the companion document to this EIS--the Forest Plan The purpose of the Forest Plan is to provide for multiple use and sustained yield of goods and services wthin the context of protecting ecosystems for diversrty of habtats (terrestrial and aquatic) and viability for all species The Forest Plan will

1 establish Forest-wide multiple use goals and objectives, the objectives are both short-term (10 years) and long-range (50 years) projections,

2 establish Forest-wide standards and guidelines to fulfill NFMA requirements relating to future management activties.

3 designate management areas and establish direction applying to future management activities,

4 designate land suitabilty for all management activrties,

5 establish the types and levels of goods and services that might result from maintaining healthy ecosystems,

6 make non-wilderness multiple use allocations for those roadless areas released by the 1984 California Wilderness Act.

7 include monitoring and evaluation requirements,

8 guide the management of the Shasta-Tnnity National Forests for the next 10 to 15 years, and

9 allocate National Forest land to the combination of resource management activities for which it is most sutted

Upon its approval and application, the Forest Plan will

1 be revised at least every I5 years,

2 be reviewed every five years to determine the need for more frequent revision, and

3 be amended, as necessary, by means of the NEPA process

D Relationship with Past and Future Planning

When approved, the Forest Plan will also supersede the following individual plans now being used to manage the Shasta-Trinrty National Forests

1 Ranger District Multiple-Use Plans,

2 Timber Management Plan (1975), and

3 Unit Plans for

(a) Medicine Lake Highlands, and

(b) Upper Trinrty

In addition. the program direction and standards and guidelines from the following plans would be incorporated by reference and be brought into conformance wtth the Forest Plan, where necessary

1 Pacific Crest Trail Management Plan,

2 Management Plan for the Shasta and Trinity Units of the Whiskeytown-Shasta-Trinity National Recreation Area (NRA),

3 Off-Highway Vehicle (OHV) Management Plan,

4 Yolla Bolly-Middle Eel Wilderness Management Plan,

5 Forest Transportation Management Plans,

6. Land and Water Conservation Fund Plans, and the

7 South Fork Trinity River Wild and Scenic Management Plan

Besides superseding or incorporating existing plans, resource/implementation plans will be developed during the planning period (i e , Wild and Scenic River management plans, wilderness plans, Adaptive Management Area Plans) These special area management plans and implementation plans, intended for specific resources or programs, would rely on the Forest Plan for a broad "umbrella" of direction These plans would be in compliance with and incorporated into the Forest Plan as completed or form the basis for amending the Forest Plan

The Hierarchy of Forest Service Planning

E

The Forest Service has a three-level hierarchy of integrated land management planning. Individual Forest Plans are only one part *of* the general Forest Service planning effort

At the National level, and based on information received from nine Forest Sewice Regions nationwide, the RPA recommended program sets direction and estimates capacities for goods and services that might be available from the Regions

At the Regional level, a Regional Guide was developed to provide direction and establish Standards and Guidelines at the regional scale The 1984 Regional Guide for the Pacific Southwest Region (Region 5) covers I8 National Forest units that administer 20 million acres of public land This regional guide was amended on April I3, 1994 for those Forests in the range of the northern spotted owl, by the signing of the ROD that adopted new land allocations and standards and guidelines

At the Forest level, each Forest Plan validates or provides a basis for changing the allocations and Standards and Guidelines that are in the regional guide On-the-ground activities and projects carry out the direction and Desired Future Condition (DFC) described in the Forest Plan Local ecosystem assessment uses Forest Plan direction and its landscape level DFC as a basis for local ecosystem analyses This process allows "tiering" to the broader documents Incorporating the Forest Plan and Final EIS by reference also allows concentration on issues spectfic to smaller scale analysis. Similarly, the Forest Plan is tiered to the Pactfic Southwest Regional Guide, which is tiered to the National RPA Program (See Figure I-I)

The Planning Process

F

The Forest planning process, as specified in the NFMA uses an interdisciplinary approach that, with public participation, considers economic, social, and environmental impacts The planning process includes the following steps.

I identification of public issues,

2. development of planning criteria,

3 inventory of data and collection of information.

4 analysis of the management situation,

5 formulation of alternatives,

6 estimated effects of alternatives,

7 evaluation of alternatives,

8 selection of a preferred alternative,

9 plan approval by the Regional Forester,

I0 plan implementation, and

I I monitoring and evaluation

This EIS presents the results of planning steps one through eight

Public comments in response to the proposed Shasta-Trinity Forest Plan and the President's Plan were considered in developing this Final EIS and Forest Plan The selection of a Final Forest Plan will be made by the Regional Forester who is the responsible official for this action That decision will be documented in a Record of Decision that will be available to the public

The public may review the planning records (files containing details of the planning process) at the headquarters of the Shasta-Trinity National Forests, 2400 Washington Avenue, Redding, California These records are generally incorporated by reference here and are specifically referenced at several points throughout the EIS and Forest Plan

Figure I-1
Hierarchy of land Management Planning in the National Forest System

National Direction
(Goals and Objectives)

Forest and Rangeland Renewable Resource Planning Act (RPA) 1990

National Forest Management Act (NFMA) 1976

Regional Direction
(Goals and Objectives)

Regional Guide

Forest Direction
(Goals and Objectives)

Site-Specific Projects

National Forest Land and Resources Management Plan

This EIS is a long and complex document For ease in understanding some of the technical words or phrases used refer to the Glossary in Chapter VIII Additionally, the appendices are included to help gain an understanding of the background, analysis, options, and intent of the EIS

G Relationship with Ecosystem Management

Rapidly changing and competing demands are being placed upon the economic, social, and environmental values of the National Forests. In response to these demands the Forest Service has adopted an ecological approach to management While Ecosystem Management embraces a wide array of concepts, philosophies, and management techniques, it can best be descnbed as looking at the whole rather than the parts, providing for sustainable ecosystems at all scales, and building new partnerships that will work together for land stewardship, regardless of ownership

Looking at the whole means all resource specialists and/or scientists are looking at the landscape together, not independently It means going beyond understanding how the present condition or desired future condition (DFC) might impact the specialists biotic or abiotic resource, but integrating the requirements for all resources to establish a DFC that provides the best overall balance It's ultimately not single species management but viable ecosystem management Often that balance is best met by adopting DFC's that are within the range of natural vanability and encourage the protection and/or enhancement of natural vegetation types, but there will be instances where the DFC is skewed by social needs

Sustaining ecosystems at all scales recognizes the need to do analysis within appropriate boundanes for the issues/concerns to be addressed There are 4 general scales that ecosystem analysis will address, regional, provincial, watershed, and site Analysis is not limited by those boundaries but will extend to the range of the resource being addressed. *An* example is any analysis done within a watershed that has stocks at risk would as a minimum examine the entire range of that stock The role of the particular watershed as it fits into the larger basin would be an important outcome of the analysis

Developing new partnerships will be a major component of Ecosystem Management Future management will look at all lands within a watershed and prescribe treatments with other owners that are complimentary and result in viable ecosystems across ownerships Future management will also result in land management and regulatory agencies working together from the outset as opposed to land management agencies proposing and regulatory agencies reacting to finished analysis

Ecosystem Management has been woven into the Forest Plan for the Shasta-Tnnity National Forests The three facets of Ecosystem Management, as descnbed above, would be incorporated into the management direction provided by the Forest Plan. Throughout ts implementation, the Forest Plan will chart the course for Ecosystem Management and through monitoring and adaptive management will be amended to reflect new understandings that emerge

H Forest location

The Shasta-Tnnity National Forests lie within portions of Humboldt, Modoc, Shasta, Siskiyou, Tehama, and Tnnity Counties in Northern California Principal communities within the influence of the Shasta-Trinity National Forests include, Hayfork, Lewiston, Mt Shasta, McCloud, the greater Redding area, and Weaverville (See **Figure 1-2)** The largest is the city of Redding with a population of about 70,000 residents

The Shasta-Trinity National Forests are divided into seven Ranger Districts where on-the-ground management is delegated to a District Ranger. The Mt Shasta, McCloud, and Shasta Lake Ranger Districts are on the Shasta Forest The four Ranger Districts on the Trinity Forest are Big Bar, Hayfork, Weaverville, and Yolla Bolla

Interstate 5 (the major north-south freeway on the West Coast) and State Highway 299 (the major east-west route across Northern California) enhances visitor access to an area rich in recreation opportunities Mt Shasta, Shasta Lake, Clair Engle (Trinity) Lake, and the Trinity Alps and Yolla Bolly-Middle Eel Wildernesses are the most popular recreation destinations on the Forests

The administrative unit covered by the Forest Plan (the planning area) encompasses approximately 2 8 million acres. Excluding privately owned and other non-National Forest lands, more than 2 I million acres remain (see **Table I-I**). This area excludes approximately *89,000* acres of the Shasta National Forest which are administered by the Lassen National Forest (The Shasta and Trinity National Forests were proclaimed separately by Congress, but they were combined into one administrative unit in 1954)

Scope of Public Issues Addressed

The scoping process results in the identification of public issues which are related to the management of the National Forest. Public issues indicate the scope and nature of the analysis needed for the Draft EIS, and they act as blueprints in the structuring of alternatives. The issues represent important reasons for considering changes in management direction. They are instrumental in formulating alternatives and in understanding the consequences of implementing any one of the alternatives.

The scoping process first began in *1979* when the Forest Service asked the public to submit issues to be addressed in the Draft EIS for the Shasta-Trinity National Forests' proposed Forest Plan. Three-hundred thirty (330) pieces of correspondence, containing about *2,000* comments, were received. These comments were sorted, classified, screened, and analyzed. This process insured that the planning effort focused directly on those major public issues which will determine future uses of the Shasta-Trinty National Forests' land and resources. Ultimately, *25* public issues emerged.

Subsequent to the initial scoping that took place in 1979, a Draft EIS and proposed Forest Plan were published and made available to the public; these documents were released on August 16, 1986. Although the Draft EIS and proposed Forest Plan were later withdrawn by the Regional Forester, the public comment period was completed, and more than 1,300 responses were received. A summary of the content analysis process was developed and made available to the public in May, 1987. This phase of the scoping process lead to the identification of 30 public issues.

A second Draft EIS and proposed Forest Plan were published and distributed to the public on February *27*, 1990. When the public comment period was completed, over 1,500 letters or postcards had been received. However, for reasons previously described in this chapter, this Draft EIS and proposed Forest Plan were later withdrawn. All of the public comments were analyzed and used to revise the 21 issues to those found in the DEIS. Some of the public issues that were previously identified did not warrant further consideration; they were either dropped or combined with other issues. In response to the 1993 DEIS over 400 letters were received. Even though the decision for establishment of the Mount Shasta Ski Area will be decided in another document and the religious and cultural significance of Mount Shasta was determined through another process, there was concern over the "Mt. Shasta" being dropped as an issue. The land allocation and use of Mt. Shasta is returned as an issue in this document.

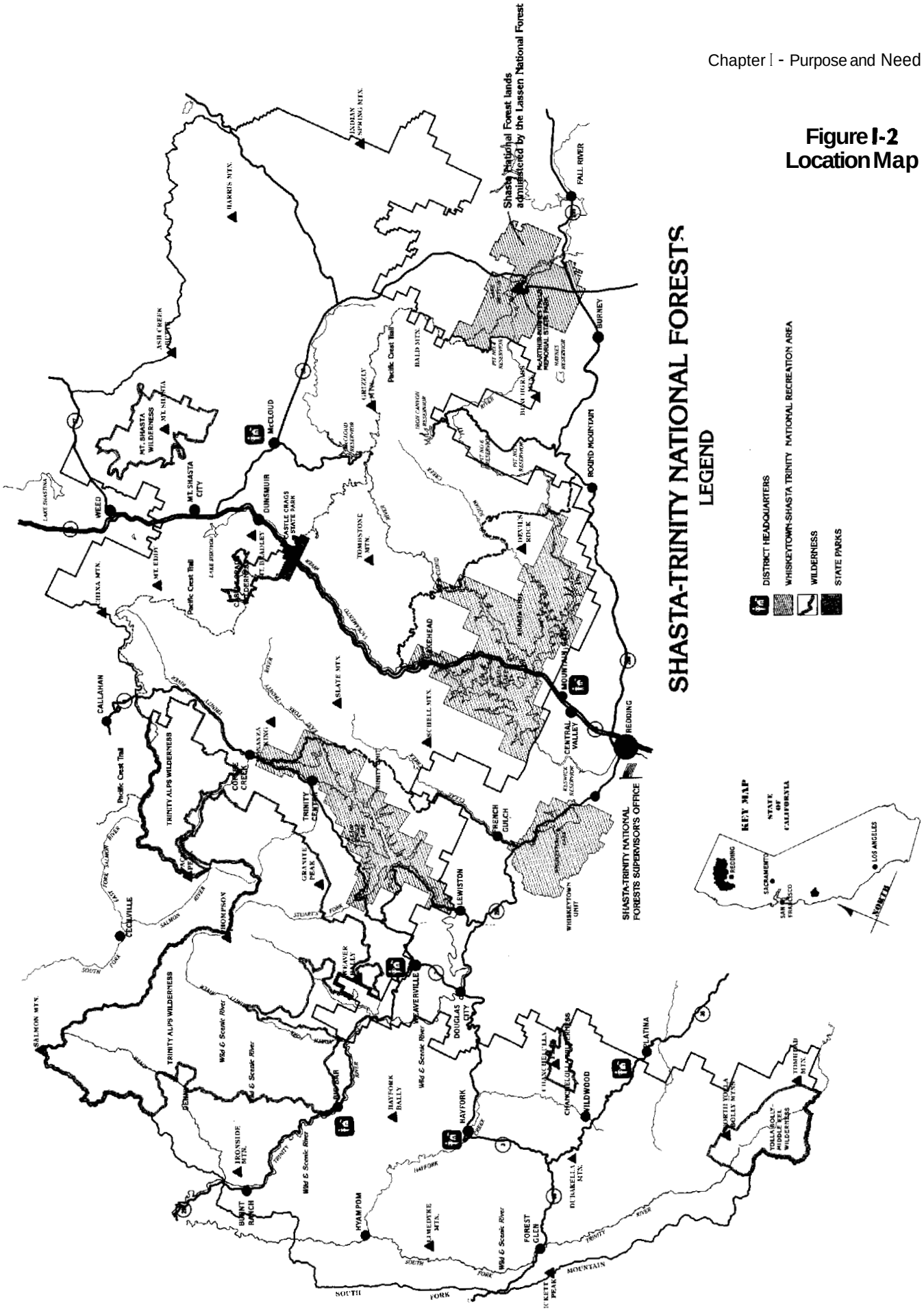
A complete listing of the public comments received on the DEIS and their disposition can be found in Appendix K. Following is a list of the public issues addressed in this EIS.

Table I-1
Shasta-Trinity National Forests
Net Acreage by County
(as of September 1991)

County	Shasta NF	Trinity NF	Shasta-Trinity NF	Percent of Net Shasta-Trinity Acres in the County
Humboldt	0	2,465	2,465	<1
Shasta	407,864	31,918	439,782	21
Siskiyou	431,745	0	431,745	20
Tehama	0	76,947	76,947	4
Trinity	228,751	941,857	1,170,608	55
TOTAL	1,068,360	1,053,187	*2,121,547	100

* Acreages do not include approximately 89,000 acres administered by the Lassen National Forest. This figure includes all of the Shasta-Trinity National Forests' land that is within Modoc County.

Figure I-2
Location Map



Public Issues

Heritage Resources

Issue #I- How should the Forests effectively provide identification, protection, and interpretation of archaeological, historical, and religious sites?

Many tradrtional Indian religious sites/areas or practices, such as the gathenng of religious matenals, involve National Forest lands In addrtion, there are numerous archaeological and histoncal values on these lands

Biological Diversity

Issue #2- How should the Forests' vegetative resources be managed for ecosystem diversity? Special consideration would be given to providing habitats that maintain or enhance populations of threatened and endangered (T&E) species and viable populations of sensitive species and/or management indicators.

There is public concem that a wide vanety of ecosystems should be maintained on the Forests to specrfically prowde for the

1 maintenance and/or enhancement of habrtats for Federally listed T&E species (plants and animals),

2 mamtenance and/or enhancement of habrtats sufficient to prowde for viable populations of all other existing species (plants and animals),

3 maintenance and/or enhancement of the Forests' ecosystems and the biodiversity (plants and animals) associated wrth them, and

4 mamtenance and/or enhancement of special elements or components of these ecosystems (i e., snags, down logs, cliffs, vegetative seral stages, etc)

Issue #3- How much of the older vegetative seral stages existing on the forests should be retained?

There is public concern that sufficient amounts of old growth habtats be retained and/or enhanced on the Forests to provide for the.

1 viability of all species (plants and animals) requinng this type of habitat for all or part of their life cycle; and

2 sufficient representation and retention of this ecosystem component for the sake of maintaining vegetatwe biodiversity.

Facilities

Issue #4- How many miles of additional roads are needed and to what standard should they be constructed and maintained in order to meet future needs?

Roads create impacts directly on the landscape and indirectly on other resources by making access easier for users. At issue is the amount of addrtional roading needed and to what standard they should be maintained. *Also* of concem is whether or not the roads should remain open to public use.

Fire and Fuels

Issue #5- To what extent should prescribed burning be used as a way to reduce fuel hazards, prepare sites for reforestation, and improve wildlife habitat?

'rescribed burning is the intentional burning of a predetermined area for planned objectwes. At issue is the Forest Service's ability to balance beneficial uses of prescnbed fire with the negative consequences of burning, such as smoke, energy waste, loss of soil protection, and modification of wildlfe habrtat

Fisheries/Water

Issue #6- How should watersheds be managed to maintain or enhance water quality and fisheries?

The Shasta-Trinity National Forests contain the headwaters of two important watersheds in the State. the Sacramento and Tnnty Rivers. These watersheds provide high qualty water that has a broad vanety of uses, including

that of supporting an important anadromous fishery (salmon and steelhead).

Human and Community Development

Issue #7- What activities and outputs should be provided to maintain community stability?

For most small communties stability is largely a matter of economics. Forest activties affect local economies in several ways. (1) jobs are created from Forest resources, primarily timber harvesting; and (2) payments of Forest Service shared receipts help build roads and support local schools.

Minerals

Issue #8- How can mineral development and exploration be encouraged while minimizing adverse impacts to non-mineral surface resources?

Concern exists that minerals and energy development is not being recognized as avalid use of National Forest land,

Range

Issue #9- Is livestock grazing an appropriate use of wilderness? If so, how should conflicts be minimized between livestock use and recreationists?

There is concern that livestock grazing can degrade the attributes with primtive recreation within Wilderness.

ISSUE **#10-** How should liwstock grazing be managed to minimize degradation of riparian areas?

There is concern that livestock grazing in ripanan areas diminishes vegetation, breaks down stream banks, and adversely affects fish and wildllfe habtat, **as** well **as** water qualrty.

RECREATION

Issue #11- How much of the Forests should be open, closed, or restricted to off-highway vehicle **(OHV)** use?

Concern exists that OHV use can cause damage to other resources, such as soils and wildlife. The use of OHVs has increased while the lands open to this use have diminished. Conflicts can also occur between OHV users and other recreationists.

Issue #12- How should the Forests supply water-oriented recreation facilities and opportunities ***to*** meet increasing demand?

There is a statewide public need for addtional water-oriented recreation activrties. The Forests have the potential to supply most forms of water-oriented recreation However, the current supply of support facilities will not meet estimated demand Conflicts are occurring between different types of use

Riparian Areas

Issue **#13-** How wide should riparian management zones **(RMZs)** be and what management activities should be allowed within them?

Forest management activities have the potential to affect water quality and the fisheries resource on the Forests. Timber harvesting, prescribed burning, and road construction near streamcourses are of particular concern to nany people, because these activities have a potential for degrading water qualrty and fisheries habtat

Special Areas

ISSUE **#14-** What areas should be recommended for Research Natural Area (RNA) and Special Interest Area (SIA) establishment?

This issue relates to the number, size, and location of RNAs to be recommended for establishment on the Forests RNAs are established (1) to contribute to the preservation of examples of all signlficant natural ecosystems for purposes of research and ecological study, (2) to provide gene pools, and, (3) where appropriate, to protect habitats of T&E and sensitive species of plants and animals

This issue also relates to SIAs. The objectives of establishing SIAs are. (1) to protect, and, where appropriate, foster public use and enjoyment of areas with scenic, historical, geological, botanical, zoological, palentological, or other special characteristics, and (2) to classify areas that possess unusual recreation and scientific values so that

these special values are available for public study, use, or enjoyment

Timber

Issue #15- Should herbicides be used to control vegetation in order to meet timber management objectives?

There has been growing controversy regarding the use of chemicals. particularly herbicides, for the control of undesirable vegetation in forest plantations At issue over the use of herbicides is the effects of herbicides on human health, domestic animals, fish and wildlife. the cost and effectiveness of herbicides as compared to other vegetative control treatments, the need to maintain timber growth and water quality, and the registration of chemicals

Issue #16- What should the timber harvest level or allowable sale quantity (ASQ) be?

Public opinion is sharply divided on the question of timber harvests Many people feel that timber harvesting should be increased, others feel that the Forests are being overcut to the detriment of other resources

Issue #17- What silvicultural practices should be used to assure reasonably successful reforestation of harvested lands and to maintain tree species diversity?

There is concern over the success of the Forests' reforestation program, particularly on the areas that were previously clearcut There is also concern that the conversion of some nontimber growing areas (i e , brushfields) to forest plantations reduces deer habitat, resulting in lower deer populations Public concern has also been expressed over reforesting plantations wrth a single species of trees

Issue #18- What harvest methods, including clearcutting, should be used to meet management objectives?

Public concern over the practice of clearcutting has occurred mainly because of the appearance of the clearcut, the effects on water quality, and the possibility of herbicide use to reestablish new stands

Visual Quality

Issue #19- How and where should visual quality be protected and enhanced?

Visual effects of management practices have become more apparent in recent years There is public concern that scenic quality has declined overall and that certain silvicultural practices and road building adivrties have contributed to this decline There is also concern that visual quality does not receive adequate emphasis This is most notable along sensitive travel corridon Gthen feel that visual resource practices are too restrictive on management activities, particularly timber harvesting and mining

Wild and Scenic Rivers

Issue #20- What river segments should be recommended for inclusion in the Federal Wild and Scenic Rivers System?

Portions of the New River, the North Fork and South Fork of the Tnnity River, and the Trinity River were added to the National Wild and Scenic Rivers System in 1981 Several other major riven and streams on the Forests have the potential for Wild and Scenic River designation This designation would maintain examples of pnstine aquatic and riparian ecosystems and provide river-oriented recreational opportunities There is concern that designation would restrict other management activities, such as timber harvesting, and adversely affect pnvate inholdings

For those rivers that have a high percentage *of* private lands there is concern by private landownen (especially along the McCloud River) that access and land use would be restricted

Wilderness and Roadless Areas

Issue #21- How should the Forests' roadless areas be managed, including the Mt. Eddy further planning area?

Approximately 498,776 acres, or 24 percent of the Shasta-Trinity National Forests, are designated in five Wildernesses One roadless area, Mt Eddy, was designated for further planning and is evaluated for wilderness designation as part of the Forests' planning process The 1984 Calrfornia Wilderness Act stated that those roadless areas, not designated as either wilderness or further planning, be

managed for multiple-use purposes, and that they be reviewed again for the wilderness option when the Forest Plan is revised in 10-15 yean At issue are management activities that would occur in some of the undesignated roadless areas between now and the next revision of the Forest Plan

Issue #22 To what extent should Mt. Shasta be allocated to prescriptions that would occur or encourage downhill skiing or other management activities that might conflict with the wilderness or cultural resource values in the area?

Over the past 15 yean, since the demise of the old Mt Shasta Ski Area many events have occurred that will *effect* the long term management of Mt Shasta Those events include the creation of the Mt Shasta Wilderness area, and the recognition of the Cultural and Native American values of Mt Shasta At issue is what kinds of activrties should be allowed in the Mt Shasta area and where can they occur

Again, it should be noted that these issues are important considerations in the development of the alternatives in the FEIS and the Forest Plan

Chapter 1

Alternatives Including the Preferred Alternative

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CHAPTER II
Alternatives Including The Preferred Alternative

Introduction
A

This chapter describes the alternatives and benchmarks examined during the land management planning process The major topics discussed include,

1 **Alternative Development Process -** This section describes an alternative, discusses the regulations applicable to the development of alternatives, describes how Forest alternatives were developed: and discusses the range of altematives and factors that limit the range,

2 **Benchmarks -** Describes the purpose and function of benchmarks and gives the analysis and conclusions for each,

3 **Alternatives Considered But Eliminated From Detailed Study -** Describes the alternatives eliminated and the rationale for dropping them,

4 **Alternatives Considered in Detail -** Describes and compares each of the alternatives and discusses management direction common to all alternatives

Alternative Development Process
B

Description of an Alternative

An alternative is a set of goals and objectives that is centered around a specific theme This theme guides the management of forest resources from the current condition to a desired future state

Alternatives constitute a major part of the environmental analysis process described in the National Environmental Policy Act of 1969 (NEPA) regulations The proposed action, various alternatives, and "no action" are considered in comparative form to sharply define the issues and provide a clear basis for choice to the decision maker and the public. NEPA regulations also require that the alternatives eliminated from detailed study be identified and discussed

The National Forest Management Act of I976 (NFMA) regulations specify that the primary goal in formulating alternatives, in addition to NEPA compliance, is to "Provide an adequate basis for identifying the alternative that comes nearest to maximizing net public benefits " Net public benefits are the overall long term value to the Nation of all outputs and positive effects (benefits) less all associated inputs and negative effects (costs) whether they can be quantitatively valued or not See Appendix D for further details

NFMA regulations also state that a reasonable range of alternatives should be formulated with the goal of achieving multiple use objectives In particular, the alternatives should meet the following criteria.

1 Each alternative would be capable of being achieved,

2 An alternative would be formulated showing the most likely condition expected to exist if current management direction continued,

3 Each alternative would provide for the orderly elimination of backlog areas needing treatment for restoration of renewable resources as necessary;

4 Each identified major public issue would be addressed in one or more of the alternatives, and

5 Each alternative would present, to the extent practicable, the most economically efficient combination of management practices that can meet the objectives established The measure of cost efficiency is Present Net Value (PNV)

Additionally, each alternative is to state the conditions and uses that would result, the goods and services to be produced, the resource management standards and guidelines to be followed, and the purposes of the management direction proposed

The alternatives described in this chapter are based on management themes A set of management prescriptions is then applied to specific areas of land in a unique combination that is guided by the alternative theme

A management prescription is a set of practices used to manipulate certain lands and resources for a particular

purpose, such as timber production, recreation, or wildlie

The number of altematives for managing over 2 1 million acres of National Forest land wrth the diversity of the Shasta-Trinty National Forests could be limitless Therefore, the ultimate choice of which alternatives to present must be based on some type of systematic approach This approach is discussed below

Description of the Process Used to Develop Alternatives

The formulation of alternatives is the culmination of five steps in the NFMA planning process The following summarizes how these steps were accomplished A more detailed discussion of these actions. particularly those related to FORPLAN (a linear programming model), can be found in Appendix B

1 Major public issues were identrfied through public involvement efforts Management concerns, originating from wtthin the Forest Service organization, were added to the public issues (refer to Appendix A) Public issues, management concerns, and resource opportunities were then consolidated into a series of issue statements (refer to Chapter I) The issues developed during the initial public involvement effort were modified as a result of public comments received on the previous Draft Environmental Impact Statement (Draft EIS) That document was wrthdrawn in 1986 Management concerns were either dropped or elevated to public issues depending on the comments received A subsequent Draft EIS was issued in February 1990 Although that draft was not followed by a Final EIS, the public comments received were used to further refine the issues addressed in the 1993 DEIS The issues addressed in this FEIS reflect further modification In response to public comment to the 1993 DEIS

2 In order to respond to the issue statements a set of 1 1 Management Prescriptions was developed These prescriptions contain 'emphasized' and 'permitted' practices (See Chapter 4 of the Forest Plan) A suitability analysis, using resource suitabilty models, was then conducted to determine which activities were feasible on specific units of land This analysis also identified the best resource opportunities for applying the prescnptions depending on the theme of an alternative

3 To match the needs of the public, as evidenced by the public issues, and the capabilty of the Shasta-Trinty National Forests to respond to these needs, geographically distinct capability areas were developed

4 The capabilrty areas were then combined into analysis areas based on commonalty of physical attributes. suitability, productivty, and public issues

These analysis areas formed the basis for putting information into FORPLAN This linear programming model was used to allocate prescriptions and schedule outputs over time

5 For each FORPLAN analysis area a tange of sutable FORPLAN prescnptions was identrfied Following this the costs and outputs associated wtth applying vanous FORPLAN prescriptions to the analysis areas were calculated

6 The next series of tasks was related to the objective of analyzing the management situation on the Forests from the standpoint of minimum and maximum supply potentials, resource condttions, resource opportunities. demand projections, and needed changes in management direction Both FORPLAN and the Forests' Data Base were useful in establishing the boundanes wtthin which a range of feasible alternatives could be developed These minimum and maximum supply potentials were used as benchmarks (see Benchmarks in Section C of this chapter) during the analysis process

To document this analysis, a series of papers was prepared These papers constitute the Shasta-Trinty National Forests' Analysis of the Management Sttuation (AMS), which resulted in the Affected Environment (see Chapter III)

7 The final phases of the alternative development process involved the development of a set of economically efficient altematives within the feasible range defined by the benchmark To meet this objective, the following tasks were carried out

(a) A Forest Interdisciplinary (ID) Team developed a set of alternative themes and emphasis statements in response to NFMA regulations, Forest and Rangeland Renewable Resources Planning Act (RPA) direction, regional direction. public issues, and Forest capabilties

(b) FORPLAN was then used to determine the most cost efficient mix of prescriptions for each alternative Minimum management requirements (MMRs), and minimum implementation requirements (MIRs) were incorporated into FORPLAN as restrictions in all alternatives The ID Team added other restrictions to the FORPLAN model based on the unique resource emphasis of each alternative These additional constraints, and the rationale for each, are discussed in Appendix B

(c) FORPLAN then selected prescriptions to be applied to each analysis area based on PNV and other objectives Periodic check; were performed using the Forests' Data Base and the suitability models developed earlier to ensure that the FORPLAN solutions were spatially logical and implementable on the ground Where necessary, the ID Team adjusted the FORPLAN restrictions to produce a feasible schedule of outputs and prescriptions within the theme of the alternatives

8 The Forests' management team divided the Forests into 22 Management Areas and assigned management prescriptions to each These management prescriptions are consistent with the FORPLAN solution

9 Lastly, the alternatives were compared in terms of PNV, output levels, *effects,* and response to public issues This information presented the Forest Supervisor with the facts necessary to recommend a preferred alternative to the Regional Forester The preferred alternative is presented as one of the alternatives in this document

Characteristics Which Limit the Range of Alternatives

The range of alternatives considered on the Shasta-Trinity National Forests is limited by physiographic/topographic and poltical factors These limitations are

1 **Classified Areas:** The Castle Crags, Chanchelulla, Mt Shasta, Trinity Alps, and Yolla-Bolly Middle Eel Wildernesses, totalling 498,776 acres (about *24* percent of the Forests), will not be subject to re-evaluation or change as a result of this planning The classified Wild and Scenic Rivers fall into this category as well as 106 4 miles of the Trinity River system The Shasta Mud Flow Research Natural Area, containing 3,115 acres, is also in this category

2 **National Recreation Areas:** The Shasta Unit (of the Whiskeytown-Shasta-Trinity National Recreation Area [NRA]) containing 115, 138 acres, and the Trinity Unit, containing 60,145 acres, are both restricted as to the type and intensity of management that may take place For instance, regulated timber harvest is prohibited in the Shasta Unit and sharply restricted in the Tnnity Unit

3 **Released Roadless Areas:** By law, wilderness is not an option to be considered for the 29 released roadless areas on the Forests during this planning cycle

4 **Physical Factors:** About 49 percent of the Forests' land base is not suitable or available for timber production Only 30 percent of the Trinity National Forest and 40 percent of the Shasta National Forest contain lands with less than 40 percent slopes Management activities are limited on slopes in excess of 40 percent Nearly 6 percent of the Forests' most productive growing sites are on highly unstable landscapes which severely restrict management options

5 **Threatened and Endangered Species** Approximately 500,000 acres of land formally considered suitable for timber harvest are unavailable for timber harvest This land is allocated to Threatened and Endangered Species and late-successional dependent species

Establishing a Range of Alternatives

Through the development of benchmark it was possible to analyze a broad range of reasonable alternatives for each resource or combination of resources This includes a minimum management level benchmark at the lower bounds and a series of single resource emphasis benchmarks at the upper bounds Factors which demonstrate that a broad range of alternatives has been considered in this document include

1 The range of alternatives is well distributed between the minimum level benchmark and the maximum single resource benchmark;,

2 All of the public issue statements are addressed by one or more alternatives,

3 A wide variety of prescriptions is applied to the available land base in the various alternatives **Table 11-14** shows the allocation of prescriptions among the alternatives,

4 Various resources show a wide range of outputs between alternatives. For instance, the allowable sale quantrty (ASQ) in the Ist decade ranges from a low of 65 3 million board feet (MMBF) to a high of I I 2 4 MMBF; The range of dfierent resource outputs and allocations is demonstrated in **Table 11-16** and **Table 11-27**

Benchmarks

C

Benchmarks exhibit the following characteristics:

- They display physical, ecological, and technical capabilities,
- they are not limited by Forest Service policy or budget, discretionary constraints, spatial feasibility, or program and staffing requirements,
- they are physically and technically, but not necessanly operationally, implementable,
- they are not alternatives in the sense of providing a total integrated program of management

The purposes *of* benchmarks are:

- To provide a reference point for comparing alternatives,
- to provide an analytical base for the development of alternatives,
- to explore the resource potential and current resource condition, and
- to display the need for change and the decision space within which change can occur

Conclusions Reached From Study and Analysis *of* Benchmarks

Following are the basic descriptions often benchmarks and the significant findings that were learned from each. Selected outputs from the benchmarks are displayed in **Table II-I** A more complete discussion of how each benchmark was modeled is contained in Appendix B

FLW - Maximum Present Net Value (PNV) with Flow and long-Term Sustained Yield (LTSY) Constraints Benchmark. This benchmark demonstrates the most economically efficient level of resources that can be produced with only those constraints applied that assure technical feasibility Minimum Management Requirements (MMRs) are not applied to this benchmark Therefore, it is also used as the basis for evaluating the effect of MMRs on PNV The objective function of the FLW benchmark is to maximize PNV

Although this benchmark produces the greatest PNV possible from the Forests, it does not fully address the issues and legal requirements associated with water quality and wildlife diversity Conditions would fall below those needed to maintain viable populations of some wildlife species, and thresholds of concern would be exceeded from a water quality standpoint. In addition, FLW does not fully respond to issues or concerns related to visual quality maintenance and enhancement

The FLW benchmark established a maximum physical and biological capacity of 6 I 0 MMBF per year in the Ist decade for timber outputs but timber outputs would reduce to 3 I 9 MMBF by the 5th decade and continue to be reduced in the following decades due to declining inventory This high rate of timber harvesting was the mqor factor in generating the highest water yield of any benchmark This benchmark, therefore, established the maximum capacity for water yield for the Forests Recreational demands were also met. Under FLW grazing outputs would increase to 67,000 animal months (AMs) per year, a result of special management and type conversion from brush to grass through fire and seeding

Late seral stage wildlife habitats on suitable timber lands would be deficient for wildlife needs because of intensive stocking control on recently harvested areas and a more rapid removal of mature timber stands Viability for threatened and endangered (T&E) species would not be maintained, and the viability of species associated with large blocks of older over-mature timber could not be assured. Deer numbers are the highest of any benchmark because of the large amount of early seral stages created and the amount of direct habitat improvement initiated

HZO - Water Yield Maximization Benchmark. The objective of this analysis was to define the maximum capability of the Forests to provide water over the I990 RPA planning penod, subject to MMRs and maximization of PNV This benchmark was useful in identifying the maximum capabilities of water yield on the Forests obtained by timber harvest and conversion of brush to grass It also showed that total water yields could be increased only slightly from naturally occurring levels Achieving the maximum water yield caused an increase in PNV compared to the MMR benchmark (descnbed below)

The H20 benchmark addressed most market related issues but failed to adequately address non-market values, especially visual quality

Timber outputs would be lower than under the MMR benchmark Water quality outputs in the form of equivalent roaded acres (ERAs) exhibit the same characteristics found in the MMR analysis. Range outputs are similar to the RGN benchmark (below) as a result of the early seral stage emphasis Wildlife outputs are not measurably different from all other benchmarks except FLW, because MMRs result in the allocation of a large

portion of the land base to prescnptions that minimally disturb the landscape

MKV - Maximum PNV-Market Values Only Benchmark. The objectives of this benchmark were (l) to display the outputs and costs which would result from maximizing the PNV of outputs having market prices, and (2) to provide the relative proportion in PNV between market and assigned (or non-market) outputs when compared wrth the MMR benchmark analysis Only timber, grazing, developed recreation, and anadromous fish production are valued

This benchmark best responds to issues relating to the production of market outputs and services It does not fully deal with issues related to non-market benefits such as dispened recreation, wilderness opportunties, and maintenance and enhancement of visual quality objectives Results of this analysis, and companson wth the MMR benchmark, indicated that timber outputs for the tint 5 decades averaged three percent lower than MMR timber outputs

Average recreation visitor day (RVD) outputs would be lower than the outputs from the MMR benchmark, because only developed recreation was valued Likewise. wildlie user days (WUDs) were lower because only induced outputs for wildlife were counted

MLV - Minimum Level of Management Benchmark. The minimum level benchmark shows the unavoidable costs and benefits of public ownership of the Forests It establishes a basis for comparing controllable outputs and discretionary costs and benefits of the various alternatives Management adivities are limited to those needed to protect life, health, and safety, to prevent environmental damage, and to manage unavoidable land uses Production activities, such as timber harvest, developed recreation, and livestock grazing are not included The objective function is to minimize costs

While minimum level management can be achieved with a significant decrease in costs, it also has a signlficant decrease in PNV PNV is the lowest of any benchmark Minimum level management does not conform to existing legislation governing management of the Forests nor does it satisfactorily address Forest issues The largest portion of the cost included in MLV is associated wrth fire protection and suppression

MMR - Minimum Management Requirements Benchmark. This benchmark, when compared to the FLW benchmark, illustrates the opportunity costs involved in collectively meeting MMRs MMRs are basic resource protection requirements attributable to laws and regulations which are beyond the Forest Service's abilky to change It also forms the basis for evaluating alternative requirements in addtion to the MMRs The objective function is to maximize PNV

This benchmark fully addresses the issues and concerns relating to economic levels of all priced outputs and associated consequences It also responds to issues relating to maintaining water qualtty, vegetative diversity, and viable populations of wildlie species It does not fully respond to non-priced benefts such as visual qualtty, riparian area management, and semi-primtive recreabon

A series of analyses was performed in conjunction with this benchmark to show the marginal effects and costs of each of the major MMRs The following elements of the MMR benchmark were individually examined in a series of sensitivity analyses.

- Non-declining yield policies (analysis),
- viable population-diventty requirements (focusing on spotted owl requirements),
- water quality/cumulative watershed impact requirements,
- threatened and endangered species requirements.
- dispersion requirements, and
- perennial riparian area management requirements

The conclusions reached after analyzing each of the above sensitivity analyses are discussed later in this chapter

A timber output of 134 MMBF was achieved under benchmark MMR in the lst decade, which equates to a decrease of 78 percent from FLW in the lst decade Timber outputs average three percent higher than the MKV benchmark for the 5 decades analyzed

All recreational demands were met

Forage outputs under this benchmark reached 34,000 AMs annually in the first decade Fewer acres were converted from brush to grass than was the case under FLW

Late seral stage wildlife habitats on tentatively surtable timber lands are reduced but increase on the Forest as a whole Viability for all species would be maintained Enhancement of T&E and selected sensrtive species habitats would occur

NON - Maximum Non-Wilderness Benchmark. This benchmark was not analyzed The MMR analysis did not allocate the Mt Eddy area to Wilderness, and, therefore, this analysis was not necessary to determine effects Results and findings are the same as shown for the MMR benchmark

RGN- Range Maximization Benchmark. The intent of this analysis was to define the maximum capabilty of the Forests to provide commercial livestock grazing over the next 50 years, subject only to MMRs The objective function of this benchmark is to maximize livestock forage Few issues, if any, were satisfied by this benchmark, especially those related to non-market benefits

All areas with suitable forage and available for livestock production were included in this analysis Maximizing the range resource shows that a 5-decade average of 39,200 AMs/year is possible This compares to only 33,800 AMs/year in the MMR benchmark A lower proportion of timber lands is intensively managed for timber This is due to non-release in regenerated timber stands in order to provide additional forage, resulting in timber outputs 9 percent lower than the outputs from the MMR benchmark in the first 2 decades Cumulative watershed impacts were not measurably different from MMR

Because of extensive conversion of vegetation types to more flammable fuel types, burned acres would be higher than MMR

Wildlife outputs would be similar to MMR because of the dominant restrictive effect MMRs have on potential activties allowed on the overall land base.

TBD - Maximize Timber Outputs for One Decade-Departure Benchmark. The purpose of this benchmark was to establish the maximum timber output which could be attained in the first decade subject to MMRs with the non-declining yield policy removed

This benchmark did not adequately respond to the Forests' issues, from the standpoint of economic stability to the timber industry-dependent communrties, nor did it respond to non-market related issues

Benchmark TBD fully responded to the timber-related issues only in the short term (i e., the 1st decade of the planning period) First decade harvest was 165 MMBF, 19 MMBF higher than the TBR benchmark (below) However, over the 5 decade period timber harvest was 14 MMBF less Other outputs and *effects* of TBD were similar to TBR

TBR - Maximize Timber Outputs Benchmark. A major purpose of this analysis was to establish the maximum production levels in timber harvesting subject to timber policy constraints, MMRs, and economic efficiency The objective function of this benchmark was to maximize timber in the first decade.

This analysis adequately addressed the timber harvesting-related issues The benchmark did not fully address non-timber related issues

When companng this analysis with the MMR analysis, timber volumes harvested were 9 percent higher with a one percent decrease in PNV However, the 146 MMBF would cause an increase in cumulative watershed impacts (as displayed through the ERA outputs) This increase in watershed disturbance would also impact the fisheries programs and create the need for increased habtat improvement work in order to meet future demands for both anadromous and inland fisheries This benchmark would not respond to non-priced benefts such as visual quality, and riparian area management as well as the MMR benchmark

Range outputs are similar to the MMR benchmark Wildlife outputs are similar to MMR as well as the other benchmarks with the exception of FLW

WLN - Maximum Wilderness Benchmark. The purpose of this analysis was to evaluate the impacts of assigning all further planning areas to wilderness The Mt Eddy area, containing 7,720 acres, is the only further planning area on the Forests Because of the small amount of suitable land within the Mt Eddy area, placing it in wilderness results in a slight decrease in timber outputs compared to the MMR benchmark All other outputs remain about the same

This benchmark specifically deals with the issue concerning the designation and management of wilderness on the Forests It does not fully address issues related to visual quality and semi-primitive recreation

Conclusions About Resource Interactions and Capabilities Under the Benchmark Analysis.

General. The maximum resource potential for timber, range, and water indicates the upper production limits possible for resource management, but they are unrealistic to achieve because of high costs, lower PNV, or unacceptable trade-offs with other resources

Fire Management The acres to be burned by wildfire are directly related to fuel types created by management activities under each benchmark The affect of the MMRs which are applied to all benchmarks, except FLW, tend to mask any measurable differences between the benchmark as they would relate to wildfire potential Exceptions to this would be H20 and RNG where more acres are being managed at earlier seral stages to provide for water and/or forage Even the emphasis in these benchmark probably would not have a significant affect on wildfire acres Acres burned for all benchmarks are greater than historical levels, primanly due to an accumulation of fuels in later seral stage vegetation

It should be noted that no changes were made in the base fire organization used in the benchmarks so as to simplify the analysis That is, there was no attempt to mtigate the number of acres burned by wildfire by intensifying the suppression organization

Fish. Impacts on fish habitats on the Shasta-Trinity National Forests parallel the impacts on watersheds shown by ERAs resulting from each benchmark In general, those benchmarks which resulted in a signrficant number of acres disturbed would also result in the greatest potential impact on fish habitat Again, except for FLW, all benchmarks are significantly restricted by MMRs in both the number of acres available for disturbance and the intensrty of disturbance It is expected that all benchmarks, except FLW, would have a similar impact on fisheries and that none would fully respond to riparian related values. The effect of all benchmarks except FLW would be measurably less than historical levels Although not signftcant, TBD and TBR would have a greater affect on fisheries than the rest of the benchmarks, except FLW

Pounds *of* fish and wildllfe user days, both anadromous and inland, are expected to be similar for all benchmarks except FLW (The projected numben in **Table II-1** reflect the habtat capability, not actual numben Actual numbers are affected by more than habtat and would be reflective *of* all facton.)

Further Planning Areas. The disposition of the one remaining further planning area (Mt Eddy) has little effect on resource outputs or PNV

Range. Range outputs under any of the benchmarks (except MLV) far exceed current existing levels of use for forage The animal months ***(AMs)*** resulting from the benchmarks are triggered by the amount of type conversion and the amount *of* forage production available in the form of transtion range as a result of timber harvest

Recreation. Unless constrained or not valued RVD outputs always go to the demand cutoff because beneft values far exceed the costs of providing the use

Timber. Timber capabilties in the 1st decade of the planning penod range from a high of 610 MMBF under the FLW benchmark to a low of 107 MMBF under the H20 benchmark When MMRs are applied to the analysis. however, this range in the solution space decreases from a high output of 165 MMBF under TBD to 107 MMBF under H20 **As** mentioned earlier, the addtion of legal, nondiscretionary requirements to the model had a substantial effect on both PNV and timber outputs in the 1st decade of the planning period

Other timber conclusions reached from the analysis of the benchmarks are

- The effect *of* the non-declining yield constraint on 1st decade timber outputs (MMBF) is signrficant when the FORPLAN objective function is to maximize timber volume (example 165 MMBF under the TBD benchmark versus 146 MMBF under TBR benchmark in the 1st decade
- Under the benchmarks npanan areas along perennial streams are allocated to timber prescriptions stand maintenance or no scheduled harvest
- About 5,000 acres per year of regeneration cutting and reforestation is projected (all benchmarks except FLW) This is signrficantly less than the 7,500 acres the Forests have been averaging over the nine-year period (1980 - 1988)
- With a relatively unconstrained model, most of the tentatively sutable timber land is allocated to even-aged management using clearcutting for the final harvest The analysis demonstrated that this combination is the most cost efficient
- Most existing stands, on lands sutable for timber harvest, are regenerated wthin the first 6 decades
- Few intermediate harvests (e g , commercial thinning) are scheduled This indicates that other harvest methods are more cost effective and contribute more towards PNV
- High site-low cost lands are scheduled for harvest in the early decades This confirms that the selection was based on PNV
- Wth a relatively unconstrained model, very little of the non-stocked. brush, hardwood, or knobcone pine stocked land is reforested This is true for any benchmark requinng that PNV be maximized

Visual Quality. Impacts on visual quality are directly related to the number of acres physically altered and the intensity at which they are altered A proxy of degree and intensity of disturbance is provided by the outputs of acres altered by management activities shown as "Effective Altetation" ("EFFALT") under the FORPLAN reports. The acres altered are similar for all benchmarks, except FLW, and are less than histoncal levels. This is due to the significant effect application of MMRs has to all benchmarks

Water Quality. Outputs in ERAs provide acomparison of the level of water quality which could occur under each benchmark. The levels are directly related to the amount of acres that are disturbed. FLW, TBR, and TBD represent those benchmarks where disturbance is the highest but only FLW is beyond acceptable limits. TBR and TBD are similar to the other benchmarks and disturbance is below historical levels

Water Yield. Water production outputs do not vary by more than IO percent when compared to a background water yield except for FLW. Water yields have relatively little influence in the analysis except that the beneft values for water can cause brush conversion to take place and certain timber stands to be harvested that would otherwise be uneconomical

Wildlife. The viability of wildlife species is generally related to the proportion of lands allocated to intensive timber management prescriptions Intensive timber management prescriptions tend to reduce the amount of later seral stages (4a, 4b-c, and 4c-older) down to the 5 percent level which is the minimum management requirement for diversity Due to the effect of MMRs, none of the benchmarks, except FLW, would result in a reduction of later seral stages.

Table II-1
Average Annual Outputs and Activities, Decades 1 through 5

	BENCHMARK*								
Activity / Resource	**FLW**	**H2O**	**MKV**	**MLV**	**MMR**	**RGN**	**TBD**	**TBR**	**WLN**
Economics									
Present Net Value (PNV) MM$	10.454	8.841	8.685	6.588	8.777	8.670	8.692	8.703	8.787
Total Cost - Million Dollars {MM$}									
Base Year (1989) 44									
Decade 1	121	63	63	31	62	63	65	62	61
Decade 2	84	57	57	32	57	57	58	59	56
Decade 3	87	61	61	32	61	60	59	63	60
Decade 4	83	66	66	32	62	66	63	64	62
Decade 5	76	69	69	33	64	70	63	66	63
Fish									
Anadromous Fish - Commercial Harvest - Thousand Pounds {M pounds}									
Base Year (1989) 363									
Decade 1	363	691	691	691	691	691	691	691	691
Decade 2	273	691	691	691	691	691	691	691	691
Decade 3	68	691	691	691	691	691	691	691	691
Decade 4	56	691	691	691	691	691	691	691	691
Decade 5	56	691	691	691	691	691	691	691	691
Anadromous Fish - Sport {M pounds}									
Base Year (1989) 113									
Decade 1	113	293	293	293	293	293	293	293	293
Decade 2	85	353	353	353	353	353	353	353	353
Decade 3	64	413	413	413	413	413	413	413	413
Decade 4	27	413	413	413	413	413	413	413	413
Decade 5	27	413	413	413	413	413	413	413	413
Anadromous Fish - Sport -Thousand Fish User Days {M FUDs}									
Base Year (1989) 40									
Decade 1	40	130	130	130	130	130	130	130	130
Decade 2	30	160	160	160	160	160	160	160	160
Decade 3	22	190	190	190	190	190	190	190	190
Decade 4	10	190	190	190	190	190	190	190	190
Decade 5	10	190	190	190	190	190	190	190	190

* BENCHMARKS:

- FLW — Maximum Present Net Value (PNV) with Flow and Long-term Sustained Yield (LTSY) Constraints
- H2O — Water Yield Maximization
- MKV — Maximum PNV-Market Values Only
- MLV — Minimum Level of Management
- MMR — Minimum Management Requirements
- RGN — Range Maximization
- TBD — Maximize Timber Output-Departure
- TBR — Maximize Timber Output
- WLN — Maximum Wilderness

Table II-1
(Continued)

Activity / Resource	BENCHMARK* FLW	H2O	MKV	MLV	MMR	RGN	TBD	TBR	WLN
Fish (Continued)									
Inland Fish - Other Than T&E (M FUDs)									
Base Year (1989) 396									
Decade 1	356	374	374	374	374	374	374	374	374
Decade 2	320	374	374	374	374	374	374	374	374
Decade 3	288	390	390	390	390	390	390	390	390
Decade 4	271	404	404	404	404	404	404	404	404
Decade 5	271	406	406	406	406	406	406	406	406
Inland Fish - Other Than T&E (pounds)									
Base Year (1989) 1424									
Decade 1	1424	1557	1557	1557	1557	1557	1557	1557	1557
Decade 2	1282	1557	1557	1557	1557	1557	1557	1557	1557
Decade 3	1154	1639	1639	1639	1639	1639	1639	1639	1639
Decade 4	1083	1734	1734	1734	1734	1734	1734	1734	1734
Decade 5	1083	1734	1734	1734	1734	1734	1734	1734	1734
Range									
Grazing Potential-Thousand Animal Months (M AMs)									
Base Year (1989) 12									
Decade 1	67	40	33	0	34	41	38	34	36
Decade 2	56	38	35	0	36	39	36	36	35
Decade 3	43	34	35	0	35	35	33	36	35
Decade 4	38	39	32	0	33	40	34	36	34
Decade 5	37	40	31	0	31	41	33	34	34
Recreation									
Developed Recreation - Thousand Recreation Visitor Days (M RVDs)									
Base Year (1989) 1,200									
Decade 1	1261	1261	1261	0	1261	1261	1261	1261	1261
Decade 2	1453	1453	1453	0	1453	1453	1453	1453	1453
Decade 3	1646	1646	1646	0	1646	1646	1646	1646	1646
Decade 4	1838	1838	1838	0	1838	1838	1838	1838	1838
Decade 5	2030	2030	2030	0	2030	2030	2030	2030	2030
Dispersed Recreation - Million Recreation Visitor Pays (MM RVDs)									
Base Year (1989) 2 56									
Decade 1	276	276	146	146	276	276	276	276	276
Decade 2	320	320	167	167	320	320	320	320	320
Decade 3	370	370	189	189	370	370	370	370	3.70
Decade 4	430	430	210	210	430	430	430	430	430
Decade 5	500	500	232	232	500	500	5.00	5.00	5.00

Table II-I
(Continued)

	BENCHMARK*								
Activity / Resource	**FLW**	**H2O**	**MKV**	**MLV**	**MMR**	**RGN**	**TBD**	**TBR**	**WLN**
Timber									
Timber - Million Board Feet {MMBF)									
Base Year (1989) 184									
Decade 1	610	107	122	0	134	122	165	146	131
Decade 2	519	112	128	0	134	122	140	146	131
Decade 3	441	117	135	0	137	128	119	146	137
Decade 4	375	123	141	0	143	134	125	146	144
Decade 5	319	129	148	0	145	141	132	146	145
Long Term Sustained Yield {LTSY)									
Million Cubic Feet {MMCF}	43	207	234	0	228	223	209	231	232
Million Board Feet {MMBF}	288	138	156	0	153	149	140	155	155
Water									
Water Yield {M Acre feet}									
Base Year (1989) 5448									
Decade 1	6369	5671	5610	5,303	5617	5659	5655	5575	5619
Decade 2	6059	5619	5530	5,303	5535	5608	5546	5558	5527
Decade 3	5723	5520	5505	5,303	5509	5509	5469	5531	5509
Decade 4	5603	5670	5512	5,303	5495	5646	5524	5536	5503
Decade 5	5574	5689	5512	5,303	5492	5678	5501	5529	5473
Wilderness									
Wilderness {Acres}									
Base Year (1989) 498,776									
Decade 1	498,776	498,776	498,776	498,776	498,776	498,776	498,776	498,776	506,496
Decade 2	498,776	498,776	498,776	498,776	498,776	498,776	498,776	498,776	506,496
Decade 3	498,776	498,776	498,776	498,776	498,776	498,776	498,776	498,776	506,496
Decade 4	498,776	498,776	498,776	498,776	498,776	498,776	498,776	498,776	506,496
Decade 5	498,776	498,776	498,776	498,776	498,776	498,776	498,776	498,776	506,496
Wildlife									
Deer {M Animals}									
Base Year (1989) 62									
Decade 1	68	62	62	62	62	62	62	62	62
Decade 2	71	62	62	62	62	62	62	62	62
Decade 3	75	62	62	62	62	62	62	62	62
Decade 4	79	62	62	62	62	62	62	62	62
Decade 5	83	62	62	62	62	62	62	62	62

Table II-I
(Continued)

Activity / Resource	FLW	H2O	MKV	MLV	MMR	RGN	TBD	TBR	WLN
				BENCHMARK*					
Wildlife (Continued)									
All **Wildlife Species-Thousand Wildlife User Days {MWUDs}**									
Base Year (1989) 584									
Decade 1	584	584	500	584	584	584	584	584	584
Decade 2	584	634	540	634	634	634	634	634	634
Decade 3	584	698	590	698	***698***	698	698	698	698
Decade 4	584	775	650	775	775	775	775	775	775
Decade 5	584	837	690	837	837	837	837	837	837
Threatened, Endangered and Sensitive Species									
Goshawks {Number of Pairs)									
Base Year (1989) 150									
Decade 1	0	150	150	150	150	150	150	150	150
Decade 2	0	150	150	150	150	150	150	150	150
Decade 3	0	150	150	150	150	150	150	150	150
Decade 4	0	150	150	150	150	150	150	150	150
Decade 5	0	150	150	150	150	150	150	150	150
Spotted Owls {Number of Pairs}									
Base Year (1989) 97									
Decade 1	0	170	170	170	170	170	170	170	170
Decade 2	0	180	180	180	180	180	180	180	180
Decade 3	0	190	190	190	190	190	190	190	190
Decade 4	0	200	200	200	200	200	200	200	200
Decade 5	0	210	210	210	210	210	210	210	210
Eagles/Falcons {Number of Pairs}									
Base Year (1989) 25/6									
Decade 1	0/0	32/9	32/9	32/9	32/9	32/9	32/9	32/9	32/9
Decade 2	0/0	35/14	35/14	35/14	35/14	35/14	35/14	35/14	35/14
Decade 3	0/0	35/14	35/14	35/14	35/14	35/14	35/14	35/14	35/14
Decade 4	0/0	35/14	35/14	35/14	35/14	35/14	35/14	35/14	35/14
Decade 5	0/0	35/14	35/14	35/14	35/14	35/14	35/14	35/14	35/14

D Alternatives Considered and Eliminated from Detailed Study

The National Environmental Policy Act of 1969 (NEPA) requires that agencies rigorously explore and objectively evaluate all reasonable alternatives and briefly discuss the reasons for eliminating those not developed in detail

In addition to the IO benchmarks descnbed previously, 9 individual alternatives were analyzed. Out of this total, four alternatives, portraying a reasonable range of market and nonmarket outputs and activities, are described in detail later in this chapter

Five alternatives were eliminated from detailed study for one or more of the following reasons

1 Failure to adequately address the public issues,

2 Not reasonably attainable without changes in basic statutes and regulations of the National Forests, and

3 The outputs and *effects* of an alternative were similar (not signrficantly different) to one selected for detailed study (i e , duplicate and redundant alternatives)

Descriptions of these five akematives, including their themes, resource objectives, and rationale for elimination, are summanzed below Each of the altematives was modeled in FORPLAN to determine outputs Selected average annual outputs and potential outputs for these alternatives are shown in **Table II-2.**

Alternative CEE (Constrained Economically Efficient Alternative)

Theme. The purposes of Alternative CEE were to portray the most economically *efficient* mix *of* allocations and schedules. subject to meeting minimum management requirements (MMRs) and minimum implementation requirements (MIRs), and to demonstrate the opportunity cost of the MIRs taken collectively It also forms a base analyses to be used in evaluating Forest-level direction common to all alternatives From a modeling standpoint MIRs were not measurable due to the effect of MMRs

Resource Objectives. Under this altemative. resource goals and objectives were to maximize present net value (PNV) in the most economically efficient manner subject only to MMRs and MIRs High market outputs are attained while amenity values and outputs are minimized

Reasons for Elimination. This alternative was eliminated because it did not recognize addrtional Forest-wide direction needed to fully respond to major public issues, management concerns, and resource opportunities For example, no restrictions on timber management apply to the Shasta and Trinity Units of the NRA and the foreground viewing areas along Interstate 5, Highway 299, and Highway 36

Alternative CEF (Constrained Economically Efficient Alternative with Forest Constraints)

Theme. The purposes of this alternative are similar to Alternative CEE However, this alternative analyzes the opportunities and costs of adding Forest-wide management directions which are common to all alternatives in *addition to* the MMRs and MIRs *of* Alternative CEE Collectively, these are the minimum set of requirements which the Forests have determined to be important enough to impose on every alternative regardless of the theme in order to make them implementable on the ground

Resource Objectives. This alternative determines the maximum level of outputs and PNV attainable for altematives with Forest level management requirements applied High market outputs are achieved while providing adequate protection to soils, water, and wildlie Forest level requirements are described in detail later in this chapter

Reasons for Elimination. This alternative was eliminated from detailed study because rt was similar to Altemative RPA (1990 RPA Program Emphasis)

Alternative LBU (25 Percent Budget Reduction)

Theme. Under this alternative. the expected outputs and services that could be provided in the future were analyzed as if the current (normalized 1989) budget was reduced by 25 percent

Resource Objectives. Resources would be managed to at least meet minimum requirements prescnbed by laws, regulations, and Forest Service management direction Most output levels would be reduced from current levels to meet the budget constraint Activities would be concentrated on the existing roaded land base

Reasons for Elimination. This altemative was discarded because the budget limitations would not allow an adequate response to local and national needs for wood products, recreation, and resource protection There

would be a 48 percent reduction in timber outputs compared to Alternative CUR (No Action/No Change) in the first decade

Alternative PFD (Preferred Alternative/Departure)

Theme. The theme of this alternative is identical to Alternative PRF (Preferred Altemative), except that departure from non-declining yield is allowed for 5 decades The purpose of analyzing this departure alternative was to determine whether multiple-use objectives could be better met by regulating the planned sale and harvest of timber volume in a manner that deviates from the principle of non-declining yield

Resource Objectives. Resource objectives are the same as those shown for Altemative PRF which is discussed later in this chapter

Reasons for Elimination. When compared to Alternative PRF, PFD had a higher budget, and a lower total timber harvest wlth more clearcutting Alternative PRF provides more volume, with non-declining even-flow yields, without a future reduction in timber yields Therefore, a departure does not help maintain communrty stabilty Also, other alternatives examined in detail exceed the first period harvest of this alternative

Overall, multiple use objectives and public issues and concerns are better addressed in Alternative PRF

Alternative 12C (late-Successional Forest Management)

Theme. The theme of this alternative was developed by the Scientrfic Panel on Late-Successional Forest Ecosystems in their report to Congress titled, "Alternatives for Management of Late-Successional Forests of the Pacrfic Northwest", published October, 1991 Alternative 12C, as described in the report, applies a series of old-growth protective measures to the Forest Plan (Alternative PRF). These measures include Old-Growth Reserve areas, owl additions, green tree retention, and 180 year minimum rotations forest-wide This theme also includes the watershed/fish emphasis designed by the Panel to maintain and restore (1) ecological functions and processes in streams, and (2) habrtat of potential threatened and endangered fish species and stocks of fish

Resource Objectives Under this alternative, resource goals and objectives are to maximize present net value (PNV) in the most economically efficient manner subject to the constraints of the Forest Plan alternative (PRF) plus the additional constraints imposed by Alternative 12C

Reasons for Elimination. This alternative was eliminated from detailed study, because it is not responsive to local social/economic needs The highly protective measures of 12C reduce the available land base by approximately *90,000* acres and the timber harvest by approximately 50 MMBF This is, however, an implementable altemative and can be looked at in detail if the constraints are required in the future

Table 11-2
Alternatives Eliminated from Detailed Study

Activity /Resource	ALTERNATIVE CEE	CEF	PFO	LBU	12c
Economics					
Present Net value (PNV) MM$ - 150 years	8,777	8.69 I	8,229	8,154	8,079
Total Cost - Million Dollars {MM$}					
Base Year (1989) 44					
Decade 1	62	61	57	48	51
Decade 2	57	56	57	47	51
Decade 3	61	61	59	48	53
Decade 4	62	62	61	49	55
Decade 5	64	63	63	49	57
Fish					
Anadromous Fish - Commercial Harvest - Thousand Pounds {M pounds}					
Base Year (1989) 363					
Decade 1	69 I	69 I	69 I	69 I	69 I
Decade 2	69 I	69 I	69 I	69 I	69 I
Decade 3	69 I	69 I	69 I	69 I	69 I
Decade 4	69 I	69 I	69 I	69 I	69 I
Decade 5	69 I	69 I	69 I	69 I	69 I
Anadromous Fish - Sport {M pounds}					
Base Year (1989) 113					
Decade 1	293	293	293	293	293
Decade 2	353	353	353	353	353
Decade 3	413	413	413	413	413
Decade 4	413	413	413	413	413
Decade 5	413	413	413	413	413
Anadromous Fish - Sport - Thousand Fish User Days {M FUDs}					
Base Year (1989) 40					
Decade 1	130	130	130	130	130
Decade 2	160	160	160	160	160
Decade 3	190	190	190	190	190
Decade 4	190	190	190	190	190
Decade 5	190	190	190	190	190

- **Alternatives**
  CEE - Constrained Economically Efficient
  CEF - Constrained Economically Efficient Alternative with Forest Constraints
  PFD - Preferred Alternative/Departure
  LBU - 25 Percent Budget Reduction
  12C - Late-Successional Forest Management

Table II-2
(Continued)

Activity / Resource	ALTERNATIVE CEE	CEF	PFD	LBU	I2C
Fish (Continued)					
Inland Fish - Other Than T&E (M FUDs)					
Base Year (1989) 356					
Decade 1	374	374	374	374	374
Decade 2	374	374	374	374	374
Decade 3	390	390	390	390	390
Decade 4	404	404	404	404	404
Decade 5	406	406	406	406	406
Inland Fish - Other Than T&E (M pounds)					
Base Year (1989) 1424					
Decade 1	1,551	1,557	1,557	1,557	1,557
Decade 2	1,557	1,557	1,557	1,557	1,557
Decade 3	1,639	1,639	1,639	1,639	1,639
Decade 4	1,734	1,734	1,734	1,734	1,734
Decade 5	1,734	1,734	1,734	1,734	1,734
Range					
Grazing Potential - Thousand Animal Months (M AMs)					
Base Year (1989) 12					
Decade 1	34	34	34	34	34
Decade 2	36	36	36	36	36
Decade 3	35	35	35	35	35
Decade 4	33	33	33	33	33
Decade 5	31	31	31	31	31
Recreation					
Developed Recreation - Thousand Recreation Visitor Days (M RVDs)					
Base Year (1989) 1,203					
Decade 1	1,261	1,261	1,261	1,261	1,261
Decade 2	1,453	1,453	1,453	1,453	1,453
Decade 3	1,646	1,646	1,646	1,646	1,646
Decade 4	1,838	1,838	1,838	1,838	1,838
Decade 5	2,030	2,030	2,030	2,030	2,030
Dispersed Recreation - Million Recreation Visitor Days (MM RVDs)					
Base Year (1989) 2.56					
Decade 1	2.76	2.76	2.76	2.76	2.76
Decade 2	3.20	3.20	3.20	3.20	3.20
Decade 3	3.70	3.70	3.70	3.70	3.70
Decade 4	4.30	4.30	4.30	4.30	4.30
Decade 5	5.00	5.00	5.00	5.00	5.00

Table 11-2
(Continued)

Activity / Resource	ALTERNATIVE CEE	CEF	PFD	LBU	I2C
Timber					
limber - Million Board Feet {MMBF}					
Base Year (1989) 184					
Decade I	134	129	89	55	36
Decade 2	134	129	81	55	37
Decade 3	137	135	85	55	39
Decade 4	147	142	89	55	41
Decade 5	145	142	94	55	43
Long Term Sustained Yield {LTSY}					
Million Cubic Feet {MMCF}	22 8	22 4	162	11.2	10 3
Million Board Feet {MMBF}	1520	149 4	108 I	747	68 7
Water					
Water Yield {M Acre Feet}					
Ease Year (198915303					
Decade I	5,303	5,303	5,303	5,303	5,303
Decade 2	5,303	5,303	5,303	5,303	5,303
Decade 3	5,303	5,303	5,303	5,303	5.303
Decade 4	5.320	5.315	5,308	5,303	5,315
Decade 5	5,303	5,303	5,315	5,303	5.312
Wildemess					
Wilderness {Acres}					
Base Year (1989) 498.776					
Decade I	498,776	498,776	498,776	498,776	498,776
Decade 2	498,776	498,776	498,776	498.776	498,776
Decade 3	498,776	498,776	498,776	498,776	498,776
Decade 4	498.776	498,776	498,776	498,776	498,776
Decade 5	498,776	498,776	498.776	498,776	498.776
Wildlife					
Wildlife - {Habitat Capability in Animal Numbers}					
Deer {M Animals}					
Ease Year (1989) 62					
Decade I	62	62	62	62	62
Decade 2	62	62	62	62	62
Decade 3	62	62	62	62	62
Decade 4	62	62	62	62	62
Decade 5	62	62	62	62	62

Table 11-2
(Continued)

Activity /:Resource	ALTERNATIVE CEE	CEF	PFD	LBU	I2C
Wildlife (Continued)					
All-Wildlife Species-Thousand Wildlife User Days {M WUDs)					
Base Year (1989) 584					
Decade I	584	584	584	584	584
Decade 2	634	634	634	634	634
Decade 3	698	698	698	698	698
Decade 4	775	775	775	775	775
Decade 5	837	837	837	837	837
Threatened, Endangered and Sensitive Species					
Goshawk {Number of Pairs)					
Base Year (I 989) I50					
Decade I	I50	I50	I50	I50	I50
Decade 2	I50	I50	I50	I50	I50
Decade 3	I50	I50	I50	f50	I50
Decade 4	I50	I50	I50	I50	I50
Decade 5	I50	I50	I50	I50	I50
Spotted Owl {Number of Pairs)					
Base Year (1989) 97					
Decade I	I70	I70	I70	I70	I85
Decade 2	I80	I80	I80	I80	I95
Decade 3	I90	I90	I90	I90	210
Decade 4	200	200	200	200	210
Decade 5	210	210	210	210	210
Eagle / Falcon {Number of Pairs)					
Base Year (1989) 25/6					
Decade I	32/9	32/9	32/9	32/9	32/9
Decade 2	35/14	35/14	35/14	35/14	35/14
Decade 3	35/14	35/14	35/14	35/14	35/14
Decade 4	35/14	35/14	35/14	35/14	35/14
Decade 5	35/14	35/14	35/14	35/14	35/14

Alternatives Considered in Detail

E

Introduction

This section covers a vanety of topics relating to the alternatives and management prescriptions (I) it presents direction common to all alternatives, (2) it explains the concept of management prescnptions and their relationship to the management areas, (3) it descnbes *the* alternatives and shows in table format acreage allocations, outputs, and costs for each, and (4) it compares the alternatives both narratively and in tabular form Maps for each akemative are in a packet accompanying this EIS

Direction Common to all Alternatives

Higher level direction (laws, regulations, and regional and national policy) is part of the Forests' overall management direction and as such is common to all alternatives Higher level direction is not repeated in this document unless it is used to emphasize a particular point

Direction common to all alternatives, which is presented in this document, includes (a) Minimum Management Requirements, (b) Minimum Implementation Requirements, (c) Timber Policy Requirements, (d) Old-growth Legislation, (e) Regional Herbicide Policy, (9 Forest Management Requirements, and (g) Forest Standards and Guidelines

Minimum Management Requirements (MMRs). MMRs are designed to meet basic requirements taken from the National Forest Management Act (NFMA) regulations for the management of National Forest land They represent requirements outside Forest Service authority, because they are based on statutes and regulations rather than agency policy Procedures for defining MMRs were specified by the Pacific Southwest Region (Region 5) MMRs apply to all alternatives and most benchmarks MMRs include

(I) **Suitable Lands.** Lands are considered suitable for timber production if

(a) The land is forested and is currently producing or is capable of producing crops of industrial wood,

(b) The land has not been withdrawn from timber production by Congress, the Secretary of Agriculture, or the Chief of the Forest Service. On the Shasta-Tnnity National Forests the five existing Wildernesses and the Shasta Mud Flow Research Natural Area are examples of lands wrthdrawn from timber production,

(c) Technology and knowledge are available to ensure timber production without irreversible damage to soils, productivity, or watershed conditions,

(d) Existing technology and knowledge, as reflected in current research and experience, provide reasonable assurance that adequate restocking can be attained wtthin five years after final harvest, and

(e) Adequate information is available to project responses to timber management activities

(2) **Threatened and Endangered (T&E) Species.** The habitat determined to be critical for T&E species will be identlfied and measures will be prescr.bed to prevent the destruction or adverse modification of such habitat The peregrine falcon, northern spotted owl, marbled murrelet, and bald eagle are the only species on the Forest that fall in this category Recovery targets assigned to the Forests for peregrine falcon are 6 pairs and for bald eagle 20 pairs Recovery for the owl is provided by habitat set aside through a combination of the adoption of the Interagency Scientific Committee Report (ISC) and the adoption of the Fish and Wildlife Service draft recovery plan Late-successional habitat and other management requirements for Alternative PRF is similar to that described above but was modified by the Record of Decision for Old-Growth Dependent Species in the Pacific Northwest (President's Plan) and is descnbed in the Standards and Guidelines specific to each alternative section Recovery requirements for the marbled murrelet are not yet known, but they will be incorporated into the Final Land and Resource Management Plan No activity will occur in marbled murrelet habtat until their requirements are known

On September 28, 1992, the U S Fish and Wildlife Service (USFWS) listed the marbled murrelet population in Oregon, Washington, and California as a threatened species under the Endangered Species Act (ESA) The Forest Service is now consulting with the USFWS on all activities that may affect the marbled murrelet Based on a review of information about the effects of Forest Service management activities on the marbled murrelet, new limitations on future actions have been instituted to maintain options for a more permanent marbled murrelet conservation strategy

The Forest Service will not sign any additional decision notices for timber sales that would log existing marbled murrelet habitat on National Forest lands within 35 miles inland from the manne environment

Future changes in management direction are expected as addrtional information on the marbled murrelet is gathered and analyzed The Forest Service established a marbled murrelet conservation assessment team in June, 1992 This team will consolidate the available information concerning marbled murrelet ecology and habrtat conditions in order to determine the efforts needed for maintaining healthy populations through its current range

The USFWS is developing a recovery plan for the marbled murrelet Region 5 will prepare multi-year, multi-phase implementation recovery strategies to help monrtor and accomplish the Forest Service's portion of recovery objectives and actions agreed to in an approved USFWS recovery plan The implementation strategies will be incorporated into the Forest Plans or support documents (Forest Service Manual [FSM] 2672 24,2672 24a)

National Environmental Policy Act (NEPA) documents will be prepared when a more permanent policy is developed to protect the marbled murrelet NFMA and *NEPA* procedures will be followed in prepanng interim standards and guidelines for the marbled murrelet

(3) **Viable Wildlife Populations.** A viable population is regarded as one that has the estimated numbers and distribution of reproductive individuals within the planning area to insure its continued existence throughout the species range Mitigation measures were defined for viable populations in two areas. goshawks and snag-dependent species

Goshawk Manage goshawk habitat to maintain the known range of the species at a density of at least one territory of 100 acres per 18 square miles. with distances between adjacent territories no more than 12 miles. This results in maintaining habitat for 150 pair of goshawks, distributed in forested areas across the Forests

Snag-Dependent Species Wrthin the conifer and broadleaf vegetation types provide, maintain, and manage for an average of 15 snags per acre with the following specifications

a 12 snags per acre between 15 and 24 inches diameter at breast height (dbh) and greater than 20 feet high, and

b 0.3 snags per acre greater than 24 inches dbh and greater than 20 feet high

(4) **Diversity of Plant and Animal Communities.** Diversity of plant and animal communrties is achieved by providing a threshold level of vegetation types and seral stages found wrthin the Forests Plant and animal communities are managed so that diversity is similar to that currently existing on the Forests Reductions in diversity are prescribed only when needed to meet the overall multiple-use objectives of an alternative Specifically, direction is to provide and maintain at least five percent of each vegetation type/seral stage combination found in the Forests

(5) **Riparian Areas.** Provides protection of perennial streams, streambanks, shorelines, lakes and wetlands This includes prevention of long-term adverse changes and minimization of short term changes in water temperature, chemistry, sedimentation, and channel blockages

Riparian MMRs are defined as (1) areas 100 feet horizontal distance from the edge of standing bodies of water: (2) areas 100 feet horizontal distance on both sides of perennial stream channels, and (3) all wetlands Suitable timber lands within the ripanan areas are allocated to Minimal Timber Management prescriptions

6) **Soil and Water Productivity** Provides for conservation of soil and water resources and prevention of significant or permanent impairment of the productivity of the land The amount of land disturbance on sensitive watershed lands is limrted in order to avoid soil loss, activation of mass land failures, and degradation of water quality through sedimentation Existing, disturbed soil areas would be identrfied and treated to improve soil productivity as appropriate

7) **Protect Designated Wild, Scenic, and Recreation Rivers.** These rivers are managed according to guidelines contained within the National Wild and Scenic Rivers Act Management direction is focused on the maintenance and enhancement of these river? for their recreation and scenic values

Minimum Implementation Requirements (MIRs). MIRs re used to ensure that alternatives are minimally accept-

able and implementable on the ground They differ from MMRs in that they are within agency control, but there is little discretionary control regarding their application at the Forest level They are established at the Regional level and apply to all alternatives but not to the benchmarks MIRs help ensure that

(1) Sensitive plants are managed so that species do not become threatened or endangered because of Forest Service actions

(2) Foregrounds and middlegrounds of State and County designated scenic highways (or those within the 1970 State Master Plan) are managed to partial retention visual quality objectives *(VQOs)* Affected routes are US 97, State Highways 3, 36, *89,* and Interstate 5 from its intersection with US Highway 97 to its intersection with State Highway 89

(3) No more than 18 percent of the total sutable timber land base is available for clearcutting under even-aged management systems in any decade

Timber Policy Requirements. This group of requirements focuses on forest management policies such as (1) rotation length and culmination of mean annual increment requirements for timber harvest scheduling, (2) sustatned yield requirements, (3) harvest flow requirements, and *(4)* dispersion Refer to Appendix B

Old-Growth **Legislation.** Old-growth legislation, primarily for the Pacfic Northwest Region and the Klamath Province of the Pacific Southwest Region USDA-Forest Service, is pending at both the State and Federal level On May 28, 1991 Congress chartered a committee consisting of Jack Ward Thomas, Jerry Franklin, Norm Johnson, and Jim Gordon with the charge of developing a scientifically creditable old-growth management strategy for Federal lands

On June 10, 1991 National Forests, National Parks, and Bureau of Land Management Districts within the Douglas-fir zone of the Pacific Northwest sent representatives to Portland, Oregon to assist this committee in developing its strategy Major elements in this strategy were to include such things as critical anadromous fisheries habitat, threatened, endangered, and sensitive plant and wildlife species habitat and critical watersheds

Old-growth stands were placed into one of three categories (1) most significant, (2) signficant, and (3) other Most signficant old-growth was defined as those large contiguous stands exhibiting little fragmentation Significant old-growth was defined as large areas containing old-growth exhibiting some fragmentation Other old-growth was defined as highly fragmented areas with residual stands of old-growth

Seventeen alternatives have been developed and analyzed to determine the affects on other Forest resources

If the current policy on old-growth was to change to either protect all old-growth stands *or* to significantly modify present silvicultural treatments, the timber ASQ for each altemative would decrease signficantly These changes would be projected from data supplied by the Region's computer model of vegetation management cost and yields and would be adapted to this Forests' specific situation as well as to the altematives presented in this EIS

Regional Herbicide **Policy.** In February 1989, Region 5 released a Final Environmental Impact Statement (FEIS) for Vegetation Management for Reforestation It includes detailed discussions and analyses of a preferred alternative (emphasize local management flexibility), altematives to the preferred (including no vegetation management, no application of herbicides, and no aerial application of herbicides), and the consequences to the environment The FEIS addresses the *effects* of various vegetation management treatments, including herbicide use, on issues such as water quality, human health and safety, and fish and wildlife Project level environmental analysis would address site-specific issues

Based on the preferred alternative in the FEIS. as modified in the Record of Decision (hereby incorporated by reference into the Shasta-Trinity National Forests' EIS and Forest Plan), all alternatives in the Forest Plan and EIS are predicated on the continued use of the full range of vegetative treatments

The Forest Plan (See Chapter 4 - Forest Standards and Guidelines for timber) directs that (1) the selection of any treatment will be made at the project level based on a site-speck analysis of the relative effectiveness, environmental effects, and costs of the feasible alternatives Herbicides will be selected only if their use is essential to meet management objectives, and (2) monitoring and enforcement plans to implement specific measures will be developed for site-specific projects and described in the environmental analyses for these projects

All alternatives in this EIS assume continued use of the full range of treatments for reforestation and timber stand improvement, including mechanical, biological, chemical, and thermal The Citizens for Better Forestry (CBF) alternative does not include the use of chemical methods

If the current policy on the use of herbicides were to change to either disallow or restrict their use, then, based on the effects outlined in the Regional Vegetation Management for Reforestation FEIS, the timber yields and vegetation management costs for each alternative presented in this EIS would likely change as shown below. These changes are projected from data supplied by the Region's computer model of vegetation management costs and yields and are adapted to this Forests' specific situation as well as to the Forest Plan alternatives presented in this EIS

The analysis indicates a reduction in ASQ of about 5 percent if no herbicides are used, due to the loss of confer stocking and growth of potential crop trees The need for alternate treatments will raise annual costs about **30** percent There would be no change in the sultable timber land base for any alternative, because all lands are assumed to be regenerable to minimum stocking standards wlthin five years after harvest, using methods other than herbicides

Eliminating aerial use of herbicides will result in a reduction in ASQ of about 2 percent and raise annual costs about 5 percent

Forest Management Requirements (FMRs). FMRs are minimum standards needed to ensure implementability at the local Forest level They are based on Forest (rather than Regional) conditions that are in addltion to MMRs and MlRs These requirements are not applied to benchmarks or the Constrained Economic Efficiency (CEE) Altemative FMRs are applied to all other alternatives and include the following

(I) **Whiskeytown-Shasta-Trinity National Recreation Area (NRA).** The Shasta and Tnnrty Units of the NRA are common to the alternatives considered

(2) **Sensitive Travel Corridors/Viewsheds.** The foreground areas along Interstate 5 (south of the Highway **89** junction), Highway **299,** and Highway **36** (east of Highway **3)** are managed to meet a minimum visual qualty objective of partial retention

(3) **Bitterbrush.** This browse species will be maintained as a component of vegetation in important deer summer range on the McCloud Flats and an area north of Mt Shasta

(4) **Hardwoods** Maintain an average basal area of **30** square feet of hardwoods on major wildlife and visual areas to protect hardwood dependent species and visual qualty

(5) **Wildlife Emphasis Areas** Some areas will emphasize decadent habitat snags and down logs Snags will be maintained at a density of at least 2 5 per acre Large, down logs will be maintained at natural levels in some wildlife emphasis areas and up to **30** tons per acre in other areas

(6) Existing Administrative Sites and Developed Recreation Sites. Existing sites are common to all alternatives considered.

(7) **Mt. Shasta Ski Area.** Approximately **1,690** acres are allocated to a prescnption that will allow downhill skiing use in all alternatives

(8) **Proposed Special Interest Areas (SIAs)** Eight areas are proposed for SIA consideration under all alternatives

(9) Proposed Research Natural Areas (RNAs) Four areas among the **I4** areas being considered for RNAs are common to all alternatives

IO) **Riparian Areas Along Intermittent and Ephemeral Streams.** A minimum riparian management zone of 100 feet on each side is identified for protection of water qualrty and fisheries habitat

Forest Standards and Guidelines (Common to All Alternatives)

Iore than **200** Forest-wide Standards and Guidelines S&Gs) are detailed in Chapter **4** of the Draft Forest Plan hat was issued with the Draft Environmental Impact Statement These Standards and Guidelines apply to lternatives RPA, CUR, and CBF Standards and Guidelines or alternative PRF are found in Chapter 4 of the accompanying Final Forest Plan Management direction is resented for each of the resources, support functions, nd areas of special concern on the Shasta-Tnnity National Forests. The S&Gs provide the resource protection neasures that will be used when implementing project ctivities Used in conjunction wlth the management ractices for each Management Prescription (descnbed ater), they provide the means to mitigate or minimize dverse resource impacts

Standards and Guidelines Specific to Alternatives

Introduction. There are several S&Gs which vary by alternative or where the number of areas to which the S&Gs apply These S&Gs are descnbed in this section

Goshawks Alternatives CUR, RPA, and CBF provide for 150 goshawk terrltones, however, the minimum size of the terrltones changes in some alternattves Alternatives **RPA** and CUR protect a minimum of 100 acres per territory while alternative CBF protects a minimum of **150** acres Alternative PRF provides for protection of nesting pairs but no addltional terrltones are designated over the allocations made for old-growth dependent species

Visual Quality The number of roads to which the Retention and Partial Retention standards apply in the foreground varies by alternative **as** follows

	PRF	RPA	CUR	CBF
Retention	7	0	30	7
Partial Retention	20	6	22	20

The list of roads for Alternative PRF is shown in the Standards and Guidelines contained in Chapter 4 of the Forest Plan The list of roads for the other alternatives is documented in the Forest Planning Records

Special Areos The number of special areas to be recommended for classification vanes by alternative These differences are **as** follows

	PRF	RPA	CUR	CBF
RNAs	8	5	8	13
SIAs	19	13	9	15

Regenerobon by *Clearcutting* Alternatives CUR and RPA allow clearcutting Alternatives PRF and CBF allow regeneration cutting wlth the requirement to retain green trees in the units

Ripanon Areas The width of npanan management zones (RMZs) and the type of management wlthin the zones varies by alternative **as** follows All alternatives except CBF define RMZ **I** for class 1 and 2 perennial streams as the greater distance between the 100 year flood plain, extent of npanan vegetation, the inner gorge or the distance of *two* site trees from the edge of the channel This will generally be 300 feet or greater Alternative CBF requires that the RMZ never be less than 300 feet on each side **A** similar relationship exists for class 3 streams although the distance is one site tree or 150 feet There is no scheduled timber harvest within RMZ **I** for any alternative

Late-Successional Reserves Alternatives CUR, RPA, and CBF have a Late-successional Reserve system that was developed as a combination of the requirements from the Interagency Scientific Committee report (Habitat Capability Areas) and the Draft Fish and Wildlife Service Recovery Plan (Designated Conservation Areas and Critical Habitat) Alternative PRF has a Late-successional Reserve system that was designated by the Record of Decision for the President's Plan Chapter 4 of the Final Forest Pian descnbes those areas and their Standards and Guidelines.

Management Prescriptions (and Their Relationship to the Management Areas)

A Management Prescnption is an overall strategy for managing the resources of a specific area of land in order to address issues and obtain desired goals and objectives The specific piece of land to which prescnptions are tied is the Management Area The Forests have been divided into 22 Management Areas, and their boundanes are constant in all alternatives

The boundanes of the Management Areas follow definite topographic features where possible and are generally consistent with Ranger District boundaries Management Area boundanes are shown on the map of the Preferred alternative (PRF) Several prescriptions may be applied to different parts of each Management Area depending on land capabilrty and alternative theme

Management Prescnption write-ups consist of a stated objective, management practices that are to be emphasized or permitted, a description of the areas where the prescnption can be applied, and a list of standards and guidelines that apply to the prescription The Management Prescription S&Gs are in addltion to the Forest-wide standards and guidelines Eleven Management Prescnptions have been developed for use in the Forests

Table 11-3 summarizes the 11 Manager,,ent Prescriptions **Table 11-4** provides a comparative display of each prescnption's treatment of the Forests' resources and activlties A detailed description of each Management

Prescription can be found in the Forest Plan (Chapter 4) and in Appendix L (Descriptions of Management Practices)

The management practices that are emphasized or permitted with a particular prescription come from about three dozen practices developed for use on the Forests Each practice has one or more outputs, some of which are defined within the FORPLAN model. **A** complete list of scheduled and nonscheduled outputs and how they were modeled is shown in Appendix B.

Associated Standards and Guidelines. Another important element of the Management Prescnptions is their associated standards and guidelines. **A** complete listing and more definitive descriptions of prescnptions and associated standards and guidelines are contained in Chapter 4 of the Forest Plan

Each Management Prescription, when applied to the ground, provides a set of outputs and/or effects.

Occasionally there are areas with overlapping prescnptions Wherever this occurs, the most restrictive prescnptions, as to the type of management activities that may take place, prevail For example, a Research Natural Area (Prescnption X) may occur within a Wilderness area (Prescription V) In this situation, the most restrictive prescription. Prescription V, would apply

The relative degree of restriction on management activities for the prescnptions used in the alternatives considered in detail is (from most restrictive to least restrictive) as follows

'V-Wilderness Management,

X-Special Area Management:

I-Unroaded Non-Motorized Recreation (Wild Segments of Wild and Scenic Rivers),

IX-Riparian Management (Class I & 2 Streams, etc);

XI-Heritage Resource Management,

VII-Threatened, Endangered, and Selected Sensitive Species;

I-Unroaded Non-Motorized Recreation (including Roadless Recreation).

II-Limited Roaded Motorized Recreation (including Scenic portions of Wild and Scenic Rivers),

IX-Riparian Management (Class 3 & *4* Streams, etc)

IV-Roaded, High Density Recreation;

III-Roaded Recreation (including Recreation portions of Wild and Scenic Rivers),

VI-Wildlife Habitat Management:

VIII-Commercial Wood Products Emphasis/Timber Management

The management direction system explained on the previous pages is graphically summarized in **Figure II-I**

Figure II-1
The Management Direction System on the Shasta-Trinity National Forests

National & Regional Management Direction:

1. Forest Service Manual (FSM) Direction
2. Minimum Management Requirements (MMRs)
3. Minimum Implementation Requirements (MIRs)
4. Timber Policy Requirements
5. Regional Vegetative Management Policy

Forest-Level Management Direction:

1. Forest Management Requirements
2. Associated Standards and Guidelines

Management Prescriptions:

1. Management Practices
2. Associated Standards and Guidelines

Management Areas:

1. One or More Management Prescriptions
2. Supplemental Management Direction

Site-Specific Projects:

1. Proposed Action
2. Mitigation Measures

Table II-3
Summary of Management Prescriptions for the Shasta-Trinity National Forests

Prescription I:	**Unroaded Non-Motorized Recreation**
Objective:	The purpose of this prescription is to provide for semi-primitive non-motorized recreation opportunities* in unroaded areas outside existing Wildernesses while maintaining predominantly natural-appearing areas with only subtle modifications. Special recreational and visual values, fisheries, and riparian resources are emphasized. Also emphasized in this prescription is retention of old-growth vegetation and management of wildlife species requiring late seral stage conditions.
Prescription II:	**Limited Roaded Motorized Recreation**
Objective:	The purpose of this prescription is to provide for semi-primitive motorized recreation opportunities, while maintaining predominantly natural-appearing areas with some modifications. Recreational and visual resources are important values, semi-primitive activities are emphasized. Managing for old-growth vegetation and wildlife species requiring these late seral stages is also an important consideration.
Prescription III:	**Roaded Recreation**
Objective:	The purpose of this prescription is to provide for an area where there are moderate evidences of the sights and sounds of humans. Modifications are evident and may appear moderate to observers in the area but would be unnoticed or visually subordinate from sensitive travel routes. This prescription emphasizes recreational opportunities associated with developed road systems and dispersed and developed camp sites. Fish and wildlife management, which supports the recreational use of wildlife species (hunting, fishing, and viewing), is also emphasized. The emphasis of timber harvesting activities would be to meet recreation, visual, and wildlife objectives while maintaining healthy and vigorous stands.
Prescription IV:	**Roaded, High Density Recreation**
Objective:	The purpose of this prescription is to provide for areas which are characterized by a substantially modified natural environment. Sights and sounds of humans are readily evident, and the interaction between users is often moderate to high. Facilities are designed for use by a large number of people. Recreational and visual resources are important values with rural recreation emphasized.
Prescription V:	**Wilderness Management**
Objective:	This prescription provides for management of Congressionally designated Wildernesses in accordance with the National Wilderness Preservation Act of 1964 and associated regulations. Emphasis is placed on maintaining natural ecosystems. This includes retention of old-growth vegetation and management of wildlife species requiring these late seral stage conditions.

* Refer to Chapter VIII - (Glossary) for a description of recreation resource concepts and terms.

Table II-3
(Continued)

Prescription VI:	**Wildlife Habitat Management**
Objective:	The pnmary purpose ofthis presmpbon is to maintain and enhance big game, small game, upland game bird and non-game habitat, thereby providing adequate hunting and viewing opportunities. Habitat management for species which are primarily dependent upon early and mid-seral stages is an important consideration. While *this* prescription does not emphasize those wildlife species dependent on late seral stages, habitat favorable to these species would occur within this prescription Vegetabon is manipulated to meet wildlife habitat management objectives and to maintain healthy, vigorous stands using such tools as timber management and prescribed fire Cutting unit sizes and locations, timing of stand entries, and intensity *of* site preparation, release, and thinning are modified *to* provide desirable habitat conditions through time. Roaded natural recreabon opportunties would be maintained Riparian habrtat is managed under Prescription IX for npanan dependent fish and wildlfe species
Prescription VII:	**Threatened, Endangered, and Selected Sensitive Species**
objective	The purpose ofthis prescnpbon is to provide special management for threatened and endangered (T&E) species It also includes special, selected sensitive wildlfe species which are pnmanly dependent on late seral stage conditions This prescnpbon also emphasizes retention and enhancement of sensitive plant species, old-growth vegetabon, and hardwoods. Sensitive fish and wildlife species, which are dependent on npanan areas, would **be** managed in accordance with the standards and guidelines in Prescription IX
Prescription VIII:	**Commercial Wood Products Emphasis/Timber Management**
Objective:	The purpose ofthis prescnpbon is to obtain an optimum bmber yield of wood fiber products from producbve forest lands limber yields are planned from sultable bmber lands to meet the timber management objectives *of* producing maximum wood fiber and sawlog volume Major investments would be made in road construction, fuels management, reforestabon, vegetation management, and timber stand improvement Timber **stands** would be managed to obtain maximum growth and yields using cultural pracbces which control compebng vegetabon (release and weeding). obtain stochng control (thinning), and minimue mortality (pest management) Rotation lengths would normally be short, ranging from 70 to 140 years and averaging about 110 years, depending on site and species Vegetative manipulabon would provlde habitat for those wldlfe species pnmarily dependent on early and mid-seral stages
Prescription IX:	**Riparian Management**
Objective:	The purpose ofthis prescription is to maintain or enhance npanan areas, wildlie and fisheries habttat, and water quality by emphasizing streamside and wetland management Multiple resource uses and activities would occur in support of, and to the extent that they do not adversely affect the mamtenance of nparian area dependent resources (e g , fish, wildlife, water quality) fish habitats would be maintained and enhanced along with those semi-pnmibve non-motonzed recreation opportunities associated with npanan areas. This prescription also emphasizes retention and/or enhancement of old-growth vegetabon The retenbon and/or enhancement of habitat for sensitive species, such as the willow flycatcher, summer steelhead, and Tnnrty bristle snail, is also an important objective This prescnpbon also provides connective habitat for migration, dispersal. and foraging for several wildlife species

Table II-3
(Continued)

Prescription X:	**Special Area Management**
Objective:	This prescription provides for protection and management of special interest areas (SIAs) and research natural areas (RNAs). Protection and management of associated amenity values, including unique plant, animal, and aquatic systems, would be consistent with special area objectives.
Prescription XI:	**Heritage Resource Management**
Objective:	The primary theme of this prescription is to protect designated cultural resource values, interpret significant archaeological and historical values for the public, and encourage scientific research of these selected properties. Visual resources, water quality, wildlife habitat, and vegetation would be protected.

Table II-4
Comparative Summary of Management Prescriptions

Resource/Activity	I Unroaded Non-Motorized Recreation	II limited Roaded Motorized Recreation	III Roaded Recreation
Facilities	Roads No new permanent roads will be constructed Trails Construct/maintain so that they are suitable for foot and equestrian travel	Roads Construct/maintain at low density Primary service level D roads with a limitted amount of service level C Trails Construct/maintain so that they are suitable for foot and equestrian travel, some open to motorized vehicles	Roads Construd maintain in harmony with roaded natura ROS activities Trails Construct/maintain in harmony with roaded natura ROS activities
Fire and Fuels	Shaded fuelbreak allowed adjacent to high risk areas only, preattack facilities limited to safety zones and helispots, utilize low impact suppression techniques	Provide shaded fuelbreaks where beneficial, preattack facilities limited to safety zones and helispots, favor low impact suppression tactics	Locate preattack facilities to minimize conflicts with recreation use, fuel treatment to emphasize utilization
Minerals	Mineral activity t x ted, prospecting access could be restricted	Mineral activity not affected, timely reclamation emphasized, in national recreation areas, no new loc arc p d and all minerals are subject to leasing procedures	Mineral activity not affected, timely reclamation emphasized, in national recreation areas, no new locations are permitted and all minerals are subject to leasing d
Range	Establish stocking and management levels needed to maintain or improve range to satisfactory condition	Establish stocking and management levels needed to maintain or improve range to satisfactory condition	Establish stocking and management levels needed to maintain or improve range to satisfactory condition
Recreation: Off-highway Vehicles **(OHV)**	Closed to OHV use except for emergency purposes	Open to OHV use on designated trails and areas rated suitable for OHV use Use restricted in major recreation and wildlife areas	Open to OHV use on designated trails and areas rated suitable for OHV use Use restricted in major recreation and wildlife area.
Recreation: **Rec. Opportunity** Spectrum **(ROS)**	Semi-Primitive Non-Motorized Recreation (SPNM)	Semi-Primitive Motorized Recreation (SPM)	Roaded Natura (RN)
limber	No harvest, removal limited to dead, dying or high risk **trees** due to catastrophic events	Primarily minimal management using stand maintenance or salvage. a limited amount of regeneration harvest	Primarily modified management, uneven-aged or minimal management. no harvest in the Shasta Unit of the National Recreation Area (NRA)
Visual **Quality**	Management activities will meet retention (R) and partial retention (PR) as indicated on the adopted Visual Quality Objective (VQO) map	Management activities will meet adopted VQOs of R and PR as shown on the adopted VQO map	Meet VQOs of R, PR, or modification (M) as indicated on the adopted VQO map
Wild & Scenic Rivers	This prescription applies to "wild" portions of a wild and scenic rivers designation	This prescription applies to "scenic" portions of a wild and scenic rivers designation	This prescription applies to "recreation" portions of a wild and scenic rivers designation

Table II-4
(Continued)

Resource/Activity	IV Roaded, High Density Recreation	V Wilderness Management	VI Wildlife Habitat Management
Facilities	Roads ti :t/r nt: r accessing recreation areas and activities Trails Construct and maintain to serve as short links to primary transportation facilities	Roads N roads allowed Trails Construct/maintain trails to serve pnmitive theme	Roads Manage use and density to provide for wildlife needs. Trails Manage use to provide for wildlife needs
Fire and Fuels	Control wildfires at smallest possible size. fuel treatment to emphasize utilization	Locate incident bases and staging areas outside wilderness, use low impact suppression techniques and utilize natural barriers	Fuel treatment to be determined in project analysis. leave sufficient dead/down material to meet wildlife needs
Minerals	Mineral activity not affected, timely reclamation emphasized	Locatable mineral activity prohibited subject to valid existing rights. mineral material and leasable mineral development prohibited	Mineral activity not affected
Range	Herd and/or fence to keep livestock out of recreation sites as needed	Grazing will continue. when establishment pre-dated the wilderness, at a level consistent with the maintenance of wilderness characteristics	Establish proper use standards for livestock consistent with wildlife needs, give preference to wildlife in major conflict areas
Recreation. Off-Highway Vehicles (OHV)	Open to OHV use on designated trails and areas rated suitable for OHV use Use restricted in major recreation and wildlife areas	Closed to OHV use, except for emergency purposes	Open to OHV use on designated trails and areas rated suitable for OHV use Use restricted in major recreation and wildlife areas
Recreation: Rec Opportunity Spectrum (ROS)	Rural (R)	Primitive (P). SPNM	Roaded Natural (RN)
Timber	No harvest, removal limited to dead, dying or high risk trees	No harvest	Primarily modified management, uneven-aged and/or minimal management
Visual Quality	Management activities around developed recreation sites will meet retention (R) and partial retention (PR) as indicated on the adopted Visual Quality Objective (VQO) map	Management activities will meet preservation (P) VQOs	Management activities will meet R, PR. or modification (M) as shown on the VQO map
Wild & Scenic Rivers	Not applicable	Applies to wild and scenic rivers if located within wilderness	Not applicable
Wildlife	Manage existing management indicator species (MIS) habitats to provide for species which are tolerable to high human activity or disturbance–factor	Allow animal and plant populations to cycle naturally with little active management by humans	Manage to enhance habitats for selected MIS at emphasis levels, resulting in possible population increases. manage T&E and sensitive plants and animals to maintain and/or increase populations

Table II-4
(Continued)

Resource/Activity	VII Threatened, Endangered and Selected Sensitive Species	VIII Commercial Wood Products Emphasis/ Timber Management	IX Riparian Management
Facilities	Roads Limt road use and densty wthin wildlfe habitats Trails Limt use where conflicts wth wildlfe occur	Roads Construct/maintain a road system to efficiently access timber areas Trails Construct/maintain to meet Roaded Natural (RN) or Rural (R) ROS	Roads Restrictions on location of stream crossings and densty Trails Same as roads
Fire and Fuels	Fuel treatment to be determined in project analysis, meeting wildlife needs has priority	Fuel treatment wil be managed to enhance timber and ne g production while meeting watershed and wildlife ie	Treat fuels causing watercourse damag use low impact suppression techniques and minimize mechanical disturbance, no broadcast t
Minerals	Mineral activity restricted within T&E areas. not affected b sensitive species	Mineral activity not affected	Mineral activity not affected, timely reclamation required
Range	Manage livestock number and use to prevent any adverse impacts to T&E and sensitive species habtat and any adverse disturbance to existing populations	Seek opportunities to use livestock as a tool on transitional range to reduce competition for tree species, emphasize forage production for livestock and wildlfe on unsuitable bmber lands	Manage livestock to prevent significant adverse imoacts to riparian habitat, wildlie use has priority over livestock use where conflicts exist
Recreation: Off-Highway Vehicles (OHV)	Open to OHV use on designated trails and areas rated suitable for OW use Use restncted in major recreabon and wldlfe areas	Open to OHV use on designated trails and **areas** rated suitable for OHV use Use restncted in major recreabon and wildlife areas	Open to OHV use on designated trails and areas rated suitable for OW use Use restncted in major recreabon and wildlife areas
Recreation: Rec. Opportunity Spectrum (ROS)	SPM. R N subject to wldlfe habitat needs	Rand RN	SPNM, SPM, RN. R subject to ripanan area management requirements
Timber	Timber harvest subject to needs of species based on approved recover/ or management plans	Timber management emphasized. all timber practices are allowed subject to standards and guidelines	Timber harvest minimal to meet nipanan standards, timber pracbces only allowed if necessary for maintenance and/or improvement of ripanan values
Visual Quality	Manage to meet Rand PR as indicated on the adopted VQO map	Management activities will usually meet a VQO of M and maximum moddcabon (MM) wth same areas meeting PR as shown on the adopted VQO map	Management activities will meet VQOs of R and PR as shown on the adopted VQO map
Wild & Scenic Rivers	Applies to wild and scenic nver corridors where T&E or sensitive species habtat occurs	Not applicable	This prescnption applies to ripanan areas wthin wild and scenic river comdors
Wildlife	Manage T&E species to achieve recovery goals, manage sensitive species to prevent listing	Mai ab tats c v able populations of management indicator species (MIS) 2nd sensitive species with emphasis on early seral stage species	Manage to maintain or enhance an habitats fo MIS that are totally dependent on or significantly utilize these areas

Table II-4
(Continued)

Resource/Activity	X Special Area Management	XI Heritage Resource Management
Facilities	Roads No new road construction allowed Trails Limited to meeting area objectives	Roads No new roads will be constructed, reconstruction allowed only if no signficant advene impacts are created Trails No new trails constructed
Fire and Fuels	Not allowed except for research purposes in Research Natural Areas (RNAs), within Special Interest Areas (SIAs) Utilize suppression tactics that use the least possible impacts to SIA values	Utilize suppression tactics that cause the least possible impacts to cultural resource values
Minerals	Locatable mineral development prohibted upon area withdrawn from mineral entry, subject to valid exisbng nghts. mineral matenal and leasable mineral development prohibited	Mineral activity subject to cultural resource requirements. extensive mitigation could be required
Range	Livestock grazing may take place if it does not conflict with the primary intent of the RNA or SIA	Prevent damage to stes from livestock by utilizing fencing or other restrictive practices
Recreation. Off-Highway Vehicles (OHV)	Open to OHV use on exisbng designated roads only Closed to OHV use where there are no existing roads	Closed to OHV use
Recreation Rec. Opportunity Spectrum (ROS)	SPNM	SPNM. SPM. RN
Timber	No harvest	No harvest
Visual Quality	Management activities will meet VQOs of P as shown on the adopted VQO map	Management activities will n a VQO range consistent with cultural site purpose. ranging from R to MM
Wild & Scenic Rivers	Not applicable	Not applicable
Wildlife	Protect (but do not actively manage) the habitats for exisbng wildlie species	Manage habitats for viable populations of species occurring in the area

Individual Alternative Descriptions

Each alternative is summanzed below, beginning with the Preferred Alternative (PRF), followed by the 1990 RPA Program Emphasis Alternative (RPA), the No Action/No Change Alternative (CUR), and the Citizens for Better Forestry Alternative (CBF) Each is summanzed in terms of

a The theme and resource objectives of the alternative.

b Environments to be created or retained as a result of implementing the management direction.

c The number of acres devoted to each management prescription, and

d Outputs and costs Outputs are planned for decade 1, potential outputs are shown for decades 2 through 5 for long-term comparisons and disclosure of environmental consequences

Specific outputs for each resource are compared by alternative in **Table 11-16**

Further details on the impacts and interactions of activities and outputs are found in Chapter IV, Environmental Consequences Finally, Appendix B discloses how each alternative was modeled during the analysis process

Alternative PRF (Preferred Alternative)

Theme. The goal of Alternative PRF will be to propose a combination of commodity and amenity outputs, goods, and sewices in response to balancing national goals with local needs

This alternative will provide a wide range of developed and dispersed recreation opportunities in a variety of settings Special resource management emphasis will be given to riparian areas, wild and scenic riven, and Mt Shasta Grazing will be maintained at current levels while fishenes will receive increased emphasis

First priority in ecosystem management will be to return the landscape patterns to those that will have occurred without the exclusion of fire A large portion of the landscape is densely vegetated and has unacceptable fuel accumulations that make it a candidate for unacceptable insect, disease, and wildfire events This will be accomplished, while protecting the other resource values, through a combination of thinning. fuel treatments, and prescribed fire

This alternative will provide timber outputs at about one-third of historic levels due to an increased emphasis on other resource values such as late-successional dependent species habitat and the aquatic resource

On the land available for timber harvest, timber outputs will be provided from the more productive lands while maintaining natural appearing landscapes in high use recreation areas and along major travel routes Protection and maintenance of habttat for wildlife species that are dependent on early and late seral stages are important considerations

Refer to **Table 11-6** for outputs in this alternative

Resource Objectives

Air Quality

Emphasis will be to manage for utilization of fuels management and logging residue to reduce the amount of prescribed burning On some landscapes, burning will be required as an integrated part of ecosystem management Where burning is required to meet management objectives, it will be done only on approved burn days

Biological Diversity

Allocations will have the effect of emphasizing later seral stage vegetation All seral stages will remain within the five percent requirement Chaparral will cycle naturally with the use of fire (see the Fire and Fuels section) Through fire/ecosystem research, begin to return fire to its natural role as a major component of biological diversity See the Wildlife section for more details on biological diversity

In Alternative PRF, over 1,400,000 acres of vegetated lands will be allowed to "cycle naturally" after landscapes are brought into a condition where their response to natural disturbance would be acceptable Thinning and other fuels management related activities will be required where fire has been unnaturally excluded from the ecosystems for the past 80-100 years These treatments will put the vegetation in a condttion where natura events will not always result in undesirable catastrophic damage

Cycling naturally is defined as continuing through the processes of succession without major induced management by humans Natural processes will occur such as insects, disease, flood, fire, windthrow, etc. Some management by humans, such as fish/wildlife habitat improvement projects will be allowed to occur The potential estimated effects of "cycling naturally" for a 50 to 150 year period (very short ecological timeframe) will include but not be limited to

- Loss of human-induced early seral stage areas,
- tending stands to move towards climax conditions (older seral stages),
- accumulation of dead standing/down matenals,
- loss of existing human-induced fragmentation (clear-cuts, roads),
- more homogeneous stands,
- reduction in total numbers of some plant/animal species (early seral stages) with increases in others (moderate to older stages),
- an increase in the area occupied by climax species,
- initial increase of shrubhardwood species in some areas,
- reduction of shrubhardwood species in closed canopy situations,
- occurrence of natural fire with some induced fire suppression by humans, and
- reduction in active road systems

Biomass

Logging residues, available for biomass utilization, will be generated on approximately 6,400 acres per year in the Ist decade Smaller material will also be generated from precommercial thinning activities on about 2,600 acres per year

Biomass will be available for personal use firewood, energy-producing wood-burning plants, and other appropnate uses Material will be left in sufficient quantities to provide adequate wildlife habitat and to maintain soil productivity Excess quantities of biomass will be reduced in conjunction with treatment methods including prescribed fire

Botany

There are no Federally designated threatened or endangered plant species on the Forests

Sensitive. Akernative PRF will emphasize maintenance of viable populations of all native plant species Management practices will ensure that no species become threatened or endangered because of Forest Service activities

Sensitive plant populations will be mapped and recorded Selected populations will be monitored, and a Species Management Guide will be developed for each species

Until these guides are developed viability will be maintained by managing habitat to perpetuate the species In most cases this will involve protecting populations from disturbance There are instances, however, where disturbance may be necessary to maintain viability of certain sensitive plant species Land acquisition, special area designations, and cooperative management plans will be used as protection tools

Forest Endemics. Populations of endemic plants will be napped and their habitats protected, where feasible, until Forest Endemic Management Guides are developed

Population information for sensitive and Forest endemic plants will be shared regularly with the California Natural Diversity Data Base and other appropriate agencies

Heritage Resources

Heritage resource management activities will include increased evaluation of sites to determine resource values so that appropriate management direction can be determined Areas subject to ground-disturbing activities will be nventoried Identified historic properties will be valuated before undertakings will commence Eligible heritage resources will be nominated to the National Register of Historic Places Inventory work in support of other resources (e g ,timber) will diminish from the level of recent years since re-entry of previously surveyed areas e g ,timber compartments) will occur Surveys associated with ecological unit inventories will increase

n response to new direction in the Heritage Resources Program, increased interpretation and enhancement of Prescription XI (Heritage Resources Management) areas will take place Monitoring activities will increase Access, ise, and integrity of traditional sites and locations important to Native American religious and heritage practices

will be emphasized Public participation (e g , through partnerships, Passport In Time projects, etc) will be encouraged

Facilities

Structures. The administrative site facilities at the Northern Califomia Service Center (NCSC). Hyampom, Big Bend, Hayfork, Weaverville, McCloud, Harrison Gulch, and Lake Shore will be upgraded.

In the interest of cost effectiveness, administrative site leases will be eliminated in favor of agency-ownedfacilrties A possible exception may be the public information contact site at the south (northbound) arrival station for the Shasta Unrt of the Whiskeytown-Shasta-Trinity National Recreation Area (NRA)

Recreation facilities will receive heavy maintenance and some will be upgraded to handle present-day recreation vehicles and to better serve users Some fire lookouts will be replaced or upgraded because of their extremely poor condition

All facilities will be operated in a reasonably safe and efficient manner This may require construction. reconstruction and/or obliteration of some buildings or systems

Bridge construction and replacement will stress permanent bridges on arterial and collector roads and local roads which are open to the public

Transportation. The arterial/collector/local road system will be increased and reconstructed as shown in **Table 11-6** No signlficant changes in classlfication or jurisdiction will be planned Seasonal road closures will be recommended to prevent damage to roadway facilities and adjacent resources such as sensitive wildlife areas and highly erosive soils These closures will take place as needed to meet the Forest standards and guidelines The road and trail system will be evaluated for compliance with the Riparian Reserve standards and guidelines (see Riparian Reserves and Management Prescription IX in Chapter 4 of the Forest Plan)

Operation and maintenance of the Forests' transportation system will be similar to present standards No major changes in construction or reconstruction standards will be anticipated Upgrading of selected important arterial/collectors will be emphasized to increase safety and reduce maintenance and haul costs including provisions to better accommodate passenger cars

Special emphasis will be given to creating scenic byways to accommodate the needs of those driving for pleasure Some scenic byways may be created in cooperation with neighbonng Forests, the State, Counties, and cost share cooperators.

New trail construction will remain low, but a trail or system of trails will be developed on Mt Shasta.

Maintenance of the Forests' trail system will continue to emphasize logging out for access, prevention of resource damage, and safety of the users

Fewer cost-share agreement supplements will be processed, since most of the large private land parcels have been accessed

Fire and Fuels

Fire suppression will be at the most efficient level as determined by the National Fire Management Analysis System (NFMAS)

Acres burned are expected to be greater than historical averages due to the higher fuel loading across the Forests as a result of other resource needs This will be due to the allocation of over 500,000 acres to Late-Successional Reserve/Prescription VII (Threatened, Endangered, and Selected Sensitive Species). This allocation allows minimal vegetation management and associated fuel treatments and/or the treatment of natural fuels unless the treatments can be shown to benefit the old-growth characteristie; of the reserve

Overall it is intended to treat all landscapes in a manner that returns them to a condition that would have happened naturally had fire not been excluded for the past 80-100 years For this to happen the forest will need to treat 30,000-90,000 acres per year Treatment of natural fuels and resource activity-created fuels is projected to be approximately 20,000-50,000 acres annually in the short term Fuels from timber harvesting will be decreased due to a decrease in overall harvesting on the Shasta-Trinity National Forests All vegetation treatments including fuels treatment and timber harvest will be done in conjunction with the overall requirements or desired future condition of the ecosystem

In conjunction wrth research, a program will begin during this planning period to restore fire to its natural role in the ecosystem The objective will be to institute prescnbed natural fire on all areas bumed during the last decade In addition, all areas that have had mechanical fuel reduction,

wildernesses and some areas where prescnbed fire can be used to restore the natural ecosystem wthout pnor treatment will be included

Protection efforts will be emphasized in high value plantation areas Flammability reduction will be utilized to help protect plantations Wthin the Wildernesses the use of planned and unplanned ignitions for prescnbed fire will be utilized The anticipated burn characteristics will approximate those of pristine or near pristine conditions. Mosaic patterns for wildlife species diversity will be stressed Wildfire suppression tactics and strategies will utilize "light hand on the land" as found in National Interagency Fire Line Handbook Forest Service Handbook (FSH) 5109 32a.

Fisheries

Emphasis will be for protection and restoration of Key Watersheds as defined in Chapter 4 of the Forest Plan

Habtat typing surveys and evaluations will be completed on selected anadromous fish streams, on selected red-band trout streams with 50 percent or more adjacent National Forest land ownership, on most Class I and 2 mqor perennials, and on a few Class III minor inland fish streams

Streamside riparian inventories will be completed on most Class I anadromous fish streams

An increased reliance will be placed on the natural long-term recovery of non-sensitive and senstive anadromous fish habtat

Habtat improvement will occur for anadromous fish in the Trinity Rver Basin, warmwater fish at Shasta and Trinity Lakes and inland coldwater fish on major perennial inland fish streams Surveys will be undertaken to analyze the need to implement habitat improvement on minor perennial inland fish streams Direct fish habrtat improvements will occur for rainbow trout and winter-run steelhead to accommodate a greater portion of major consumptive sportfishing

Forest Pests

Maintaining and improving forest health is a guiding objective This altemative will allow and require that consideration of a full range of pest management measures be integrated into resource management planning and activties Detection, evaluation, and control of pest-caused damage will be intensively practiced over those lands where vegetation will be actively managed This is particularly true where vegetation management is practiced in order to meet timber, wildlife, recreation, or other resource objectives.

Minerals

The orderly development of mineral resources will be encouraged Any adverse impacts of mineral related activities will be minimized through required lease stipulations and the administration of plans of operation Plans of operation will require reclamation of lands disturbed by mining

Range

Overall, livestock grazing will be the same as current levels Grazing use will be reduced wthin the transitory range in Late-Successional Reserves Opportunties for improved range management, particularly in riparian areas, will increase over the present level Grazing use will be managed so that riparian habitats are maintained or improved Water sources will be developed to meet domestic livestock needs.

Standards and Guidelines in Chapter 4 of the Plan provide for specific utilization standards and ecosystem objectives as they relate to livestock use

Recreation

The recreation potential of the Shasta-Trinity National Forests is displayed in 12 geographic "recreation theme areas" These areas represent the framework for developing management opportunities over the next 5 decades They respond directly to projected recreation demand increases identified in the 1989 USDA Forest Service RPA Assessment The objective is to identify and develop unique recreabon opportunities offered by each theme area, rather than to provide identical opportunities in all locations.

Theme areas will be emphasized in decades I and 2, they will be maintained through decades 3, 4, and 5 Descriptions of these theme areas can be found in the Recreation Section of Chapter III of the FEIS

All developed recreation sites will be operated at the standard service level by the end of the 1st decade Assistance from recreation service partners and volunteer organizations will be required to achieve standard service

levels Substandard campgrounds will be rehabilitated at the rate of 6,750 PAOT (people-at-one-time capacrty) per decade (135 camping units per year) Picnic sites will be rehabilitated at the rate of 509 PAOT per decade (10 picnic units per year) Interpretive sites will be rehabilitated at *the* rate of 500 PAOT per decade (five interpretive sltes per year) Trailheads will be rehabilitated at the rate of 1,000 PAOT per decade (two trailheads per year)

Trails will be maintained at the standard service level by the end of the 1st decade Trails will be reconstructed at the rate of 50 miles per decade (five miles per year) Trails on the Trinity side of the Forests will have priority for reconstruction efforts Forest personnel will recruit assistance from volunteers and organizations to leverage Forest Service trail budgets

New recreation construction will address facilrty needs within the recreation theme areas Campgrounds will be constructed at the rate of 500 PAOT per decade (two 50 unit campgrounds per decade) Picnic sites will be constructed at the rate of 500 PAOT per decade (ten 10 unit picnic sltes per decade) Interpretive sites will be constructed at the rate of 300 PAOT per decade (30 interpretive sites per decade) Visitor information stations will be constructed to provide an additional 400 PAOT (two centers constructed in the 1st decade only) New trailheads will be constructed at a rate of 500 PAOT per decade (one trailhead per year)

New trail construction emphasis will be in the recreation theme areas These trails will be constructed at the rate of 50 miles per decade (five miles per year) Newly constructed trails will replace old, substandard trails In the first 50 years, this will result in 250 miles of new trail

Wildernesses will be operated at the standard service level by the end of the 1st decade Emphasis will be to protect and preserve the wilderness qualrty while maintaining its availabilrty for use and enjoyment

Forest off-highway vehicle (OHV) trails and low-standard roads will serve as part of a statewide system and provide long-distance touring opportunities

Riparian Areas

Maintenance and improvement of riparian resources will be emphasized Practices to protect stream courses and ripanan resources are included in the Rparian Reserve allocation and the ripanan prescription Standards and Guidelines (Chapter 4 of the Plan) which vary in width They average 350 feet on both sides of Class 1 and 2 streams and 150 feet on both sides of Class 3 and 4 streams Timber management and other ground-disturbing activrties will not be permrtted within the Rparian Reserve allocation until a watershed analysis determines that the reserve widths or standards can be modified Rparian Reserves will also serve as travel corridors for wildlife

Soils

Soils will be managed to maintain or improve soil productivity and to prevent excessive surface erosion. mass wasting, soil compaction, and cumulative watershed impacts A sufficient amount of woody debns and slash will be left after management activrties to provide soil protection and organic material Management activrties within unstable areas, such as active landslides and inner gorges, will be restricted Areas with highly erosive soils will be closed to OHV use

Special Areas

Research Natural Areas (RNA) This alternative will allocate 23,260 acres of National Forest lands to RNAs Under this alternative, 8 areas will be allocated See **Table IV-8** in Chapter IV for a listing of these areas

The Pacific Southwest Research Natural Area Commrttee's refined target system will be used to guide the future selection of RNA candidates Information from the Calrfornia Natural Diversity Data Base will be used to assist in locating suitable examples of the target elements

A management plan will be wntten for each RNA

Special Interest Areas (SIA). Nineteen areas, totalling 6,981 acres, will be recommended for SIA designation Twenty-two addltional areas will be evaluated for their potential SIA classlfication (Refer to **Table III-14** and the SIA section in Chapter III for a listing of these areas)

Sites in the California Department of Fish and Game (DFG) inventory of signlficant natural areas will be considered for SIA candidate status

A management plan will be developed for each SIA

Timber

Timber management activities will be conducted to achieve a wide vanety of resource objectives This alter-

native will result in an average annual allowable sale quantity (ASQ) of 82 million board feet (MMBF) in the Ist decade from a suitable timber land base of about 530,000 acres (52 MMBF from the Shasta Forest and 30 MMBF from the Trinrty Forest)

On approximately eighty three percent of the acres surtable for timber production, timber management activrties will be relatively intensive and yields will be high to moderate In specially designated areas, timber management will be modified to attain other resource objectives, such as maintenance of visual qualrty and/or wildlie habrtat On about seventeen percent *of* the surtable acres, timber management will be minimal in order to emphasize other resource uses, such as semi-primrtive recreation, or because of site limitations which preclude intensive timber management

Approximately 540,000 sultable acres will not be available for timber management in this alternative due to land allocations to other non-timber uses, which preclude timber harvesting on a regular basis

A mix of silvicultural systems will be used to meet management objectives, with an emphasis on even-aged systems An estimation *of* the average annual acres and volume harvested in the Ist decade, by cutting method, is shown in **Table II-5**. This estimate does not take into consideration the initial ecosystem management priorrty of vegetation treatments that will return the landscape to a vegetation pattern that more closely resembles what will be there had fire not been excluded for the past 80-100 yean This will require thinning and fuel treatments to occur at higher levels until ecosystem objectives are met After these ecosystem objectives are met treatments will occur as shown in **Table 11-5**

The timber on suitable lands will be managed on an average 120 year rotation (minimum *90* years) This timber harvest schedule will result in about 12 1 percent of the sultable acres being treated in the Ist decade About 6 6 percent of the sultable acres will be regenerated in the Ist decade in this alternative

Even-aged management will be the primary regeneration systems used on lands where timber is intensively managed Units will generally be 5 to 20 acres, and average about 10 to 12 acres in size. Reserve trees will be retained wrthin regeneration unrts whenever feasible, including salvable sub-merchantable conifers and large green trees Clearcutting will be used only when it is the only alternative to meet land management objectives Clearcutting will be used primarily on understocked stands on steep slopes

4 mix of even-aged and uneven-aged systems, with an emphasis on selection cutting, will be used on lands where timber management is modified for other resource objectives pnmarily in areas managed for wildlie or visuals

Stand maintenance, or salvage, will be the primary system used on lands where timber management is minimal

Emphasis will be on regeneration *cutting* of understocked stands and stands which are growing poorly Regeneration cutting will result in an average of 3,500 acres of reforestation per year in the Ist decade A combination of artificial and natural regeneration will be used to regenerate the Forests Reforestation will be done using a species mix native to the Forests

The timber harvest schedule for this alternative will result in an average annual net growth of about 156 MMBF on suitable lands by the 5th decade This growth represents

Table II-5
Timber Cutting Methods {Alternative PRF)

	Acreage		Volume	
Cutting Method	**Acres**	**Percent**	**MMBF**	**Percent**
Clearcut	0	0	0	0
Green Tree Retention*	2,000	31	38	46
Selection	1,500	23	*20*	34
Commercial Thinning	2,000	31	12	15
Salvage	930	14	4	5
Totals	**6,430**	**100**	**82**	**100**

* Includes Shelterwood cuts

an average of about 285 board feet per acre per year on suitable lands

Release of confer seedlings (chemical and non-chemical) from competing vegetation will occur on approximately 4,000 acres per year, primarily on lands where timber growth and yield is emphasized

On suitable timber lands, hardwoods will be managed to provide a continuous supply of firewood and biomass, while providing for wildlfe habitat needs Pure hardwood stands will not be artificially converted to confers for timber production purposes

Visual Quality

Visual qualrty will be emphasized along candidate state scenic highways, in the National Recreation Area, on Mt Shasta, around developed recreation sltes, and in major dispersed recreation areas Visual qualty will also be emphasized in the foreground of other sensitive travel corndon An expanded wild and scenic nvers system and several new special interest areas will be managed in the foreground to provide protection for visual quality Wildernesses will be managed to preserve the characteristic landscape Moderate protection will be provided for the scenic setting of waterways Late-Successional and Riparian Reserves will provide addltional visual qualrty protection

On about 25 percent of the Forests management activrties will be noticeable on the landscape Roads and vegetative openings will be out of scale with the charactenstic landscape Openings will be compatible wrth natura. shapes

This alternative will provide a high degree of emphasis on visual quality. This is because a small portion of the land base area will be allocated to allowing wood fiber production and the larger area set-aside for threatened and endangered species and wildemess, etc

Water

The pnmary emphasis will be to maintain or improve water qualrty and quantrty in order to meet domestic use needs and fish habltat requirements The pnmary objective will be to maintain the qualty of water at or above State objectives This will be accomplished through implementation of supplemental management direction for appropnate management areas (refer to the Forest Plan), and through the use of Best Management Practices (BMPs) (See the Rpanan Areas section for a discussion of Rpanan Management Zones)

Degraded watersheds will be improved at the rate of about 300 acres per year No specific management objective will be planned for the purpose of changing water yield

Wild and Scenic Rivers

This alternative will include I06 4 miles (National Forest land only) of existing Wild, Scenic, and Recreation Rivers including New River, the North Fork Trinrty River, the South Fork Tnnty Rver, and the mainstem Trinity Rver An addltional 79 7 miles (National Forest land only) of study rivers will be recommended for designation (Beegum Creek, Canyon Creek, Hayfork Creek, the upper segments of the North Fork and South Fork Tnnty River, and Virgin Creek) Complete descriptions of these nvers are presented in Appendix E The existing and proposed rivers will be recommended for Congressional designation

Charactenstics which make the Lower McCloud Rver, Upper McCloud River, and Squaw Valley Creek eligible for wild and scenic river classification will be retained through development of a Coordinated Resource Management Plan with the private landowners along the river.

Recommend that the State of California include the Sacramento Rver, between Box Canyon and the NRA boundary, as part of the State's Wild and Scenic Rver System That portion of the river meets recreation eligibilrty standards for wild and scenic nver designation However, about 84 percent of the adjacent lands are privately owned

Wilderness and Roadless Areas

Existing Wildernesses will be maintained under this alternative Included will be the Yolla Bolly-Middle Eel Wilderness with 36,805 acres (Shasta-Tnnrty National Forests' portion only) as well as the Wildernesses designated in the 1984 Calfornia Wildemess Act Acreage shown is National Forest land only

Wilderness	Acres
Castle Crags	10,483
Chanchelulla	7,800
Mt Shasta	38,560
Trinity Alps	405,128

A total of 498,776 acres on the Shasta-Trinity National Forests will be managed as part of the National Wilderness Preservation System.

Approximately 81 percent of the 29 released roadless area's acreage will remain undeveloped This occurs because much of the later seral stage vegetation exists in these roadless areas, it was allocated as Late-Successional Reserve or to unroaded non-motorized (Prescription I)

The Mt Eddy Further Planning Area (7,720 acres) will be managed primarily for semi-primitive non-motorized and semi-primtive motorized recreation

Wildlife

Wildlife management objectives will maintain habitat to support all species on the Forests at or above viable population levels The distribution and vanety of wildlife habrtat will be maintained

Management indicators, or wildlife assemblages, will be managed to benefit all species that are represented by the assemblage Forest standards and guidelines pertaining to special habitat components (i e , snags, hardwoods, dead and down material, seral stages, etc.) will set the minimum level of management throughout the Forests

Hardwood forest types will be managed primarily for the benefit of wildlife and not for conversion to conifen.

In the Ist decade, the average direct habitat improvement will be done annually on 5,050 acres

About 172,000 acres will be allocated to Prescription VI (Wildlife Management) in this alternative Included in this prescription are deer winter ranges and 5,000 to 6,000 acres of bitterbrush Timber management activities will beneft wildltfe This prescnption provides an average of at least 30 square feet of basal area per acre in hardwoods, and minimizes disturbances to wildlife that may take place through use of the Forests' transportation network

Wildlife - Threatened, Endangered (T&E), and Sensitive Species

All known or future sites of Federally listed threatened or endangered (T&E) species or Regional Forester identrfied sensitive species will be fully protected and managed according to the recovery plan and/or habitat requirements for each species

Environment to be Created

By the year 2040, about 90 percent of the Forests will remain in a fairly natural condition This percentage will be in relatively large, contiguous blocks including five wildernesses, eight research natural areas, eight wild and scenic rivers, Late-Successional Reserves, and Riparian Reserves

Areas managed for their riparian values will contribute to a naturally appearing landscape Large portions of the 29 former roadless areas will remain unroaded

Areas seen from State highways, county roads, forest roads with high recreation use, and recreation srtes will remain relatively unchanged. Forest activties will not be evident in areas wth distinctive landscapes

On the remaining 10 percent of the Forests, forest management activities will be evident These areas will be modified to varying degrees by activties such as timber harvesting, road construction, developed recreation areas, and mining Openings created by timber cutting will be apparent but well dispersed throughout the area

In 50 years, about 8 percent of the Forest will consist of stands which are less than 50 years of age These regenerated stands will generally consist of larger even-aged stands (greater than 5 acres) on about 6 percent of the Forests Smaller even-aged and uneven-aged stands will be normal on the remaining 4 percent of the Forests where timber activities occur

Wildlife habitat will be less diverse than it is today, with more habitat in the late seral stages and less habitat in the early seral stages

The number of acres allocated to each Management Prescription under Alternative PRF follows

Table 11-6
Average Annual Outputs by Decade - Alternative PRF*

Resource Element	Base Year** 1989	'90 RPA Goals.' I	DECADE I	2	3	4	5
Economics							
Total Budget (MM$)	40		41 8	44 1	45 6	47 2	49 7
Total Cost (MM$)	44		55 4	57 8	59 3	60 9	63 3
Facilities							
Transportation							
Trail Construction/Reconstruction (miles)	0/1		5/5	5/5	5/5	5/5	5/5
Road Construction (miles)	63		3	5	5	5	5
Road Reconstruction (miles)	73		22	22	20	20	21
Road System (miles)	6,500		5.700	4.900	4.900	4.900	4.900
Dams and Reservoirs (number)							
Forest Sewice	2		2	2	2	2	2
Other Federal	3		3	3	3	3	3
Other State/Local	1		1	1	1	1	1
Pnvate	10		10	10	10	10	10
Administrative Sites (number)							
Forest Sewice Owned	24		26	26	26	26	26
Leased	2		0	0	0	0	0
Fire and Fuels							
Total Fuel Treatment (acres)	6,300		30,000	30.000	90,000	90,000	90.000
Ecosystem Management Related Treatment	1,500		26,500	26.500	86,500	86,500	86,500
Timber-Related Fuel Treatment	4,500		3,500	3,500	3,500	3.500	3.500
Expected Acres Burned by Wildfire			11,000	11,000	11,000	11,000	11,000
Intensity Class 1	32		55	55	55	55	55
Intensity Class 2	48		154	154	154	154	154
Intensky Class 3	774		330	330	330	330	330
Intensky Class 4	850		451	451	451	451	451
Intensky Class 5	3.345	-	4,686	4,686	4,686	4.686	4,686
Intensity Class 6	1,350		5.324	5,324	5,324	5,324	5,324
Fish							
Inland Fish Other Than T&E							
(M Pounds)	1,424	1,794	1.817	1,817	1.817	1.817	1.817
Anadromous Fish							
Commercial (M Pounds)	691	457	691	691	691	691	691
Sport (M Pounds)	163	142	353	353	353	353	353

* See the last page of this table for abbreviated terms and meanings
** A base year of 1989 and the 1990 RPA program were used as instructed by the Regional Guide for *the* Pacific Southwest Region. revised 1990

Table II-6 (Continued)

Resource Element	Bare Year** 1989	'90 RPA Goals** I	DECADE 1	2	3	4	5
Fish (Continued)							
Direct Habitat Improvement							
Acres/Structures							
Inland Fish	15/25	-	30190	30190	30/90	30/90	30/90
Anadromous Fih(Commercial)	0/0	-	0/0	0/0	0/0	0/0	0/0
Anadromous Fish (Sport)	5/50	-	30/64	30164	30/64	30/64	30/64
Thousand Fish User Days (MFUDs)							
Inland Fish	396	-	410	410	410	410	410
Anadromous Fih(Sport)	40	-	160	160	160	160	160
Human Resources							
Programs (Enrollees)	50		50	50	50	50	50
Lands and Minerals							
Land Acquisition (Acres)	6,996		1,500	1,500	1,500	1,500	1,500
Minerals (Operating Plans)	122	146	125	137	151	166	183
Range							
Grazing (MAMs)	12	12	83	83	83	83	83
Recreation							
Developed Public (MM RVDs)	71		0.75	0 86	0.97	1.09	1 2
Developed Private (MM RVDs)	.49		051	0 59	0 68	0 75	0.83
Dispened (MM RVDs)	2 56	*	2.9	3 4	39	4.5	53
Wilderness (MM RVDs)	13		014	016	019	022	025
Open, Usable OHV Areas-Summer (Acres)	239 2	-	239175	239175	239175	239 175	239175
Open, Usable OHV Areas-Winter (Acres)	1762	-	176200	176200	176200	176200	176200
Roads and Trails							
Open Only to OHV Use-Summer (Miles)	0	-	0	0	0	0	0
Open Only to OHV Use-Winter (Miles)	0	-	0	0	0	0	0
Closed to OHV Use-Summer (Miles)	810		810	810	810	810	810
Closed to OHV Use-Winter (Miles)**	815		815	815	815	815	815
Ember							
Allowable Sale Quantity (MMCF)	28		12 3	12 3	12 3	12 9	13 6
Allowable Sale Quantity (MMBF)	184	-	82	82	82	86	90 4
Long Term Sustained Yield (MMCF)	-	-	15 5	15 5	15 5	15 5	15.5
Long Term Sustained Yield (MMBF)		-	1033	103.3	103.3	103.3	103 3
Reforestation (Acres)	9.400		3,500	3,500	3,500	3,500	3,500
Timber Stand Improvement (Acres)	7,800	-	5,300	5,300	5,300	5,300	5.300

* The RPA goals include wildlfe and fish user days (WFUDs) The Forest's figures depict dispersed recreation user Days only

** Refers to seasonal closure and does not include trails, such as the Pacrfic Crest Trail (PCT), where OHV use is Prohibited.

Table II-6
(Continued)

Re: rce Elemei	'Base Year** 1989	'90 RPA Goals** 1	DECADE I	2	3	4	5
Timber (Continued)							
Wood Products Other Than Sawtimber							
Firewood (M Cords)	21		25	30	30	30	30
Visual Quality							
Visual Quality Index	127.3	-	1273	130.2	131 7	131.5	131.5
Water							
Quality (M Acre feet at standard)	5,448	-	5,438	5,436	5,436	5.433	5.437
Increased Quantity (M acre feet)***	5,450		-12	-14	-14	-17	-13
Watershed Improvement (Acres)	399	706	3 w	300	300	300	300
Wildlife							
Threatened, Endangered and Sensitive Species (TE&S)							
Bald Eagle (# managed pairs)	25		32	35	35	35	35
Goshawk (# pairs)	150		150	150	150	150	150
Peregnne Falcon (# managed pain)	6		9	14	14	14	14
Spotted Owl (# pars)	97	-	170	180	190	200	210
Other Than TE&S							
Deer (M animals)	62		62	62	62	62	62
Direct Habitat lmpmvement (MWUDs)							
All Species	2		44	51	59	69	61
Acres/Structures of Direct Habitat Improvement							
All Species	1360/35		5050/150	8550/180	8652/216	8652/260	8760/310
Wildlife User Days (M WUDs)							
Consumptive Species	282	338	282	282	282	282	282
Non-Consumptive Species	282	347	282	323	375	435	504
Total WUDs	564		608	656	716	786	847

*** The value for Decades 1-5 is the dfierence between the increased quantity, in Base Year 1989, and the projected quality water yield by decade This is not an indicator of decreased water quality, only of the net increase/decrease of water yield

Abbreviated Term and Meanings for this Table
M = Thousand MM = Million MMBF = Million Board Feet MMCF = Million Cubic Feet
OHV = Off-Highway Vehicle AMs = Animal Months
RVDs = Recreation Visitor Days
TE&S = Threatened, Endangered & Sensitive
WUDs = Wildlife User Days

	Prescription- PRF	Acreage	Percent of Forest
	Congressionally Reserved Areas*	498,776	24%
V	Wilderness Management	498,776	24%
	Late Successional Reserves	53 1,520	25%
VII	Threatened, Endangered and Selected Sensitive Species	53 1,520	25%
	Administratively Withdrawn Areas	159,872	8%
I	Unroaded Nan-Motonzed Recreation	66,984	3.2%
II	Limited Roaded Motorized Recreation	59,040	2.8%
IV	Roaded, High Density Recreation	6,247	0.3%
X	Special Area Managemerit	24,031	1.1%
XI	Heritage Resource Management	3,570	0.2%
	Riparian Reserves	274,308	13%
IX	Riparian Management**	274,308	13%
	Adaptive Management Area	164,828	8%
III	Roaded Recreation	55,594	3%
VI	Wildlife Habitat Management	42,785	2%
VIII	Commercial Wood Products Emphasis/Timber Management	66,449	3%
	Matrix	492,243	23%
III	Roaded Recreation	144,298	7%
VI	Wildlife Habitat Management	129,190	6%
VIII	Commercial Wood Products Emphasis/Timber Management	218,754	10%

* Acreage shown includes Wild & Scenic Rivers, Research Natural Areas, and Cultural Resource Areas within wlderness

** All Rparian areas will be managed according to this prescription, acreage is for Matnx and AMA only

Alternative RPA
(1990 RPA Program Emphasis)

Theme. The goal of Alternative RPA is to portray how the 1990 RPA program for the Shasta-Trinty could best be implemented

The primary objective will be to provide products and services at levels expected to help satisfy current and future demands stated in the 1990 RPA program

Expenditures will be maintained within the RPA specified budget (no more than 20 percent above the current budget)

Timber outputs will not meet historic levels or RPA targets due to policies recently established to protect the northern spotted owl

Grazing will increase over current levels

A variety of recreation opportunities will be provided, primarily in a roaded setting Most of the released roadless areas will be managed as spotted owl habitat

This alternative will emphasize wildlife species dependent upon late seral stages (e g , spotted owl), while maintaining acceptable levels of early seral stage habitat

Refer to **Table 11-8** for outputs in this alternative

Resource Objectives

Air Quality

Emphasis will be to manage for utilization of wood residue, thereby reducing the amount of prescribed burning Where burning is required to meet management objectives, it will be done only on approved burn days where conditions exist to rapidly disperse the smoke

Biological Diversity

Allocations will have the effect of emphasizing later seral stage vegetation All seral stages will remain within the five percent requirement Chaparral will cycle naturally except for a low level of induced management (prescribed fire) See the Wildlife section for more details on biological diversity.

In Alternative RPA over 1,400,000 acres of vegetated lands will be allowed to "cycle naturally" This is defined as continuing through the processes of succession without major induced management by humans Natural processes will occur such as insects, disease, flood, fire, windthrow, etc Some management by humans, such as fish/wildlife habitat improvement projects, will be allowed to occur The potential estimated effects of "cycling naturally" for 50 to 150 year period (very short ecological timeframe) will include but not be limited to

- Loss of human-induced early seral stage areas,
- tending stands to move towards climax conditions (older seral stages),
- accumulation of dead standing/down materials,
- loss of existing human-induced fragmentation (clear-cuts, roads),
- more homogeneous stands,
- reduction in total numbers of some plant/animal species (early seral stages) with increases in others (moderate to older stages),
- an increase in the area occupied by climax species,
- initial increase of shrub/hardwood species in some areas,
- reduction of shrub hardwood species in closed canopy situations,
- occurrence of natural fire with some induced fire suppression by humans, and
- reduction in active road systems

Biomass

Logging residues, available for biomass utilization, will be generated on approximately 8,900 acres per year in the 1st decade Smaller material will also be generated from precommercial thinning activities on about 2,800 acres per year

Biomass will be available for personal use firewood, energy-producing wood-burning plants, and other appropriate uses Material will be left in sufficient quantities to provide adequate wildlife habitat and to maintain soil productivity

Botany

There are no Federally designated threatened or endangered plant species on the Forests

Sensitive. Alternative RPA will emphasize maintenance of viable populations of all native plant species Management practices will ensure that no species become threatened or endangered because of Forest Service actions

Sensitive plant populations will be mapped and recorded Selected populations will be monitored, and a Species Management Guide will be developed for each species

Until these guides are developed viability will be maintained by managing habitat to perpetuate the species In most cases this will involve protecting populations from disturbance There are instances, however, where disturbance may be necessary to maintain viability of certain sensitive plant species Land acquisition, special area designations, and cooperative management plans will be used as protection tools

Population information for sensitive plants will be shared regularly wlth the California Natural Divenity Data Base and other appropriate agencies.

Heritage Resources

Hentage resources activities will emphasize evaluation *of* sites to determine resource values so that appropriate management direction can be determined Areas subject to ground-disturbing activities will be surveyed and evaluated before contracts are committed or activities commence Except for the ecological units inventories, surveys will decrease from recent years Interpretation and enhancement of Prescnption XI (Heritage Resource Management) sltes will take place in response to new direction in the Heritage Resources program Monitoring activities will increase Access, use and integrity of traditional sites and locations important to Native American religious and heritage practices will be maintained

Facilities

Structures. The administrative site facilities at the Northem California Service Center (NCSC), Hyampom, Big Bend, Hayfork, Weaverville, McCloud, Harrison Gulch, and Lake Shore will be upgraded The facilities at administrative sites will be operated in a reasonably safe and efficient condition This may require construction, reconstruction, and/or disposal of structures at each site

In the interest of cost effectiveness, administrative site leases will be eliminated in favor of agency-owned facilities **A** possible exception may be the public information contact site at the south (northbound) arrival station for the Shasta Unit of the Whiskeytown-Shasta-Trinity National Recreation Area (NRA)

Recreation facilities will receive heavy maintenance and some will be upgraded to handle present day recreation vehicles and to better serve users Some fire lookouts will be replaced or upgraded because of their extremely poor condition

Bridge construction and replacement will stress permanent bridges on arterial and collector roads and local roads which are open to the public

Transportation. The arterial/collector/local road system will be increased and reconstructed as shown in **Table 11-8** No significant changes in classlfication or jurisdiction will be planned Seasonal road closures will be recommended to prevent damage to roadway facilities and adjacent resources such as sensitive wildlife areas and highly erosive soils These closures will take place where needed to meet the Forest standards and guidelines The road and trail system will be evaluated for compliance with the ripanan standards and guidelines (see Management Prescription IX, Forest Plan, Chapter 4)

Operation and maintenance of the Forests' transportation system will be similar to present standards No major changes in construction or reconstruction standards will be anticipated Upgrading of selected important arterial/collectors will be emphasized to increase safety and reduce maintenance and haul costs including provisions to better accommodate passenger cars

Special emphasis will be given to creating scenic byways to accommodate the needs of those driving for pleasure Some scenic byways may be created in cooperation with neighboring Forests, the State, Counties, and cost share cooperators

New trail construction will be relatively high, and a trail or system of trails will be developed on Mt Shasta

Yaintenance of the Forests' trail system will continue to emphasize logging out for access, prevention *of* resource damage, and safety of the users

Fewer cost-share agreement supplements will be irocessed, since most of the large private land parcels have been accessed Maintenance of cost-share roads will be emphasized

Fire and Fuels

Fire suppression will be at the most efficient level as determined by the National Fire Management Analysis System (NFMAS)

Acres burned are expected to be greater than histoncal averages due to the higherfuel loading across the Forests as a result of other resource needs This will be due primarily to the allocation of approximately 500,000 acres to Management Prescription VII (Threatened, Endangered, and Selected Sensitive Species) which allows minimalvegetation management and associated fuel treatments and/or the treatment of natural fuels as they occur

Treatment of natural fuels and resource activity-created fuels is projected to be about 6,580 acres annually during the Ist decade Where feasible, fuels from timber harvesting will be reducedto the level needed for wildlife and watershed protection by utilization of unmerchantable material

Protection efforts will be emphasized in high value plantation areas Flammability reduction will be utilized to help protect plantations Wthin the Wildernesses the use of planned and unplanned igntions for prescnbedfire will be utilized The anticipated burn characteristics will approximate those of pnstine or near pristine conditions Mosaic patterns for wildlk species diversity will be stressed Wildfire suppression tactics and strategies will utilize "light hand on the land" as found in National Interagency Fire Line Handbook FSH 5 I09 32a

Fisheries

Habtat typing surveys and evaluations will be completed on selected anadromous fish streams, on selected redband trout streams with 50 percent or more adjacent National Forest land ownership, on all Class I and 2 major perennials. and on most minor inland fish streams

Efforts will be made to conduct more comprehensive inventones of streamside riparian areas within the Trinity hver Basin Streamside riparian inventories will be completed on most Class I and 2 anadromous fish streams

Natural long-term recovery of non-senstive and senstive anadromous fish habrtat will be de-emphasized in lieu of increased production goals

Habitat improvement will occur for anadromous fish in the Trinity River Basin and be significantly increased for warmwater fish at Shasta and Tnnity Lakes and for inland coldwater fish on major perennial inland fish streams Habtat improvement will be increased on minor perennial inland fish streams Direct fish habrtat improvements will occur for rainbow trout and winter-run steelhead to accommodate a significant portion of major consumptive sportfishing

Forest Pests

This akernative will allow and require that consideration of afull range of pest management measures be integrated into resource management planning and activities Detection, evaluation, and control of pest-caused damage will be intensively practiced on lands where vegetation will be actively managed, primarily to meet timber management goals

Minimal pest management will occur on the balance of the land base This includes protection of other lands from epidemics on National Forest lands, and the protection of the resources in these areas

Minerals

The orderly development of mineral resources will be encouraged Any adverse impacts of mineral related activties will be minimized through required lease stipulations and the administration of plans of operation Plans of operation will require reclamation of lands disturbed by mining

Range

Grazing use will increase by about I7 percent from current levels Grazing allotments wthin Wildernesses will be maintained Opportunities and expenditures for intensified range management will be increased over the present stuation Water sources will be developed to meet domestic livestock needs

Recreation

The recreation potential of the Shasta-Trinity National Forests is displayed in I2 geographic "recreation theme areas" These areas represent the framework for developing management opportunities over the next 5 decades They respond directly to projected recreation demand increases identified in the 1989 USDA Forest Service RPA Assessment The objective is to identify and develop unique recreation opportunties offered by each

theme area, rather than to provide identical opportunities in all locations

Theme areas will be emphasized in decade I, they will be maintained through decades 2, 3, 4, and 5. Descnptions of these theme areas can be found in the Recreation section of Chapter III

Developed recreation sites will be operated at the standard service level by the end of the 2nd decade Assistance from recreation service partners and volunteer organizations will be required to achieve standard service levels. Substandard campgrounds will be rehabilitated at the rate of 4,500 PAOT (people-at-onetime capacty) per decade *(90* camping units per year). Picnic sites will be rehabilitated at the rate of 500 PAOT per decade (10 picnic units per year). Interpretive sites will be rehabilitated at the rate of 500 PAOT per decade (five interpretive srtes per year). Trailheads will be rehabilitated at the rate of 1,000 PAOT per decade (two trailheads per year)

Trails will be maintained at the standard service level by the end of the 2nd decade Trails will be reconstructed at the rate of 100 miles per decade (10 miles per year) Trails on the Trinity side of the Forests will have the priority for reconstruction efforts. Forest personnel will recruit assistance from volunteers and organizations to leverage Forest Service trail budgets

New recreation construction will address facility needs wrthin the recreation theme areas Campgrounds will be constructed at the rate of 800 PAOT per decade (four 40 unrt campgrounds per decade) Picnic sites will be constructed at the rate of 1,000 PAOT per decade (twenty 10 unit picnic sites per decade) Interpretive sites will be constructed at the rate of 300 PAOT per decade (30 interpretive sites per decade) Visitor information stations will be constructed at the rate of 100 PAOT per decade (two stations per decade). Visitor information centers will be constructed to provide an addrtional 200 PAOT (one center per decade, first two decades only) New trailheads will be constructed at a rate of 500 PAOT per decade (one trailhead per year).

New trail construction emphasis will be in the recreation theme areas These trails will be constructed at the rate of 100 miles per decade (10 miles per year) Old, substandard trails will be removed from the system, as newly constructed trails replace them In the first 50 years, this will result in 500 miles of new trail

Wildernesses will be operated at the standard service level by the end of the 2nd decade Emphasis will be to protect and preserve the wilderness quality of the resource while maintaining its availability for the use and enjoyment

Forest OHV trails and low-standard roads will serve as part of the statewide system and provide long-distance touring opportunities

Riparian Areas

Maintenance and improvement of riparian resources will be emphasized. Practices to protect stream courses and npanan resources are included in the riparian prescnption standards and guidelines which vary in width They average 350 feet on both sides of Class I and 2 streams and 150 feet on both sides of Class 3 and 4 streams Timber management and other ground-disturbing activities will not be permitted adjacent to Class I and 2 streams, they will be modified along Class 3 and 4 streams Rpanan areas will also serve as travel corridors for wildlife

Soils

Soils will be managed to maintain soil productivity and to prevent excessive surface erosion, mass wasting, soil compaction, and cumulative watershed impacts A sufficient mount of woody debris and slash will be left after management activities to provide soil protection and organic material Management activities within unstable mas, such as active landslides and inner gorges, will be restncted Areas with highly erosive soils will be closed to OHV use

Special Areas

Research Natural Areas (RNA). This alternative will allocate 13,400 acres of National Forest lands to RNAs Jnder this alternative, 5 areas will be established See **Table IV-8** in Chapter IV for a listing of these areas

The Pacific Southwest Research Natural Area Committee's refined target system will be used to guide the future selection of RNA candidates Information from the California Natural Diversty Data Base will be used to assist in locating suitable examples of the target elements

4 management plan will be written for each RNA

Special Interest Areas (SIA). Thirteen areas will be recommended for designation as SIAs Six potential areas will be evaluated for SIA status These are (1) Dubakella Mountain, (2) McGinnis Springs, (3) Mt Shasta Scenic

Area. (4) Potem Falls, (5) lilted Rock Lava Flow, and (6) Trout Creek See **Table** IV-I0 for the 13 recommended SIAs

A management plan will be developed for each SIA

Timber

Timber management activlties will be conducted to meet the 1990 RPA timber targets, or to come as close to them as possible Although the allowable sale quantrty (ASQ) target is not achieved in this alternative, relatively high outputs result in an ASQ of 112 4 million board feet (MMBF) in the Ist decade from a surtable timber land base of about 638,100 acres (53 MMBF from the Shasta Forest and 59 MMBF from the Trinity Forest)

On approximately 537,700 acres sultable for timber production, timber management activlties will be relatively intensive and yields will be high to moderate In specially designated areas. timber management will be modified to attain other resource objectives, such as maintenance of visual quality and/or wildllfe habtat On about 100,400 sultable acres, timber management will be minimal in order to emphasize other resource uses, such as semi-primitive recreahon, or because of site limitations, which preclude intensive timber management

Approximately 439,700 suitable acres will not be available for timber management in this alternative due to land allocations to other non-timber uses which preclude timber harvesting on a regular basis

A mix of silvicultural systems will be used to meet management objectives, wtth an emphasis on even-aged systems **An** estimation of the average annual acres and volume harvested in the first decade by cutting method is shown in **Table 11-7**

The timber on suttable lands will be managed on an average 120 year rotation (minimum 90 years) This timber harvest schedule will result in about 13 9 percent of the suitable acres being treated in the Ist decade About 7 4 percent of the sultable acres will be regenerated in the Ist decade

Clearcutting will be the primary regeneration system used on lands where timber is intensively managed and where timber management is modlfied for other resource objectives Units will be larger than five acres, and average about 20 acres in size No large green reserve trees will be retained wrthin regeneration units on intensively managed lands However. salvable sub-merchantable confers will be retained where feasible

Uneven-aged selection systems will not normally be used except where timber growth and yield is not the primary objective and timber management is modified for other resource objectives

Stand maintenance, or salvage, will be the primary system used on lands where timber management is minimal

Emphasis will be on regeneration cutting of understocked stands and stands which are growing poorly Regeneration cutting will result in an average of 4,700 acres of reforestation per year in the Ist decade A combination of artificial and natural regeneration will be used to

Table II-7
Timber Cutting Methods (Alternative RPA)

	Acreage		Volume	
Cutting Method	**Acres**	**Percent**	**MMBF**	**Percent**
Clearcut	3,810	43	69	***62***
Green Tree Retention*	930	10	19	17
Selection	0	0	0	0
Commercial Thinning	3,150	36	19	17
Salvage	1,000	11	5	4
Totals	***8,890***	**100**	**112**	**100**

* Includes Shekelwood cuts

regenerate the Forests Reforestation will be done using a species mix native to the Forests.

The timber harvest schedule for this akemative will result in an average annual net growth of about 173 MMBF on surtable lands by the 5th decade This growth represents an average of about 271 board feet per acre per year on suitable lands

Release of conifer seedlings (chemical and non-chemical) from competing vegetation will occur on approximately 4,300 acres per year, primarily on lands where timber growth and yield is emphasized

On suitable timber lands, hardwoods will be managed to provide a continuous supply of firewood and biomass, while providing for wildlife habrtat needs

Visual Quality

Visual quality will be emphasized along candidate state scenic highways, in the National Recreation Area, on Mt Shasta, in developed recreation sites and in the foreground of a few sensrtive travel corridors Wildemess areas will be managed to preserve the characteristic landscape. Existing wild and scenic rivers and special interest areas will continue to be managed in the foreground to protect visual quality Limited protection will be provided for the scenic setting of waterways

On a small portion of the Forests' land base that emphasizes wood fiber production, management activrties will be noticeable Areas of the Forests will be dominated by roads and vegetative openings which will be out of scale with the characteristic landscape Openings will be compatible wrth natural shapes

Overall, visual quality will receive slightly less emphasis than in any other alternative

Water

The primary emphasis will be to maintain water qualty and quantity in order to meet domestic use needs and *fish* habitat requirements Water qualty for beneficial uses will be maintained through the use of Best Management Practices (BMPs) (See the Riparian Areas section for a discussion of RMZ widths)

Watersheds in a degraded condition will be improved at the rate of about 700 acres per year No specific management activities will be planned to change water yield.

Wild and Scenic Rivers

This alternative will include 106 4 miles (National Forest land only) of existing Wild, Scenic, and Recreation Rivers including New River, the North Fork Tnnty River, the South Fork Tnnity River, and the mainstem Trinty River. No additional rivers will be recommended for designation

Wilderness and Roadless Areas

Existing Wildernesses will be maintained under this alternative Included will be the Yolla Bolly-Middle Eel Wilderness with 36,805 acres (Shasta-Trinity National Forests' portion only) as well as the Wildernesses designated in the 1984 Calfornia Wildemess Act Acreage shown is National Forest land only.

Wilderness	Acres
Castle Crags	10,483
Chanchelulla	7,800
Mt Shasta	38,560
Trinity Alps	405,128

4 total of 498,776 acres on the Shasta-Trinity National Forests will be managed as part of the National Wilderness Preservation System

Qproximately 71 percent of the *29* released roadless area's acreage will remain undeveloped This is because much of the later seral stage vegetation exists in these roadless areas, it was allocated as habrtat for older seral stage dependent species (spotted owl)

Wildlife

Wildlife management objectives will maintain habitat to support all species on the Forests at or above viable population levels The distribution and vanety of wildlife habitat will be maintained

Yanagement indicaton, or wildlife assemblages, will be managed to benefit all species that are represented by the assemblage Forest standards and guidelines pertaining to special habitat components (i e snags, hardwoods, dead and down material, seral stages, etc) will set the minimum level of management throughout the Forests.

An average of at least 15 snags and 5 tons of dead/down material per acre will be maintained. This snag and dead/down level will most likely be exceeded on those areas of the Forests where timber management is not scheduled, or about 70 percent of the Forests

Hardwood forest types will be managed pnmanly for the benefit of deer, bear and gray squirrel but not for conversion to conifers

In the 1st decade, direct habitat improvement will be done annually on 8,224 acres for all species

Habitat capabilrty will exist after the 5th decade for an additional 12,000 deer, to help maintain consumptive wildlife user days (WUDs)

About 182,612 acres will be allocated to Prescription VI (Wildlife Management) in this alternative Included are deer winter ranges and 5,000 to 6,000 acres of bitterbrush This prescnption alters timber management practices, provides an average of at least 30 square feet of basal area per acre in hardwoods, and minimizes disturbances to wildlife that may take place through use of the Forests' transportation network

Wildlife - Threatened, Endangered (T&E), and Sensitive Species

All known or future sites of Federally listed threatened or endangered (T&E) species or Regional Forester identified sensitive species will be fully protected and managed according to the recovery plan and/or habitat requirements for each species

Environment to be Created

By the year 2040, about 70 percent of the Forests will remain in a fairly natural condtion This percentage will be in relatively large, contiguous block including five wildernesses, five research natural areas, four wild and scenic riven. and spotted owl habitat (HCAs and CHAs)

Areas managed for their ripanan values along perennial streams will also contribute to a naturally appeanng landscape, but will be relatively small, narrow stnps of land Large portions of the 29 former roadless areas will remain unroaded

Areas seen from major State highways and high use recreation sites will remain relatively unchanged Forest activities will be visible from most county and forest roads Forest activities will not be evident in areas with distinctive landscapes

On the remaining 30 percent of the Forests, forest management activties will be ewdent These areas will be modified to varying degrees by activities such as timber harvesting, road construction, developed recreation areas, and mining

In 50 years, about 11 percent of the Forest will consist of stands which are less than 50 years of age These regenerated stands will generally consist of larger even-aged stands (greater than 5 acres) on the 11 percent Smaller even-aged and uneven-aged stands will be normal on only a minor portion of the Forests where timber activities occur

Wildlife habitat will be less diverse than it is today, with more habitat in the late seral stages and less habitat in the early seral stages

The number of acres allocated to each management prescnption under Altemative RPA follows

Table II-8
Average Annual Outputs by Decade - Alternative RPA*

Resource Element	Base Year** 1989	'90 RPA Goals**	DECADE 1	2	3	4	5
Economics							
Total Budget (MM$)	40	-	43.1	42.3	43.8	44.2	47 3
Total Cost (MM$)	44		56 8	56	57 5	57 8	60 9
Facilities							
Transportation							
Trail Construction/Reconstruction (miles)	0/1		10/10	10/10	10/10	10/10	10/10
bad Construction (miles)	63	-	23	11	11	5	5
bad Reconstruction (miles)	73	-	22	23	21	21	22
bad Maintenance (miles)	6.500	-	6,580	6,690	6,800	6,850	6,900
Dams and Reservoirs (number)							
Forest Service	2	-	2	2	2	2	2
Other Federal	3	-	3	3	3	3	3
Other State/Local	1	-	10	1	1	1	1
Private	10	-		10	10	10	10
Administrative Sites (number)							
Forest Service Owned	24		26	26	26	26	26
Leased	2		0	0	0	0	0
Fire and Fuels							
Total Fuel Treatment (acres)	6,300	-	6,580	6.640	6,660	6,680	6,680
Fire-Related Treatment	1,500		1,500	1,500	1,500	1,500	1,500
Timber-Related Fuel Treatment	4,500		4.700	4,700	4,700	4,700	4.700
Other Fuel Treatment (for wildlife)	300	,	380	440	460	480	480
Expected Acres Bumed by Wildfire			11,000	11,000	11,000	11.000	11.000
Intensity Class I	32		55	55	55	55	55
Intensity Class 2	48		154	154	154	154	154
Intensity Class 3	774		330	330	330	330	330
Intensity Class4	850	-	451	45 1	45 1	45 1	45 1
Intensity Class 5	3,345		4,686	4.686	4,686	4,686	4,686
Intensity Class 6	1,350		5,324	5,324	5,324	5,324	5.324
Fish							
Inland Fish Other Than T&E							
(M Pounds)	1,424	1,794	1.947	1,947	1,947	1,947	1,947
Anadromous Fish							
Commercial (M Pounds)	691	457	691	69 1	691	691	691
Sport (M Pounds)	163	142	563	563	563	563	563

* See the last page of this table for abbreviated terms and meanings.

** A base year of 1989 and the 1990 RPA program were used as instructed by the Regional Guide for the Pacific Southwest Region; revised 1990

Table II-8
(Continued)

Resource Element	Base Year** 1989	'90 RPA Goals'* 1	DECADE 1	2	3	4	5
Fish **(Continued)**							
Direct Habitat Improvement							
Acres/Structures							
Inland Fish	15/25	-	80/125	801125	80/125	801125	80/125
Anadromous Fish (Commercial)	0/0	-	0/0	0/0	0/0	0/0	0/0
Anadromous fish **(Sport)**	5/50	-	301120	30/120	30/120	301120	301120
Thousand Fish User Days (MFUDs)							
Inland Fish	396	-	415	415	415	415	415
Anadromous Fish (Sport)	40	-	265	265	265	265	265
Human Resources							
Programs (Enrollees)	50		50	50	50	50	50
Lands and Minerals							
Land Acquisition (Acres)	6,996	-	1.500	1,500	1,500	1.500	1,500
Minerals (Operating Plans)							
Range							
Grazing (MAMs)	12	12	10	10	10	10	10
Recreation							
Developed Public (MM RVDs)	71		0 75	0 77	0 at?	1 0	1 11
Developed Private (MM RVDs)	49		051	0 68	077	0 84	0 92
Dispersed (MM RVDs)	256	*	2 9	3 4	3 9	4 5	5 3
Wilderness (MM RVDs)	13		0 14	0 16	0 19	0 22	0 25
Open. Usable OHV Areas-Summer **(Acres)**	2392	-	256120	256120	256120	256120	256120
Open. Usable OHV Areas-Winter **(Acres)**	176 2		198730	198730	198730	198730	198730
Roads and Trails							
Open Only to OHV Use-Summer (Miles)	0	-	0	0	0	0	0
Open Only to OHV Use-Winter (Miles)	0		0	0	0	0	0
Closed to OHV Use-Summer (Miles)	810	-	810	810	810	810	810
Closed to OHV Use-Winter (Miles)**	815		815	815	815	815	815
Timber							
Allowable Sale Quantity (MMCF)	28		16 9	16 9	16 9	17 7	18 6
Allowable Sale Quantity (MMBF)	184		112 4	112 4	112 4	118 0	1239
Long Term Sustained Yield (MMCF)			20 5	20 5	20 5	20 5	20 5
Long Term Sustained Meld (MMBF)			1367	1367	1367	1367	1367
Reforestation (Acres)	9.400		4.700	4,700	4,700	4,700	4.700
Timber Stand Improvement (Acres)	7.800	-	7,100	7.100	7,100	7.100	7,100

* The RPA goals include wildlife and **fish** user day; (WFUDs) The Forest's figures depict dispersed recreation user Days only

** Refers to seasonal closure and does not indude trails, such as the Pacific Crest Trail (PCT), where OHV use is Prohibited

Table II-8
(Continued)

Resource Element	Base Year** 1989	'90 RPA Goals** I	DECADE I	2	3	4	5
limber (Continued)							
Wood Products Other Than Sawtimber							
Firewood (M Cords)	21		25	30	30	30	30
visual Quality							
Visual Quality Index	127.3		127.4	130.1	128.1	128.1	128.1
Water							
Quality (M Acre feet at standard)	5,448		5,462	5,464	5,460	5,456	5,458
Increased Quantity (M acre feet)***	5,450		+12	+14	+10	+6	+8
Watershed Improvement	399	706	700	710	450	300	300
Wildlife							
Threatened, Endangered and Sensitive Species (TE&S)							
Bald Eagle (# managed pairs)	25	-	32	35	35	35	35
Goshawk (# pairs)	150		150	150	150	150	150
Peregnne Falcon (# managed pairs)	6		9	14	14	14	14
Spotted Owl (# pairs)	97	-	170	180	190	200	210
Other Than TE&S							
Deer (M animals)	62		62	65	68	71	74
Direct Habitat Improvement (MWUDs)							
All Species	2		65	113	167	253	393
Acres/Structures of Direct Habitat Improvement							
All Species	1360/35		8224/126	8224/151	8310/181	8310/217	7670/260
Wildlife User Days (M WUDs)							
Consumptive Species	282	338	282	282	282	282	282
Non-Consumptive Species	282	347	282	323	375	435	504
Total WUDs	564	-	629	718	824	970	1.179

*** The value for Decades 1-5 is the difference between the increased quantity, in Base Year 1989, and the projected quality water yield by decade. This is not an indicator of decreased water quality, only of the net increase/decrease of water yield

Abbreviated Terms and Meanings for this Table.
M = Thousand MM = Million MMBF = Million Board Feet MMCF = Million Cubic Feet
OHV = Off-Highway Vehicle AMs = Animal Months
RVDs = Recreation Visitor Days
TE&S = Threatened, Endangered & Sensitive
WUDs = Wildlife User Days

	Management Prescription	Acres
I	Unroaded Non-Motorized Recreation	22,092
II	Limited Roaded Motorized Recreation	11,388
III	Roaded Recreation	**292,556**
IV	Roaded High Density Recreation	6,290
*V	Wilderness Management	498,776
VI	Wildlife Habitat Management	182,612
VII	Threatened, Endangered and Selected Sensitive Species	530,358
**VIII	Commercial **Wood** Products Emphasis/Timber Management	537,354
***IX	Riparian Management	27,775
X	Special Area Management	8,776
XI	Heritage Resource Management	3,570
TOTAL ACRES		**2,121,547**

* Acreage shown includes Wild and Scenic Rivers, Research Natural Areas, and cultural resource areas within Wilderesses.

** Acreage includes both suitable and unsutable timber lands

*** All riparian **areas** would be managed according to this prescription. Acres do not include riparian area acreage in Prescriptions V and VII

Alternative CUR (No Action/No Change)

Theme. The goal of Alternative CUR will be to continue the current (1989) level and mix of outputs based on current land allocations, directions, policies and practices Goods and services will be provided at 1989 levels to the extent possible given recent threatened and endangered species listings

This alternative will act as a baseline and represents the current resource management direction as reflected in existing plans on the Forests

Expenditures (budgets) will not exceed 1989 levels.

Timber outputs will be provided at about one-half historic levels due to policies recently established to protect the northern spotted owl The current mix of silvicultural practices will be employed

Non-market forest resources, such as research natural areas and wild and scenic rivers, will continue to be protected at existing levels

A variety of recreation opportunities will be provided, primarily in a roaded setting

Refer to **Table 11-10** for outputs in this alternative.

Resource Objectives

Air Quality

Current State air quality standards will be met Prescribed burning will be accomplished only when conditions are favorable for smoke dispersion and standards can be attained

Biological Diversity

Allocations will have the effect of emphasizing later sera stage vegetation All seral stages will remain wlthin the five percent requirement Chaparral will cycle naturally except for a low level of induced management (prescnbed fire) See the Wildlife section for more details on biological diversity

Biomass

Logging residues, available for biomass utilization, will be generated on approximately 9,700 acres per year in the first decade Smaller biomass material will also be generated from precommercial thinning activities on about 3,100 acres per year

Biomass will be available for personal use firewood, energy-producing wood-burning plants, and other appropriate uses Material will be left in sufficient quantities to provide adequate wildlife habltat and to maintain soil productivty

Botany

There are no Federally designated threatened or endangered plant species on the Forests.

Sensitive. Alternative CUR will emphasize maintenance of viable populations of all native plant species Management practices will ensure that no species become threatened or endangered because of Forest Service actions

Sensitive plant populations will be mapped and recorded Selected populations will be monitored, and a Species Management Guide will be developed for each species

Until these guides are developed viability will be maintained by managing habitat to perpetuate the species. In most cases this will involve protecting populations from disturbance There are instances, however, where disturbance may be necessary to maintain viability of certain sensitive plant species Land acquisition, special area designations, and cooperative management plans will be used as protection tools

Population information for sensitive plants will be shared regularly with the California Natural Divenity Data Base and other appropnate agencies

Heritage Resources

A continuation of the present sltuation will see heritage resources management activlties carned out primarily as a support function (e g , for timber) Areas subject to ground-disturbing activities will be surveyed and recorded sltes evaluated before contracts were awarded or activities commence Some interpretation, research, and enhancement will take place. Active protection and monltonng will increase Access, use, and integrity of traditional sites

and locations important to Native American religious and cultural practices will be maintained

Facilities

Structures. The administrative site facilities at the Northern California Service Center (NCSC), Hyampom, Big Bend, Hayfork, Weaverville, McCloud, Harrison Gulch, and Lake Shore will be upgraded

In the interest of cost effectiveness, administrative site leases will be eliminated in favor of agency-owned facilrties A possible exception may be the public information contact srte at the south (northbound) arrival station for the Shasta Unit of the Whiskeytown-Shasta-Trinity National Recreation Area (NRA)

Recreation facilrties will receive heavy maintenance and some will be upgraded to handle present day recreation vehicles and to better serve users Some fire lookouts will be replaced or upgraded because of their extremely poor condrtions

All facilities will be operated in a reasonably safe and efficient condition This may require construction, reconstruction and/or obliteration of some buildings or systems

Bridge construction and replacement will stress permanent bridges on arterial and collector roads and local roads open to the public

Transportation. The arterial/collector/local road system will be increased and reconstructed as shown in **Table 11-10** No signrficant changes in classification or jurisdiction will be planned Seasonal road closures will be recommended to prevent damage to roadway facilrties and adjacent resources such as sensitive wildlife areas and highly erosive soils These closures will take place where needed to meet the Forest standards and guidelines The road and trail system will be evaluated for compliance with the Rparian standards and guidelines (see Management Prescription IX, Forest Plan Chapter **4)**

Operation and maintenance of the Forests' transportation system will be similar to present standards No major changes in construction or reconstruction standards will be anticipated Upgrading of selected important arterial/collectors will be emphasized to increase safety and reduce maintenance and haul costs including provisions to better accommodate passenger cars

Special emphasis will be given to creating scenic byways to accommodate the needs of those driving for pleasure Some scenic byways may be created in cooperation wlth neighbonng Forests, the State, Counties, and cost share cooperators

New trail construction will remain low, but a trail or system of trails will be developed on Mt Shasta

Maintenance of the Forests' trail system will continue to emphasize logging out for access, prevention of resource damage, and safety of the users

Fewer cost-share agreement supplements will be processed since most of the large private land parcels have been accessed Maintenance of cost-share roads will be emphasized

Fire and Fuels

Fire suppression will be at current levels This will be approximately 71 percent of the most efficient level as determined by the National Fire Management Analysis system (NFMAS)

Acres burned are expected to be greater than historical averages due to the higher fuel loading across the Forests as a result of other resource needs This will be due primarily to the allocation of approximately 500,000 acres to Management Prescription VII (Threatened, Endangered, and Selected Sensitive Species) which allows minimal vegetation management and associated fuel treatments and/or the treatment of natural fuels as they occur

Treatment of natural fuels and resource activity-created fuels is projected to be about 7,080 acres annually during the first decade Where feasible, fuels from timber harvesting will be reduced to the level needed for wildlie and watershed protection by utilization of unmerchantable material

Protection efforts will be emphasized in high value plantation areas Flammability reduction will be utilized to help protect plantations Within the Wildernesses the use of planned and unplanned ignitions for prescribed fire will be utilized The anticipated burn characteristics will approximate those of pnstine or near pristine conditions Mosaic patterns for wildlife species diversity will be stressed Wildfire suppression tactics and strategies will utilize "light hand on the land as found in National Interagency Fire Line Handbook FSH 5109 32a.

Fisheries

Habitat typing surveys and evaluations will be completed on selected anadromous fish streams, on selected redband trout streams with *50* percent or more adjacent National Forest land ownership, and on a few Class I major perennials No minor perennial inland fish streams will be habitat typed

Streamside riparian inventories will be completed on a few Class I anadromous fish streams

Limited emphasis will be placed on the natural long-term recovery of non-sensitive and sensitive anadromous fish habitat

Habitat improvement will continue at a low to moderate emphasis level for anadromous fish in the Tnnty River Basin and for warmwater fish at Shasta and Trinity Lakes Limited fish habitat improvement will occur on a few major perennial inland fish streams No fish habitat improvement will occur on minor perennial inland fish streams Direct fish habitat improvements will occur for steelhead trout, largemouth bass, redband trout, and for rainbow trout in a few major perennial streams to accommodate some major consumptive sportfishing

Forest Pests

This alternative will allow and require that consideration of a full range of pest management measures be integrated into resource management activities Detection, evaluation, and control of pest-caused damage will be intensively practiced on those lands where vegetation will be actively managed, primarily to meet timber management goals Minimal pest management will occur on the remaining land base to protect other lands and resource values from epidemics Integrated pest management will be practiced at levels appropriate with the management prescriptions for the site specific/special purpose areas

Minerals

The orderly development of mineral resources will be encouraged Any adverse impacts of mineral related activities will be minimized through required lease stipulations and the administration of plans of operation Plans of operation will require reclamation of lands disturbed by mining

Range

Overall, livestock grazing will be the same as current levels. Grazing use wrthin the transttoty range in Habitat Conservation Areas will be reduced. Opportunrties for improved range management, particularly in riparian areas, will increase over the present level Grazing use will be managed so that riparian habitats are maintained or improved Water sources will be developed to meet domestic livestock needs.

Recreation

Most of the developed recreation sites will be operated at less than the standard service level Assistance from various partners will be required to achieve standard service levels Substandard campgrounds will be rehabilitated at the rate of *2,250* PAOT (people-at-one-time capacty) per decade (45 camping units per year) Picnic sites will be rehabilitated at the rate of *250* PAOT per decade (five picnic units per year) Interpretive sites will be rehabilitated at the rate of 100 PAOT per decade (one interpretive sites per year) Trailheads will be rehabilitated at the rate of 500 PAOT per decade (one trailhead per year)

Twenty percent of the trails will be maintained at the standard service level and 80 percent of the trails will be maintained at less than the standard service level Trails will be reconstructed at the rate of *20* miles per decade (two miles per year) Forest personnel will recruit assistance from volunteers and organizations to leverage Forest Service budgets

New campgrounds will be constructed at the rate of *250* PAOT per decade (one *50* unrt campground per decade) Picnic sites will be constructed at the rate of 100 PAOT per decade (two 10 unrt picnic sites per decade). Interpretive sites will be constructed at the rate of 100 PAOT per decade (10 interpretive sites per decade) New trailheads will be constructed at a rate of 50 PAOT per decade (one trailhead per decade)

New trails will be constructed at the rate of *20* miles per decade (two miles per year)

Wldemess will be operated at less than the standard service level Emphasis will be to protect and preserve the wilderness quality of the resource

Forest OHV trails and low-standard roads will serve as part of the statewide system and provide long-distance touring opportunities.

Riparian Areas

Maintenance and improvement of riparian resources will be emphasized Practices to protect stream courses and riparian resources are included in the riparian prescription standards and guidelines which vary in width They average 350 feet on both sides of Class I and 2 streams and I 50 feet on both sides of Class 3 and 4 streams Timber management and other ground-disturbing activrties will not be permitted adjacent to Class I and 2 streams, they will be modlfied along Class 3 and 4 streams Riparian areas will also serve as travel comdors for wildlife

Soils

Soils will be managed to maintain soil productivity and to prevent excessive surface erosion, mass wasting, soil compaction, and cumulative watershed impacts A sufficient amount of woody debris and slash will be left after management activities to provide soil protection and organic matenal Management activrties wrthin unstable areas, such as active landslides and inner gorges, will be restricted Areas with highly erosive soils will be closed to OHV use

Special Areas

Research Natural Areas (RNA). This alternative will allocate 2 1,470 acres of National Forest lands to RNAs Under this alternative, 8 areas will be established See **Table IV-8** in Chapter IV for a listing of these areas

The Pacific Southwest Research Natural Area Commrttee's refined target system will be used to guide the future selection of RNA candidates Information from the California Natural Diversity Data Base will be used to assist in locating suitable examples of the target elements

A management plan will be written for each RNA

Special Interest Areas (SIA). Nine areas will be recommended for designation as SIAs No additional areas will be evaluated for potential SIA classification Refer to **Table IV-10** for a listing of these areas

A management plan will be developed for each SIA

Timber

Timber management activities will be conducted to achieve the current (1989) level of timber outputs, based on current management direction from existing Multiple Use Plans and Timber Management Plans, and current (1989) budget levels This alternative will result in an average annual allowable sale quantrty (ASQ) of 105 8 million board feet (MMBF) in the 1st decade from a suitable timber land base of about 635,800 acres (5 I MMBF from the Shasta Forest and 55 MMBF from the Tnnity Forest)

On approximately 502,800 acres suitable for timber production. timber management activities will be relatively intensive and yields will be high to moderate In specially designated areas, timber management will be modified to attain other resource objectives, such as maintenance of visual quality and/or wildlie habitat On about 133,000 suitable acres, timber management will be minimal in order in order to emphasize other resource uses, such as semi-pnmtive recreation, or because of site limitations, which preclude intensive timber management

Approximately 442,000 suitable acres will not be available for timber management in this alternative due to land allocations to other non-timber uses, which preclude timber harvesting on a regular basis

A mix of silvicultural systems will be used to meet management objectives, with an emphasis on even-aged systems An estimation of the average annual acres and volume harvested in the 1st decade by cutting method is shown in **Table *11-9***

The timber on suitable lands will be managed on an average 120 year rotation (minimum 90 years) This timber harvest schedule will result in about 15 2 percent of the suitable acres being treated in the 1st decade About 8 2 percent of the surtable acres will be regenerated in the 1st decade

Clearcutting will be the primary regeneration system used on lands where timber is intensively managed, such as in the General Forest Zone of the Multiple Use Plans (MUP) Units will generally be larger than five acres, and average about 15 to 20 acres in size Reserve trees will be retained within some regeneration units Reserve trees will normally consist of salvable sub-merchantable conifen and large green trees

Other cutting methods will be used where timber management is modfied for other resource objectives,

such as in the Travel Influence and Water Influence Zones of the MUP.

Stand maintenance, or salvage, will be the primary system used on lands where timber management is minimal

Only a minor amount of uneven-aged selection cutting will be used in this altemative.

Emphasis will be on regeneration cutting of understocked stands and stands which are growing poorly. Regeneration cutting will resutt in an average of 5,200 acres of reforestation per year in the 1st decade A combinahon of artificial and natural regeneration will be used to regenerate the Forests Reforestation will be done using a species mix native to the Forests

The timber harvest schedule for this alternative will result in an average annual net growth of about 190 MMBF on suitable lands by the 5th decade This growth represents an average of about 300 board feet per acre per year on sutable lands

Release of conifer seedlings (chemical and non-chemical) from competing vegetation will occur on approximately 4,700 acres per year, primarily on lands where timber growth and yield is emphasized

On suitable timber lands, hardwoods will be managed to provide a continuous supply of firewood and biomass, while providing for wildlife habitat needs

Visual Quality

Visual quality will be emphasized along candidate state scenic highways, in the National Recreation Area, on Mt Shasta, in developed recreation sites, and in the foreground of most sensitive travel corridon Wildernesses will be managed to preserve the characteristic landscape Existing wild and scenic riven and special interest areas will be managed in the foreground to provide special emphasis for scenic qualty Moderate protection will be provided for the scenic setting of waterways

Managementactivties will dominate the landscape on only a small portion of the land base that emphasizes wood fiber production In those areas roads and vegetative openings will be noticeable and will be out of scale with openings in the charactenstic landscape but will be compatible with natural shapes

Water

The primary emphasis will be to maintain water quality and quantity in order to meet domestic uses and fish habitat requirements A pnmary objective will be to maintain the quallty of water at or above State objectives. Water qualty for beneficial uses will be protected through the use of Best Management Practices (BMPs) (See the Riparian Areas section for a discussion of RMZ widths)

Watersheds in a degraded condtion will be improved at the rate of about 300 acres per year. No specific management activlties will be planned for the purpose of changing water yield

Table 11-9
Timber Cutting Methods (Alternative CUR)

	Acreage		Volume	
Cutting Method	**Acres**	**Percent**	**MMBF**	**Percent**
Clearcut	3.160	33	43	40
Green Tee Retention*	1,780	18	37	35
Selection	300	3	2	2
Commercial Thinning	2,820	29	17	16
Salvage	1,600	17	Z	Z
Totals	**9.660**	**100**	**106**	**100**

* Includes Shelterwood cuts.

Wild and Scenic Rivers

This altemative will include 106 4 miles (National Forest land only) of the existing Wild, Scenic. and Recreation Riven including New River, the North Fork Trinity River, the South Fork Tnnrty River, and the mainstem Trinity River No additional rivers will be recommended for designation

Wilderness and Roadless Areas

Existing Wildernesses will be maintained under this alternative Included will be the Yolla Bolly-Middle Eel Wilderness with 36,805 acres (Shasta-Trinity National Forests' portion only) as well as the Wildernesses designated in the 1984 California Wilderness Act Acreage shown is National Forest land only

Wilderness	
Castle Crags	10,483
Chanchelulla	7,800
Mt Shasta	38,560
Trinity Alps	405,128

A total of 498,776 acres on the Shasta-Tnnrty National Forests will be managed as part of the National Wilderness Preservation System

Approximately 72 percent of the 29 released roadless area's acreage will remain undeveloped This occurs because much of the later seral stage vegetation exists in these roadless areas, it was allocated as habttat for older seral stage dependent species (spotted owl)

The Mt Eddy Further Planning Area (7,720 acres) will be managed primarily for unroaded non-motorized recreation

Wildlife

Wildlife management objectives will maintain habtat to support all species on the Forests at or above viable population levels The distribution and variety of wildlife habitat will be maintained.

Management indicators, or wildlife assemblages, will be managed to beneft all species that are represented by the assemblage Forest standards and guidelines pertaining to special habltat components (i e , snags, hardwoods, dead and down matenal, seral stages, etc) will set the minimum level of management through the Forests

An average of at least 1 5 snags and 5 tons of dead/down matenal per acre will be maintained This snag and dead/down level will most likely be exceeded on those areas of the Forests where timber is not intensively managed, or about 70 percent of the Forests

Hardwood forest types will be managed pnmarily for the beneft of wildlife and not for conversion to confers

In the Istdecade, direct habitat improvement will be done annually on 2,08 1 acres for all species

About 1 14,509 acres will be allocated to Prescription VI (Wildlife Management) in this alternative Included in the prescnption are deer winter ranges and 5,000 to 6,000 acres of bitterbrush This prescription has timber management for the beneft of wildlfe, provides an average of at least 30 square feet of basal area per acre in hardwoods, and minimizes disturbances to wildlife that may take place through use of the Forests' transportation network

Wildlife - Threatened, Endangered (T&E), and Sensitive Species

All known or future stes of Federally listed threatened or endangered (T&E) species or Regional Forester identified senstive species will be fully protected and managed according to the recovery plan and/or habttat requirements for each species

Environment to be Created

By the year 2040, the Forests will not have changed appreciably in appearance About 70 percent of the Forests will remain in a fairly natural condition This percentage will be in relatively large, contiguous block including five wildernesses, eight research natural areas, four wild and scenic rivers, and Management Prescription VII (Threatened, Endangered, and Selected Sensitive Species)

Areas managed for their ripanan values will also contnbute to a naturally appearing landscape, particularly along perennial streams

Areas seen from State highways, county roads, forest roads with high recreation use, and recreation sites, which are currently undisturbed, will remain relatively un-

changed Forest activities will not be evident in areas with distinctive landscapes

On the remaining 30 percent of the Forests, forest management activities will be evident These areas will be modified to vatying degrees by activities such as timber harvesting, road construction, developed recreation areas, and mining

In 50 years, about 12 percent of the Forests will consist of stands which are less than 50 years of age. These regenerated stands will generally consist of larger even-aged stands (greater than 5 acres) on about 11 percent of the Forests Smaller even-aged and uneven-aged stands will be normal on the remaining 1 percent of the Forests where timber activities occur

Wildlife habitat will be different than it is today, with more habitat in the late sera stages

The number of acres allocated to each Management Prescription under Altemative CUR follows

Table 11-10
Average Annual Outputs by Decade -Alternative CUR*

Resource Element	Base Year** 1989	'90 RPA Goals** I	DECADE I	2	3	4	5
Economics							
Total Budget(MM$)	40		39 8	37 5	39 5	40 0	43 0
Total Cost (MM$)	44		53 4	56 I	58 I	58 7	61 6
Facilities							
Transportation							
Trail Construction/Reconstruction (miles)	0/I		2/2	2/2	2/2	2/2	2R
Road Construction (miles)	63		23	I I	I I	5	5
Road Reconstruction (miles)	73		22	23	22	22	23
Road Maintenance (miles)	6.500		6580	6690	6800	6850	6900
Dams and Reservoirs (number)							
Forest Service	2		2	2	2	2	2
Other Federal	3		3	3	3	3	3
Other State/Local	I		I	I	I	I	I
Private	I0		I0	I0	I0	I0	I0
Administrative Sites (number)							
Forest Service Owned	24		26	26	26	26	26
Leased							
Fire and Fuels							
Total Fuel Treatment (acres)	6,300		7,080	7,140	7.160	7.180	7.180
Fire-Related Treatment	I,500		I,500	I,500	1.500	I,500	I,500
Timber-Related Fuel Treatment	4,500		5,200	5.200	5,200	5.200	5.200
Other Fuel Treatment (for wildlife)	300		380	440	460	480	480
Expected Acres Burned by Wildfire			I5,000	I5,000	15,000	15.000	I5,000
Intensty Class I	32		75	75	75	75	75
Intensty Class 2	48		210	210	210	210	210
Intensty Class 3	774		450	450	450	450	450
Intensty Class 4	850		615	615	615	615	615
Intensty Class 5	3,345		6,390	6,390	6.390	6,390	6.390
Intensty Class 6	I,350		7,260	7,260	7,260	7,260	7,260
Fish							
Inland Fish Other Than T&E							
(M Pounds)	1,424	I,794	1,557	1.557	I,639	1,734	I,734
Anadromous Fish							
Commercial (M Pounds)	69 I	457	69 I	69 I	69 I	69 I	69 I
Sport (M Pounds)	I63	I42	293	353	413	413	413

- See the last page of this table for abbreviated terms and meanings

** A base year of 1989 and the 1990 RPA program were used as instructed by the Regional Guide for the Pacific Southwest Region. revised 1990

Table II-10
(Continued)

Resource Element	Base Year** 1989	'90 RPA Goals**	DECADE 1	2	3	4	5
Fish (Continued)							
Direct Habitat Improvement							
Acres/Structures							
Inland Fish	15/25		17/35	17/35	17/50	17/70	17/70
Anadromous Fish [Commercial)	0x,	-	0/0	0/0	0x,	0x,	0x,
Anadromous Fish (Sport)	5/50	-	20/48	20/64	20/80	20/80	20/80
Thousand Fish User Days (MFUDs)							
Inland Fish	396		374	374	390	404	406
Anadromous Fish (Sport)	40	-	130	160	190	190	190
Human Resources							
Programs (Enrollees)	50		50	50	50	50	50
***Lands* and Minerals**							
Land Acquisition (Acres)	6,996	-	1,500	1.500	1,500	1,500	1.500
Minerals (Operating Plans)	122	-	125	137	151	166	183
Ranee							
Grazing (MAMs)	12	-	83	83	83	83	83
Recreation							
Developed Public (MM RVDs)	71		075	086	056	063	069
Developed Private (MM RVDs)	49		051	059	068	075	083
Dispersed (MM RVDs)	256	*	2.8	32	37	43	50
Wilderness (MM RVDs)	13		014	016	0.19	022	025
Open, Usable OHV Areas-Summer (Acres)	2392	-	243020	243020	243020	243020	243020
Open, Usable OHV Areas-Winter (Acres)	1762		187720	187720	187720	187720	187720
Roads and Trails							
Open Only to OHV Use-Summer (Miles)	0	-	0	0	0	0	0
Open Only to OHV Use-Winter (Miles)	0	-	0	0	0	0	0
Closed to OHV Use-Summer (Miles)	810	-	810	810	810	810	810
Closed to OHV Use-Winter (Miles) **	815		815	815	815	815	815
Timber							
Allowable Sale Quantity (MMCFJ	28		15.9	159	159	16.7	17.5
Allowable Sale Quantity (MMBF)	184		1058	105.8	f058	111	116 6
Long Term Sustained Yield (MMCFJ	-		191	19.1	19.1	t9 1	19.1
Long Term Sustained Yield (MMBF)	-		127.4	127.4	127.4	1274	1274
Reforestation (Acres)	9,400		5,200	5,200	5,200	5,200	5,200
Timber Stand Improvement (Acres)	7,800		7,800	7,800	7,800	7,800	7,800

* The RPA goals include wildlife and fish user days (WFUDs). The Forest's figures depict dispersed recreation user Days only

** Refers to seasonal closure and does not include trails, such as the Pacific Crest Trail (PCT), where OHV use is Prohibited

Table 11-10
(Continued)

Resource Element	Bare Year** 1989	'90 RPA Goals** 1	DECADE 1	2	3	4	5
Timber (Continued)							
Wood Products Other Than Sawtimber							
Firewood (M Cords)	21	-	25	30	30	30	30
Visual Quality							
UsualQuality Index	1273	-	1272	129.9	129.8	129 8	129 8
Water							
Quality (M Acre feet at standard)	5.448	-	5.458	5,456	5.454	5,454	5.453
Increased Quantity (M acre feet)***	5,450	-	+8	+6	+4	+4	+3
Watershed Improvement	399	706	300	300	300	300	300
Wildlife							
Threatened, Endangered and Sensitive Species (TE&S)							
Bald Eagle (# managed pairs)	25		32	35	35	35	35
Goshawk(# pairs)	150		150	150	150	150	150
Peregnne Falcon (# managed pairs)	6		72	14	14	14	14
Spotted Owl (# pairs)	97			72		72	72
Other Than T&E							
Deer (M animals)	62		62	62	62	62	62
Direct Habitat Improvement (MWUDs)							
All Species	2		20	30	41	58	51
Acres/Structures of Direct Habitat Improvement							
All Species	1360135		2081/79	2081/95	2135/114	2135/137	2192/164
Wildlife User Days (M WUDs)							
Consumptive Species	282	338	282	282	282	282	282
Non-Consumptive Species	282	347	282	322	375	435	504
Total WUDs	564		584	634	698	775	837

*** The value for Decades 1 is the difference between the increased quantity, in Base Year 1989, and the projected quality water yield by decade This is not an indicator of decreased water quality, only of the net increase/decrease of [illegible]

Abbreviated Terms and Meanings for this Table

M=Thousand 1M=Million MMBF=Million Board Feet :F=Million Cubic Feet
OHV = Off-Highway Vehicle AM: = A [illegible] al Montl
RVDs = Recreation Visitor Days
TE&S = Th [illegible] te [illegible] , E [illegible] & [illegible]
WUDs = Wildlife User Days

	Management Erescription	Acres
I	Unroaded Nan-Motonzed Recreabon	5,027
II	Limited Waded Motorized Recreation	15,593
III	Roaded Recreation	360,487
IV	Waded, High Density Recreation	6,678
*V	Wilderness Management	498,776
VI	Wildlife Habitat Management	1 14,509
VII	Threatened, Endangered & Selected Sensitive Species	528,129
**VIII	Commercial Wood Products Emphasis/Timber Management	544,220
***IX	Rpanan Management	27,775
X	Special Area Management	16,783
XI	Heritage Resource Management	3,570
TOTAL ACRES		2,121,547

* Acreage shown includes Wild and Scenic Rivers, Research Natural Areas, and cultural resource areas within Wildernesses.

** Acreage includes both suitable and unsuitable timber lands.

*** All riparian areas would be managed according to this prescription Acres do not include riparian area acreage in Prescriptions V and VII

Alternative CBF (Citizens for Better Forestry)

Theme. This alternative was developed in conjunction with the Citizens for Better Forestry, a regional coalition of environmental groups and individuals The goal of Alternative CBF is to strike a balance between resource use and resource restoration

Protection of streamsides. fishery restoration, inter-connecting corridors for wildlie, soil conservation, water-associated recreation, wild and scenic nven, and water quality improvement will be strongly emphasized

Maintaining priority roadless areas in an undeveloped condition is an important consideration of this alternative

Special emphasis will be given to the Mt Shasta area in recognition of its outstanding features and ecological and cultural significance

Alternative CBF stresses the importance of maintaining habitatfor wildlife species dependent upon late seral stages (old-growth)

Timber management objectives in this alternative emphasize harvest systems other than clearcutting Alternative CBF does not include the use of herbicides (See the Timber section in this Alternative)

Refer to **Table 11-12** for outputs in this alternative

Resource Objectives

Air Quality

Protection of air qualty will be emphasized in order to retain high quality recreational experiences and reduce carbon dioxide and toxic gas loading of the atmosphere

This alternative will minimize air qualty degradation by reducing slash burning In regeneration cuts, seedlings will be planted through slash, where feasible Where burning is required for management activities, such as site preparation, cool burn prescriptions will be used Slash burning will be done in the spring and fall when the smoke will be dispersed rapidly Main haul roads and roads near residences or recreation facilities will be surfaced to reduce dust

Biological Diversity

Biological diversity is often described as "the diversrty of life" Ecologists studying the processes of life focus on three levels of biological diversity genetic. species and ecosystem diversity The most familiar level, species diversty, involves the number of species in a given area The Shasta-Trinity National Forests *are* a remarkably rich biological haven They harbor hundreds of species of vertebrate animals in addition to many more invertebrate, plant, and other species Several of these species are rare, threatened, or endangered

An important but less obvious level of biological diversty is genetic diversity within species **An** examination of members of the same species from dfferent parts of their ranges indicates they differ in certain ways Much of that variation is due to differences in the genes that the individuals inherited from their parents For example, a redfir growing on the Shasta National Forest is genetically different from the same species growing on the Tahoe National Forest Similarly, spotted owls in the Shasta-Trinity region are sufficiently dfferent from their counterparts in the Sierra Nevada that ecologists classify these neighboring populations into distinct subspecies

Finally, there is the aspect of biological diversity in which dfferent physical settings contain distinct communities of species This is ecosystem diversty A variety of ecosystems is found within the Shasta-Trinity National Forests Along the borders of riven and streams are narrow nparian bands harboring species dependent on readily available water At the highest elevations of the forests are subalpine communities consisting of species adapted to cold temperatures and high levels of wind and ultra-violet radiation In the mid-elevations of the mountains is a special and increasingly threatened ecosystem, the old growth forest

All three levels of biological diversty, singly or together. are constantly changing over time The natural dynamics and complexity of ecosystems mean that future condrtions are not perfectly predictable, events such as fire, drought, wind, floods, and insect or pathogen activity shape ecosystems through space and time Human activities also play a profound role in shaping ecosystems The changing ecosystem, in turn, generates changes in species and genetic diversty This means that the habitat requirements for each organism are constantly changing their position and dimensions on the geographical landscape over time

One important example of ecological evolution is the development of a snag, its habitat changes, its fall to the ground, and the subsequent changes to the downed log

Finally, the log is incorporated as large, woody matenal in the soil profile, where special symbiotic mycorrhiza fungi return the mineral nutrients. These nutnents are essential for tree, shrub, or grass growth and survival.

Other important models of ecological evolution, which must be understood for sensrtive management of the forest, are tree growth and seral stage formation and development, species habitat requirements and habitat formation, stream geologic and habitat evolution, riparian formation and development, resource extraction and utilization The forests, rangelands, meadows, chaparral, nparian areas, and streams are a kaleidoscope of habltat patterns Collectively, they determine the location and abundance of the species found in the forest at any given time These resource areas will serve as benchmarks or baselines for the future, understanding the ecological processes affecting them is essential for forest health and resource management

Alternative CBF will protect genetic divenlty by discouraging the fragmentation of old growth forests and by providing protected connective corndors for wildlfe to avoid the isolation of species dependent on the old growth habitat This alternative also emphasizes the natura recovery of fishery stocks

Species diversity will also be enhanced in Alternative CBF fisheries habrtat will be improved over the first and following decades to improve aquatic diversity, wildlfe conditions will be improved by the retention of snags and large dead and downed matenal and prescribed burns, timber and rangelands will have enhanced habrtat patterns because of the mosaics created by prescribed bums

To provide ecosystem divenlty, Altemative CBF will emphasize the protection and improved viability of the late seral/old growth ecosystems This is accomplished by the management recommendations detailed later in this section for. silvicultural prescriptions, roadless areas and areas left undeveloped in a natural condition, enhanced riparian zones, Research Natural Areas (RNAs), Wild and Scenic Rivers, fuels management, and pest control Grass and rangelands will be improved by regulating livestock, protecting meadows, and improving range condrtions over time.

Biomass

Logging residue that is used for biomass will be generated on approximately *5,900* acres per year in the first decade Smaller biomass material will be generated from precommercial thinning activities on about 2,500 acres per year. Biomass utilization will be restricted where it will reduce timber productivity because of soil nutrient loss, soil compaction, or loss of soil volume Large, woody material, such as cull logs and large limbs, will be left in sufficient quantity to provide wildlife habltat and future soil enhancing components

Botany

Alternative CBF will maintain sensitive plant species and their essential micro habitats at levels which assure their long-term viability

An inventory of all endemic plant species will be performed, including the mapping of their locations The inventory will also alert project planners so that there will be no negative impacts on the project sites A management plan will be developed

The Calfornia Natural Diversity Data Base will be used in conjunction with Forest Service data to formulate a sensitive plant list A comprehensive species management guide will be developed

Until this guide is developed, sensitive plants will be protected to ensure that they and their surrounding communities remain undisturbed

No pesticide use or livestock grazing will be allowed within these areas

Commercial forest foraging will only be done under permit. A survey will be completed by Forest Service personnel to establish the amount and type of forest products to be harvested and the method of harvesting used

Heritage Resources

Alternative CBF will protect heritage resources by reducing the amount of land subject to ground-disturbing activities (i e , protection of riparian management zones [RMZs] and wildlife corridors)

An inventory will be made of likely and known heritage srtes Significant srtes will be inventoried by the year 2000 Areas containing less signrficant sites will be inventoried by 2010 Eligible sites will be nominated for inclusion in the National Register of Historic Places (NRHP) Areas subject to ground-disturbing projects will be surveyed and evaluated before contracts are awarded or activities begin Identified sites will be protected by project modification or

mitigation measures Access. use, and integrrty of srtes and locations that are important to tradrtional Native American religious and cultural practices will be protected, such as Mt Shasta

Facilities

Structures. Remote administrative work centers will be maintained, upgraded, or reduced in size on a case-by-case basis This will be done to meet management needs in a reasonably safe and cost-effective manner

To reduce costs, administrative site leases will be eliminated in favor of agency-owned facilrties Possible exceptions will be the public information contact sites (i e , the south [northbound] arrival station for the Shasta Unit of the Whiskeytown-Shasta-Trinity National Recreation Area [NRA])

Transportation. The Forests' road system will be expanded only to the extent needed to provide for adequate multiple-use management Many areas designated for timber management will require new road construction Areas designated for semi-primitive recreation, old-growth-dependent wildlife, or protection of unstable soils will require fewer or no roads Roads that are deemed unnecessary will be eliminated and the area will be returned to a natural condition

Road design will give attention to well-engineered stream crossings, prudent road routing, and narrow road widths High-use. permanent native surface roads will be graveled and/or in-sloped rather than out-sloped In sensitive wildlife or high erosion areas, where public access is not needed, roads will be closed wrth gates, berms, or barricades

Road maintenance will be increased over current levels with particular attention given to stream crossings Prevention of sidecast material from entering streams and cut bank stabilization will be major goals Forest road signing and mapping will be upgraded to better aid forest users

Cost-share agreements with private inholders will continue They will be augmented, where necessary, to provide equitable financing of road construction and maintenance

Trails will be maintained and upgraded, where necessary, to provide a safe, comfortable, and aesthetically pleasing expenence fortrail users Unmainiained, historic trails will be reopened

New trails will be provided, as necessary, to enhance recreational opportunities Trail access will not adversely affect wildltfe, fishenes, or wilderness recreational values

Options will be explored to increase government funding and the volunteer labor force to better provide for trail construction, improvements, and maintenance

A comprehensive trail condition inventory will address maintenance needs, reconstruction priorities. re-routings away from sensrtive areas, and user conflicts Increased emphasis will be given to new trail construction and reconstruction A system of trails on Mt Shasta will provide a recreation opportunty for those unable i o climb the mountain or hike at high altitudes

Fire and Fuels

Alternative CBF will emphasize large-scale fuel reduction to return the forest to more natural conditions and reduce the potential for catastrophic fe Without an active fuel treatment program, acres burned will be greater than historical averages This is due to higher fuel loading as a result of other resource needs and historic suppression policies In areas allocated to Prescription VII (Threatened, Endangered, and Selected Sensitive Species), a fuels management program will be inltiated to reduce fuels to avoid loss io catastrophic fire Prior to burning. hand crews will reduce concentrations of fuels and create shaded fuelbreaks

Treatment of natural fuels and resource activity-created fuels is projected to be a minimum of 6,000 acres annually during the Ist decade and up to 43,000 acres per year if budget resources are provided Where feasible. fuels from timber harvesting will be reduced to the level needed for wildlife and watershed and soil protection Science-based prescriptions will be developed to provide for the biological needs of the site and protection of habitat components

Protection efforts will be emphasized in high value plantation areas Flammability reduction will be used to help protect plantations by thinning, pruning and removing flammable material Utilization of undesirable vegetation will be stressed rather than leaving or treating within areas where timber operations are carried out A large amount of usable material could be recovered in the form of chips, biomass fuel, poles, and firewood

Within Wildernesses, the use of planned and unplannec ignitions will be used for prescribed fire. Burn characteristics will approximate those of pristine or near pristine conditions Mosaic patterns for wildllfe and vegetatior species diversity will be stressed. Wildfire suppressior tactics and strategies will utilize "light hand on the land" as found in National Interagency Fire Line Handbook Forest Service Handbook (FSH) 5109 32a

Fire suppression will be at the most efficient level as determined by the National Fire Management Analysis System (NFMAS)

Fisheries

Forest-wide and management prescription standards and guidelines, Best Management Practices (BMPs), *RMZs,* and supplemental management area direction will be implemented to protect and maintain all fishery resources on the Forests Habitat surveys and evaluations and the monitoring of timber sales and grazing activities will be accomplished

This alternative displays the full array of native fisheries management opportunities Emphasis will be placed on management indicators to meet recreational sportfishing demands Protecting and improving native fishery habitat capabilty is a mqor resource objective Special protection and management actions will be used to enhance some species

This alternative will generate a 30 percent increase in habitat capability for anadromous fish (steelhead trout) within four decades This alternative will generate a 20 percent increase in resident fish habitat capability (rainbow trout) within four decades

Fish habitat will be improved and watershed restoration activities undertaken Watershed restoration projects in ephemeral and intermittent streams will be implemented to protect, maintain, and enhance steelhead trout and rainbow trout habitat in downstream perennial stream areas Direct fish habitat improvement work for steelhead trout and rainbow trout will occur in minor and major perennial streams to accommodate major consumptive sportfirhing.

Since the Forests greatest number of wildlife/fish user days (WFUDs) are associated with the National Recreation Area lakes (Shasta, Trinity, and Lewiston Lakes) and other lakes on the Forests, reservoir habitat management will be emphasized to benefit major consumptive sportfishing for rainbow trout, largemouth bass, as well as native species.

Threatened, Endangered (T&E) and Sensitive Species

There are no Federally designated threatened and endangered fish species on the Shasta-Trinity National Forests Special management direction will be undertaken for sensitive species.

Spring-run (Summer) Steelhead and Spring-run Chinook Salmon. Forest-wide and management prescription standards and guidelines, Best Management Practices (BMPs), Riparian Management Zones (RMZs), and supplemental management direction will be implemented to protect and maintain summer steelhead and spring-run chinook salmon habitat

Spring-run (summer) steelhead and spring-run chinook salmon will receive all possible protection until populations recover Sport fishing will be discouraged Forest Service personnel will participate in anti-poaching patrols Monitoring of all projects will be done to ensure effectiveness of BMPs Winter logging will be prohibited Degraded watersheds will not be entered until they had recovered Recovery will be determined by *conformity* with the highest possible habitat capability Emphasis on water quality protection and wild and scenic river designation by this alternative will enhance the opportunlty for recovery of these species

General stream habitat condition surveys and regular sampling of spawning gravels at selected sttes will be conducted to provide support information for proposed projects These surveys will include ongoing monitoring of pools to document changes in pool size, depth, and temperature Habitat type surveys on the mainstem South Fork Trinity River, the East Fork South Fork *Trinity* River, upper Hayfork Creek, Rattlesnake Creek, Salt Creek, and other key tributaries within this basin will be done to assess densities of steelhead and salmon juveniles

Spring-run (summer) steelhead and spring-run chinook salmon adults and out-migrant juveniles will be counted in the mainstem South Fork Trinity River This information will be correlated with similar data collected from Big French Creek, Canyon Creek, East Fork North Fork Trinity River, New River, and the North Fork Trinity River to provide new baseline data on anadromous fish habitat production potential

Studies will be developed in cooperation with the California Department of Fish and Game (DFG) and the U S Fish and Wildlife Service to access the spawning efficiency/mor-

tality due to habitat conditions (i e , sedimentation of redds) on the mainstem and South Fork of the Trinity Rver

Snorkeling surveys will be conducted in Big French Creek, Canyon Creek, North Fork Trinity River, including the East Fork of North Fork, New River, and the South Fork Trinity River All feasible fish habitat improvement and watershed restoration projects will be implemented on threatened summer steelhead streams, with the goal of reaching production potentials

Sedimentation of spawning gravels may be a primary cause of declining salmon populations in the South Fork Trinrty River Montoring efforts shall include regular sampling of salmon spawning gravels at selected srtes, utilizing a McNeil sampler or equivalent accepted technique This *effort* is necessary to document changes in spawning gravel quality in the main river where chinook salmon spawn

Numerous slides along the South Fork Tnnty River may be contributing to the sedimentation of spawning gravels Various slide stabilization techniques should be attempted in order to evaluate efficacy Successful techniques should be implemented basin wide

Big French Creek will be assessed to determine its potential for summer steelhead introduction Any fish introductions will be managed by the DFG

Bull Trout. Forest-wide and management prescription standards and guidelines. land allocation constraints. BMPs. RMZs. and supplemental management area direction will be implemented to protect and maintain bull trout habitat

Introduction of the bull trout onto National Forest lands within the McCloud River will be coordinated wrth the DFG The McCloud Rver, above Lake McCloud, will be habitat typed prior to introduction A monitonng plan will be developed with the DFG to determine the success of introduction. extent of distribution. juvenile densty trends. numbers of adults, and habitat preferences, etc All feasible fish habitat improvement projects will be implemented for bull trout

Rough Sculpin. Guidelines will be developed to protect and maintain potential rough sculpin habitat during forest operations Consultation with the DFG will continue A recovery plan will be prepared for the rough sculpin in conjunction with the DFG detailing areas of expansion in the Pit Rver system

Redband Trout. Forest-wide and management prescription standards and guidelines, BMPs, RMZs, and supplemental management area direction will be implemented to protect and maintain redband trout habitat

The redband trout could sustain an increase in dispersed recreational sportfishing with a major emphasis on a catch-and-release fishery It will not be managed for major consumptive sportfishing unless an increase in population numbers can be projected to sustain such a fishery

Trout Creek will be managed as a premiere redband trout stream All feasible fish habitat improvement and watershed restoration projects will be implemented The need for further land acquisition in the Trout Creek drainage will be evaluated to ensure a consistent application of beneficial management practices.

Habitat type surveys will be conducted in Edson Creek, Moosehead Creek, Sheepheaven Creek, Swamp Creek, and Tate Creek All feasible fish habltat improvement and watenhed restoration projects will be implemented on redband trout streams Currently unused habitat in Raccoon Creek will be assessed to determine its potential for redband trout introduction Any fish introductions will be managed by the DFG If redband trout are introduced, a monitoring plan will be developed for Raccoon Creek with the DFG This plan will help determine the success of introduction, extent of distribution, juvenile density trends, numbers of adults, and habitat preferences, etc

Forest Pests

Integrated Pest Management will be practiced but with some constraints A range of **pest** management activities will be available to maintain pest-caused losses at acceptable levels Emphasis will be placed on prevention Microhabitats for pest predators will be actively planned for The intensty and type of pest management activities employed will be determined on a site-specific basis and will be dependent on management goals and resource values affected The intensrty of vegetation management activlties will determine which pest management activrties are applicable Most pest management practices will be indirect, and they will attempt to alter pest habrtats and encourage natural controls No chemical or botanical pesticides will be used Biological pesticides will be used only as a last resort No pest suppression activties will occur in designated wildemesses Herbicide use will not be resumed

Minerals

Surface resources will be protected to the maximum extent possible under existing law Mineral uses will be discouraged or regulated where they will unreasonably impact other Forest uses

To avoid conflicts with objectives for the Mt Shasta Scenic Area, recommendations will be made that no surface occupancy on new leases be allowed above 4,500 feet Recommendations will be made to the Bureau of Land Management(BLM) for withdrawal from mineral entry on the same area

Investigations of abandoned chromium, asbestos, and mercury mines will be conducted in the East Fork of the Trinity River Basin to determine if toxics are polluting the watershed and to what extent

Range

Grazing will be allowed with the following mitigations/restrictions

Grazing will be managed at approximately 8 3 thousand animal months (M AMs) or in relation to improving and maintaining the productivity and condtion of the range, as determined by annual monrtonng

Exclusionary control plots will be established in representative plant communities in selected allotments Animals will be allowed to graze in the allotments only at specified times

Allotment holders will be responsible for animal damage to plantations and for any other substantial resource damage

Grazing in newly planted areas will be prohibited until the trees reached six feet in height

Grazing will be monitored in riparian areas to determine if any damage is occurring and what corrective measures should be initiated.

Natural openings and plant communrties will be inventoned and any conflicts found between wildllfe and cattle will be resolved in favor of wildlife

Alternative stock watering systems will be developed away from springs and streams wrth exclusionary fencing installed where necessary.

Private landowners will be given priority on allotments in their areas

N o addrtional grazing allotments or AMs will be allowed in Wildernesses Existing allotments will be phased out as they are vacated Ultimately, the only grazing in Wildernesses will be by pack stock

The spread of noxious weeds will be controlled by restricting the use of hay unless it is free of weeds and seed

An annual plan of use will be prepared for each allotment with appropriate environmental documentation and mitigation Temporary allotments will be terminated

Recreation

A 'Mt Shasta National Scenic Area' will be recommended to provide a recreation focus and to recognize and enhance the unique qualities which gained Mt Shasta its status as a natural landmark. High altitude Shasta red fir, adjacent to the Mt Shasta Wilderness, will be left intact Only selection cutting will be allowed at lower altitudes Visual quality and recreation values will be maintained Timber management activities, which are specifically designated to complement this focus, will be allowed

A Protection Plan will be developed to emphasize the recreation values of the Lower McCloud River and Squaw Valley Creek Canyons. This will be done by using a mix of management prescnptions that provide primitive and developed recreation opportunities, as well as older overmature habtat dependent species and protection of the unique McCloud wild trout fishery. Timber management opportunities will occur around the periphery of these areas, and they will be compatible wrth the recreational focus in the heart of the area

The Trinity Divide Biolink will link the Klamath Province with the Sierra Nevada Province through the Mt Eddy further planning area and Castle Crags State Park This will be done to enhance recreation opportunrties and wildlife values

Interpretive sewices and 50 percent of the campgrounds will be operated at the standard service level Campgrounds will be kept open during the primary use season (Memorial Day through Labor Day). Substandard

developed recreation sites will be rehabilitated at the rate of 275 PAOTS (people-at-one-time capacrty) per decade The rehabilttation program will be focused on areas most heavily used or wtth the highest potential level of use

New construction will be focused on facilities that meet future demand and inform the public of recreation opportunities New campgrounds will serve 500 PAOTS each in decades 1 and 2

A well distributed trail network will be developed and maintained across the Forests Reconstruction will take place on 50 miles per decade (five miles per year) One trailhead will be constructed or rehabilitated per year

About 185 miles will be designated as off-highway vehicle (OHV) travelways by the end of the fifth decade These travelways will be open to all OHVs in clearly marked, designated areas consistent wtth the protection of other resource uses

Fifty percent of the dispersed recreation sttes will be managed at the standard service level, and 50 percent will be at the low standard level Serious health and safety deficiencies will be corrected Monitoring of primttive recreation needs will be implemented for future planning needs

North state skiing needs and sites will be assessed

Riparian Areas

A high level of protection will be provided/emphasized for riparian ecosystems through the adoption of standards and guidelines and special management direction

RMZ standards and guidelines will be amended to provide for additional monttoring and protection See the Forest Plan, Chapter 4, Management Prescription IX (Riparian Management)

This alternative will also adopt the standards and guidelines and management direction found in **Exhibit I** on the next page

Resource managers will use the most protective standards and guidelines, directions or goals whenever a conflict appears between the Forest-wide Standards and Guidelines and those found in **Exhibit I**

Soils

Protection of soils will be a pnmary objective of this alternative Soil organic material and a complete duff layer will be maintained–to provide long-term soil productivrty of timber and range lands

Logging on wet soils will be prohibtted Lopping and scattering of slash and planting through slash will be required to protect soil nutrients Large, woody debns and slash will be left on the ground to provide the long-term soil organic matenals needed to maintain soil moisture and microbial activity Hardwood and brush components will be retained to provide nutrient cycling

Areas wtth high or extreme soil erosion hazard ratings will be closed to OHV use Grazing will be restricted on areas where monitonng demonstrates negative impacts to soils Management activities will be excluded from areas of high instability such as innergorges (See the discussion on soils in the Special Areas section)

Special Areas

Research Natural Areas (RNAs). This alternative will allocate 26,970 acres of National Forest lands to RNAs Under this alternative, 13 areas will be established See **Table IV-8** in Chapter IV for a listing of these areas

In addttion, a 500-acre triad grove west of the Burnt Lava Flow will be evaluated for an eastside pine type This is an undisturbed watenhed representative of adlacent watersheds This area will be used for comparative studies similar to the Nature Conservancy studies in the McCloud contiguous area

Consideration for RNA establishment will be given to aquatic, hydrologic. geologic, soils. and high-priority unique plant, animal, and natural communities The Rough Gulch watenhed and the South Fork Tnnrty, between Rough Gulch and Smoky Creek, will be recommended for hydrologic RNA designation

High-pnorrty California Natural Diversity Data Base sttes, not subject to adequate protection by other means. will also be recommended for RNA designation

A Level 3 soils inventory will be initiated for sensitive soils to identify potential soils-based RNA candidates Bear Creek will be recommended for RNA designation for diorritic soils (highly-erodible and representative of significant portions of the Trinrty National Forest)

Exhibit I
Standards and Guidelines for the Two Watershed and Fish Options

Option	Description
Current Option	Rparian standards and guidelines and Best Management Practices to minimize cumulative effects in watersheds, as defined in current Forest Service (FS) and Bureau of Land Management (BLM) Plans
Watershed and Fish Habitat Emphasis Options	**Reserve areas:** Wilderness, National Parks, Wild and Scenic Rivers, LS/OG I, and owl additions. **Riparian management areas on all FS and BLM lands:** (1) Wild, Scenic, and Recreational nvers designated or under study. no-harvest area 1/4 mile on each side of the stream or the width of the 100-year flood plain, whichever is larger, where qualrty, fish or other ecological values are descnbed as part of the stream's outstandingly remarkable features (2) No-harvest area 1/8 mile of each side of the stream or the width of the 100-year flood plain, whichever is larger, on major streams draining at least 30 square miles. (3) Fish-bearing streams: 300-foot no-harvest area on each side of stream. (4) Permanently flowing non-fish-beanng streams: 150-foot no-harvest area on each side of stream. (5) Seasonally flowing or intermittent streams: 50-foot no-harvest area on each side of streams in areas of moderate and high soil instability. No harvest areas will vary with topographic and on-site conditions, but the horizontal width of such areas, implemented in practice, should reach the objectives expressed as averages here **Key watersheds identified as having high-quality fisheries, water or ecological values (Appendix D):** Augment the Forest Plan standards and guidelines with the 50-11-40 rule and rotations approaching 200 yean (management option C as described in "Lands Outside of Reserves,' under "Forest Management") **Forest road systems and related road-drainage problems:** (1) *Reduce and* minimize *forest road-system* mileage. (a) Minimize construction of new roads, and construct no new roads in current roadless areas identified in the Forest Plan, (b) Remove (return to a natural condition) spur roads and other non-essential roads (2) Conduct a forest road-system analysis by National Forest and BFM District to identify road locations and practices which will reduce impacts to riparian areas of exisbng and new roads

Exhibit I
Standards and Guidelines for the Two Watershed and Fish Options

Option	Description
	(3) *Road drainage* (a) Increase maintenance of road network during the rainy season (b) Upgrade culverts to larger sizes on existing and planned roads. (c) Increase frequency of culverts on new and existing roads
	Logging slash treatment/prescribed fire: (1) Eliminate hot bums on steep grounds. (2) Eliminate bums in riparian management areas.
	Livestock grazing: Include temporary and permanent exclusion from nparian areas to promote the reestablishment of shrubs, hardwoods, and fringe wetlands, and maintenance of stream-bank integrity
	Riparian and fish-habitat restoration: Establish a program that will ensure long-term stream-habitat stability
	Cumulative effects: Conduct an analysis by National Forest and BLM District to aid in the timing and location of timber harvest and location of roads and landings.

No grazing will be allowed in *RNAs* unless specfically required to maintain the targeted element

Special Interest Areas (SIAs). Fifteen areas, totaling 3,812(+) acres, will be recommended for SIA designation under this alternative Following is a listing of those areas (1) Blake Mountain, (2) Cable Creek, (3) beep Crater, (4) Giant Crater Lava Tube System, (5) Little Glass Mountain. *(6)* Lower McCloud River Wild Trout Area, *(7)* Mt Shasta Scenic Area, (8) Natural Bridge, (9) Paint Pot Crater, (10) Pumice Stone Mountain, (11) Samwel Cave, (12) Spatter Cones, (13) Tedoc Mountain, (14) Trout Creek Redband Trout Area, and (15) Western Azalea See Table IV-10 in Chapter IV

Table 11-11
Timber Cutting Methods (Alternative CBF)

	Acreage		Volume	
Cutting Method	**Acres**	**Percent**	**MMBF**	**Percent**
Clearcut	0	0	0	0
Green Tree Retention*	2,690	45	43	66
Selection	1,400	24	13	20
Commercial Thinning	1,040	18	6	9
Salvage	750	13	3	5
Totals	**5,880**	**100**	**65**	**100**

* Includes Shekelwood Cuts.

Timber

This alternative will result in an average annual allowable sale quantrty (ASQ) of 65.3 million board feet (MMBF) in the first decade from a suitable timber land base of about 495,400 acres (30 MMBF from the Shasta Forest and 35 MMBF from the Trinity Forest)

On approximately 372,700 acres sultable for timber production, timber management activities will be relatively intensive and yields will be moderate to high Impacts to wildlife will be minimized by the interspersion of riparian zones and other lands where little or no harvesting will occur Large, woody material, such as cull logs and large limbs, will be left in sufficient quantrty to provide wildlife habitat and future soil enhancing components Wildlife will benefit from the hardwoods and snags that will be left

In scenic view areas and special wildlfe areas, timber management will be modified to protect visual quality and/or enhance specific wildlife habitat On about 122,700 suitable acres, timber management will be minimal in order to emphasize other resource uses, such as recreation, or because of site limitations which preclude intensive timber management

An additional 582,400 suitable acres will not be available for timber management, because they are allocated to other uses, such as old-growth wildlrfe habitat, recreation, ecosystem research, threatened, endangered and sensitive plant or animal protection, or watershed protection These uses preclude timber harvesting on a regular basis

Selection and green tree retention will be the main harvesting systems used An estimation of the average annual acres and volume harvested in the first decade is shown in **Table 11-11**

The timber on surtable lands will be managed on a minimum 120 year rotation This timber harvest schedule will result in about 1 1 9 percent of the suitable acres being treated in the first decade About 8 3 percent of the suitable acres will be regenerated in the first decade

No clearcutting will be used in this alternative Emphasis will be placed on the uneven-aged selection system including single tree and group selection This system will be applied, where feasible, on slopes less than 40 percent Uneven-aged selection will be the predominant system on low site class lands and areas where high visual qualrty is to be maintained Openings will be two acres or less

The green tree retention system will be the dominant system used on slopes greater than 40 percent Harvest units will be limited to less than 20 acres in size. In addition to saving as much of the existing understory as possible, 12 of the larger trees will be saved on each acre of well stocked stands, and 6 trees per acre on understocked stands, if available A maximum of 70 percent of the merchantable volume per acre will be removed under this system Where possible, these units will be long narrow strips to maximize edge and inseeding of natural regeneration

Commercial thinning will be accomplished in overstocked stands to a minimum of 11 inches diameter-at-breast height (DBH) and 40 percent crown closure

Stand maintenance (salvage) will be practiced extensively to capture commercially valuable dead or dying trees

The harvesting systems will use minimal site preparation by burning Large slash, in excess of Minimum Management Requirements (MMRs), will generally be used for firewood, chips, or fuelwood for biomass power plants Small slash will be left on site

This alternative will result in an average of 4,100 acres of reforestation per year in the first decade A combination of artificial and natural regeneration will be used Planting will be done with a species mix to perpetuate the variety of conifer species found growing on the site

The timber harvest schedule for this alternative will result in an average annual net growth of about 101 MMBF; by the fifth decade, on the suitable lands This growth represents an average of about 205 board feet per acre per year

No herbicides will be used Where needed, non-chemical, manual means of vegetation management will be used Vegetation management (non-chemical release) will occur on about 3,700 acres per year, primanly on lands where timber growth and yield are emphasized

On suitable timber lands, hardwoods will be managed for wood products, while providing for wildlife habrtat needs Those hardwoods cut dunng logging operations will be yarded to landings for use as firewood or as biomass for power plants (see Biomass section). Pure hardwood stands will not be converted to conifers, but they may be managed for wood production on a sustained yield basis Fuelwood management zones will be identified around population centers, and hardwoods will be managed

within these zones to provide continuing supplies of firewood for home use

Visual Quality

Visual quallty will be emphasized in the NRA, on Mt Shasta, in the McCloud Rver area and wtthin the Trinty Divide Biolink area It will also be emphasized around most developed recreation srtes An expanded Wild and Scenic Rivers system, along with wider RMZs on other waterways, will be managed to provide protection for visual qualrty

About three quarters of the Forests(ı e ,Wildernessesand other reserve areas) will be managed to preserve the characteristic landscape Visual qualrty will also be an important consideration wtthin roadless areas assigned semi-primrtive prescnptions Management activties will be evident along proposed State scenic highways, but visual qualrty objectives will not fall below "partial retention" (See Chapter 111, Visual Qualrty, **Figure III-6**, Visual Qualrty Objectives [VQOs])

In the remainder of the Forests, timber management activities will not cause the visual quality objective to fall below "modkcation" (see Chapter III, Visual Quality, Figure III-6, VQOs) However, higher road densities will be required to carry out the timber prescriptions in this alternative

The visual character of the Forests will change to more diversity, slightly more old-growth, and smaller diameter trees Overall, this alternative will provide a high degree of emphasis on visual qualrty

Water

Maintaining water qualrty will be highly emphasized in this alternative Riparian Management Standards and Guidelines, Best Management Practices (BMPs). and Rpanan Management Zones (RMZs) will be applied to Forest activties that will affect water qualty

Watersheds in a degraded condition will be improved by the year 2000 Non use of herbicides will signkcantly reduce the nsk of water contamination from chemical sources

No specific management objectives will be planned for the purpose of changing water yields Outstanding resource waters will have no degradation

Wild and Scenic Rivers

This alternative will include 106 4 miles (National Forest land only) of Wild, Scenic, and Recreation Rivers including New Rver. the North Fork Trinty Rver, the South Fork Trinity Rver, and the mainstem Trinrty Rver These will be supplemented by an addltional 116 6 miles (National Forest land only) and 72 6 miles (pnvate land) recommended for designation Beegum Creek, Canyon Creek, a portion of Hayfork Creek, the upper and lower segments of the McCloud Rver, the upper segments of the North Fork and South Fork Tnnity Rver, the Sacramento River, Squaw Valley Creek, and Virgin Creek (See the Wild and Scenic Rivers write-up, FEIS Chapter IV)

Action on the McCloud and Sacramento Rivers will be coordinated wrth the State of California due to the amount of private land involved Complete descriptions of these rivers are presented in Appendix E

In response to public input and regional direction (Regional Forester Paul Barker's direction of 9/26/90), the Forest shall conduct a forest-wide assessment of other potential Wild and Scenic River candidates, including the East Fork Trinrty Rver

Wilderness and Roadless Areas

Existing Wildernesses will be maintained under this alternative Acreage shown is National Forest land only

Wilderness	Acres
Castle Crags	10,483
Chanchelulla	7,800
Mt Shasta	38,560
Trinity Alps	405,128
Yolla-Bolly Middle Eel	36,805

A total of 498.776 acres of the Shasta-Trinity National Forests will be managed as part of the National Wilderness Preservation System In addrtion, the 7,720 acre Mt Eddy Roadless Area will be recommended for Wilderness designation

Pest management suppression will not be conducted within Wilderness area boundaries

No feed for grazing cattle will be carried into, or distributed in, any Wilderness

Management plans will be written to address concerns including over-use; party size, stock numbers, trailhead quotas, visitor education; campste condition, trail condition, limits of acceptable change (LAC), monitonng, fire, heritage resources, species re-introduction, and wilderness grazing

Wilderness patrol programs will be established

No new grazing allotments will be established Unused or vacated grazing permits will be retired

Fifteen released roadless areas will remain roadless These are

Trinity Forest	Shasta Forest
Chinquapin	Castle Crags B
East Beegum	Devils Rock
East Fork	Mt Shasta B
Fisher Gulch (in part)	West Girard
Little French Creek	East Girard
Pattison	(Nature Conservancy
Penney Ridge	portion)
South Fork	
Underwood	
West Beegum	
Wildlife	

Wildlife management objectives will maintain habtat to support all species on the Forests at or above viable population levels The distribution and variety of wildlife habtat will *be* maintained

Management indicators(I e , deer, bear, gray squirrel, and pileated woodpecker) will be managed to at least the moderate level identified in the habttat capabilrty rnodels While accountability is on a Forest-wide basis, objectives will be measured at the compartment level

Forest Standards and Guidelines pertaining to special habitat components (I e , snags, hardwoods, dead and down material, seral stages, etc) will set the minimum level of management throughout the Forests Snags and dead and down materials will be managed to the same level as in Alternative PRF except in Prescription VI as described in this section

Hardwood forest types will be managed primarily for the beneft of deer, bear and gray squirrel but will not be managed for conversion to conifers

In the Ist decade, the average direct habitat improvement will be done annually on 4,962 acres to benefit deer and other wildlife species.

Prescnption VI, Wildlife Management, includes designated wildlife areas for black bear, deer and gray squirrel These species will receive a higher level of emphasis in this prescription than in other areas of the Forests. Areas wthin Prescnption VI will be managed to "high" capability model standards Included are deer winter ranges, six black bear areas, and 5,000 to 6,000 acres of bitterbrush About 209,500 acres are allocated to Prescription VI in this alternative

On Prescription VI lands an average of 3 5 snags per acre will be maintained, 75 percent of these will be hard snags.

Timber management activties will be permitted to enhance habitat on Prescription VI lands Road densities will not exceed an average of I 5 miles per square mile

On lands identified as deer transition and winter ranges, an average of 46 square feet of hardwoods per acre will be maintained On the remaining areas, an average of 30 square feet/acre basal area (the equivalent of I0, 24-inch diameter trees per acre) of hardwoods will be maintained If less than 30 square feet basal area is present naturally, the existing level of hardwoods will be maintained

This alternative emphasizes maintaining biotic diversity of plant and animal life native to the area Special emphasis will be given to retention of older over-mature habitats A diverse and well-distributed landscape pattern will be created and maintained Monitoring will be conducted annually on a compartment level using management indicators This list will include guilds from each of the major wildlife groups, (granivores, detntivores, folivores, herbivores, fungivores and carnivores) and guilds specializing in each of the wildlife habitat relationship (WI-IR) special habtat components

Wildlife Corridors

Trinity Forest - A system of I ,200 foot wide corndors will be established to interconnect Prescription I (Unroaded Non-Motorized Recreation, V (Wilderness Management), VI (Wildlife Habitat Management), and VII (Threatened, Endangered and Selected Sensitive Species) These corridors will be managed as Prescription VII

Shasta Forest - A system of variable width corndors will be established to interconnect Prescnption I (Unroaded

Non-Motorized Recreation), II (Limited Roaded Motonzed Recreation), V (Wilderness Management), VI (Wildlife Habitat Management), VII (Threatened, Endangered, and Selected Sensitive Species), and X (Special Area Management). These corridors will be managed as Prescription VII

Under this alternative, comdor widths will be based on their relationship to the management of all other elements of the Forests No pesticide use, timber harvesting, or grazing will occur wrthin terntones or comdon Unused or vacated grazing allotments will be closed

Wildlife - Threatened, Endangered, and Sensitive Species

All known or future srtes of Federally listed threatened or endangered (T&E) species or Regional Forester identified sensrtive species will be fully protected and managed according to the Recovery Plan and/or habltat requirements for each species

Threatened

Spotted Owl. The Forests will provide habitat conservation areas (HCAs) and other measures as designated by the Interagency Scientific Committee (ISC) Report or as defined by the Recovery Plan, whichever is more restrictive This system will be adjusted as more definitive scientific information becomes available

Marbled Murrelet. On September 28, 1992, the U S Fish and Wildlife Service (USFWS) listed the marbled murrelet population in Oregon, Washington, and California as athreatened species under the Endangered Species Act The Forest Service is consulting wrth the USFWS on all activities that may affect the marbled murrelet Recovery requirements for the marbled murrelet are not yet known, but they will be incorporated into the Final Land and Resource Management Plan No activity will occur in marbled murrelet habitat until their requirements are known

Endangered

Bald Eagle. All known bald eagle nesting terrrtones will be managed according to direction provided in the Pacific Bald Eagle Recovery Plan (1986) and models developed for the Wildlife Habitat Relationship Program (WHRP) This plan calls for managing 20 pairs of bald eagles Newly found nests will receive similar treatment

Peregrine Falcon. Peregrine falcon nesting terrrtories will be protected and managed according to the Recovery Plan for Peregnne Falcon- Pacfic Population (1982) and models developed for WHRP This plan calls for managing 6 pain of peregrine falcons Newly found nests will receive similar treatment

No timber harvest or pesticide use will occur wrthin bald eagle *or* peregrine falcon terrrtones

Sensitive

Fisher and Pine Marten. By the end of the fifth decade approximately 749,000 acres of fisher and 549,000 acres of pine marten habrtat will exist on the Forests Some of this habitat will remain in relatively large contiguous blocks within areas allocated to no scheduled timber harvest (e g wildemesses, research natura areas, wild nven) Forty four percent of the Forests will be in a near natural condrtion In order to provide links and travel corridors within and between habitat segments, Alternative CBF will include 2 14,000 acres of land adjacent to perennial and intermittent stream courses (ripanan management zones) Two fisher habtat areas and 12 pine marten habrtat areas will be established and managed as Prescription VII

Red fir is an important vegetation type for the pine marten By decade five approximately 85,900 acres of red fir will remain in a near natural condrtion

Goshawk. Alternative CBF will manage 150 territories at a minimum of 150 acres each

Other - Wolverine. Wolverine is a state threatened species whose populations and habtats will be inventoried, in cooperation with the DFG, in order to develop a wolverine management plan

Environment to be Created

By the year 2040, about 90 percent of the Forests will remain in a fairly natural condrtion This percentage will be in relatively large, contiguous blocks including six wildernesses, 13 research natural areas (RNAs), 15 Special Interest Areas (SIAs), 10 Wild and Scenic Rivers, habrtat conservation areas (HCAs), and wide corridors for older over-mature dependent species

Areas managed for their riparian values will also contribute to a naturally appearing landscape along perennial and intermittent streams, in fairly large. wide stnps of land

Fifteen of the 29 former roadless areas will be undisturbed The 7,720 acre Mt Eddy Further Planning Area will be recommended for Wilderness designahon.

Areas seen from State highways, county roads, forest roads wlth high recreation use, and recreation stes will remain relatively unchanged Forest activties will not be evident in areas w t h distinctive landscapes

On the remaining areas of the Forests, forest management activties will be evident. These areas will be modified to varying degrees by activlties such as timber harvesting, road construction, developed recreation areas, and mining

In 50 years, about 10 percent of the Forests will consist of stands which are less than 50 years of age These regenerated stands will generally consist of a mosaic of even-aged and uneven-aged stands less than five acres in size

Wildlife habitat will be more diverse than it is today, w t h less habltat in the early seral stages, about the same amounts in the mid-seral stages, and more habitat in the late seral stages Approximately 370,000 acres of old growth habitat will remain

Table 11-12
Average Annual Outputs by Decade - Alternative CBF*

Resource Element	Base Year** 1989	'90 RPA Goals'. I	DECADE 1	2	3	4	5
Economics							
Total Budget (MM$)	40		38 1	39 1	400	41 8	44 1
Total Cost (MM$)	44		51 7	52 8	53 6	55 5	57 8
Facilities							
Transportation							
Trail Construction/Reconstruction (miles)	0/1		5i5	5/5	5/5	5i5	5/5
Road Construction (miles)	63		15	7	7	5	5
Road Reconstruction (miles)	73		16	17	16	17	17
Road Maintenance (miles)	6,550		6,500	6,570	6,440	6,690	6,740
Dams and Reservoirs (number)							
Forest Service	2		2	2	2	2	2
Other Federal	3		3	3	3	3	3
Other State/Local	1		1	1	1	1	1
Private	10		10	10	10	10	10
Administrative Sites (number)							
Forest Service Owned	24		26	26	26	26	26
Leased	2		0	0	0	0	0
Fire and Fuels							
Total Fuel Treatment (acres)	6.300		5.880	5.940	5,960	5,980	5.980
Fire-Related Treatment	1,500		1,500	1.500	1.500	1,500	1,500
Timber-Related Fuel Treatment	4,500		4.100	4,100	4,100	4.100	4,100
Other Fuel Treatment (for wildlife)	300		380	440	460	480	480
Expected Acres Bumed by Wildfire			11,000	11,000	11,000	11,000	11,000
Intenslty Class 1	32		55	55	55	55	55
Intenslty Class 2	48		154	154	154	154	154
Intenslty Class 3	774		330	330	330	330	330
Intensrty Class 4	850		451	451	451	451	451
Intenslty Class 5	3.345		4,686	4,686	4,686	4,686	4,686
Intenslty Class 6	1.350		5,324	5.324	5,324	5,324	5,324
Fish							
Inland Fish Other Than T&E							
(M Pounds)	1,424	1,794	1,713	1.713	1,770	1,837	1,837
Anadromous Fish							
Commercial (M Pounds)	691	457	691	691	691	691	691
Sport (M Pounds)	163	142	353	353	353	353	353

* See the last page of this table for abbreviated terms and meanings

** A base year of 1989 and the 1990 RPA program were used as instructed by the Regional Guide for the Pacific Southwest Region. revised 1990

Table II-12
(Continued)

Resource Element	Base Year** 1989	'90 RPA Goals** 1	DECADE 1	2	3	4	5
Fish (Continued)							
Direct Habitat Improvement							
Acres/Structures							
Inland Fish	15/25	-	39/82	39/82	39/82	39/82	39/82
Anadromous Fisn (Commercial)	0/0	-	0/0	0/0	0/0	0/0	0/0
Anadromous Fish (Sport)	5/50	-	30/64	30/64	30/64	30164	30/64
Thousand Fish User Days (MFUDs)							
Inland Fish	356		388	388	400	412	412
Anadromous Fish (Sport)	40		85	85	100	115	115
Human Resources							
Programs (Enrollees)	50	-	50	50	50	50	50
Lands and Minerals							
Land Acquisition (Acres)	6,996	-	1,500	1,500	1,500	1,500	1,500
Minerals (Operating Plans)	122	146	85	85	85	85	85
Ranee							
Grazing (M AMs)	12	12	83	83	83	83	83
Recreation							
Developed Public (MM RVDs)	71		075	086	097	109	12
Developed Private (MM RVDs)	49		051	059	068	075	083
Dispersed (MM RVDs)	256	*	276	3.2	37	4.3	50
Wilderness (MM RVDs)	13		014	016	019	022	025
Open. Usable OHV Areas-Summer (Acres)	239 2		220,195	220.195	220.195	220,195	220,195
Open, Usable OHV Areas-Winter (Acres)	1762		98.750	98,750	98,750	98,750	98,750
Roads and Trails							
Open Only to OW Use-Summer (Miles)	0	-	0	0	0	0	0
Open Only to OHV Use-Winter (Miles)	0		0	0	0	0	0
Closed to OHV Use-Summer (Miles)	810		810	810	810	810	810
Closed to OW Use-Winter (Miles)**	815		815	815	815	815	815
Timber							
Allowable Sale Quantity (MMCF)	28	-	98	98	9.8	100	102
Allowable Sale Quantity (MMBF)	184		65 3	65 3	65 3	66 4	68 1
Long Term Sustained Yield (MMCF)			113	113	113	113	113
Long Term Sustained Yield (MMBF)		-	75 3	75 3	75 3	75 3	75 3
Reforestation (Acres)	9,400		4.100	4,100	4,100	4.100	4,100
Timber Stand Improvement (Acres)	7,800	-	6.200	6,200	6,200	6.200	6,200

* The RPA goals include wildlife and fish user days (WFUDs) The Forest's figurer depict dispersed recreahon user Days only

** Refers to seasonal closure and does not include trails, such as the Pacific Crest Trail (PCT), where OHV use is Prohibited.

Table 11-12
(Continued)

Resource Element	Base Year** 1989	'90 RPA Goals** 1	DECADE 1	2	3	4	5
Timber (Continued)							
Wood Products Dther Than Sawtimber							
Firewood (M Cords)	21	-	25	30	30	30	30
Visual Quality							
visual Quality Index	127.3		127.4	130.1	128.1	128.1	128.1
Water							
Quality (M Acre feet at standard)	5.448		5,437	5.437	5,436	5,435	5,435
Increased Quantity (M acre feet)***	5,450		-13	-13	-14	-15	-15
Watershed Improvement (Acres)	399	706	300	300	300	300	300
Wildlife							
Threatened, Endangered and Sensitive Species (TE&S)							
Bald Eagle (# managed pain)	28		32	35	35	35	35
Goshawk (# pairs)	150		150	150	150	150	150
Peregrine Falcon (# managed pairs)	6		9	14	14	14	14
Spotted Owl (# pairs)	97		185	195	210	210	210
Other Than TEBS							
Deer (M animals)	62		62	62	62	62	62
Direct Habitat Improvement (MWUDs)							
All Species	2		35	51	58	67	61
Acres/Structures of Direct Habitat Impmvement							
All Species	1360/35		49621143	4962/172	5060,206	5060,247	5 163,296
Wildlife User Days (All Species) M WUDs							
Consumptive Species	282	338	282	282	282	282	282
Non-Consumptive Species	282	347	282	322	375	435	504
Total WUDs	564		599	655	715	784	847

*** The value for Decades 1-5 is the difference between the increased quantity, in Base Year 1989, and the projected qualrty water yield by decade This is not an indicator of decreased water quality, only of the net increase/decrease of water yield

Abbrewated Terms and Meanings for this Table
M=Thousand MM=Million MMBF=Million Board Feet MMCF=Million Cubic Feet
OHV = OR-Highway Vehicle AMs = Animal Months
RVDs = Recreabon Visitor Days
TE&S = Threatened, Endangered & Sensitive
WUDs = Wildlife User Days

	Management Prescription	Acres
I	Unroaded Noh-Motonzed Recreation	120,630
II	Limited Roaded, Motonzed Recreation	6,589
III	Roaded Recreation	245,486
IV	baded, High Density Recreation	6.290
*V	Wilderness Management	506,496
VI	Wildlife Habitat Management	207,116
VII	Threatened,-Endangered and Selected Sensitive Species	625,896
**VIII	Commercial Wood Products Emphasis/Timber Management	341,703
***IX	Riparian Management	27,775
X	Special Area Management	29,996
XI	Heritage Resource Management	3,570
TOTAL ACRES		**2,121,547**

* Acreage shown includes Wild and Scenic Rivers, Research Natural keas, and cultural resource areas within Wildernesses

** Acreage includes both suitable and unsuitable timber lands.

*** All riparian areas would *be* managed according to this prescripbon Acres do not include riparian *area* acreage *in* Prescriptions V and VII

Comparison of Alternatives

F

This section expands on the preceding portion of this chapter It displays the range of differences exhibited by the alternatives considered, and it describes the major changes that would be expected as a result of their implementation The alternatives considered by Shasta-Trinity National Forests personnel are compared in five ways

1 variations in the acreages assigned to the different management prescriptions,

2 Differences in physical outputs and activities of major elements and resources,

3 Differences in economic efficiencies between alternatives based on present net value (PNV) wtth consideration for net public benefits (NPB),

4 Differences in major environmental consequences resulting from land allocations and management activities, and

5 Differences in the ways each alternative responds to major public issues

There is a major comparison between alternatives that is pertinent to understanding the relative affects of all four alternatives in detail That comparison is wtth Alternative CUR, as descnbed in the 1990 Draft EIS. which reflects recent, historical levels of commodity related outputs

Since the 1990 Draft EIS, several decisions have been made which. in turn, have caused signficant changes in the four alternatives when compared to the 1990 CUR Alternative Those decisions include (1) the listing of the spotted owl, (2) an emphasis on old-growth and its related species, (3) the adoption of riparian standards and guidelines that provide for riparian values, and (4) the signing of the Record of Decision for Late-Successional Dependent Species (the President's Plan) These changes result in far greater effects (positive and negative) when comparing the alternatives to the 1990 CUR Alternative than the difference in effects between any of the alternatives in this document

In this section and in Chapter IV, the environmental consequences are described for the four alternatives considered in detail Those consequences vary, but all alternatives generally have positive affects on those consequences relating to the biological and physical environment On the other hand, there are adverse affects on those consequences relating to local economies dependent on timber harvest when compared to the 1990 Draft EIS, Alternative CUR

Table 11-16 displays the Ist and 5th decade outputs from the alternatives considered in detail and Alternative CUR in the 1990 Draft EIS

Iand Allocation Comparisons

Differences in land allocations among the alternatives considered in detail are displayed in **Table 11-14** The number of acres allocated to management prescnptions within each alternative is also shown Since each prescription contains a different set of practices and activities which focus on varying levels or intenstties of resource use, the number of acres within each prescription is indicative of the relative emphasis under different alternatives

Following is a brief discussion of the differences between management prescnptions

I - Unroaded Non-Motorized Recreation This prescription includes former RARE II roadless areas Also included are wild segments of Wild and Scenic Rivers outside of wildernesses These areas would be managed primarily for primttive, dispersed recreation and visual quality, they would be left undeveloped and roadless Alternatives PRF and CBF, with a high emphasis on amenity and non-market values, have the most acres in this prescription

II - limited Roaded Motorized Recreation. This prescription includes portions of former RARE II roadless areas, high elevation areas with low road densities. areas in and around the Whiskeytown-Shasta-Trinity Nattonal Recreation Area (NRA), and scenic segments of the Wild and Scenic Rivers These areas would be managed primarily for dispersed recreation wtth limited motorized use

III - Roaded Recreation. This is the primary prescription for the NRA, recreational segments of Wild and Scenic Rivers, and areas to be managed to a high visual qualrty Alternatives RPA and CUR have the most acres in this prescnption because of their emphasis on visual quality These altematives also allow other management practices along most visually sensitive roads on the Forests

IV - Roaded, High Density Recreation. Developed sttes and high-use dispersed recreation areas are included in this prescription Acreage does not vary signrficantly between alternatives

V - Wilderness Management. This prescription includes the five designated Wildernesses It also includes the Mt Eddy further planning area in Alternative CBF

VI -Wildlife Habitat Management. This prescription includes areas managed primarily for consumptive wildlife species, such as deer and bear It includes habitat areas such as key deer winter range and bitterbrush areas Alternatives RPA and CBF, with a high emphasis on these species, have the most acreage in this prescription

VII - Late Successional Reserves and Threatened, Endangered, and Selected Sensitive Species. Habitats to be managed for these plant, fish, and wildlife species are included The mqor acreage differences between alternatives is the addtional T&E habitat allocated for furbearers in Alternative CBF

VIII - Commercial Wood Products Emphasis/Timber Management. This prescription includes suitable timber lands where timber would be managed to produce moderate to high yields Acreages include small inclusions of unsutable timber lands within sutable areas Those alternatives which place the greatest emphasis on timber management (Alternatives RPA and CUR) have the most acreage in this prescription

IX - Riparian Management. This prescription includes Riparian Management Zones (RMZs) in and around perennial (Class I and 2) streams (including inner gorges), sensitive intermittent and ephemeral (Class 3 and 4) streams, and lakes and reservoirs Acreages shown in **Table 11-14** are estimates Acreages are not shown on the alternative maps because many ripanan areas are included in more restrictive prescriptions such as I, V, VII, or X Prescription IX applies to all areas where ripanan characteristics are found, not just mapped areas (see the Forest Plan, Chapter 4, Management Prescription IX) For these reasons any display of acres in this prescription could create an impression that riparian values were being emphasized in one alternative over another The riparian standards and guidelines have been applied equally to all alternatives

X - Special Area Management. This prescription includes areas recommended for Research Natural Area (RNA) and Special Interest Area (SIA) establishment Acreages shown do not include RNAs within wildernesses

XI - Heritage Resource Management. This prescription includes significant cultural sites which are eligible for inclusion in the National Register of Historic Places as well as traditional Native American sites The acreage within this prescription does not vary by alternative

Output/Activity Comparisons

The most quantfied and specfic figures for comparing the alternatives are provided in **Table 11-16** These resource-specfic outputs and activlties reflect the themes and objectives for each of the alternatives examined in detail. For example, the degree to which the Forest would be used for grazing under each alternative is measured in animal months (AMs) **Table 11-16** shows the variation in such grazing use from one alternative to another Addtional comparisons by alternatives are shown in **Table 11-17**

Resource Objectives

Air Quality

State standards will be met in all alternatives

Biomass

The amount of biomass matenal available for use will be largely dependent upon the number of acres harvested Therefore, Alternatives RPA and CUR, with high harvest levels, will generate more biomass material than alternatives with low harvest levels, such as Alternative CBF Alternative PRF will have a high biomass potential because of its emphasis on fuels management

Around population centers, biomass will be managed primarily for firewood in all alternatives Hardwoods will be managed to provide continuing supplies of firewood or home use

Biological Diversity

All alternatives will meet the diversity standards and guidelines which provide for the components of biological diversity In terms of richness the standards and guidelines for snag densities, seral stages, hardwoods, riparian, etc , will be required in each alternative and provide for that component. In terms of evenness, all alternatives will emphasize later seral stage vegetation, but they will provide in excess of 5 percent for each seral stage The greatest change in pattern of vegetative seral stages will occur in alternatives that emphasize vegetative manipulation Alternatives RPA and CUR will have the largest cumulative effect on pattern, but all alternatives will have a much smaller effect on pattern when compared to recent historical levels.

Table 11-13
Road Construction/Reconstruction
by Alternative (1st Decade)
(Average Miles per Year)

Alternative	Construction	Reconstruction
PRF	3	22
RPA	23	22
CUR	23	22
CBF	15	16

Botany

All alternatives will provide for protection of plants listed as senstive by the Regional Forester

Facilities

Road Construction and Reconstruction. During the 1st decade, road construction and reconstruction will occur in varying amounts as shown in Table 11-13.

Trail **Construction/Reconstruction.** Refer to Table 11-16.

Fire and Fuels

Fire and fuels management programs will include fuel treatment activities, such as utilization of material for alternate energy, personal use firewood. commercial firewood, prescnbed buming and fuelbreak maintenance and construction, and wildfire activities, such as presuppression planning and direct suppression actions Fuels

Tabl 11-14
Acreage Allocations by Management
Prescriptions and Alternatives
(Acres)

	Management Prescription	PRF	RPA	CUR	CBF
I	Unroaded Non-Motorized Recreation	66,984	22.092	5,027	120,630
II	Limited Roaded Motorized Recreation	59,040	11,388	15,593	6,589
III	Roaded Recreation	199,892	292,556	360,487	245,486
IV	Roaded, High Density Recreation	6,247	6,290	6,678	6,290
V	Wilderness Management*	498,776	498,776	498,776	506,496
VI	Wildlife Habitat Management	171,976	182,612	114,509	207, 116
VII	T and E and Selected Sensitive Species	531,520	530,358	528, 129	625,896
VIII	Commercial Wood Products Emphasis/ Timber Management**	285,203	537,354	544,220	341,703
IX	Riparian Management***	274,308	27,775	27,775	27,775
X	Special Area Management	24,031	8,776	16.783	29,996
XI	Heritage Resource Management	3,570	3.570	3.570	3.570
Total Acres		2,121,547	2,121,547	2, 121,547	2,121,547

* Acreage shown includes Wild and Scenic Rivers, Research Natural Areas, and hentage resource areas wrthin wilderness

** Acreage includes both suitable and unsuitable timber lands

*** All riparian areas would be managed according to this prescnpbon. Acreages are estimates and would be approximately the same in all alternatives. Acres do not include ripanan area acreage in Prescriptions V and VII

management that replicates the natural role of fire in the ecosystem will be emphasized in alternative PRF.

Presuppression will be planned to provide protection and an appropriate suppression response to meet burned acre predictions in the most efficient manner Suppression strategy on all lands will be to control fires at the least size/cost unless, in future Wilderness Management Plans, a strategy of confinement or containment is developed and authorized

Future Wilderness Management Plans may authorize suppression strategies of containment or confinement where site specific crtena so indicates.

All alternatives will have a suppression organization in line with the most efficient level as determined by the National Fire Management Analysis system Acres burned annually will be higher than in recent history due to the large number of acres in all altematives that are not available for fuels management, pnmanly with natural fuel accumulations

Fisheries

The theme and resource objectives prescribe the actions which will occur in agiven alternative **Table 11-15** presents avisual companson by alternative of the elements that are important to the Forest fisheries program

Forest Pests

Integrated Pest Management (IPM) will be moderately to intensively practiced on lands where vegetation is actively managed Therefore, Alternatives RPA and CUR, with relatively large amounts of land to be actively managed, will have larger IPM programs Smaller IPM programs will be expected in Alternative CBF, where more land will be subject to minimal pest management activties. Alternative PRF will have a moderate to intensive IPM program to assure protection of late-successional habltat from unacceptable mortality and subsequent wildfire

The degree *of* Forest pest activity and resulting resource damage in an alternative will be directly affected by the degree or intensity of the IPM program

lands

Lands activties will be the same under **all** alternatives Land line location will continue at a rate of about 150 miles per year Land purchase financing will be limited to lands considered valuable for outdoor recreation purposes or those needed to conserve threatened, endangered, or senstive species of fish, wildlife or plants This limitation is legislatively imposed on the purchase funds available (Land and Water Conservation Funds) The purchase of desirable properties will be handled on a willing seller-willing buyer basis. This frequently results in opportunity purchases as desirable lands become available

Under all alternatives desired, available private inholdings will be acquired within existing Wilderness and the Shasta and Trinity Units of the Whiskeytown Shasta-Trinity National Recreation Area (NRA) Most cases will involve small, individually owned parcels

Minerals

Mineral resource development opportunties are related to the number of acres available for mineral exploration and development Lands withdrawn from mineral entry affect mineral activity potential Wthdrawals from mineral entry will be tied directly to RNA establishment, creation of new wildernesses and designation of wild portions of Wild and Scenic Rivers The largest acreage to be withdrawn occurs under Alternative CBF The least acreage withdrawn is under Alternative RPA

There are three mineral categories mineral materials, easables, and locatables These will occur under any alternative The Forest Service issues permits for the nineral materials (common varieties such as sand, gravel, cinders, etc) The Bureau of Land Management issues eases for Federally-owned deposits of oil, gas, geothermal, coal, phosphate, sodium, potassium, and sulphur on he National Forest lands when recommended by the Forest Service Locatable minerals (gold, silver, etc) are acquired by filing a mining claim under the General Mining Law of 1872, as amended These types of minerals become subject to regulations governing leasable minerals n established National Recreation Areas Oil, gas, and geothermal resource leases are appropriate for all alternatives. The only current interest in geothermal is in the iortheast portion of the Shasta Forest

Range

n comparison to the current level (8,300 animal months AMs]), livestock grazing will remain about the same in Alternatives PRF and CBF and will increase by about 20 percent (10,000 *AMs)* in Alternative RPA

Table 11-15
A Comparison of Alternatives by Fisheries Evaluation Elements

Evaluation Elements	PRF	RPA	CUR	CBF
Surveys and Inventories				
Habitat Typing Anadromous Fish Streams	Complete On All Selected	Complete On All Selected	Complete On All Selected	Complete On All Selected
Trout Streams	Complete On All Selected	Complete On All Selected	Complete On Most Selected	Complete On Most Selected
Major Perennial Streams	Complete On Most Class I/II	Complete On All Class I/II	Complete On A Few Class I	Complete On A Few Class I
Minor Perennial Streams	Complete On A Few Class III	Complete On Most Class III	None	None
Streamside Riparian Inventories	Complete On Most Class I	Complete On Most Class I/II	Complete On A Few Class I	Complete On A Few Class I
Coordinated Resource Inventories (CRI)	Limited	Increase	Very Limited	Limited
Natural Habitat Recovery				
Non-Sensitive Anadromous Fish	Increase	Decrease	Limited	Significant Increase
Sensitive Anadromous Fish Spring-Run Chinook Salmon	Increase	Decrease	Limited	Increase
Summer Steelhead Trout	Increase	Decrease	Limited	Increase
Habitat Improvement				
Non-Sensitive Anadromous Fish	Increase	Increase	Low-Moderate	Decrease
Sensitive Anadromous Fish Spring-Run Chinook Salmon	Limited	Limited	Limited	Limited
Summer Steelhead Trout	Limited	Limited	Limited	Limited
Inland Warmwater Fish	Increase	Significant Increase	Low-moderate	Significant Increase
Bull Trout	No Action	No Action	No Action	No Action
Redband Trout	Trout Creek + 2 Others	Significant Increase	Trout Creek Only	Trout Creek Only
Rough Sculpin	No Action	No Action	No Action	No Action
Inland Coldwater Major Perennials	Increase	Significant Increase	Very Limited	Very Limited
Minor Perennials	Analyze Need/ Opportunities	Increase	None	None

Table II-15 (Continued)

Evaluation Elements	PRF	RPA	CUR	CBF
Monitoring and Evaluation				
Non-Sensitive Anadromous	Increase	Increase	Limited	Increase
Sensitive Anadromous	Increase	Increase	Limited	Increase
Inland Warmwater Fish	Increase	Increase	None	increase
Bull Trout	No Action	No Action	No Action	No Action
Redband Trout	Trout Creek Only	Trout Creek + 1 other	Trout Creek [Very Limited]	Trout Creek [Very Limited]
Rough Sculpin	None	None	None	None
Inland Coldwater Fish				
Major Perennials	Limited	Increase	Very Limited	None
Minor Perennials	None	limited	None	None

Recreation

Developed Recreation. All alternatives will meet projected demand for developed recreation through the first two decades Water-oriented recreation will be emphasized Alternatives PRF, RPA, and CBF will meet demand over the entire planning period through expansion of existing sites and construction of new ones Program emphasis in Alternative CUR will cause the most signficant differences in the 3rd, 4th, and 5th decades between developed recreation opportunities offered and demand No new sites will be constructed, no existing substandard sites will be rehabilitated, and some existing sites will be closed, if necessary

Dispersed Recreation. Alternatives PRF and RPA will meet projected demand through the planning penod. Alternative CUR and CBF will not

OR-highway vehicle (OHV) use opportunities for open, usable areas will be similar for all alternatives Use will occasionally be restricted in some areas to avoid conflict with non-motorized activities Expansion of cross-country skiing opportunities will be encouraged in all alternatives

Riparian Areas

Practicesto protect stream courses and nparian resources will be included in the riparian management standards and guidelines as described in the draft Forest plan for all alternatives except PRF. Riparian standards for alternative PRF are found in the final Forest Plan under the Riparian Reserve allocation and Prescription IX

Rparian Management Zones (RMZs) vary in width in all alternatives For alternatives CUR, RPA, and CBF they average 350 feet on both sides of perennial (Class 1 and 2) streams and 150 feet on both sides of intermittent and ephemeral (Class 3 and 4) streams No timber management activities will be scheduled adjacent to perennial streams, they will be modlfied along intermittent streams. Average RMZ widths will be applied according to the riparian standards described under Management Prescnption IX in Chapter 4 of the Forest Plan

For alternative PRF there is no timber management allowed within the perennial or intermittent stream buffers until the completion of a watershed analysis and only if the analysis determines that the buffers and/or their standards and guidelines will be modlfied *(See* Chapter 4 of the final Forest Plan under Rpanan Reserves)

Soils

Land management practices such as timber harvesting, reforestahon site preparation, and vegetation type conversion can affect soil productivity Soil quallty standards and Best Management Practices (BMPs) that mitigate soil

Table 11-16
Comparison of Annual Outputs by Alternative for Decades 1 and 5*

Resource Element	Base Year 1989	1990 RPA Goals	Decade	ALTERNATIVE PRF	RPA	CUR	CBF	1990 CUR
Economics								
Total Budget (Million dollars [MM$])	40		1	41 8	43. 1	39.8	38 1	28
			5	49 7	47 3	43 0	44 1	26
Total Cost (MM$)	44		1	55.4	56 8	53 4	51 7	31
			5	63 3	60 9	61 6	57 a	29
Facilities								
Transportation								
Trail Construction/Reconstruction (miles)	0/1		1	515	10/10	2/2	5/5	6
			5	5/5	10/10	2/2	5/5	2
Road Consruction (miles)	63		1	3	23	23	15	79
			5	5	5	5	5	44
Road Reconstruction (miles)	73		1	22	22	22	16	71
			5	21	22	23	17	69
Road Maintenance (miles)	6,500		1	5,700	6,580	6,580	6,500	6,828
			5	4,900	6,900	6,900	6,740	9,173
Dams and Reservoirs (number)								
Forest Service	2		1	2	2	2	2	2
			5	2	2	2	2	2
Gther Federal	3		1	3				
			5	3				
Gther State/Local	1		1	1	1	1	1	1
			5	1	1	1	1	1
Pnvate	10		1	10	10	10	10	10
			5	10	10	10	10	10
Administrative Sites (number)								
Forest Service Owned	24		1	26	26	26	26	26
			5	26	26	26	26	26
Leased	2		1	0	0	0	0	0
			5	0	0	0	0	0

* See the last page of this table for abbreviated terms and meanings

Table 11-16
Comparison of Annual Outputs by Alternative for Decades 1 and 5*

Resource Element	Base Year 1989	1990 RPA Goals	Decade	ALTERNATIVE PRF	RPA	CUR	CBF	1990 CUR
Fire and Fuels								
Total Fuel Treatment (acres)	6,300		1	30,000	6,580	7,080	5,880	11,622
			5	90,000	6,680	7,180	5,980	10,086
Fire Related Treatment	1,500		1	26.120	1,500	1,500	1,500	2,500
			5	86,020	1,500	1,500	1,500	2,500
Timber-Related Fuel Treatment	4,500		1	3,500	4,700	5,200	4,100	8,022
			5	3,500	4,700	5,200	4,100	5,386
Other Fuel Treatment (for wildlfe)	300		1	380	380	380	380	1,100
			5	480	480	480	480	2,000
Expected Acres Bumed by Wildfire			1	11,000	11,000	15,000	11,000	7,136
			5	11,000	11,000	15,000	11,000	8,064
Intensity Class 1	32		1	55	55	75	55	29
			5	55	55	75	55	33
Intensity Class 2	48		1	154	154	210	154	167
			5	154	154	210	154	188
Intensity Class 3	774		1	330	330	450	330	231
			5	330	330	450	330	261
Intensity Class 4	850		1	451	451	615	451	583
			5	451	451	615	451	658
Intensity Class 5	3,345		1	4,686	4,686	6,390	4,686	3,298
			5	4,686	4,686	6,390	4,686	3,722
Intensity Class 6	1,350		1	5,324	5,324	7,260	5,324	2,828
			5	5,324	5,324	7,260	5,324	3,202
Fish								
Inland Fish (Other than T&E) (M Pounds)	1,424	1,794	1	1.817	1,947	1,557	1,713	1,424
			5	1,817	1,947	1,734	1,837	1,424
Anadromous Fish Commercial (M Pounds)	691	457	1	691	691	691	691	691
			5	691	691	691	691	691
Sport (M Pounds)	163	142	1	353	563	293	353	163
			5	353	563	413	353	163

Table II-16
Comparison of Annual Outputs by Alternative for Decades 1 and 5*

Resource Element	Base Year 1989	1990 RPA Goals	Decade	ALTERNATIVE PRF	RPA	CUR	CBF	1990 CUR
Fish (continuted)								
Direct Habitat Improvement (acres/structures)								
Inland Fish	15/25	-	1	30/90	80/125	17/35	39/82	1/10
			5	30/90	80/125	17/70	39/82	3/30
Anadromous Fish (Commercial)	0/0	-	1	0/0	0/0	0/0	0/0	0/0
			5	0/0	0/0	0/0	0/0	0/0
Anadromous Fish (Sport)	5/50	-	1	30/64	30/120	20/48	30/64	1/8
			5	30/64	30/120	20/80	30/64	3/24
Direct Habitat Improvement (Thousand Fish Use Days [MFUDs]) Inland Fish	396	-	1	410	415	374	388	356
			5	410	415	406	412	751
Anadromous Fish (Sport)	40	-	1	160	265	130	85	40
			5	160	265	190	115	83
Human Resources								
Programs (Enrollees)	50	-	1	50	50	50	50	50
			5	50	50	50	50	50
Lands and Minerals								
Land Acquisition (Acres)	6,996	-	1	1,500	1,500	1,500	1,500	6,820
			5	1,500	1,500	1,500	1,500	6,820
Minerals (Operating Plans)	122	146	1	125	131	125	85	119
			5	183	192	183	85	119
Range								
Grazing (Thousand Animal Months [M AMs])	12	-	1	8.3	10	8.3	8.3	12
			5	8.3	10	8.3	8.3	12
Recreation								
Developed Public (MM RVDs)	.71	-	1	.75	.75	.75	.75	.75
			5	1.2	1.11	.69	1.2	.69
Developed Private (MM RVDs)	.49	-	1	.51	.51	.51	.51	.52
			5	.83	.92	.83	.83	.83

Table 11-16
Comparison of Annual Outputs by Alternative for Decades 1 and 5*

Resource Element	Base Year 1989	1990 RPA Goals	Decade	ALTERNATIVE PRF	RPA	CUR	CBF	1990 CUR
Recreation (continued)								
Dispersed (MM RVDs)	2 56	-	1	2.9	2.9	2.8	2 8	2.8
			5	5 3	5 3	5 0	5 0	5 0
Wilderness (MM RVDs)	13		1	14	14	14	14	14
			5	.25	25	.25	25	19
Open, Usable OHV Areas - Summer (M Acres)	239 2	-	1	239 2	256 1	243 0	220 2	243 0
			5	239 2	256 1	243 0	220 2	243.0
Open, Usable OHV Areas -Winter (M Acres)	1762		1	1762	198 7	1877	98 8	187 7
			5	176 2	198 7	1877	98 8	1877
Roads & Trails Open Only to OHV Use -Summer (Miles)	0		1	0	0	0	0	52
			5	0	0	0	0	185
Roads & Trails Open Only *to* OHV Use -Winter (Miles)	0		1	0	0	0	0	36
			5	0	0	0	0	138
Roads & Trails Closed to OHV Use -Summer (Miles)	810		1	810	810	810	810	0
			5	810	810	810	810	0
Roads & Trails Closed to OHV Use -Winter (Miles)	815	-	1	815	815	815	815	174
			5	815	815	815	815	320
Timber								
Allowable Sale Quantity (MMCF)	28	-	1	12.3	16.9	15.9	9.8	34.6
			5	13 6	18 6	17 5	10 2	34 6
Allowable Sale Quantity (MMBF)	184	-	1	82	1 12.4	105.8	65.3	236.5
			5	90 4	123 9	116 6	68 1	236 5
Long Term Sustained Yield (MMCF)			1	15.5	20.5	19.1	11.3	39.7
			5	15 5	20 5	191	11 3	39 7
Long Term Sustained Yield (MMBF)		-	1	103.3	136 7	127.4	75.3	266.0
			5	103 3	1367	1274	75 3	266.0
Reforestation (acres)	9,400		1	3,500	4,700	5,200	4.100	8,020
			5	3.500	4,700	5,200	4,100	5,390
Timber Stand Improvement (Acres)	7,800	-	1	5,300	7,100	7,800	6,200	1 1,260
			5	5,300	7,100	7,800	6,200	8,300

Table 11-16
Comparison of Annual Outputs by Alternative for Decades I and 5*

Resource Element	Base Year 1989	1990 RPA Goals	Decade	ALTERNATIVE PRF	RPA	CUR	CBF	1990 CUR
Wood Products Other Than Sawtimber								
Firewood (M Cords)	21		1	25	25	25	25	31
			5	30	30	30	30	36
Visual Quality								
Visual Quality Index	1273		1	1273	1274	127 2	1274	1220
			5	131 5	128 1	129 8	128 1	111 3
Water								
Quality (M Acre feet at standard)	5,448		1	5,438	5.462	5,458	5,437	5,448
			5	5,437	5,458	5,453	5,435	5,450
Increased Quantity (M Acre feet)	5,450		1	-12	+12	+8	-13	0
			5	-13	+8	+3	-15	0
Watershed Improvement (Acres)	399	706	1	300	700	300	300	53
			5	300	300	300	300	53
Wildlife								
Threatened, Endangered and Sensitve Species (TE&S)								
Bald Eagle (# managed pain)	25		1	32	32	32	32	20
			5	35	35	35	35	20
Goshawk (# pairs)	150		1	150	150	150	150	190
			5	150	150	150	150	190
Peregrine Falcon (# managed pairs)	6		1	9	9	9	9	6
			5	14	14	14	14	6
Spotted Owl (# pain)	97	-	1	170	170	72	185	72
			5	210	210	72	210	72
Wildlife - Other than T&E								
Deer (M Animals)	62		1	62	62	62	62	66
			5	62	74	62	62	71
All Species	2		1	44	65	20	35	1
			5	61	393	51	61	7

Table 11-16
Comparison of Annual Outputs by Alternative for Decades 1 and 5*

Resource Element	Base Year 1989	1990 RPA Goals	Decade	ALTERNATIVE PRF	RPA	CUR	CBF	1990 CUR
Wildlife (continued)								
Acres/Structures of Direct Habitat Improvement								
AI Species	1360/35		1	5050/150	8224/126	2081/79	4962/143	1100/9
			5	8760/310	7670/260	2192/164	5163/296	1200/16
Wildlife User Days (M WUDs)								
Consumptive Species	282	338	1	282	282	282	282	285
			5	282	282	282	282	291
Non-Consumptive Species	282	347	1	282	282	282	282	304
			5	504	504	504	504	551
Total WUDs	564	-	1	608	629	584	599	589
			5	847	1,179	837	847	842

* Abbreviated Terms and Meaning for this Table

M = Thousand MMBF = Million Board Feet MMCF = Million Cubic Feet

OHV = OR-Highway Vehicle RVDs - Recreation Visitor Days

Table 11-17
Additional Key Comparisons by Alternatives (1st Decade)

		ALTERNATIVE			
		PRF	RPA	CUR	CBF
Recreation Opportunities					
RVDs*					
	Primitive (P)	143,600	143,650	143,600	144,975
	Semi-Primitive Non-Motorized (SPNM)	170.500	103.340	98,642	419,630
	Semi-Primitive Motorized (SPM)	299,987	172,507	175.376	193.878
	Roaded Natural (RN)	2.721,163	1,325,640	2,873,541	2.891,647
	Rural (R)	554,300	2,144,463	598,391	239,470
PAOT**					
	Primitive	997	997	997	1.013
	Semi-Primitive Non-Motorized	1.123	748	620	2,195
	Semi-Primitive Motorized	12.247	7.696	7.683	8.886
	Roaded Natural	116,265	63,118	127,228	119,469
	Rural	103,053	645,720	125.043	3.136
Wilderness					
Acres		498,776	498,776	490,776	506,496
Research Natural Areas					
Number		8	5	8	13
Acres		23,260	13.400	21,470	26,970
Wild and Scenic Rivers					
Miles					
	Existing Wild	39 3	39 3	39 3	39 3
	Recommended Wild	48.5	en	en	56.8
	Subtotal Wild	**87.8**	**393**	**393**	**96.1**
	Existing Scene	22 1	22 1	22 1	22 1
	Recommended Scenic	17 3	0.0	en	25 1
	Subtotal Scenic	**39.4**	**22 1**	22.1	**47 2**
	Existing Recreation	45 0	45 0	45 0	45 0
	Recommended Recreation	13.9	0.0	00	34.7
	Subtotal Recreation	**58.9**	**45.0**	**45 0**	**79.7**
	Total	**186.1**	**106.4**	**106.4**	**223.0**

* RVDs = Recreation Visitor Days
** PAOT = People-At-One-Time

erosion, compaction, nutrient loss, and organic matter loss will protect soil productivity BMPs will be employed for each alternative

Harvest levels and acres impacted will be much less than historical levels; however, soil productivity could still be effected

Alternative CBF will potentially affect the fewest acres annually at 5,880, Alternative PRF will affect 6,430 acres Alternatives RPA and CUR could affect soil productivity the most by permitting harvesting on 8,890 and 9,660 acres, respectively.

Special Areas

Research Natural Areas (RNA). Allocations for RNA establishment range from a low of 13,400 acres (5 areas) in Alternative RPA to a high of 26,970 acres (13 areas) in Alternatives CBF The designation under Alternative PRF is 23,260 acres (8 areas), and Alternative CUR, 21,470 acres (8 areas) These figures do not include the existing Shasta Mud Flow RNA (3,115 acres) which will be retained in all alternatives

Special Interest Areas (SIA). Proposed allocations for SIA establishment range from a low of 9 areas in Alternative CUR, to 13 areas in Alternative RPA, to 15 areas in Alternative CBF, to a high of 19 areas in Alternative PRF

Timber

Table 11-18 displays important timber related information about the alternatives and one of the benchmarks This timber information shows how the alternatives differ from each other in response to each of their management objectives Important differences between alternatives are explained below

Suitable Acres - The amount of suitable timber acres reflects the differences in land allocations between alternatives The total suitable acres are primarily a function of the following (1) the amount of area allocated to wilderness and semi-primitive non-motorized (SPNM) recreation, and (2) the amount of area dedicated to threatened, endangered, and sensitive (TE&S) wildlife, and retention of late-successional reserves

Alternatives RPA and CUR have the most suitable acres Alternative PRF has fewer suitable acres due primarily to additional allocations for T&E species and limited roaded motorized Alternative CBF has the least amount of suitable acres due to additional wilderness. unroaded non-motorized and additional T&E species habitat

Inventory-This is the total inventory on the suitable lands Inventory values are generally proportionate to the suitable acres Those alternatives with more suitable lands generally display a higher beginning inventory than alternatives with less suitable land

The ending inventory volumes are a reflection of the suitable acres, the ending age class distribution, and the management intensity of the timber prescriptions applied. The ending inventories vary as a result of the differing harvest levels and the subsequent growth rates on the different land bases in the alternatives Alternative CBF carries the smallest inventory of all the alternatives due to a relatively small land base

Allowable Sale Quantity (ASQ) - The ASQ for an alternative is reflective of the amount of suitable timber land and the intensity of management on those lands Alternatives with a large amount of suitable land that will be managed intensively, such as in Alternative RPA, will have a higher ASQ Alternatives with a small amount of suitable land and/or land that will not be intensively managed, such as in Alternative CBF, will have lower ASQs

Long-Term Sustained Yield Capacity (LTSY) - The LTSY is also a reflection of suitable acres and management intensity It is, theoretically, the highest uniform yield that could be obtained over time from the regulated (suitable) land base in an alternative, under a specified management intensity In most cases, the differences in LTSY vary directly with the amount of suitable land

Growth - Net growth is largely a function of the amount of acres regenerated in the early decades in an alternative It is also affected by the intensity of management and by differences in the amount of suitable land in each alternative Most of the net growth increase is due to the rate at which understocked and slow-growing stands are regenerated and replaced with new, faster growing, younger stands Net growth is highest in those alternatives where a relatively large amount of regeneration cutting is done on a large suitable land base

Intensity level - The 70-100 percent yield category represents those prescriptions which reflect relatively minor reductions in projected timber growth and yield because of other resource constraints The 20 percent yield category represents those prescriptions which reflect major reductions in growth and yield due to other resource constraints or considerations such as extended rotations or special cutting practices

Alternatives wlth a higher proportion of suitable land in the higher yield category, such as Alternative RPA, will generate more yields than an alternative wlth a greater amount of sutable land in the reduced yield categones, such as in Alternative CBF

Regeneration Harvest Acres - The regeneration harvest acres generally vary directly wlth the ASQ The number of regeneration harvest acres is highest in those alternatives with a high ASQ, such as Alternatives RPA and CUR

Those alternatives that have more flexibility in selecting the regeneration harvest methods have the greatest proportion of clearcutting, such as Alternative RPA This is because clearcutting is normally the selected method when maximizing ether present net value (PNV) or timber volumes (ASQ) In alternatives where the primary objective is to emphasize resources other than timber, such as Alternatives PRF and CBF, the amount of clearcutting was restricted and, therefore, more green tree retention and/or selection cutting was selected

The amount of land to be reforested varies directly with the regeneration harvest acres

Comparison with Existing Timber Management Plan (TMP) - The total sultable land base in Alternative PRF is signficantly less than the commercial forest land base in the existing TMP (about 530,000 acres versus 1,074,400 acres) This decrease is due pnmanly to past land adjustments (exchanges) and the allocation oftentatively suitable timber land to non-timber prescnptions This includes semi-pnmltive non-motorized recreation areas, the Shasta Unt of the NRA, major wildlife areas, Late-Successional Reserves. Riparian Reserves, and research natural areas In addition, suitable lands which are nonstocked (hardwoods, brushfields. etc) are not included in the suitable timber land base in Alternative PRF due to high costs

The ASQ in Alternative PRF is significantly less than the potential yield in the existing TMP (82 million board feet [MMBF] versus 3126 MMBF) The actual sold volume under the existing TMP (1975-1992) has averaged about 200 MMBF per year The pnmary difference between the ASQ and the potential yield is due to a reduction in the suitable timber land base Also. the potential yield includes 968 MMBF from the marginal component The marginal component includes yields from hardwoods, unstable lands, and non-regenerable lands These lands are classified as unsutable in Alternative PRF and, therefore, are not included in the ASQ determination

Land Classification for Timber - The tentatively suitable timber land base will not vary by alternative However, a wide variation will exist among the altematives in their use of tentatively sutable lands for timber production The amount of tentatively suitable timber land which is available for timber management under an alternative is dependent upon the management objectives reflecting the theme of each altemative. economic efficiency, and resource allocations which preclude timber production A summary of timber land suitability classifications for each altemative is presented in **Table 11-19**

Visual Quality

All alternatives provide the same basic visual protection for Wildernesses, the NRA, candidate state scenic highways, and developed recreation sites Most recreationists and traveler; will continue to view a landscape that is not dominated by management activlties

Alternatives RPA and CBF do not provide as much visual protection along the main travel routes as Alternatives PRF and CUR Away from the main travel routes, management practices and the resulting visual qualty varies widely among alternatives Alternatives RPA and CUR allow more dominant alterations than other alternatives Semi-primitive areas, wild and scenic rivers, and uneven-aged management are emphasized more in Alternative CBF The visual effect of the differences in emphasis is shown by the difference in visual quality objectives (VQOs) **Figure II-2** displays the percent of National Forest lands for each alternative which will be managed for particular VQOs

The visual qualrty index (VQI) rates the amount and degree of alteration to the landscape, which occurs in different variety classes, for each alternative The VQI provides another method of companng visual resource outputs The ratings are based on research assumptions of public preferences for certain categories of landscapes A larger VQI represents a higher visual rating VQIs range from 1315 in Alternative PRF to 1281 in Alternatives RPA and CBF in the 5th decade This represents an increase in VQI ranging from one percent to three percent See **Table 11-16** for a display of the VQI for each altemative

Water

Water quantrty will not be measurably different between alternatives due to reduced rimber harvest levels This is based on a companson of the past 15 year average

Table II-18
Timber Resource Management Information

	Benchmark MMR**	ALTERNATIVE* PRF	RPA	CUR	CBF
Suitable Lands (M acres)	679.1	530	638.1	635 8	4954
Inventory					
Current (Million Cubic Feet [MMCFJ	1,532	1,358	1,526	1,586	1,140
Current per Acre (Cubic Feet[CF])	2.256	2,562	2,391	2,494	2,301
End of the 16th Decade - 160 years from current (MMCF)	1,639	2,260	2,066	2,074	1,343
1st Decade Average Annual Allowable Sale Quantity (ASQ)					
ASQ (MMCF)	20.0	12 3	16 9	15 9	9 8
Percent of Current Inventory	1.4	1 0	1 2	1 1	1 0
ASQ (Million Board Feet [MMBF])	133.5,	82.0	1124	105 8	65 3
Long Term Sustained Yield Capacity (LTSY)					
MMCF	23.6	15 5	21 7	20 3	1 1 3
Percent of End Inventory (1 6th Decade)	1 4	0.8	1 3	1 0	1 0
Maximum ASO/Percent of LTSY***	95	91	95	95	95
Average Annual Net Growth					
CF per Acre/Present	32.8	38 8	34 5	39.2	225
CF per Acre/Year 2030	41,3	42.8	40.6	44 9	30.7
Tot4 MMCF/Year 2030	28. 1	23.4	25.9	28 6	15 2
k e a & Percent of Suitable Land by Intensity Level					
70 - 100% Yield (Intensive + Modified Management)					
M Acres	553 9	434.6	537.7	502 8	372 7
Percent of Total	82	82	84	79	75
20 Percent Yield (Minimal Management)					
M Acres	125.2	95 4	100.4	1330	122 7
Percent of Total	18	18	16	21	25
Regeneration Harvests - 1st Decade					
Clearcut (M Acres)	Sa 7	0 0	38. 1	31 6	0 0
Green Tree Retention ****	0 0	20.0	9 3	17 8	26 9
Selection (M Acres)	0 0	15 0	0 0	3 0	14.0
Harvest Total/Percent of Suitable Lands	8.6	6.6	7.4	E2	8 3

* Tentatively suitable timber lands for all alternatives = 1,077.8 M Acres, and present inventory = 2,847 MMCF:

** MMR = Management Requirements.

*** Long Term Sustained Yield not met during the planning horizon (16 decades or 160 year]
The maximum ASQ reached during the planning horizon is shown as percent of LTSY.

Table 11-18
(Continued)

DATA FROM EXISTING SHASTA-TRINITY TIMBER MANAGEMENT PLAN - 1975 (Amended)			
Potential Yield	Shasta Working Circle =	1427	MMBF/year,
	Trinity Working circle =	169.9	MMBF/year,
	Total Shasta-Trinity =	312.6	MMBF/year
Average Annual Volume Sold (1975-1992)	Shasta Working Circle =	95	MMBF/year,
	Trinity Working Circle =	105	MMBF/year,
	Total Shasta-Trinity =	200	MMBF/year
Acres	Standard Component =	548,227	acres,
	Special Component =	112,288	acres,
	Marginal Component =	413.866	acres,
	Total =	1,074,381	acres

Water quality is potentially affected by vegetation disturbance caused by wildfire, timber harvest, or type conversion The only potential differences between alternatives is in the number of acres of timber being harvested

Standards and guidelines (see Chapter 4 of the Forest Plan) will assure that water quality will not be adversely effected They include Best Management Practices (BMPs) and the Riparian Management standards and guidelines (S&Gs) Although the S&Gs will help protect water quality, there is the potential for degradation to occur The amount of degradation will be in proportion to the number of acres harvested by alternative

Alternatives RPA and CUR could potentially have the largest affect on water quality Alternatives PRF and CBF will have a lesser affect

Wild and Scenic Rivers

Alternatives RPA and CUR will add no addtional miles of Wild, Scenic, and Recreation Rivers to the existing 106 4 miles currently designated Alternative PRF will recommend 79 7 (National Forest land only) addtional miles of streams Alternative CBF will add 116 6 miles **Figure 11-3** provides a comparative display of the number of miles of recommended as Wild, Scenic, and Recreation Rivers for each alternative

Wilderness and Roadless Areas

The four alternatwes analyzed in detail show little difference in the number of acres designated for wilderness This is because of the enactment of the 1984 California Wilderness Act which designated as Wilderness about 24 percent of the land base of the Shasta-Trinity National Forests Under the Act, only areas designated as 'Further planning" could be considered for wilderness during this round of Forest planning Thus, 498,776 (net) acres are designated under all alternatives except CBF Under Alternative CBF the Mt. Eddy area, the only area identrfied under the California Wilderness Act for 'Further planning," will be proposed for wilderness designation Therefore, an addtional 7,720 acres in Prescription V (Wilderness Management) will be recommended under Alternative CBF or about 1 5 percent more than in the other alternatives

All alternatives will maintain and manage most of the former roadless areas in a natural condtion Overall, Alternative CBF will retain the most roadless acres in a natura. state (88 percent), while Alternative RPA will retain the least roadless areas in a natural state (71 percent) (Refer to Appendix C)

Wildlife

Wildlife management objectives will maintain habtat to support all species on the Forests at or above viable population levels The distribution and vanety of wildlife habtat will vary by alternative but will be maintained in all alternatives

Accountability for management indicaton will be Forest-wide, but objectives will be measured at the management area level

Forest standards and guidelines pertaining to special habitat components will set the minimum level of management throughout the Forests in all alternatives

An average of at least 1.5 snags and 5 tons of dead/down material per acre will be maintained in all alternatives These levels will generally be exceeded throughout most of the Forests

Hardwood forest types will be managed primarily for the benefit of wildlfe species in all alternatives.

In the Ist decade, direct habitat improvement acres for all wildlife species will vaty from a high of 8,224 acres per year in Alternative RPA to a low of 2,08 I acres per year in Alternative CUR

The acreage allocated to Prescnption VI (Wildlife Management) ranges from a high of about 207, I 16 acres in Alternative CBF to a low of about I 14,509 acres in Alternative CUR

Alternatives RPA and CUR retain the largest amount of acres in the early to mid-seral stages, while Alternatives PRF and CBF retain the largest amount of acres in the mid

	PRF	RPA	CUR	CBF
Non-Forested Land (includes water)	I20	i20	I 20	I 20
Forested Land	2,00 I	2.00 I	2,00 I	2,00 I
Forested Land Currently Withdrawn from Timber Production*	450	450	450	*450*
Forested Land not Capable of Producing Industrial Wood	329	329	329	329
Forested Land **Physically** Unsuited				
• Irreversible Damage to Soils. Watersheds or Productivity Likely *to* Occur	*90*	*90*	*90*	*90*
• Unregenerable within 5 Years of Final Harvest	54	54	*54*	54
Inadequate Information to Project Responses	0	0	0	0
Tentatively Suitable Timber Ease	1,078	1,078	I,078	I,078
Not Suitable for Timber under the Alternative**	548	*440*	442	583
Total Unsuitable **Acres**	I,47 I	I,363	1,365	1,506
Total Suitable **Acres**	530	638	636	*495*
Total National Forest **Acres**	2,121	2,121	2,121	2,121

* Areas wrthdrawn by an Act of Congress. the Secretaiy of Agriculture, or the Chief of the Forest Service

** Lands identified as not appropriate for timber production due to (I) assignment to other resource uses to meet alternative objectives, (2) management requirements, or (3) not being cost efficient in meeting alternative objectives over the planning horizon

to late seral stages (See **Table IV-3** in the Biological Diversity Section of Chapter IV for seral stage acres by altemative)

Wildlife - Threatened, Endangered (T&E), and Sensitive Species

Threatened

Spotted Owl All alternatives except PRF provide for spotted owl habitat by the allocation of HCAs and DCAs from the Interagency Scientific Committee (ISC) report and the draft recovery plan, respectively, to Prescription VII (Threatened, Endangered, and Selected Sensitive Species) In addition, all remaining lands are subject to the 50-11-40 rule Altemative PRF provides habtat through the allocation of Late-Successional Reserves, Ripanan Reserves and additional standards and guidelines that apply to the other land allocations (see Chapter 4 of the Forest Plan)

Marbled Murrelet There are no known occurrences and/or nesting srtes on the Forests

Endangered

Bald Eagle All alternatives will meet the Forests' portion of the recovery goal of 20 nesting pairs Habitat to achieve this goal will be provided in all alternatives

Peregrine Falcon. All alternatives will meet the Forests' portion of the recovery goal of 6 nesting pain Habrtat to achieve this goal will be provided in all alternatives

Sensitive

Goshawk **All** alternatives except PRF will provide for management of 150 territories Altematives RPA and CUR will manage a minimum of 100 acres for each territory, and Alternative CBF will manage 150 acres In altemative PRF habrtat for goshawks is provided through the land allocations and standards and guidelines for late-successional dependent species

Figure II-2
Visual Quality Objectives (VQOs)
By Alternative

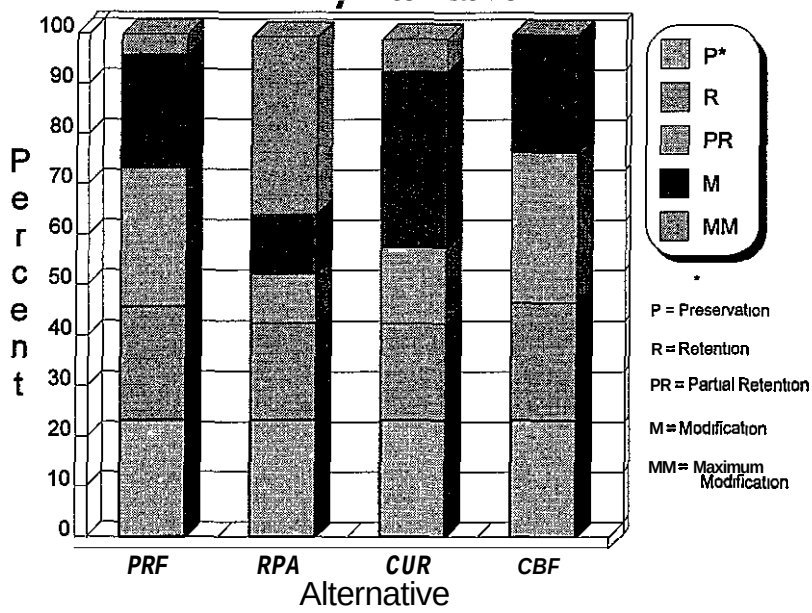
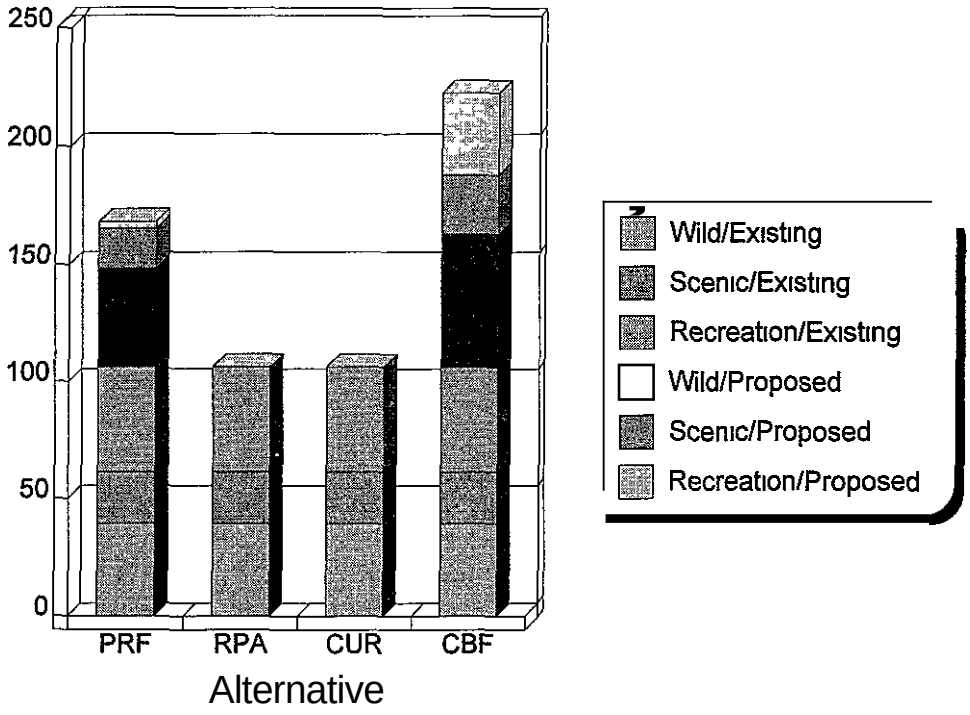


Figure 11-3
Wild and Scenic Rivers by Alternative



Economic Comparisons

The purpose of this section is to compare economic values and significant trade-offs as they relate to the four alternatives Refer to Appendix B for a detailed and technical discussion of the models and assumptions used in these comparisons

Several economic terms used here require a brief explanation Present net value (PNV) is mentioned frequently in this section PNV is an estimate of the market value of forest resources after all costs have been subtracted See Appendix D for a discussion of PNV and its relationship to costs, values, and net public benefit (NPB)

Net cash flow, **as** shown in **Tables II-23, II-25, and 11-26,** is the difference between cash receipts and timber sales, campground use, other chargeable items, and Federal costs **Table II-24** defines net cash flow for the timber program only In other words, cash receipts from timber sales are subtracted from timber costs (i e , sale preparation. reforestation, timber stand improvement, and roads)

The cost and benefit categories, as used here, also warrant a brief explanation Direct comparisons of cost and benefit for a given output can be misleading The roads cost category, for example, contributes to the value of timber and recreation Similarly, the costs of timber production contribute to the value of wildlife outputs Thus, the costs and benefts of production cannot be reliably separated and attributed to any individual resource

Table 11-20 - Summary Comparison of Economic Effects. Table 11-20 is a comprehensive summary of costs, benefits, county revenues, and social effects Benefits are categorized as cash and non-cash Cash benefits are actual collections for sales of timber, fees for recreation use, firewood and Christmas tree cutting permits, and special use permit *fees* from operators of commercial businesses on National Forest lands

Cash benefits (labeled as returns to the U.S. Treasury in Table 11-20) vary primarily as a result of the timber harvest level and timber value over time The timber harvest level vanes little from one decade to the next for all the alternatives, and the real value of timber is assumed to increase at one percent annually This results in an increase in cash benefits over time By the 5th decade cash benefits range from a 47 percent increase (over 1989 levels) for Alternative CBF to a 137 percent increase for Alternative RPA

Non-cash benefits are assigned to resources which have a monetary value but for which no collection is made These resources include water, wildlife, fish, wildemess recreation, dispened recreation and free-use developed recreation sltes Overall, non-cash benefts far exceed cash benefts In most alternatives, non-cash benefts exceed 90 percent of total benefts This is caused primarily by recreation use and water production and the dollar values assumed for each

Water production varies little and all alternatives, except CUR, meet the demand for developed, dispersed and wilderness recreation By the 5th decade non-cash benefits average a 63 percent increase when compared to 1989 levels

Cost figures are detailed in **Table 11-20** All costs reflect 1989 dollan Total cost is presented and then adjusted for cooperative funds from non-Federal agencies (private and public) to obtain Federal costs Total cost is adjusted once again by deducting emergency firefighting funds The total budget, composed of Congressionally appropriated funds, is equal to Federal costs less the cost of fighting forest fires Costs are separated into *two* major components operations and maintenance, and capital investment

County revenue figures include 25 percent receipt shares and county yield tax revenues These revenues. plus estimates of area income and employment generated by Forest expenditures and outputs, form a picture of the local area of impact of the various alternatives The level of timber harvest is instrumental in determining county revenues Revenues in the 1st decade range from an decrease of $3 1 million for Alternative CBF to a increase of $1 25 million for Alternative RPA, when compared to the 1989 level

Income and employment estimates are based on the number of recreation visitor days, timber volume, range allotments, and Forest Service purchases by alternative These output levels are multiplied by income and employment multipliers developed in an Input Output model (See Appendix B) Timber volume and recreation use account for most of the total jobs and income Forest Service purchases account for about 15 percent of the total jobs and income. with range allotments accounting for less than 1 percent for all alternatives Total income and employment varies according to the timber harvest level Alternative RPA is the highest and Alternative CBF the lowest

Social impact indicaton are displayed in the form of discounted benefits, discounted costs, PNV, and benefit/cost ratios Discounted benefits are composed of market (i e timber) and non-market valued outputs (i e water,

Table 11-20
Summary Comparison of *Economic* Effects
(Millions of 1989 Dollars)

	ALTERNATIVE			
	PRF	RPA	CUR	CBF
1. Total Benefits				
Base Year 292				
Decade 1	304	316	315	301
Decade 2	367	381	378	364
Decade 3	398	411	409	394
Decade 4	435	447	445	430
Decade 5	480	498	495	473
2 Returns to the US Treasury				
Base Year 30				
Decade 1	19	30	29	17
Decade 2	29	42	40	27
Decade 3	34	47	45	32
Decade 4	41	55	53	37
Decade 5	52	71	69	44
3 Non-cash Benefits				
Base Year 262				
Decade 1	285	286	286	284
Decade 2	338	339	338	337
Decade 3	364	364	364	362
Decade 4	394	392	392	393
Decade 5	428	427	426	429
4. Total Costs				
Base Year 44				
Decade 1	56	57	58	52
Decade 2	58	56	56	53
Decade 3	60	58	58	54
Decade 4	61	58	59	55
Decade 5	63	61	62	58

1 Total benefits include both cash returns to the US Treasury and non-cash benefits. Total benefits are the estimated total amount that consumen would be willing to pay for Forest outputs, whether or not this amount is actually collected by the U S Government.

2. Returns to the U S Treasury are estimated payments by consumen of Forest outputs collected by tne Federal Government

3 Non cash benefits are the difference between total estimated amount that consumen would be willing to pay for forest outputs and the actual collections by the Federal Government At present it is National policy to provide most Forest outputs at ether no charge to consumers or at a charge less than total willingness to pay value.

4. Total costs include the Federal and non-Federal costs needed to produce Forest outputs

Table 11-20
Summary Comparison of Economic Effects

		ALTERNATIVE			
		PRF	RPA	CUR	CBF
5	Non-Federal Costs Base year 1 5				
	Decade 1	2	2	2	2
	Decade 2	2	2	2	2
	Decade 3	2	2	2	2
	Decade 4	2	2	2	2
	Decade 5	2	2	2	2
6	Federal Costs Base year 43				
	Decade 1	54	55	56	50
	Decade 2	56	54	54	51
	Decade 3	58	56	56	52
	Decade 4	59	56	57	53
	Decade 5	61	59	60	56
7	Total Budget Ease year 40				
	Decade 1	42	43	40	38
	Decade 2	44	42	38	39
	Decade 3	46	44	39	40
	Decade 4	47	44	40	42
	Decade 5	50	47	43	44
8	25 Percent Receipt Shares Base year 7				
	Decade 1	5	8	7	4
	Decade 2	8	10	10	7
	Decade 3	9	12	11	8
	Decade 4	11	14	13	9
	Decade 5	14	18	17	11

5 Non-Federal costs include all costs paid by non-Federal co-operaton (examples include State Rsh and Game habtat improvement expenditures. range capital investments made by the permittee, etc)

6 Federal costs are all borne by the Federal Government Includes costs paid from general tax receipts, costs paid from funds set aside from receipts (such as KV) and costs paid by accepting in-kind payments in lieu of cash (such as purchaser road credits) Federal costs also equal total costs less non-Federal co-operator costs

7 Total budget is equal to Federal Costs less the cost of fighting fires (FFF).

8 Twenty-five percent of returns to the US Treasury is distributed back to the counties in proportion to the Shasta-Trinty Nabonal Forests' acreage in the counties

Table 11-20
Summary Comparison of Economic Effects
(Millions of 1989 Dollars)

		ALTERNATIVE			
		PRF	RPA	CUR	CBF
9.	County Yield Tax Revenues Base Year .40				
	Decade 1	41	65	61	.27
	Decade 2	.48	.76	71	.32
	Decade 3	.55	.85	.79	40
	Decade 4	.68	1.01	.94	.49
	Decade 5	.93	1.39	1 33	62
10.	Income (Decade 1)(MM$/Year)	138	148	140	122
11	Employment (Decade 1)(Persons-Years Jobs)	3,633	3,888	3,682	3,208
12	Discounted Benefits	9,700	9,989	9,777	9,557
13	Discounted Costs	1,479	1,520	1,538	1,429
14.	Present Net Value	8,221	8,469	8,239	8,128
15	Benefit/Cost Ratio	65	66	64	6.7

9. Under California Law, a yield tax, currently equal to 2 9 percent of the timber harvest value, is levied on the timber operators.

10. Total personal income including wages, salaries, proprieter's income, and rents was estimated for the Forests' zone of influence

11. Employment generated by the Forest Service in the Shasta-Trinity National Forests' zone of influence was estimated with an input/output model, See Appendix B

12 Discounted benefits over the planning period

13. Discounted costs over the planning period.

14. Discounted benefits less total discounted costs

15. Discounted benefits divided by total discounted costs

recreation, and wildlife) Discounted benefts vary by akemative Alternative RPA has the most discounted benefts, since it has a high recreation program and a high timber output Alternative CUR has a low recreation program but is second only to Alternative RPA in timber harvested This results in Altemative CUR ranking second to RPA in discounted benefits

Discounted costs are closely related to the timber harvest level Generally the higher the timber output the higher the discounted costs

PNV is equal to discounted costs subtracted from discounted benefts PNV is a measure of investment efficiency over time, including the costs and values of market-priced and non-market-priced outputs The ranking of PNV by alternative is identical to the ranking by discounted benefits

There is also a measure of efficiency imbedded in the benefit/cost ratios Alternative CUR, while having the second highest PNV, has the lowest benefit/cost ratio This means that while additional dollars invested in this alternative have a posttive PNV, the marginal value of those addttional investments is less than the other alternatives

Conversely, Alternative CBF has a high benefit/cost ratio This is related to the high value of non-market outputs in relation to the cost of producing these outputs

Table 11-21 - Present Net Value (PNV) Comparison - Marginal Cost of Constraints. Table 11-21 displays the economic effect of each major group of minimum management requirements (MMRs) on the total unbounded economic solution represented by the Maximum PNV (FLW) benchmark (Refer to the MMR and benchmark discussions in the beginning of this Chapter) The PNV, cost, and beneftt entries in the table are the marginal or incremental values from the corresponding figure for the Minimum Level of Management (MLV) benchmark As the MLV benchmark represents the background benefts and costs associated wtth simple maintenance of the Forests, then marginal values are net changes from a minimum level of management Virtually all of the reductions in PNV are generated by corresponding reductions in timber harvest

In total the MMRs cost $1,748 million in terms of reduced PNV, a drop of 17 percent The viable population-diversity threatened and endangered (T&E) (spotted owl) constraint has the greatest effect, followed by the riparian constraints

The viable population-diverstty-T&E constraint maintains sufficient suttable spotted owl habttat, so that the continued existence of an adequate number and distribution of reproductive pairs is ensured throughout the existing range The allocation of over 500,000 acres to HCAs and the application of the 50-11-40 rule, are required to meet this MMR (see Appendix B) The cost of this constraint, in terms of reduced PNV, is $1,601 million or *92* percent of the drop in PNV between the FLW and MMR benchmark This reduction in PNV is caused primarily by reduced timber revenues This MMR masks the effects that other MMRs would have if it were not so restrictive Because of the acres restricted to no timber harvest or reduced timber harvest, the effect of the dispersion/soil and water and non-declining yield constraints are not measurable, therefore, they are not shown on **Table 11-21.**

The next most signficant management limttation in the MMRs is the allowance for perennial riparian lands On the Shasta and Trintty National Forests, outside of unsuitable lands and other more restrictive MMR constraints, over 25,000 acres are designated as nparian management zones These lands have a MMR which limits harvesting to sanitation/salvage cuts which yield only about 5 percent of the standing inventory in these areas In this manner, the npanan MMR accounts for 5 percent of the total drop in PNV between the FLW and MMR benchmarks This constraint would have a greater affect but most nparian acres are already protected by the viable population-diversity-T&E MMR

The above constraints account for approximately 97 percent of the reduction in PNV between the two benchmarks (FLW and MLV), the remaining $69 million reduction is due to minor effects by the dispersion constraint, the non-declining yield constraint and overlap

Alternative CEE is the same as MMR due to the non-effect of minimum implementation requirements Any effect they might have had was made unmeasurable by the effect of the MMRs

Finally, PNV drops an additional $17 million when the Forest constraints common to each alternative (Alternative CEF) are used

The loss in discounted benefts due to constraints is $2,558 million, a 20 percent drop Timber beneftt losses account for most of this drop Discounted costs drop $793 million, or 33 percent Timber and road costs account for most of the total drop in costs

Table 11-22 - Present Net Value Comparison of Alternatives. Table 11-22 displays the alternatives in order of

decreasing PNV The associated PNV, benefits, and costs are itemized for comparison Alternative CEF and the MLV benchmark are used to provide a frame of reference against which all the other alternatives are compared

As in the benchmark analysis, the MLV benchmark describes the background outputs and fixed costs associated with maintaining the Forests All cost and benefit figures shown in **Table 11-22** are the difference between each alternative's cost or benefit figure and the corresponding cost or benefit figure for the MLV benchmark Alternative CEF incorporates all MMRs and those Forest constraints common to all alternatives

Discounted benefits range from $2,899 million in Alternative CEF to $2,166 million in Alternative CBF Resources contributing most to these changes are by order of importance timber and recreation Timber benefits range from $944 million in Alternative CEF to $358 million in Alternative CBF Recreation benefits range from $1,496 million in Alternatives CEF, PRF, and CBF to $1,317 million in Alternative CUR Water has a large. consistent effect on discounted benefits in all alternatives It makes up over 90 percent of the "other benefits" category

Discounted costs vary from $796 million in Alternative CEF to $627 million in Alternative CBF These changes are attributed primarily to timber, roads, and recreation Timber costs range from $425 million in Alternative CEF to $267 million in Alternative CBF Road costs range from $49 million in Alternative RPA to $38 million in Alternative CBF Road **costs** do not vary by alternative except for Alternative CBF Most of the road system needed is already in place Recreation costs range from $176 million in Alternatives CBF and PRF to $168 million in Alternative CUR

PNV varies from $2,102 million in Alternative CEF to $1,539 million in Alternative CBF The largest changes in PNV are caused by timber and recreation

Table 11-23 - Average Annual Cash Flows and Non-Cash Flow Benefits. This table deducts total Federal costs from returns to the US Treasury to obtain net cash flow Net cash flow is a net cash position after Federal outlays are deducted from cash receipts from sales of timber, recreation use, and various permrts Net cash flow is a measure of economic efficiency in the shorter term where PNV is a measure of efficiency in the long term

Expenditures are greater than returns to the US Treasury in all alternatives in the 1st decade However, by the 5th decade all alternatives have significantly improved their cash flows with Alternatives PRF and CBF still being negative.

The primary reason for negative cash flows in the 1st decade is that most road building and recreation investments occur during this time By the 5th decade cash flows improve because returns to the Federal treasury increase while total Federal costs remain practically constant Primary reasons for this trend are reduced road-building costs, greatly reduced recreation investment costs, no real cost increase, and a real price increase of one percent for timber

The ranking of the alternatives by net cash flow generally follows the timber harvest level Alternative RPA has the highest decade 1 and 5 cash flows and Alternative CBF the lowest

Table 11-24 - Average Annual Timber Cash Flows - Decade 1 This table deducts costs associated with timber harvest from returns to the U S Treasury due to the sale and cutting of timber Timber receipts account for a high percentage of the returns to US Treasury for all alternatives while timber costs comprise only 20 to 30 percent of all Federal costs It is not surprising, therefore, to expect timber net cash flows to be higher than the overall net cash flows shown in **Table 11-23** Thus, from a forest-wide perspective, below cost sales are not anticipated to be a problem in any alternative except CBF in the 1st decade

Table 11-25 - Summary Listing of Reasons *for* Changes in Present Net Value. This table compares the alternatives in order of highest to lowest PNV Alternative CEF is used as the basis of comparison

TABLE 11-25 - Summary Listing of Reasons for Changes in Present Net Value.

Compared to the Constrained Economically Efficient Alternative With Forest Constraints (CEF)

Alternative CEF (Constrained Economically Efficient Alternative With Forest Constraints)

PNV = $8,691 million, Used as the Basis for Comparison

Net Cash Flow (Decade 5) = $22 million

This alternative is the most economically efficient, as it has the highest PNV In addition to the MMRs and MIRs, this alternative has Forest constraints common to all alternatives Forest constraints include (1) managing the Shasta

Unit of the Whiskeytown-Shasta-Trinity National Recreation Area (NRA) and developed recreation sites as unsuitable; (2) managmg the foreground of the Trinity Unit of the NRA as minimal timber. and (3) managing the middleground of the Trinity Unit, 100 foot intermittent riparian zones, and parts of Interstate 5 and Highway 299 as modified timber harvest The PNV results from a combination of the following Cash benefits include timber sales receipts, developed recreation receipts including special uses, and other receipts from grazing etc The greatest percentage of the PNV is from non-cash benefits such as the estimated value of wildlife user days, dispened recreation user days, and non-charge developed recreation user days

Resource Utilization Emphasis Category residents, primarily those viewing the Forest as a source of jobs and income, will find increased opportunities through recreational development and expansion However, they will find decreased timber production over average levels of the past 15 years Resource Amenity Emphasis Category residents, who are less commodity oriented, will view the decrease in timber harvest and the improvement in visual quality as beneficial

Recreationists, who are primarily attracted to large reservoirs, wildernesses, and ski areas, will see little change in their recreational experience They will benefit by new developments that keep pace with recreational demand

Alternative RPA *(1990* RPA Program Emphasis)

PNV = $8.469 million, Change in PNV = -$223 million

Net Cash Flow (Decade 5) = $12 million

PNV is reduced from Alternative CEF because of a reduced timber base Additional constraints include more restrictive riparian standards and guidelines, allocation of certain areas to Research Natural Areas, reduced harvest levels around some dispened recreation sites, reduced harvest in brtterbrush areas, and additional visual constraints

Timber yields will benefit long-time residents by providing employment opportunities and county receipts Employment opportunities and county receipts will be greater than the other alternatives considered in detail but will be less than CEF Levels of employment and county receipts will be less than average levels of the past 15 years Recreationists and Resource Amenity Emphasis Category residents may find the environmental impacts, particularly improved visual quality and more older over-mature habitat on suitable land, consistent with their values and beliefs

Alternative CUR (No Action/No Change)

PNV = $8,239 million, Change in PNV = -$453 million

Net Cash Flow (Decade 5) = $9 million

Alternative CUR approximates the 1989 timber harvest situation but legal requirements for compliance with the T&E species law will result in County income and employment significantly lower than 1989 levels This alternative has the second highest PNV of all alternatives When compared to Alternative RPA, the primary negative effect on PNV is the recreation program (lowest of all alternatives) Timber harvest levels are 7.4 MMBF less than Alternative RPA due primarily to reduced harvest levels relating to additional allocations for bitterbrush (deer habitat) and visual resource protection

Timber yields will benefit long-time residents by providing employment opportunities and county receipts Employment opportunities and county receipts will be greater than Alternatives PRF and CBF but will be less than Alternatives CEF and RPA Levels of employment and county receipts will be less than average levels of the past 15 years Recreationists and Resource Amenity Emphasis Category residents may find the environmental impacts, particularly improved visual quality and more older over-mature habitat on suitable land, consistent with their values and beliefs

Alternative PRF (Preferred Alternative)

PNV = $8,221 million, Change in PNV = -$471 million

Net Cash Flow (Decade 5) = $-6 million

When compared to Alternative CUR, additional constraints were added to this alternative that had negative effects on PNV

The number of acres available for timber harvest activities did not decrease significantly but the intensity of treatments allowed did This reduction in intensity occurred due to the use of greentree retention (GTR) as the primary form of regeneration treatment as compared with more traditional clearcut treatments GTR is described in the Management Prescription section under Matrix in chapter 4 of the Plan This results in a landscape that reflects a

Table 11-21
Present Net Value Comparison - Marginal Cost of constraints
(Millions of 1989 Dollars)

I.D. Code	Name	PNV	Change*	Discount Costs	Change*	Discount Benefits	Change*
FLW	PNV without MMRs	3.867		1,589		5,456	
	Viable Population, Diversity T&E, constraints ——		-1,601		-699		-2,270
	Riparian Constraint		-78		4 9		-127
	Other constraints and overlap		-69		-60		-129
MMR	PNV with MMRs	2.119	-1,748	81 l	-778	2,930	-2,526
	Visual Corridor constraint						
CEE		2,119	-1,748	81 l	-778	2,930	-2,526
	Common Forest Constraints		-17		-15		-32
CEF	=CEE with Common Forest Constraints	2,102	- 1,765	796	-793	2,898	-2558
MLV	Minimum Level****	6,589		802		7,39 l	

I.D. code	Name	Discount Benefits by Resource: Timber	All Rec.	Wildlife	Other**	Discount Costs by Category: Timber	Roads	All Rec.	Other***
FLW	PNV without MMRs	2,942	1,496	198	819	1,160	138	176	114
	Viable Population, Diversity, T&E								
	Riparian Constraints	See Text for Discussion							
	Balance Due to Overlap								
MMR	PNV with MMRs	970	1,496	183	282	439	51	176	76
	Visual Corridor Constraint								
CEE	Common Forest Constraints	945	1,496	183	274	425	49	176	76
CEF	=CEE with Common Forest Constraints	945	1,496	183	274	425	49	176	76
MLV	Minimum Level	0	1.409	1,199	4,782	0	0	70	732

* All changes are measured incrementally from the PNV without the MMR benchmark All costs, benefits, and PNV are net of the minimum level values Constraints causing the greatest change in the PNV are listed first.

** Other discounted benefits indude Range and Water

*** Other discounted cosh include Range. Wildlife, Fish, General Administration, and Fire costs,

**** The minimum level benchmark shows naturally occuring background benefits and fixed costs associated with maintaining the National Forest in Federal ownership, All other values are expressed as differences from the minimum level in order to display incremental tradeoffs **Other** benefits are high due to constant water *benefit* in all alternatives exceeding **4.5** million dollan

***** The acres allocated to T&E habitat for MMR mask **all** other *constraints* except the ripanan constraints, *therefore,* no other MMRs are shown **on this** table

Abbreviated terms and meanings for this table:

CEE Constrained Economically Efficient Alternative
CEF Constrained Economically Efficient Alternative with Forest Constraints
FLW Flow and Long Term Sustained Yield
MLV Minimum Level of Management
MMR Minimum Management Requirements
PNV Present Net Values

Table 11-22
Present Net Value -Comparison of Alternatives
(Millions of 1989 Dollars)

I.D. Code	PNV	Change'	Discount Costs	Change*	Discount Benefits	Change'
CEF	2,102		796		2,899	
RPA	1,880	-223	718	-78	2.598	-301
CUR	1,650	-453	736	-60	2,386	-513
PRF	1,632	-471	677	-119	2,309	-590
CBF	1,539	-564	627	-169	2,166	-733
MLV****	6,509		802		7,391	

I.D. Code	Discount Benefits by Resource				Discount Casts by Category			
	Timber	All Rec.	Wildlife	Other**	limber	Roads	All Rec	Other***
CEF	944	1,496	183	274	425	49	176	76
RPA	786	1,473	187	151	352	49	173	75
CUR	736	1,317	187	145	336	49	168	114
PRF	494	1,496	186	133	324	32	176	145
CBF	358	1,496	186	125	267	38	176	76
MLV****	0	1,409	1,199	4,783	0	0	70	732

* All changes are measured incrementally from the PNV without the MMR benchmark All costs, benefits, and PNV are net of the minimum level values

** Gther discounted benefits include Range and Mer.

*** Gther discounted costs include Range, Wildlife, Fish, General Administration, and Fire costs

**** The minimum level benchmark shows naturally occurring background benefits and fixed costs associated with maintaining the Nabonal Forest in Federal ownership All other values are expressed as differences from the minimum level in order to display incremental tradeoffs Other benefits are high due to constant water benefit in all akemabves exceeding 4 5 million dollars

Table 11-23
Average Annual Cash Flows and Non-Cash Benefits
(Millions of Undiscounted Dollars per Year)

	Decade I				Decade 5			
Alternative	Net Cash Flow	Total Federal Cost	Returns to Treasury	Non-Cash Benefits	Net Cash Flow	Total Federal cost	Returnsto Treasury	Non-Cash Benefits
PRF	-32	54	19	285	-6	61	52	428
RPA	-25	55	30	286	12	59	71	427
CUR	-27	56	29	286	9	60	69	426
CBF	-33	50	17	284	-12	56	44	429

continuous forest cover, The recreation program is at the most cost effective level which is the same as Alternative CBF; slightly higher than RPA and higher that CUR

Timber yields will benefit long-time residents by providing employment opportunrties and county receipts Employment opportunrties and county receipts will be greater than Alternative CBF but less than Alternatives CEF, RPA and CUR Levels of employment and county receipts will be less than average levels of the past 15 years Recreationists and Resource Amenity Emphasis Category residents may find the environmental impacts, particularly improved visual quality and more older late-successional habtat on sultable land, consistent wrth their values and beliefs.

Alternative CBF (Citizens for Better Forestry)

PNV = $8, 128 million, Change in PNV = -$564 million

Net Cash Flow (Decade 5) = $-12 million

When compared to Alternative PRF, several changes were added to this altemative that effect PNV negatively The major reduction occurred due to the allocation of roadless areas not in Management Prescnptions I (Unroaded Non-Motorized Recreation) and VII (Threatened, Endangered, and Selected Sensitive Species) In addtion, there were addtional allocations for visuals that precluded or reduced timber harvest The intensty of harvest prescnptions allowed was reduced over Alternative PRF primarily by not allowing any clearcutting, retaining 12 trees per acre on most acres where GTR will be applied, and limiting practices on slopes over 40 percent

This alternative has the same recreation program = Alternative PRF

Emphasis on older over-mature dependent species, protecting npanan zones, and allocating many of the roadless areas to semi-pnmtive non-motorized will be beneficial to the lifestyles of Recreationists and Resource Amenty Emphasis Category residents Lower market outputs will cause county receipts, local income, and jobs to be less than all other alternatives, and, therefore, not beneficial to the lifestyle of long-term residents who are economically dependent on the forest commodity outputs

Table 11-26 - Indicators of Responsiveness to Selected Issues and National Concerns.

PNV and net cash flow are indicaton of concern to taxpayers They measure responsiveness to national issues of economy in governments and deficit reduction The alternative tanking by PNV and the alignment with net cash flow shows certain differences in priority Alternative

Table 11-24
Average Annual Timber Cash Flows - Decade I
(Millions of Undiscounted Dollars per Year)

Altemative	Timber Net Cash Flow
PRF	2.2
RPA	8 1
CUR	6.6
CBF	-0 8

CBF ranks last in net cash flow and has the lowest PNV Alternative RPA has the highest net cash flow and PNV of the alternatives considered in detail Net cash flow is a measure of net dollar returns to the U S Treasury As such it is determined primarily by timber receipts PNV includes dollar benefts other than timber (i e recreation, wildlie, and water) This explains why all altematives have positive PNVs, but the net cash flows are only positive in the 5th decade in Alternatives CEF, RPA and CUR These alternatives have the highest allowable sale quantity (ASQ)

Available jobs and local income are indicators of local economic concerns There is a high degree of correlation within these two categories The alternative with the highest number of jobs produces the most local income, while the alternative with the lowest number of jobs produces the least income

ASQ and acres of timber management deal with a major issue on the Forests Generally, the more acres available for timber management the higher the timber output

The amount of older over-mature habrtat on the Forests is an issue at the National, Regional, and Forest level Generally, the lower the ASQ, the greater the amount of older over-mature forest remaining at the end of the 5th decade

Summary Comparison of Environmental Consequences by Alternative

Table 11-27 presents an overview of the impacts which will occur as a result of implementing any of the alternatives descnbed in this final EIS Refer to Chapter IV for a detailed discussion of the consequences specific to each resource.

Alternative Comparisons Using Responses to Public Issues

A ffth and final means of comparing alternatives is through evaluation of the degree to which each alternative responds to the various public issues These are illustrated in **Table 11-28** Refer to Chapter I and Appendix A for a detailed description of the major public issues and the scoping process used to develop them

Table 11-26
Indicators of Responsiveness to Selected issues and National Concerns

Alternative	Community Effects (Public Issue #7)			
	PNV - MM$	MM$/Year Decades 1/5	Total Personal Income (MM$/Year)	Direct and Indirect Employment (M Persons/Year)
CEF	8,691	-24/22	160	4,213
PRF	8.221	32/-6	138	3,633
RPA	8,469	-25/12	148	3,888
CUR	8,239	-27/9	140	3,682
CBF	8.128	-33/-12	122	3,208

	Timber Effects (Public Issue #16)			
	PNV - MMS	1st Decade ASQ (MMBF/Year)	Old Growth After 5th Decade (M Acres*)	Timber Management (M Acres**)
CEF	8,691	1287	340	554
PRF	8,221	82	368	473
RPA	8,469	1124	358	538
CUR	8,239	1059	364	503
CBF	8.128	653	370	372

* On suitable and unsuitable timber lands

** On capable, available, and tentatively suitable bmber lands

Abbrewated Terms and Meanings.

ASQ = Allowable Sale Quantity
CBF = Citizens for Better Forestry
CEF = Constrained Economically Efficient Alternative with Forest Constraints
CUR = No Action/No Change
M Acres = Thousand Acres
M Persons = Thousand Persons
MM$ = Million Dollars
MMBF = Million Board Feet
PNV = Present Net Value
PRF = Preferred Alternative
RPA = 1990 RPA Program Emphasis

Table 11-27
Summary Comparison of Environmental Consequences by Alternative

Resource	Subject(s)	ALTERNATIVE PRF	RPA	CUR	CBF
Biological Diversity	Seral Stage Acres at end of Decade 5				
	Early (seral stages 1&2)	177,000	185,000	181,000	173,000
	Middle (seral stages 3a,3b,& 3c)	740,000	724.000	711,000	725.000
	Late (seral stages 4a,4b,&4c)	355.000	353.000	361,000	356,000
	Older over-mature (Seral stage 4c-older)	368,000	358,000	364.000	370,000
ntage ourc	l of Rsk of adverse s on sites compared with c nt conditions	Moderate potential r sk f t d st b a based o a cres of timbe manageme	High potential nsk of t d stu ba e l on c es of tu b er management	High potential nsk of site disturbance based on acres of timber management	Lowest potential nsk of site d stu b te based o a of timber management
Economics	Predicted %change in PNV as compared to Current Alternative	- 2%	3%	0%	-1 3%
	Predicted % change in receipts to county as compared to Current Alternative - Decade 1	-29%	14%	0%	-43%
	Predicted change in employment as compared to Current Alternative - Decade 1	-1%	6%	0%	-13%
Fire & Fuels	Acres planned for fuel treatment - Decade 1	20.000	6.580	7,080	5.880
Fisheries	Projected number of pounds for MIS fish species - Decade 1				
	Anadromous	353.000	563.000	293,000	353,000
	Inland	1,817,000	1,947,000	1,557,000	1,713,000
Human and Community Development	Impact on social groups	Major impact on social groups such as long-time residents whose jobs. ether directly or indirectly, are dependent on the timber/ wood fiber industry	Major impact on social groups such as long-bme residents whose jobs, ether directly or indirectly, are dependent on the timber/ wood fiber industry.	Major impact on social groups such as long-time residents whose jobs. etherdirectly or indirectly, are dependent on the timber/ wood fiber industry.	Major impact on social groups such as long-bme residents whose jobs, ether directly or indirectly, are dependent on the timber/ wood fiber industry

Table 11-27 (Continued)

Resource	Subject(s)	ALTERNATIVE PRF	RPA	CUR	CBF
Minerals	Acres withdrawn above the 927,000 acres common to all alternatives				
	RNA	15,055	4.275	12,345	23,765
	Wilderness	0	0	0	7.720
	Wild Rivers	6,432	0	0	7.808
	Total	21,487	4,275	12,345	39,293
Range	Changes in *AM* output from current	0	1,700	0	*0*
Recreation	Developed and dispersed recreation effects				
	Developed public (MM RVDs)				
	Decade 1	.75	75	.75	75
	Decade 5	1.2	1.1	.69	1.2
	Dispersed (MM RVDs)				
	Decade 1	2 9	2.9	2.8	2 8
	Decade 5	5 3	5 3	5	5
Timber	Long-Term Sustained Yield (MMBF/year)	103 3	1367	1274	75 3
	Growth in Decade 5 (MMBF/year)	156	172 8	190 5	101 4
	Appearance of Forest **Lands**	About 22% of the total forest acres will have vegetabon management activity of some kind at some point in time. This would include openings in the forest canopy for the purpose of regenerating new stands. Some large trees will be left in most of the openings. These openings will average about 10-12 acres in size with the largest openings being about 20 acre.	About 25% of the total forest acres will have fairly Intensive timber management activity of some land at some point in time. This will include openings in the forest canopy for the purpose of regenerating new stands. Most of the openings will be clearcuts on both steep slopes and flat ground. Large trees will not normally be left in the openings. These openings will average about 20 acres in size, and as large as 40 acres	About 24% of the total forest acres will have fairly intensive timber management activity of some land at some point in time. This will include openings in the forest canopy for the purpose of regenerating totally new stands. Most of the openings will be clearcuts, on both steep slopes and flat ground. Large trees will be left in some of the openings. These openings will average about 15 to 20 acres in size	About 17% of the total forest acres will have fairly intensive timber management activity of some land at some point in time. This will include openings in the forest canopy for the purpose of regenerating new stands. Some large trees will be left. Openings will normally not exceed 20 acres in size. On flatter slopes, openings will be smaller, but more frequent, where selection logging is practiced

Table 11-27 (Continued)

Resource	Subject(s)	ALTERNATIVE PRF	RPA	CUR	CBF
Timber (continued)		Fuels treatment. to return the landscape characteristics to that which would have occurred had fire not been excluded for the past 100 years, will be applied to 70% of the forest in LSRs and Riparian Reserves First priority will be to meet the intent of those reserves			These openings will normally be less than 2 acres in size
		Another 5% of the total forest acres will have minor timber activities, mainly individual tree removal, which will not normally be ewdent to the casual forest visitor	Another 5% of the total forest acres will have minor timber activities, mainly individual tree removal, which will not normally be evident to the casual *forest* visitor	Another 6% of the total forest acres will have minor bmber activities, mainly individual tree removal, which will not normally be ewdent to the casual forest visitor	Another 6% of the total *forest* acres will have minor timber activities, mainly individual tree removal, which will not normally be evident to the casual forest visitor
		75% of the forest acres will have no planned bmber activity and would remain virtually unchanged	The remaining 70% of the forest acres will have no planned bmber activity and will remain virtually unchanged	The remaining 70% of the forest acres will have no planned timber activity and will remain virtually unchanged	The remaining 77% of the forest acres will have no planned bmber activity and will remain virtually unchanged
		Existing stands will be converted to young stands at an average rate of **about** 3500 acres per year In 50 years about 8% of the forest will consist of stands which are less than 50 years of age	Existing stands will be converted to young stands at an average rate of about 4700 acres per year In 50 yean about 11% of the forest will consist of stands which are less than 50 yean of age	Existing stands will be converted to young stands at an average rate of about 5200 acres per year In 50 years about 12% of the forest will consist of stands which are less than 50 years of age	Existing stands will be converted to young stands at an average rate of about 4100 acres per year In 50 years about 10% of the forest will consist of stands which are less than 50 years of age
visual Quality	Visual Qualrty Index (VQIs)	Candidate state scenic highways. the NRAs, developed recreation areas and most high use recreabon areas will be managed for scenic qualrty	Candidate state scenic highways, the NRAs, developed recreabon areas and most high use recreabon **areas** will be managed for scenic qualrty	Candidate **state** scenic highways. the NRAs, developed recreabon areas and most high use recreabon areas will be managed for scenic qualty	Candidate state scenic highways. the NRAs, developed recreabon areas and most high use recreabon areas will be managed for scenic qualty
		The landscape setting along wild and scenic rivers and semi-pnmtbve areas will be more natural appeanng than CUR or RPA.	The landscape semng along wild and scenic rivers and semi-primitive areas will receive the least protecbon of **all** alternatives	The landscape setting along wild and scenic rivers and semi-primitive areas will be more natural appeanng than PRF or CBF	The landscape semng along wild and scenic rivers and semi-primitive areas will be more natural appeanng than any other alternative

Table 11-27 (Continued)

Resource	Subject(s)	ALTERNATIVE PRF	RPA	CUR	CBF
Visual Quality (continued)		The future visual condrtion. as measured by the VQI, will increase by 3%	The future usual condaon, as measured by the VQI, will increase by 1%	The future visual condaon. as measured by the VQI, will increase by 2%	The future usual condition, as measured by ffie VQI, will increase by 1%
Wild & Scenic Rivers	Miles of Rivers Designated				
	Existing	106.4	106 4	106 4	106 4
	New Wild	48 5	0	0	56 8
	New Scenic	17 3	0	0	25 1
	New Recreation	13 9	0	0	34 7
	Total New	79 7	0	0	116 6
	Total	186.1	**106.4**	**106.4**	**223**
Wilderness & Roadless Areas	Impacts on wlderness attnbutes	Wilderness attnbutes will be maintained for existing areas The wlderness attnbutes of the Mt. Eddy further planning area will be slightly diminished due to resource management activities on a small amount of the area	Wilderness attnbutes will be maintained for existing areas The wilderness attnbutes of the Mt. Eddy further planning area wilt be slightly diminished due to resource management activities on a small amount of the area	Wilderness attnbutes will be maintained for existing areas The wilderness attnbutes of the Mt Eddy further planning area will be slightly diminished due to resource management activities on a small amount of the area	Wlderness attnbutes will be maintained for existing areas The wlderness attnbutes of the Mt Eddy further planning area will also be maintained.
		About 81% of the 29 rele se d roadless ;' age v ll remain undeveloped	About 71' of the 2' released r dle ss areas' acreage will remain undeveloped	About 72% of the 2' released ro: ss ;' age v il remain undeveloped	About 88% of the 29 released roadless ' age v ll remain undeveloped
Wildlife (d of 5th c ecac ;, 5) ye rs)					
	'Vildlife r E (M WUDs)	61	39	51	61
	TBE and iv Species				
	Spotte vl (g	210	210	72	210
	Bald E r l pairs)	35	35	35	35
	Peregrine Falcons (managed pairs)	14	14	14	1
	Gosha k (pairs)	150	150	150	15

Table 11-28
Disposition of Public Issues

Public Issue	Output or Effect to be Measured (1st decade unless otherwise noted)	ALTERNATIVE PRF	RPA	CUR	CBF
Heritage Resources Issue #1					
How should the Forests effectively provide identification, protection and interpretabon of archaeological. histoncal. and religious sites?	None	Significant cultural resources will be protected, enhanced, and interpreted The montoring plan will be the enforcement of S&G's Inventory and evaluation of resources will vary among alternatives according to vanations in resource outputs Consultation wtth the State Historic Preservation Office will continue as required by 36 CFR 800			
Biological Diversity Issue #2					
How should the Forests' vegetative resources be managed for ecosystem diversity?	None	Richness None of the alternatives will reduce the total number of dfierent plant or animal species Evenness All akematives meet or exceed the 5% requirements for all seral stages of all major vegetation types on a Forest-wide basis Pattern Vegetabve stands and their respectwe patterns will cycle naturally on about 73 percent of the Forests' land base The greatest change in pattern on suitable lands will be the small reduction in early seral stages There will be a corresponding increase in late seral stage vegetation types RPA and CUR will have the least increase in late seral stage vegetation and the least decrease in early seral stage			
Issue #3					
How much of the older vegetative seral stages existing on the Forests should be retained?		Standards and Guidelines relating to diversity and older over-mature dependent species will be implemented under all alternatives Acres of older over-mature forests will increase in all alternatwes			
	Acres of older over-mature forest (5th decade)	368,000	358,000	364,000	370.000
Facilities Issue #4					
How many miles of additional roads are needed and to what standard should they be constructed and maintained in order to meet future needs?	Roads Maintained, Average/1st Decade (miles/year)	5,700	6,580	6,580	6.500
	Construction (miles/year)	3	23	23	15
	Reconstruction (miles/year)	22	22	22	16

Table II-28
Disposition of Public Issues

Public Issue	Output or Effect to be Measured (1st decade unless otherwise noted)	ALTERNATIVE PRF	RPA	CUR	CBF
* See last page of this table for "Abbreviated Terms and Meanings"					
Fire and fuels Issue #5					
To what extent should prescribed burning be used as a way to reduce fuel hazards, prepare sites for reforestation, and improve wildlife habitat?		The use of prescribed fire for fire hazard reduction and other resource management (e.g., wildlife habitat management), as well as the means to mitigate its effects, is addressed in the standards and guidelines (Chapter 4, Plan) Utilization of woody debris will be emphasized over burning where possible The reintroduction of the natural role of fire will be emphasized in PRF			
Fisheries / Water Issue #6					
How should watersheds be managed to maintain or enhance water quality and fisheries!	None	It is the intent under all alternatives to minimize impacts of program activities on fisheries and water and to ensure viable fish population levels. Riparian standards and guidelines and Best Management Practices will be adopted for all alternatives See Chapter 4 of the Plan for a complete listing of the S&G's including requirements within riparian areas and widths of riparian management zones			
Human and Community Development Issue #7					
What activities and outputs should be provided to maintain community stability?		The higher the County receipts and employment figures are, the better the alternative addresses this issue Thus, Alternative RPA is the best and CBF is the worst at addressing this issue			
	County Receipts (MM$)	5	8	7	4
	Employment (# of jobs)	3,633	3,888	3,682	3,208
Minerals Issue #E					
How can mineral development and exploration be encouraged while minimizing adverse impacts to non-mineral surface resources?	None	All alternatives recognize mined development as a valid use of National Forest lands. All alternatives restrict mineral entry, to a degree, as a direct function of withdrawals			

Table 11-28
Disposition of Public Issues

Public Issue	Output or Effect to be Measured (1st decade unless otherwise noted)	ALTERNATIVE PRF	RPA	CUR	CBF
Mineral (continued)					
		In addition, Alternative CBF places management constraints on lands not withdrawn. Standards and Guidelines in the Forest Plan recognize this use The Riparian S&Gs encourage mineral development that is compatible with riparian values The goal stated in the Plan is to provide for and encourage the orderly development of mineral resources, applicable to both leasable and locatable minerals			
Range **Issue #9**					
Is livestock grazing an appropriate use of wilderness? If so, how should conflicts be minimized between livestock use and recreationists?	None	As they become vacant or inactive, grazing allotments would be terminated in Alternatives PRF and CBF. The Riparian S&Gs would affect how grazing is managed in all riparian areas and wildernesses			
Issue #10					
How should livestock grazing be managed to minimize degradation of riparian areas?	AMs	8,300	10,00	8,300	8,300
		Resolution of grazing conflicts within riparian areas would be emphasized by incorporating the Riparian S&Gs into all alternatives (see Chapter 4, Plan, Management Prescription IX)			
Recreation **Issue #11**					
How much of the Forests should be open, closed, or restricted to off-highway vehicle (OHV) use?	Open, Usable OW acres				
	Summer Acres	239.175	256,120	243,020	220.195
	Winter Acres	176,200	198,730	187,720	98,750
Issue #12					
How should the Forests supply water-oriented recreation facilities and opportunities to meet increasing demand?	None	Program direction for each alternative prescribes the degree of opportunities provided for water-oriented recreation The opportunities are described in terms of support facilities such as developed sites, interpretive service, levels of operation, and miles of wild and scenic rivers Alternatives PRF and RPA provide the most opportunities, Alternatives CUR and CBF provide slightly less			

Table 11-28
Disposition of Public Issues

Public Issue	Output or Effect to be Measured (1 st decade unless otherwise noted)	ALTERNATIVE PRF	RPA	CUR	CBF
Riparian Areas Issue #13					
How wide should riparian management zones (RMZs) be and what management activities should be allowed wrthin them?	None	Riparian S&Gs found in Chapter 4 of the Plan will apply to PRF and similar standards found in the Forest Plan apply *to* the other alternatives They specify widths by class of stream, what the standards would be for the different RMZs, and they identify kev watersheds and their more restrictive S&Gs			
Special Areas Issue #14					
what areas should be recommended for Research Natural Area (RNA) and Special Interest Area (SIA) establishment?	Proposed RNAs Number of areas	8	5	8	13
	Acres	23,260	13,400	21,470	26.970
	Proposed SIAs Number of areas	19	13	9	15
Timber Issue #15					
Should herbicides be used to control vegetabon in order to meet timber management objectives?	Release Acres/Year	4,000	4,300	4,700	3.700
		The total number of acres scheduled for release gives an indication only of the possible use of herbicides which may occur All alternatives, except CBF. incorporate a full range of vegetation management treatment methods These methods include mechanical, manual, prescribed burning, biological, and chemical Selection of any particular method would be made at the project level, based on a site specific analysis of relative effectiveness, enwonmental effects and cost. Alternative CBF allows no chemical treatment methods			
Issue #16					
What should the bmber harvest level or allowable sale quantity (ASQ) be?	ASQ MMBF/Year	82.0	112 4	105 8	65.3
	Suitable land managed for timber (M acres)	530.0	630 1	635 8	495 4
	1st decade harvest-Percent of Total Suitable Inventory	9 0	11 4	10 8	9 5

Table 11-28
Disposition of Public Issues

Public Issue	Output or Effect to be Measured (1st decade unless otherwise noted)	ALTERNATIVE PRF	RPA	CUR	CBF
Issue #17					
What silvicultural practices should be used to assure reasonably successful reforestation of harvested lands and to maintain tree species diversity?	Reforestation (Acres/Year)	3,500	4,700	5,200	4,100
		Based on National Forest Management *Act* guidelines, approximately 54,500 acres of land will be classfied as unsuitable for timber production in all alternatives, because regenerability cannot be reasonably assured within 5 years after harvest.			
		During the course of conducting reforestation activities, tree species diversity will be provided for by planting an appropriate mix of tree species, encouraging natural regeneration, and leaving advanced reproduction in harvest units			
Issue #18					
What harvest methods, including clearcutting, should be used to meet management objectives?	Estimated clearcutting acres (1st decade)	0	3,810	3,160	0
	Estimated green tree retention acres (1st decade)	2,000	*930*	1,780	*2,690*
	Estimated selection acres (1st decade)	1,500	0	300	1,400
		Silvicultural systems would be determined by site specific prescriptions at the project level			
Visual Quality Issue #19					
How and where should visual quality be protected and enhanced?		The direct environmental effects of the alternatives on visual quality include some change in visual appearance of the landscape in some areas of the Forest outside of wilderness and other areas where land disturbing practices are not allowed. These changes would be created by managed activities implemented to different usual quality levels			
		Land disturbing management activities would occur on a small portion of the land base as compared with the last 15 year average			
		Overall, visual quality would improve in all alternatives, the greatest improvements would occur with Alternatives PRF and CBF			

Table 11-28
Dispositionof Public Issues

Public Issue	Output or Effect to be Measured (1st decade unless otherwise noted)	ALTE-RNATIVE PRF	RPA	CUR	CBF
Wild and Scenic Rivers Issue #20					
What river segments should be recommended for inclusion in the Federal Wild and Scenic Rivers system?	Recommended National Wild and Scenic Rivers, new miles of National Forest Land only above the existing 106.4 miles				
	Wild	48.5	0	0	56.8
	Scenic	17 3	0	0	25 1
	Recreation	13.9	0	0	34.7
	TOTAL	79.7	0	0	116.6
Wilderness and Roadless Areas Issue #21					
How should the Forests' roadless areas be managed, including the Mt. Eddy further planning area!	National Wildemess Preservation system acres	498,776	498,776	498,776	506,496
	Roadless Areas: Percent of acres retained in undeveloped condition'	81	71	72	88
Issue #22					
To what extent should Mt Shasta be allocated to prescriptions that would allow or encourage downhill skiing or other management activities that might conflict with the wilderness or cultural resource values in the area.		All alternatives except CBF allocate lands adjacent to Mt Shasta that will allow ski area development The final decision will be made in a separate EIS. Cultural and Native American values are recognized and protected in all alternatives			

Table 11-28
Disposition of Public Issues

Public Issue	Output or Effect to be Measured (1st decade unless otherwise noted)	ALTERNATIVE PRF	RPA	CUR	CBF
Abbreviated Terms and Meanings					
AMs	Animal Months				
ASQ	Allowable Sale Quantity				
M Acres	Thousand acres				
MM$	Millions of Dollars				
MMBF	Million Board Feet				
OHV	Off-highway Vehicle				
RMZs	Riparian Management Zones				
RNA	Research Natural Area				
S&Gs	Standards and Guidelines				
SIA	Special Interest Area				

Chapter II

Affected Environment

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CHAPTER III
Affected Environment

Introduction

A

This chapter provides a comprehensive overview of the economic, social, and resource environments that would be affected or modified by the alternatives in this Final Environmental Impact Statement (Final EIS) The four alternatives under consideration were descnbed in Chapter II Careful study and examination of this chapter, along with Chapter II, are logical prerequisites to understanding the probable environmental consequences which would result from implementing each of the alternatives.

The discussions in this chapter are divided into three major sections the economic, social, and resource environments

Under each section, the discussion is in terms of public issues, the current management situation, including, where appropriate, supply and demand discussions, and management opportunities

Resource discussions are presented in alphabetical order (e g , 'Air Quality" through "Wildlife ") This order is also consistent with Chapter IV—Environmental Consequences.

General Description of the Forests

B

The 2 I million acres of the Shasta-Trinity National Forests lie in the heart of Northern California Within the Forests' boundaries are a diverse and complex array of soil and vegetation types At least four major physiographic provinces are represented on the Forests. (I) the Cascade Mountains, (2) the Klamath Mountains, (3) the Coast Range, and (4) the Sacramento Valley

The Shasta-Trinity National Forests are located within four hours driving time of the San Francisco bay area and Sacramento population centers The boundaries are but a few minutes drive from Redding, a city of nearly 70,000 people Other population centers within the Forests' zone of influence include Burney, Dunsmuir, Hayfork, McCloud, Mt Shasta City, and Weaverville

Because of their geographic location and physiographic diversity, a variety of economic, social, and resource situations exists on the Shasta-Trinity National Forests.

The Economic Environment

C

Public Issue

What activities and outputs should be provided to maintain community stability? (Public Issue #7).

Discussion of Public Issue

Changes in the output of goods and services provided by the Forests can affect the stability of the local communities As much as is practicable, output levels are maintained on a stable basis to avoid impacting these communities

Output levels *of* many goods and services are coordinated on a local, regional and national level Because of this, the actual level of some outputs may fluctuate from year to year

Annual financial budgets are usually correlated with the level of outputs generated by the Forests In other words, resource outputs at specified levels require a minimum level of funding

Fluctuations in annual budgets may also affect the mix of goods and services As budget levels drop below that required to produce a given mix of these goods and services, Forest, Regional, and National priorities associated with these outputs are reviewed This review ultimately results in a revised mix of outputs consistent with the level of funding Any specific output, depending *on* its relative *priority*, may or may not change as the overall mix changes

Correspondingly, budgets in excess *of* the minimum required to produce *a* given mix of goods and services may also affect outputs Upon review of current pnonties, outputs may be increased However, increased funding would not necessanly mandate an increase in histonc outputs Additional funding could be used to support new projects or provide for the development of new outputs

Current Management Situation

The primary economic impact area associated with the Shasta-Trinity National Forests is comprised of Shasta,

Siskiyou, Tehama, and Tnnty Counties Within this area Shasta, Siskiyou, and Trinity Counties are subject to the greatest economic influence from Forest activities These three counties contain 96 percent of the Forests' acreage The remaining acreage is located in Tehama County, with a small portion of land located in Humboldt and Modoc Counties That portion of the Shasta-Trinity National Forests that is within Modoc County is administered by the Lassen National Forest

To understand the role the Shasta-Trinity National Forests play in the economy of these Counties a discussion of the following elements is necessary (1) economic efficiency, (2) shared receipts with Counties, (3) employment, (4) local unemployment, and (5) National Forest budget levels

Statistics for these five elements were compiled prior to the listing of the northern spotted owl The U S Fish and Wildlife Service (USFWS) formally designated this species as threatened on June 26, 1990 When applicable, discussions about each element will include two general time frames One deals with historical information and another presents a scenario that considers the potential effects resulting from the listing of the spotted owl and implementation of the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl (ROD) signed by the Secretaries of Agriculture and Interior on April 13, 1994

Economic Efficiency

Allocating resources through management activities is an integral part of National Forest management The efficiency of these allocations is a topic of concern Commonly included within the topic of efficiency is the subject of economic efficiency Economic efficiency typically entails receiving greater net returns over time when compared with net costs for the same period

Actual costs of forest management activities are generally equal to the sum of individual expenses incurred to complete a task Benefits of forest management activities can be considered as the sum of actual dollar returns received plus consumer surplus values Consumer surplus values are intended to approximate the social benefits of goods over and above actual cash exchanged Commonly referred to as "willingness to pay" values, consumer surplus values do not represent "real wealth" in that money does not change hands However, many economists feel that consumer surplus values can be relevant to many social decisions

One method of determining the economic efficiency of an activity is the calculation of its present net value (PNV) A PNV is equal to the discounted sum of benefits minus the discounted sum of costs for the same period of time, each derived over the life of the activty. Discounting benefits and costs to a base year permits the comparison of values originating over a series of years all at one point in time A PNV greater than zero (i e , a positive value) indicates that returns associated with a project exceed similarly associated costs The relative size of this positive value can be thought of as a measure of a project's economic efficiency A PNV of less than zero indicates that costs associated with a project exceed returns A PNV of zero generally indicates a break even situation from an economic standpoint

Economics are considered along with other decision criterion relating to management activities Other decision criteria may outweigh economic cnteria For example, a decision to aid a segment of the population to achieve social goals may not be economical but may be preferred for other reasons Because many resource "values" cannot be expressed in monetary terms, qualitative information must always be considered along with the quantitative values measured by PNV

Historical Perspective

Values associated with recreation use as well as timber and water yields have formed the basis of benefits applicable to PNV calculations for the Shasta-Trinity National Forests Costs associated with timber management, forest roads, and recreation and fire management have formed the cost side of PNV calculations Potential output levels associated with timber and water yields and recreation use had remained relatively constant over the last five year period prior to the listing of the northern spotted owl

Post-conservation Perspective

As a result of the listing of the northern spotted owl as a threatened wildllfe species, and implementation of the ROD, potential timber yield levels on the Shasta-Trinty have decreased signficantly to about 1/3 of histonc levels

One effect of timber harvesting is a short term, or incremental, increase in total water yield from those acres harvested Because future harvest levels will be lower than histonc ones, incrementa increases in water yield from the Forests will decrease in proportion to the number of acres not harvested

Recreation use on the Forests has been relatively constant over the past several years This trend is expected to continue

Shared Receipts with Counties

A portion of the Forests' receipts (i e , 25 percent of the total receipts) is paid to the State of California for distribution back to the counties where the National Forest is located These funds are designated for the counties' use on roads and for schools

The percentage of a National Forest's total net acreage within a County is used to determine each County's share of total receipts For example, Trinity County receives 89 percent of the "25 Percent Receipts" calculated for the Trinity Forest regardless of where on the Forest those receipts came from The majority of receipts collected on the Shasta-Trinity National Forests is distributed to the tri-county area Shasta, Siskiyou, and Trinity Counties

A portion of the receipts collected by the Lassen National Forest is returned to Modoc, Shasta, and Siskiyou Counties as 25 percent payments from the Shasta National Forest This is because the Lassen National Forest administers a portion of the Shasta National Forest

Receipts subject to the 25 percent payment are directly related to the Forests' level of management activities Historically, the Forests' timber management program generated the largest portion of shared receipts

Historical Perspective

The pattern of shared receipts distributed among the counties is shown in **Table III-1** This table depicts only those receipts attributable to the Shasta-Trinity National Forests During the period shown, the Forests provided between 71 and 83 percent of Trinity County's total receipts and from 36 to 60 percent of Shasta County's Forests other than the Shasta-Trinity contribute a larger quantity of shared receipts to Siskiyou and Tehama Counties

As seen in **Table III-1**, shared receipts vary from year to year. Yearly variations aside, receipts distributed to Shasta and Siskiyou Counties have generally been between one and two million dollars annually since 1980 Trinity County's portion has fluctuated more widely ranging from two to three million dollan annually between 1988 and 1992 A rising per unit value of timber and increased volumes as a result of the 1987 wildfires caused significantly higher receipts for Trinity County for that period

Receipt to county vanations have been historically reflective of many causes including changes in interest rates, housing construction activity, varying bid rates for timber stumpage as well as fluctuating timber harvest levels

Post-conservation Perspective

With the listing of the northern spotted owl and implementation of the ROD, timber harvest levels on the Shasta-Trinity National Forests are significantly less than in the past As published in the Shasta-Trinity National Forests' annual Timber Sale Program Report, per unit values paid for timber have been increasing since 1987 The combination of increasing unit values during a time of

Table III-1

decreasing harvest levels may moderate some decrease in shared receipts

For 1993, 1992 and 1991 payments to Counties were computed under a provision of the Interior and Related Agencies Appropnations Acts For those National Forests affected by decisions on the northern spotted owl, a provision of the Acts provides for payments to States of not less than 90 percent of afive-year average of payments for Fiscal Year 1992 and a three-year average of payments for Fiscal Year 1991 Payments to the Counties would be lower if based solely on actual receipts

Employment

Management activities also have the potential to affect employment patterns wthin the Forests' area of primary economic impact These effects may be direct in nature such as Federal employment associated wth the Forests Direct effects may also be in the form of pnvate employment necessary to support Federally solicited goods and services In addtion, commodities sold by the Forests may affect employment levels

Indirect employment is commonly generated by businesses supplying goods and services required by direct employment Using lumber mills as an example, local mechanics servicing mill equipment could be considered as indirect employment generated by the sale of sawlogs

An induced effect is created by the wages generated through direct and indirect jobs as they are circulated throughout the local economy These wages are often expended for food, housing, clothing, transportation and other living expenses Induced effects may take the form of additional local employment created wthin existing businesses or the creation of new businesses The sum of the direct. indirect, and induced effects is the total local economic impact, in dollars (income) or jobs (employment)

Historical Perspective

local Employment Patterns

Total employment and the relative percentage of total employment associated with specific industnes is displayed in **Table 111-2** This table displays statistics for those counties located wthin the Primary Economic Impact Area and the State of California Information for the yean 1985 and 1991 is displayed to aid in identifying generalized employment trends Compansons of employment levels in similar industnes can also be made within the counties listed and the State of California

A review of **Table 111-2** reveals several trends All areas displayed have expenenced a decrease in total employment wthin the lumber and wood manufacturing industry as well as the transportation and utilities and agriculture, forestry, and fishenes groups Increases in employment wthin the wholesale and retail trade and services industry groups have occurred during the period 1985 through 1991

The largest employing industry group in all areas listed is divided between the wholesale and retail trade group, services, and the government group The second largest employing industry for the State of California, as well as Siskiyou and Trinity Counties, is the wholesale and retail trade group The services group is the second largest employing industry in Shasta County Government employment is the second largest group wthin Tehama County

A number of shifts in areas of employment has occurred during the period displayed Between 1985 and 1991, employment in the manufacturing industry group in the State of California has shifted toward services While Government in Trinity County remained the largest employing group, the second largest group in this county shifted to the wholesale/retail trade group wth a decrease in the manufacturing group

Tehama County experienced a further shift away from manufacturing employment to the wholesale and retail trade However, the relative difference between the percentages of employment within the top three industry groups in this County ranges from 20 to 24 percent This close range may indicate that the top three groups are essentially equal in importance, rather than definitively ranked 1, 2, and 3

Between 1985 and 1991, Siskiyou County experienced a decline in manufacturing employment and a slight gain in the relative percentage of employment in the service industry

Wholesale and retail trade remained the largest employing group wthin Shasta County. The services group increased slightly remaining second in relative ranking of employing groups during that period

Employment Impacts

Local impacts of industrial activty attributable to the Shasta-Trinity National Forests(i e , timber production, recreation use, Forest Service budget and range allotments) are estimated through the use of mukiplien Mukiplien are commonly used for estimating regional economic and industrial impacts and are generally of two kinds income and employment. As estimators, multipliers may not reflect actual condltions exactly, but they do help identify overall condtions Employment multipliers are used in this document to model local impacts (See **Table III-4** "Employment Impacts by County")

The timber industry uses sawlogs from National Forest lands and, therefore, is a pnmary industry affected by Forest Service activlties More jobs have historically been created in the timber industry as a result of Forest Service activities than any of the other industry sectors As displayed in **Table III-4**, a relative shift to recreation has occurred due to the decrease in timber outputs The majority of jobs have been created wlthin Shasta County. This occurs because of a combination of direct, indirect

Table III-2
Wage and Salary Employment
By Industry By County - 1985 & 1991
(Average Percentage)

	Shasta		Siskiyou		Tehama		Trinity		California	
Industry	**1985**	**1991**	**1985**	**1991**	**1985**	**1991**	**1985**	**1991**	**1985**	**1991**
Agriculture, Forestry, Fisheries	3.0	2.2	7.8	8.0	91	8.7	.8	1.6	3.0	2.1
Construction &Mining	6.0	7.5	3.5	4.0	3.2	3.2	5 0	3.3	4.8	4.4
Manufacturing	11 1	9 5	12.5	7 8	23.4	15.4	160	13 1	18 3	15.5
• Lumber & Wood	(4 6)	(4 2)	(10 5)	(5 9)	(16 5)	(7 9)	-		(5)	(4)
• Other	(6 5)	(5.3)	(2 0)	(1 9)	(6 9)	(7.5)			(17 8)	(15 1)
Transportation, Utilities	7.2	6 7	6.8	6 3	3 8	2.6	4.2	2 5	5.1	4.9
Wholesale & Retail Trade	26 0	268	21 9	21 9	19 5	24 0	14 3	17 2	232	232
Finance, Insurance, Real Estate	3.9	3 4	2 9	3 6	3 8	3.0	2 5	2 5	6 4	6.4
Services*	22 5	25.6	16.3	19.5	16.9	20.0	16.8	13.9	23.4	27.1
Government	20.3	18 3	28.3	28.9	20 3	22.4	-40.4	45 9	15.8	16.4
• Federal	(2.9)	(2 2)	(7 0)	(6 3)	(2 3)	(2.2)	(i0.9)	(10.6)	(3.0)	(2.7)
• State	(2.7)	(2 6)	(3 7)	(3 3)	(2 8)	(2 6)	**	**	**	**
• Local	(14.7)	(13 5)	(17.6)	(19.3)	(152)	(17 6)	(29.5)	(353)	(128)	(13 7)
Total Employment	--100%--		--100%--		--100%--		--100%--		--100%--	
Total Employment in 1,000s	394	529	12 8	14 4	11 8	12.4	3 0	3 0	11,315.0	12,855.2

Source. California Employment Development Dept., annual reports for Counties and State, 1987 and 1992.

* Includes recreation, tourism
** State and local, combined
Note: Percentages may not add up to 100 percent because of independent rounding.

and induced effects from within the County and surrounding counties. For example, a person might work at a mill in another county but do most of their shopping within Shasta County.

Several communities within the boundaries of the Shasta-Tnnrty National Forests are timber dependent These *are* communities where a high percentage of the total employment is directly or indirectly related to the sale of timber from National Forests The towns of Hayfork and Weaverville fall into this category

Recreational opportunities on National Forest lands also contribute to primary industry activity Attractions such as Mt Shasta, the Shasta and Tnnrty Units of the Whiskeytown-Shasta-Trinity National Recreation Area, and the Tnnity Alps Wildemess generate over five million recreation visitor days per year

Forest Service budgets impact industrial activity within and adjacent to the Forest boundaries Much of this impact is by virtue of maintaining Forest Service installations and associated wages paid to employees In addtion, a large share of the Forest Service budget is distributed to local industries in the form of contracted work for road building, tree planting, and campground maintenance Shasta County receives the largest impact associated with local Forest Service budgets

Post-conservation Perspective

Local Employment Patterns

The employment patterns displayed in **Table III-4** are broad based and not tied to any one specific event or segment of an industry Most of the larger term trends are expected to continue but loss of jobs in the timber industry is expected to accelerate

Employment Impacts

Post-conservation employment, resulting from Forest Service activities, is expected to decrease significantly This decrease is likely to result from lower timber harvest levels and from fewer contracts awarded for road building and tree planting

A net decrease in the numbers of Forest Service employees is also expected to occur in response to lower timber harvest targets This decrease will likely result in indirect and induced effects associated with a decrease in salaries expended within local economies

local Unemployment

That portion of the civilian workforce which is over the age of 16 and available for work but who do not work is classified as unemployed Specific reasons for not working vary widely Often the type of work performed contributes to the overall rate of unemployment during certain months of the year These types of positions may be described as seasonal in nature and include many positions within agriculture, construction, and the lumber and wood products industries

Historical Perspective

Average annual rates of unemployment for those counties within the primary economic impact area and the State of California are graphically displayed in **Table III-4** As viewed in **Table 1113**, the average annual rate of un-

Table III-3
Unemployment Rate by County
(Annual Average Percent)

	1981	1983	1985	1990	1991
Shasta	15 1	15 6	13.3	8 4	10 3
Siskiyou	16 6	18 7	15 2	11 5	12 5
Tehama	12.6	13 5	11 5	10 7	12.4
Trinity	17.4	17.5	16.2	12.5	14 5
California	7 4	9.7	7 2	5 6	7.5

Source State of California Employment Development Department Labor Force, Employment, and Unemployment and Wage and Salary Employment, by Industry, 1984 and 1992

employment for all areas listed has been declining, however, there was a slight increase in 1991

The overall stuation portrayed in **Table 111-3** indicates that annual average unemployment rates in Shasta, Siskiyou, Tehama and Trinty Counties are generally twice the State average An examination of the monthly data from which **Table 111-3** is derived reveals that

- Unemployment within the primary economic impact area is "seasonal" in nature rather than "secular" (a long term general trend) The highest rates of unemployment generally occur during the months of November, December, January, and February

- This fluctuating rate of unemployment is partially due to the seasonal nature of industries located in these counties Included are the agricultural, construction and lumber and wood products industnes as well as outdoor recreation

- The larger and more diversified economy of the State of California is directly reflected in overall lower rates of unemployment Unemployment rates exhibted by the State do not vary as much dunng the winter months as do unemployment rates within various counties

Post-conservation Perspective

Unemployment rates can be expected to continue to respond to national and statewide economic conditions, including seasonal fluctuations Reduced timber harvest levels for the Shasta-Trinty National Forests will contribute to short term unemployment levels

It has been estimated that five jobs per million board feet (MMBF) of timber harvested are required for logging and

Table III-4
Employment Impacts by Community

County / Community	Timber *	Recreation **	F.S. Budget	Range	Total Jobs
Shasta					
Anderson	138	77			215
Burney	74	39	-		113
Central Valley	102	39	8	-	149
Redding	310	807	48		
Total	624	962	56		1,642
Siskiyou					
Dunsmuir		18	-	-	18
McCloud	18	13	8	5	44
Mt Shasta	7	97	24	-	128
Weed	70	23		-	93
Total	95	151	32	5	283
Tehama					
Red Bluff	127	-	-	1	128
Total	127			1	128
Trinity					
Hayfork	121	99	16		236
Weaverville	91	162	24	1	278
Total	212	261	40	1	514
Totals	1,058	1,374	128	7	2,567

* Estimates by community based on the proportion of estimated timber volume processed by each mill from the Shasta-Trinity Nabonal Forests, adjusted for FORPLAN outputs by Region 5 California model multipliers. This procedure was modified for Shasta County to reflect the assumption that half the indirect and induced employment occurs in Redding.

** Estimates by community based on the population by town within each county: Mt. Shasta was modified to reflect the high recreational attraction of this area.

sawmilling Forest Service spending and receipt sharing create addrtional jobs In addrtion, the spending and respending of salaries and purchases of equipment and supplies supports addtional employment Intotal, ashort term impactofareductionofl0 jobs per MMBF in harvest levels is expected Becausethe majority ofthetimber sold by the Shasta-Tnnrty National Forests is processed wrthin its primary economic impact area, Counties wrthin this area could be expected to incur these reductions in employment

National Forest Budget levels

The Forest Service budgeting process involves activities at the local, regional, and national level over an extended time period For example, budget proposals are prepared by National Forest personnel two years in advance These proposals are consistent with resource pnorities and associated output levels Proposals are also submitted in sufficient detail to delineate funding requests by specific appropnations An appropnation can be defined as an authorization by Congress for the expenditure of monies for a specific purpose during a specified time frame Individual Forest budget requests are then aggregated at regional levels and the regional budgets are, in turn, aggregated at a national level The national aggregation of Forest and Regional budget proposals is then considered at an agency level by Congress

The poltical climate in which the agency budget is considered potentially affects both the total level of funding as well as the mix of appropriations wtthin a given level Approved funds are commonly distributed back to the Forests two years after submission of initial requests At the time funds are actually received, local, regional and/or national agency priorties may have changed If changes have occurred from those requested, Forests are then required to reformulate their original proposals for budget execution according to the intent of the allocations A result is that while resource needs are intended to dnve the budget process, the budget must also be flexible enough to accommodate changes in poltical priorities

Budget levels have fluctuated in the past and are expected to fluctuate in the future as well However, the Forest Service is obligated to implement minimum resource protection measures specified by applicable Forest Plans while executing annual budgets and programs Thus, Forests will implement minimum management requirements, the minimum implementation requirements, and the standards and guidelines as applicable These requirements are all aimed at appropnate resource management combined wth mitigation and monitoring requirements to minimize or eliminate impacts. (See Appendix H of the Forest Plan for more information)

Management Opportunities

Several opportunities are associated with the Forests' economic environment

Improving the economic efficiency of operations wthin the Shasta-Tnnrty National Forests is a continual reflection of forest management activities The Forests can use information and analysis derived from this planning process to help emphasize those investments which improve economic efficiency

Further quantifying the demographic charactenstics as well as preferences of recreational visitors to the Shasta-Tnnrty National Forests can be of value to Forest managers Examination of this type of information may assist in identifying opportunities to enhance and even expand recreational uses on the Forests

The Social Environment

D

Public Issue

There is no public issue concerning the social environment However, a related issue has to do with cultural resources

How should the Forests effectively provide identification, protection, and interpretation of archaeological, historical and religious sites? (Issue # I).

Current Management Situation

Forest management activrties have the potential to affect individuals within and adjacent to National Forest lands The pnmary social impact area associated wrth the Shasta-Trinity National Forests corresponds wrth the primary economic impact area previously discussed This social impact area encompasses Shasta, Siskiyou, Tehama, and Trinity Counties

Areas wthin and adjacent to Siskiyou and Trinity Counties are predominately rural in nature A number of settlements and small towns are distributed throughout these Counties. A large portion of Shasta County is also rural in nature In addition, the city of Redding is located in Shasta

Table III-5
Population by County
(in thousands of people)

County	1960	1970	1980	1990	2000
Shasta	59.5	77.6	115.7	147.0	186.5
Siskiyou	32 9	33 2	39.7	43.5	48.4
Tehama	25.3	29 5	38 9	49.6	61.7
Trinity	9 7	7 6	11 9	13 1	13 8
California	15,567.0	19,971.0	23,771.0	29,760.0	36,259.0

Sources
1960 - California Statistical Abstract, 1970
1970 - Bureau of the Census, PHC 80-v-6, March 1981
1980 - Census of Population, April 1, 1980.
1990 - Census of Population, April 1, 1990.

County Redding is considered an urban community, exhibrting a signlficantly larger resident population than other communities in the impact area

Population Trends

Shasta County has historically maintained the largest population of the four counties comprising the pnmary social impact area Through 1980, the Siskiyou County population exceeded the population of Tehama County However, during the penod from 1980 through 1990, population growth in Tehama County exceeded similar growth in Siskiyou County As of the 1990 census, Tehama County's total population had surpassed that of Siskiyou County Trinity County has historically maintained the smallest county population within the primary social impact area Historical populations, as well as projected populations through the year 2000, are displayed in **Table III-5** "Population by County"

Population growth, listed as an average annual percentage change by decade, is displayed in **Table III-6** "Population Growth by County" As displayed, all counties wrthin the pnmaty social impact area realized an increase in population during the decade from 1971 through 1980 This sudden increase took place during the same period that the rate of increase within the State of California as a whole actually decreased (See **Table III-6**) The annual average rate of population growth for these counties, during the decade from 1981 through 1990, decreased to approximately the level realized dunng the period 1961 through 1970 Projections of future growth (through the year 2000) anticipate a trend slightly less than the rate of growth experienced from 1981 through 1990

Population Composition

Populations within the primary social impact area, when compared wrth the State of California, can be considered racially homogeneous in nature This homogeneity is a direct result of between 86 and 91 percent of the populations within represented counties being made up of individuals within the white grouping

However, a trend towards the diversification of the racial distribution within the pnmary social impact area can be viewed in **Table III-7** "Population by Racial/Ethnic Distribution of County" This local trend matches the general population trend within the State of Callfomia as a whole of moving towards greater diversification

Hispanics are the second largest grouping represented after the white grouping. Native Americans, African

Table III-6
Population Growth by County

County	1961-1970	1971-1980	1981-1990	1991-2000
Shasta	30	50	2.7	2.7
Siskiyou	1	2.0	10	11
Tehama	17	32	28	24
Trinity	-22	58	10	0.5
talifornia	28	1.9	2.5	2.2

Americans, Asian and Pacific Islanders and all others form the remaining groupings listed

Social Categories

Individuals and groups of individuals are affected differently by Forest management activities primarily because of different social linkages to the Forest Social categones are used to describe the various linkages and effects of management activrties

Individualswthin the primary social impact area have been grouped within several broad categories These categories are not intended to represent specific social groups, but rather to serve as a means of describing social linkages and effects of Forest management activrties The Native American category, however, is an exception in that it can be considered descriptive of a social group Social categories have been formed based on historical and projected trends of user groups, public hearings. informal interviews of Forest personnel and users, newspaper articles, other government studies and documents, use survey, and census data

Individuals wrthin these categories may hold similar or divergent personal values Lifestyles exhibted may also be similar or divergent **A** common bond which may be found in these categories is a general similarity in their feelings concerning the use of natural resources on National Forest lands Individuals within the primary social impact area have been classfied into a series of social categories

Resource Utilization Emphasis Category. One broad classification is titled the Resource Utilization Emphasis Category These are individuals who are directly or indirectly associated with the utilization/marketing of the natural resources located in the impact area

An example of the Resource Utilization Emphasis Category is those individuals whose occupations and/or poltical activties are associated wrth the wood products industry The consolidation of these individuals wrthin several local communities has given rise to what could be classified as timber dependent communties

Timber dependent communities are those where the social and economic srtuation of the community is intertwined with and dependent on the timber industry Within these timber dependent communrties several distinct occupational communrties have been identitied *h* occupational community is a group of individuals who come "to share a common (or community) life set apart from others in society" (Salaman 1974) The occupational communrties identitied are "loggers," "sawmill workers" and "community businesses"(Salaman 1974) "Members of such communrties will not only see themselves in terms of their occupational role, but will also value this self-image" (Salaman 1974) In this fashion, personal identities, as well as community and family ties, have been found to be directly related to vocations within the timber industry It has also been found that differing occupational communities identify with the values of the particular community to varying degrees In the examples above, loggers identify the strongest with their occupational community, while sawmill workers identified less and community business people identitied the least

Table 111-7
Population by Racial/Ethnic Distribution of County
(in thousands of people)

	Spanish Origin		White		Black		Native American		Asian		All Others		Total	
County	**No**	**%**	**No**	**%**	**No**	**%**	**No.**	**%**	**No**	**%**	**No.**	**%**	**No.**	**%**
Siskiyou	25	5.9	382	879	7	1 6	17	39	4	8	< 1	0	435	100
Shasta	57	38	1340	91 1	10	7	36	25	26	18	1	1	1470	100
Tehama	5 1	103	430	867	2	5	8	17	3	7	< 1	0	496	100
Trinity	4	**33**	119	910	1	**4**	6	45	1	.8	0	0	13 1	100

Source: Califomia State Census Data Center, April 1990
Note: Population data may not add to totals because of independent rounding.

The towns of Weaverville and Hayfork in Trinity County and Weed in Siskiyou County are examples of timber dependent communities While timber plays a major role in these communrties, secondary occupations dealing with the recreation industry and government industries also make significant contributions

It should be noted that not all Resource Utilization Emphasis individuals reside within timber dependent communities Others who are also oriented towards a Resource Utilization Emphasis reside in other locations within and outside the primary social impact area

Individuals sharing a resource utilization emphasis viewpoint may be long term residents within the social impact area (i e , local residents for over 15 years, or relative newcomers to the area) Many individuals within this category are retired workers

As previously discussed, many residents of local settlements and small towns within the impact area have occupations which are dependent upon commodities produced from the National Forests Often these individuals are from families who have been in the area for several generations Loggers, millworkers, and community business people located in timber dependent communities are examples

New residents have often immigrated from urban population centers They have moved to this area for the rural environment including a lower cost of living, more recreational opportunities, and a slower pace of life Some of these individuals hold professional occupations such as teachers, doctors and lawyers or are retirees and second homeowners Others come in hopes of joining the local business communities but eventually leave the area due to limited opportunities

Resource Amenity Emphasis Category. Another broad classification is titled the Resource Amenity Emphasis Category These individuals typically value natural resources more for their amenty and symbolic values than their economic conversion values

Natural resources within the area have a higher intrinsic value to these individuals than their potential conversion dollar values For example, these individuals would prefer that local natural resource commodity items, such as timber, not be harvested but be retained for future generations Concerns exhibited by this category of individuals often go beyond the actual production of specific commodities to include philosophies and strategies forming a potential policy basis for Federal land management

These individuals may also be long term residents within the area or newly relocated residents from other areas However, resource amenrty emphasis individuals are generally not identified within occupational communrties

New residents who hold resource amenty emphasis viewpoints may be involved in a range of activities from local businesses to farming and/or mining Some new residents can be considered as alternative lifestyle residents These individuals are often seeking a simplified existence while practicing subsistence and/or commercial organic farming or mining

Retirees and second homeowners are growing segments of the population in the study area Some exhibit resource arnenty emphasis values Many of these individuals find that their economic stability is not tied to the use of natural resources as commodities They value the Forests more for their recreation opportunrties. particularly hunting, fishing, and boating

These two categories of individuals, exhibiting Resource Utilization Emphasis and Resource Amenty Emphasis characteristics, view their lifestyle and qualty of life as being interconnected with the natural resources. As individuals incorporate the ideals and, subsequently, identify with specific cultural values regarding various resource management practices, conflicts form because individuals hold differing views These conflicts have been identified as major clashes in cultural values "with signs of growing into a class conflict" (Lee 1990) Class conflicts often polarize communities with individuals 'faking increasingly rigid positions and organizing themselves on the basis of shared interests" (Lee 1990)

Recreationists. The Forests are also important to another large, diverse group of people visitors and recreationists who do not live in the primary area of influence Many live in the San Francisco/Sacramento area and value the spportunity to escape the urban environment for a weekend or more in the Shasta-Trinity National Forests Water-oriented and back-country recreation, as well as hunting and fishing, are more important to this group than timber-related industries.

'reservation of the Forests' amenrty values is a major concern of this group Many of these individuals have a sense of ownership as strong as that of area residents and are often effective at lobbying for specific environmental issues

Native Americans. Native Americans include American Indians, as well as those of Eskimo and Aleut ancestry Native Americans indigenous to the area include the

Hoopa. Yana, Wintu, Achuimawi, Shasta and Chirmariko Many of these people still maintain traditional values and practices

Native Amencans commonly maintain a continuing interest in the Forests In some cases, this interest is in the productionofforestcommodrtiesto providefor continued employment opportunities **An** example of these individuals are Native Americans who are also loggers These individuals commonly hold a viewpoint similar to individuals exhibrting a resource utilization emphasis

Other individuals are concerned with forest management practices as they may affecttradrtionalcommodrties gained from the forest The availability of these products for personal and/or spirrtual use is of concem

Native Americans, in some cases, are also concerned wrth National Forest outputs and management activities as they may impact tradrtional spiritual and/or religious adivrties Religious systems **as** practiced by Native Amencans may be considered "vastly different in many ways from the Christian tradltions of the majority of American society Thus, land management practices that are not a burden to the mainstream beliefs and tradrtions may be a burden to the Indian groups " (Theodoratus, 1984)

Management Opportunities

Clashes in cultural values have been identlfied between individuals holding Resource Utilization Emphasis viewpoints and those holding Resource Amenity Emphasis viewpoints Controversies over timber harvestingversus protection of habitat for the spotted owl are examples

This clash in cultural values has been found to show signs of an emerging "class conflict" (Lee, 1990) Participants in this conflict "are taking increasingly ngid positions and organizing themselves on the basis of shared interests" with potentially signlficant impacts on local societies (Lee, 1990)

Class conflicts have been known to emerge when conflicts between parties wrth unequal power have not been elevated to the public arena Opportunities exist to assist local governments in moving this conflict to a broad public level At this level, conversations between groups would permrt the debating of issues to assist individuals in coping with change

Public involvement in the management of National Forest resources is desirable and actively encouraged In some cases, groups of individuals have not responded to requests for input into the forest management process However, a lack of response does not necessarily mean that the individuals do not have valuable input or topics which they would like to discuss Opportunrties exist for Forest personnel to seek out these individuals This would provide for individual contact as well as opportunties to establish and strengthen community ties between individuals and the Forests' management staff

E The Resource Environment

I. Air Quality

Public Issue

No public issues focus on air quality. However, there is one related issue It is

To what extent should prescribed burning be used as a way to reduce fuel hazards, prepare sites for reforestation, and improve wildlife habitat? (Public Issue #5)

Discussion of Public Issue

Prescribed Burning. Smoke produced by prescribed burning affects air quality and reduces visibility Particulate matter and other compounds from smoke can also be hazardous to health On the Shasta-Tnnity, between 9,000 and 12,000 acres offire hazards, logging slash, and wildlife habltat are treated through prescribed fire annually.

Current Management Situation

The air qualrty standard on the Shasta-Trinity National Forests is high Forest activities which contnbute to air quality degradation are burning of forest vegetation, exhaust from vehicle and machinery use, and dust generation from logging equipment and other vehicular use of unpaved roads

The Shasta Forest lies within two air basins, the Northeast Plateau and Upper Sacramento Valley Most of the Trinity Forest is located within the North Coast Air Basin

The three air basins within the Forests are in compliance with national ambient air qualrty standards However, like most air basins in California, they exceed the California ambient air quality standard for PM-10 (particulates less than 10 microns in size) Primary sources for PM-10 include slash burning and dust generating activities

Logging is the primary industrial activity that takes place on National Forest and private lands.

The primary Forest management activities affecting air quality are the burning of logging slash, burning for fuels reduction or wildlife habitat improvement, and vehicular dust generation on unpaved roads Prescribed fe is usually the most economical way to get rid of unwanted concentrations of dead fuel.

Slash burning produces a mixture of the products of distillation, thermal decomposition, flaming and nonflaming combustion. J Alfred Hall (1972) concluded that composition of the atmospheric particulate matter is similar to material entering the air through the normal process of vegetative decomposition. Fire compresses these processes into a much shorter time The visible cloud of smoke from slash fires consists of water condensed on particulate matter and partly unburned carbon

The temperatures attained in burning forest fuels are generally too low to permrt formation of nitric oxide, a leading agent of photochemical smog Temperatures sufficiently high for formulation of nitric oxide may be attained very bnefly in explosions of concentrations of flammable gasses

Smoke from burning forest fuels is substantially different in character and function from other forms of air pollution For the most part, particles from tires of low or moderate temperatures are larger in size and shape than those from ntense fires and high temperatures Fires that bum under condltions of lower temperatures, wetter fuels, and higher humidities leave most of the charcoal and minerals on the ground

The burning of forest fuels normally takes place at elevations above the Central Valley inversion layer (1,000 - 2,000 feet). At these elevations, the fires often have sufficient energy to drive their smoke plumes far above the ayer of atmosphere that comes in contact with the surace However, down canyon air drainage and thermal nversions in local basins may create transient smoke mpacts in some areas Emissions from the prescribed burning of woody fuels are less adverse than those from ixed continuous industrial sources because the production s short-term (usually less than 24 hours), seasonal, and occurs over different areas in succeeding years When strict management practices are followed, little lasting effect on air quality results from the burning of slash

Dust from vehicle traffic on unsurfaced roads is generally a short-term pollution hazard Although air pollution from road dust is relatively insignificant, it can be annoying to the orest user

The Yolla Bolly-Middle Eel Wilderness was designated as a Class I Air Qualrty Area by the Environmental Protection Agency and the Clean Air Act of 1963 as amended in 1977 42 U S C 7801) and in 1990 Because of this, manage-

ment ofthe air quality in this area requires identification of air quality related values (AQRV) by measunng senstive indicators of those values. Visibility, flora and fauna, and water have been identified as AQRVs Subsequent assessment and monttoring indicators are necessary to determine whether or not the air quality is deteriorating The Clean Air Act requires the Forest Service to comply with the substantive and procedural requirements of the State and local air pollution control agencies

Interstate 5, which bisects the Shasta National Forest, has an annual average daily traffic rate of 13,200 vehicles per day as measured north of the Bridge Bay interchange According to the Calrfornia Department of Transportation (CALTRANS), this highway traffic does not create an air quality problem Wind currents average 6 to 8 miles per hour from the south more than 75 percent of the time. and there is measurable air movement *95* percent of the time Therefore, there is little opportunity for stagnation The constancy of these air flows results not only from changes in weather conditions, but also from a diurnal airflow from the south during daylight hours, and a switch to the north dunng nighttime hours

Management Opportunities

Periodic monitoring of ambient air quality will provide insights into the immediate air quality situation For the Shasta National Forest, the closest point at which ambient air quality is montored is at a Calrfornia Air Resources Board Field Station in Redding In addition, there is an air qualty montoring station in Yreka The Shasta County Air Pollution Control District measures particulates The CALTRANS District Office in Redding is equipped to measure ambient levels of pollutants along proposed transportation projects Furthermore. construction of an air qualtty monitoring station is a proposed mtigation measure required for the construction and operation of the Mt Shasta Ski Area The station will be constructed wthin or in the vicinity of the permt area

In Trinity County, where most of the Trinity Forest is located, there are no Air Resources Board Field Stations to measure ambient air quality The Tnnity County Air Pollution Control District measures particulates

In order to better address air quality issues wthin and adjacent to the Yolla Bolly-Middle Eel Wilderness, montoring plans should be formulated Cooperation between the Shasta-Trinity and Mendocino National Forests will be required to meet this goal

Predictions of future air quality, based upon a stationary and mobile emissions source inventory made in Shasta County in 1970, indicate that, although there will be a large increase in traffic, pollution controls will bring about a reduction in total emissions from fixed and mobile sources Estimated maximum concentrations of all three constituents (carbon monoxide, hydrocarbons, and ntrogen oxides) will be reduced to and maintained below Federal standards

Management goals for the treatment of logging slash are changing, therefore, decreased prescribed burning is foreseen In the future. more slash will be left after timber harvesting to maintain soil qualty and habitat diversity There will also be an emphasis on better utilization of excess slash for biomass and firewood These practices will result in less prescribed burning and in better air quality There will also be greater coordination with local air pollution control boards Increased partnerships can be more effective in meeting air quality standards and in finding better ways to reduce emissions from forest operations

2. Biological Diversity

Public Issues

Two major public issues focus on diversity They are

1 **How should the Forests' vegetative resources be managed for ecosystem diversity? Special consideration would be given to providing habitats that maintain or enhance populations of threatened and endangered (T&E) species and viable populations of sensitive species and/or management indicators. (Public Issue # 2)**

There is public concern that a wide variety of ecosystems should be maintained on the Forests to specifically provide for the

a Maintenance and/or enhancement of habitats for Federally listed T&E species (plants and animals),

b Maintenance and/or enhancement of habitats sufficient to provide for viable populations of all other existing species (plants and animals),

c Maintenance and/or enhancement of the Forests' existing ecosystems and the biodiversity (plants and animals) associated wrth them, and

d Maintenance and/or enhancement of special elements or components of these ecosystems (i e , snags, down logs, cliffs, vegetative seral stages, etc)

2 **How much of the older vegetative seral stages existing on the Forests should be retained? (Public Issue #3)**

There is public concern that sufficient amounts of old growth habitats be retained and/or enhanced on the Forests to provide for the

a Viability of all species (plants and animals) requiring this type of habitat for all or part of their yearly lifecycle, and

b Sufficient representation and retention of this ecosystem component for the sake of maintaining vegetative biodiversity

Discussion of the Public Issues

The public has increased its interest, concern, and awareness with respect to environmental issues, particularly those pertaining to concepts of ecosystems and biodiversity

Ecosystem is defined as a complex ecological unrt, including the biotic (living i e , plants, animals) and abiotic (non-living i e , soil, minerals, water etc) components and their relationships to each other Such units are often divided into areas wrth similar attributes and named after the dominant vegetative type in the area such as a Douglas-fir community or ecosystem

Biodiversity is the variance that may exist within the biotic components of an ecosystem(s)

The public has expressed concern about Forest Service activities and/or future management practices The public is particularly concerned about activrties which have altered or have the capability to alter the vegetative components (habitats and/or habitat attributes) of an ecosystem The type, magnrtude, location, and time in which the alterations have occurred and/or will occur represent the greatest concern

Prior to 1900, natural and/or human-induced events such as wildfire, logging. and mining activities affected vast amounts of acreage Such events often resulted in the loss, creation, and/or maintenance of edge, seral stages, and stand structure In addition, the processes of disease and natural mortality have led to variations in stand attributes and species occurrence All of these events have resulted in natural and human-induced fragmentation over small and large areas of Forest land Unfortunately, little is known about the magnitude or pattern of these occurrences nor what constituted a "natural" existing srtuation 100-200 years ago

Since 1906, an estimated 570,000 acres of Forest land have been burned. This represents an average of 6,560 acres per year The largest acreage burned occurred between 1915-1935 (300,000 acres) and between 1985-1989 (170,000 acres) Portions of the McCloud and Hayfork Ranger Districts were the hardest hit Over the last decade an average of 8,000-10,000 acres have burned each year by natural and human-induced causes

Timber harvesting activities took place on an estimated 1,000 acres per year between 1920 and 1940 During the 1940s and 50s, harvest increased to an average of 1,500 and 5,000 acres per year, respectively Since 1960,

an estimated 10,000 acres have been harvested annually Most ofthis harvestinghas been regeneration cutting **An** estimated 335,000 acres of suitable timber lands have been harvested on the Shasta-Trinity National Forests since 1910

Some people are concerned that this level of vegetative alteration may lead to

a Fragmentation of habitats, loss of special components and/or attributes of diversity such as hardwoods, snags, dead/down material, older mature timber stands, riparian habrtats, etc Increased disturbance may also result to species using these components

b Loss of populations of threatened, endangered and sensitive (TE&S) species (Refer to the sections on Botany and Wildlife/TE&S)

c Loss of viable populations *of* various other non-TE&S plant and animal species such as Pacific yew or wildlife species associated with nparian habitats (Refer to sections on Botany and Wildlife)

Relatedto the issues and concepts discussed above is the issue (Public Issue #3) of retaining sufficient amounts of older over-mature forests for the sake of their own retention as well as for the species dependent on or associated with them For example, retention of older over-mature forests has value to some people whether or not species, such as spotted owls, live in these stands Gthen argue that the economic value of the timber dictates that less acreage should be devoted to older over-mature stands Most concerns focus on large, old conifer stands that have a high level of decadence

Current Management Situation

General

Direction spelled out in the National Forest Management Act (NFMA) is to provide for diversity throughout the Forests in order to sustain the natural variety of plant and animal communities Managing for diversity is important for the provision and maintenance of (1) ecosystem stability, (2) biological variety, (3) fish and wildlfe habitats, and (4) aesthetic values

Two main assumptions can be made (1) biological diversity (both plant and animal) is made possible through the application of project mrtigation measures, Regional guide standards, Best Management Practices (BMPs), use of management indicaton, land allocations, wildlie habrtat relationships (WHR) and capability models, and (2) through the application of the above concepts, non-TE&S species will remain at viable levels

Description of Current Environment(s) and Associated Management as Related to the Components of Biodiversity.

Many of the components of diversity are or can be identified, displayed, and/or tracked through the California Natural Data Diversity Base (NDDB)

Diversity is evaluated according to three components richness, evenness, and pattern

Richness. The number of different kinds of elements found wrthin the planning area, e g , species, plant communities, vegetative seral stages, and special habrtat components (snags, cliffs, hardwoods, dead and down material etc)

Evenness (and its Reciprocal--Dominance) The relative abundance of the animals, habrtat types, successional stages, and cover classes wrthin the planning area Evenness describes the relative extent to which the proportional abundance *of* these elements is uniform

Pattern. The structural (vertical pattern) and spatial characteristics (horizontal pattern) of the different elements, e g ,vegetation layers, patch size and shape, and the spatial distribution of plants and animals adjacent to each other wrthin the planning area

Richness

There are several broad ecosystems on the Shasta-Tnnity National Forests coniferforests. hardwoods, and chaparral Wrthin these ecosystems are many dfierent vegetation types and associated special components such as riparian habitats, seral stages, snags, cliffs, caves, dead/down matenal, etc This diversty helps provide habitat(s) for the needs of at least 370 species ***of*** wildlfe either seasonally or on a year-round basis Included are 240 species of birds, 85 species of mammals, 45 species of reptiles and amphibians and a vanety of plant species (refer to Botany section) In addrtion, an unknown number of invertebrate and microbiological species exists on the Forests

Intensively managed habrtat types are discussed below Habitat types which cycle naturally or under low intensity

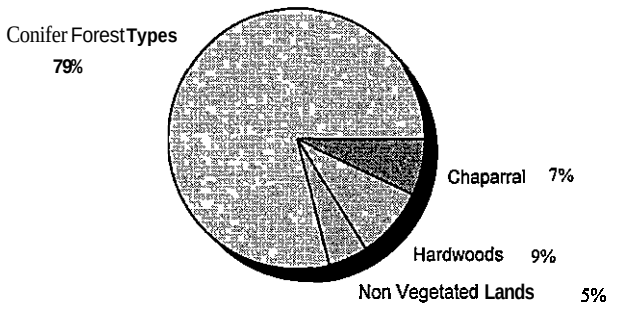
management are not discussed further, because they have little or no affect on naturally occurring diversty

Conifers: Portions of four major coniferous forest types are intensively managed on the Shasta-Trinty National Forests: mixed confer, Douglas-fir, ponderosa pine/Jeffrey pine, and red fir/white fir Many of the Forests' wildlk species use them for breeding, feeding, resting, and travel from one area to another Conifers occupy about 79 percent of the Forests' land base (refer to **Figure 111-1**). Other common confer forest types include lodgepole pine, knobcone pine, and grey pine (Refer to the Timber Section for further information on these species)

Vegetative alteration takes place on about 25,600 acres per year(05 percent of the Forests' vegetative land base) This involves an average of 10,000 acres of natural and/or human-induced vegetative burning, 5,200 acres of regeneration harvest, 1,600 acres of sanitation/salvage, 2,800 acres of partial and intermediate harvests, and 6,000 acres of timber stand improvement and conifer release.

Coniferous habitats and/or habrtat components (and the species associated with them) are retained through the standards and guidelines for snags and dead/down densities, percent retention of seral stages of major vegetation types, WHR analysis, management indicators and capability models

Figure III-1
Major Vegetation Types by Percent



These standards, guidelines, models, and concepts should be monitored and assessed to assure that they provide for retention of viable populations of plant and animal speues

Hardwoods: On the Shasta-Trinity National Forests, hardwoods grow in pure and mixed stands on about 456,000 acres, or about 9 percent of the land base (See **Figure III-1**) Many species of wildlife depend on hardwoods for foraging, especially the mast production About 190,000 acres of hardwoods grow in fairly pure stands (158,000 acres on unsurtable timber lands and 32,000 acres on sultable lands) The remaining 266,000 acres (104,000 on unsurtable timber lands and 162,000 acres on surtable lands) grow as mixed conifer-hardwood stands.

Hardwoods are divided into several types black oak, live oak, and nparian woodlands Common varieties include black oak (*Quercus kelloggi*), madrone (*Arbutus menziesii*), tanbark oak (*Lithocarpus densiflora*), canyon live oak (*Quercus chrysolepis*), and big leaf maple (*Acer macrophyllum*)

There is an opportunity to monitor and verify the use of hardwoods by wildlife to determine the habrtat requirements needed to maintain viable levels of plant and animal populations

Riparian Woodland: This type of vegetation grows where water runs intermittently or year-round The most common hardwood species are alders (*Alnus* ssp), cottonwoods (*Populus* ssp), and willow (*Salix* ssp) Various species of oaks and conifers may also grow within these areas An estimated 85,500 acres of nparian habitat are scattered throughout all vegetation types across the Forests

Management direction is geared toward managing riparian woodland areas (within a 100-600 foot band) for the benefrt of plant and animal species associated with this type and for connectivity for dispersal of late-successional dependent species These areas provide key travel routes for many species while other species rely on them for their entire lifecycle There is a need to monitor and verify use and retention of this special habitat type

Chaparral: About 149,300 acres of pure chaparral stands grow on the Shasta-Trinity National Forests It is estimated that another 60,000 acres grow under a sparse canopy of tree species See **Figure III-2** for the location of chaparral cover types

Chaparral is beneficial to wildlife (foraging, nesting, thermal, and escape cover), range (foraging and thermal

cover). and watersheds (soil stabilization and increased water yields)

The Forests' support two kinds of chaparral stands (1) those that are successional climax in nature are usually found in dry, shallow, rocky soils at elevations between 1,000 to 4,000 feet, and (2) those that occupy the site because of natural or human-induced occurrences These stands grow in deeper, more fertile soils at elevations ranging from 3,000 to 7,500 feet

The composition of the different chaparral types is extremely varied Several species of ceanothus are common They are wedgeleaf (*Ceanothus cuneatus*), lemon (*Ceanothus lemmonii*), snowbrush (*Ceanothus velutinus*), deerbrush (*Ceanothus integerrimus*), whitethorn (*Ceanothus cordulatus*), and squaw carpet (*Ceanothus prostratus*) Other common species include manzanitas (*Arctostaphylos* spp), bittercherry (*Prunus emarginata*), silk tassel (*Garrya fremontii*), Brewer's oak (*Quercus garryana* var *breweri*), dwarftanbarkoak (*Lithocarpus densiflora* var *echinoides*), chinquapin (*Castanopsis sempervirens*), chamise (*Adenostoma fasciculatum*), mountain mahogany (*Cercocarpus betuloides*), serviceberry (*Amelanchier alnifolia*) and bttterbrush (*Purshia tridentata*)

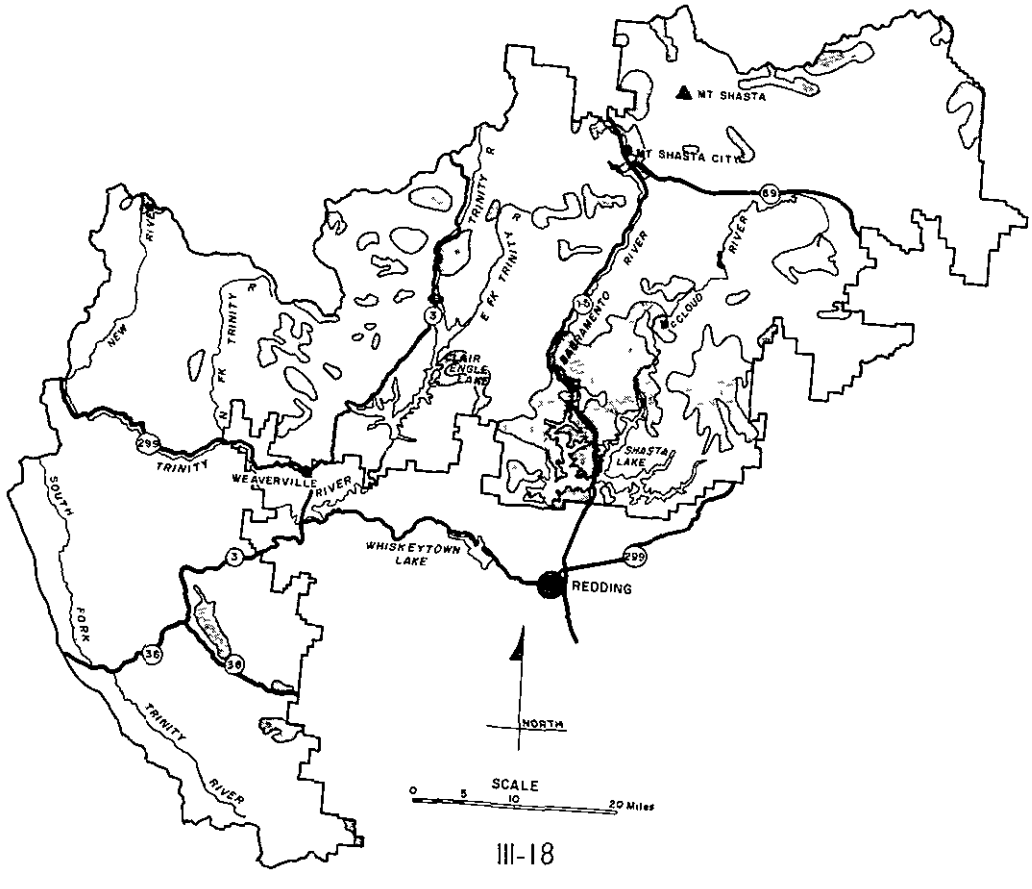
Bitterbrush is one of the more important browse or brush species for deer on the Shasta side Bitterbrush grows on about 100,000 acres in stands by rtself for mixed wlth other vegetation types Most of this bitterbrush grows on deer summer range in the McCloud Flats area or on summer and/or winter range north and west of Mt Shasta Some of these bttterbrush stands are managed primarily for the benefit of wildlife

Some bitterbrush stands are affected by timber management practices and wildlife and/or livestock grazing (primarily sheep)

In cooperation wth the California Department of Fish and Game (DFG), Forest personnel have been involved in prescribed burning of selected chaparral stands (1,000-2,000 acres per year) for the beneft of deer and other chaparral associated species The majority of burning has occurred within deer winter range. although some chaparral and brush stands have been treated on summer range as well

Natural Grasslands: About 11,000 acres of grasslands are scattered across the Forests These areas are important for many species of wildlife and provide foraging and ecotone areas

Figure 111-2
Distribution and Location of Forest Chaparral Cover Types



Grasslands are retained for the benefit they provide to wildlife More of these early seral stage types may be needed on the Forests.

Special Components: The special components include snags, dead/down materials, older over-mature stands, hardwoods, etc There are areas within the Forests where these components do not meet the existing standard(s)

Where deficits occur, management practices should be initiated to meet the required standards In the past, portions of the Shasta Forest were of special concern wrth respect to snags, older over-mature stands, and dead/down materials

Other In addition to the vegetated lands, there are about 110,000 acres of non-vegetated lands comprised of rock or water **(See Figure III-1)**

Evenness

Evenness of plant and animal communities can be approximated by the proportion of each vegetation type on the Forests **Figure III-1** shows the proportion of each mqor type and provides a good estimate of evenness A majority of the Forest (79 percent) is in the conifer vegetation type Sixteen percent is occupied by hardwoods and chaparral

Vegetation formations may be further categorized by plant size, density, and age to evaluate the evenness component of plant diversity This is referred to as seral stage diversity

Seven wildlife habitat relationships (WHR) seral stages for the North Coast - Cascades area have been identified The current distribution by seral stage and vegetation type is displayed in **Table III-8**

As indicated earlier, conifer forests make up the most dominant vegetative formation on the Forests. Mid-size trees (11-21 inches diameter at breast height [dbh]) and large-size trees (over 21 inches dbh), with medium to dense canopies, make up the mqority of the conifer forests Numerous species make up the conifer forests' ecosystem, and each has environmental parameten that affect its range and location

About 210,000 acres, or 10 percent of the vegetation on the Forests, are made up of stands which qualify as older over-mature habitat About one-half of the older over-mature habitat grows on suitable timber land and one-half is on unsuitable lands

An estimated 13 percent of the vegetation on the Forests is in early seral stages (1 and 2), 45 percent is in mid-successional, and about 34 percent is in the mature or later successional stages Another 8 percent is in pure or mixed hardwood stands

Current management direction provides for a minimum of 5 percent of each identified seral stage within each major vegetation type This is accomplished through a project-by-project assessment

The standards and guidelines should be monitored and verified to provide for an appropriate level of evenness of vegetative diversrty and its relationship and need as related to wildlife species

There is also a need for a better inventory and tracking mechanism for the older over-mature component on the Forests as it relates to its abundance, distribution, and patch size

Pattern

The existing pattern of vegetation types, seral stages, and special components varies widely across the Forests Pattern has been affected by recent (last 30 years) as well as by past management practices or natural causes

The most predominant areas of pure hardwoods grow within Wildernesses and in areas on the Big Bar, Hayfork, Yolla Bolla, and Shasta Lake Ranger Districts Concentrations of brush or chaparral grow within the Trinity Alps Wilderness, south of Hayfork Valley, along the east side of the Yolla Bolla Ranger District, and on the Shasta Lake District adjacent to Shasta Lake Large areas of mature, mixed confers grow on McCloud, Hayfork, and Yolla Bolla Ranger Districts Approximately 50 percent of the Shasta-Trinity National Forests has been classified as tentatively suitable for timber and 50 percent as unsuitable for timber This srtuation allows for a high degree of interspersion of intensively and extensively managed lands

The size and location of the Forests' broad ecosystems will not change significantly over the next 50 years Even the size and location of vegetation types will not change significantly The amount and pattern of structural diversty is constantly being altered by wildfire and Forest management activities This alteration of habitat is beneficial and important to some species of wildlife and adverse to

Table III-8
Acres of Vegetation Types by Wildlife Habitat Relationships (WHR) Types

WHR Seral Stages'	1	2	3A	3B&C	4A	4B&C	4C-older	Total	Percent
Major Conifer Types									
Mixed Conifer	53,744	37,085	301,430	477,500	140,833	294,900	155,500	1,460,991	69
Douglas-fir	1,694	4.580	598	1,793	0	2,590	15,542	26.797	1
Red Fir/White Fir	1,694	1,793	3,885	22,914	3,885	26,200	38,755	99,127	5
Ponderosa Pine/Jeffrey Pine	797	3,587	3,885	15,442	3,088	9,265	0	36,065	2
Sub-total	57,928	47,045	309,799	517.649	147,807	332,956	209,796	1,622,980	77
Other Conifer Types	0	0	299	32.216	0	8,767	0	41,282	2
Hardwoods	0	18,829	56.687	56,687	18,829	37,858	0	188,892	9
Chaparral	0	148,742	0	0	0	0	0	148,742	7
Grass	10,560	0	0	0	0	0	0	10,560	0
Total Vegetated Land**	68,488	214,617	366.785	606,553	166,636	379.581	209,796	2,012,456	95
Total-Non Vegetated Lands								109,091	5
Total Forest Acres								2,121,547	100

* Seral stages based on the following criteria

1 = Grass/forb stage consisting of annual and perennial grasses and forbs, with or without scattered shrubs and seedlings

2 = Shrub/seedling/sapling stage consisting of mixed or pure stands to 20 feet in height

3A = Pole/medium tree stage (5-21 inches dbh) including larger trees in the size range 20 to 50 feet in height Total tree canopy cover is from 10 to 39 percent Stands commonly support a substanbal shrub layer

3B&C = Pole/medium tree stage (5-21 inches dbh) including larger trees in the size range 20 to 50 feet in height Total tree canopy cover is 40 percent or greater Shrub layer is variable

4A = Large tree stage (greater than 21 inches dbh) corresponding roughly to a mature and over-mature classification generally over 110 years of age Trees generally exceed 50 feet in height, except some of the oak types at lower elevabons Total tree campy cover is from 10 to 39 percent Stands commonly support a substanbal shrub layer

4B&C = Large tree stage (greater than 21 inches dbh) corresponding roughly to a mature and over-mature classfication generally over 110 years of age Trees generally exceed 50 feet in height. except some of the oak types at lower elevations Total tree canopy cover is 40 percent or greater Shrub layer is variable

4C-older = Multi-layered large tree stage (greater than 21 inches dbh) with obvious signs of decadence Dominant trees are over 180 years of age Total tree canopy cover is 70 percent or greater

** Includes an estimated 85,500 acres of nparian habttat scattered throughout all vegetation types
NOTE The sum of the columns may not add up exactly because of independent rounding

others Forest personnel have limited control over wildfire, but they do manage for a variety of successiona stages with prescribed burning activities

Management practices allow for the alteration of vegetative patterns within areas being intensively managed This leads to a change in the size and location of different stands or seral stages of certain vegetation types. Forest personnel do not have a thorough understanding of the effects of fire and timber management activrties on concepts such as fragmentation, loss of interior wildlife species (due to reduction in size of stands), adverse increases in amount of edges, etc These are very difficult concepts to understand, assess, and manage on the ground. Present management attempts are being made to address these and other related concerns through the application of a Shasta-Trinity Supplement, WHR, and associated capabilty models There is a strong need to assess and verify that the application of such standards and guidelines is appropnate and sufficient in magnitude. Forest specialists believe that present management practices provide viable populations of all non-T&E species

The northern spotted owl (NSO) was listed as threatened under the Endangered Species Act in 1990 This, coupled with the ROD for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl, has resulted in mqor changes These changes relate directly to all three concepts of biodiversity (1) 535,379 acres of vegetated land have been placed in late-successional reserves (LSRs), (2) in addition to the base LSR acres, many addition areas within Matnx have been designated for retention including 100 acre areas around existing owl nest sites prior to January, 1994 It is estimated that 50 percent of these areas fall within areas previously designated for timber management activrties, (3) the establishment of a npanan reserve system of bands of 100 to 600 feet around perennial and seasonal waterways and wetlands These decisions have or will signrficantly change the pattern and evenness concepts of *biodiversity* from those which were planned.

Management Opportunities

When managing the Forests in the future, care must be taken to (1) provide for the maintenance of existing special components, (2) insure adequate biological variety, (3) maintain the existence of all native vertebrate fish and wildlife species found on the Forests, and (4) manage for a diverse flora representing all stages of existing vegetation well distributed in time and space over the Forests The opportunty exists to try and meet an ecosystem analysis driven minimum for seral stage one for species enhancement on many areas within the Forests The opportunity also exists to apply the concepts of ecosystem management in order to help provide for various concepts of biodiversity

There are opportunities to provide diversity through existing management direction and the creation of standards These standards would pertain to levels of snags, dead/down material, hardwoods, road densrties, corridors and their widths, percent seral stage retention. size, location and pattern of managed units, rotation lengths, etc Implementation of a monitoring program for these components of diversty would then verify if they were working as intended

The retention of a reasonable amount of older over-mature habitat should be distributed across the Forests To help meet older over-mature stand needs in deficit areas, younger stands can be identrfied and protected for future old-growth development.

There is a need to manage for better distribution and amounts of snags and dead/down material in areas on the Shasta Forest

There are opportunities to lessen the effects of timber harvesting on habitat diversty through the location, design and type of harvest units For example, smaller openings would normally create a more diverse habitat than larger openings Diversty can also be enhanced by rejuvenating over-mature and decadent browse species, such as bitterbrush, to maintain and enhance summer deer range.

Since chaparral management is receiving increased emphasis, greater management opportunities exist, especially with respect to wildlife These opportunities are best realized through coordinated resource management plans (CRMP) and other cooperative programs which include private landowners, the California Department of Forestry and Fire Protection (CDF), Department of Fish & Game (DFG), and/or other interested agencies or groups. Such coordinated efforts help reduce costs and may increase the size of treatable areas New air quality standards could affect this program by reducing potential opportunrties

Hardwood stands could be managed and enhanced through the use of vanous silvicultural treatments including thinning, release, and regeneration harvest or prescribed fire There is an opportunity to develop a 3-5 year ecosystem program management schedule to help implement future plans, to budget such efforts, and to monitor results.

3. Biomass

Public Issue

There is no major public issue relating to biomass However, there is concern that the removal of large amounts of woody material could have adverse effects on other resource values such as soils, watershed, and wildlife habitat Conversely, there is a concern over leaving extensive areas of dense undergrowth that may act as a fuel ladder presenting high risks of stand destroying crown fires Increased biomass removal for wood fiber power plants could also reduce the availability of firewood for personal use

There is also concern that prescribed burning of logging debris is detrimental to other resource values and should be reduced This issue is discussed in the Fire and Fuels section (Public Issue #5)

Current Management Situation

For purposes of this document, "biomass" is the aboveground portions of shrubs and trees, excluding material that meets commercial sawlog specifications Biomass includes logging debris from timber harvest operations (cull logs and hardwoods), material from pre-commercial thinnings, brush such as manzanita, dead and down material, and non-commercial timber species such as grey pine

In the past, almost all biomass was the result of timber harvesting activities The prevailing practice has been to dispose of this material by rearranging and/or burning

Biomass is found throughout the Forests, but its availability is limrted by factors such as slope, distance from roads, type and density of stands, and competing demands

Conversion of biomass into electrical energy has been hampered by the cost of transporting the material and because the facilities needed to process it are inadequate

Supply. Most of the biomass used in local wood fiber power plants comes from private timberlands and sawmills

Recent inventones of biomass material on the Forests have been conducted as part of fuel loading studies These inventories indicate that quantrties of biomass vary greatly from site to site It is not uncommon to find in excess of 50 tons per acre on many harvest units after logging

Most available biomass material is generated from logging debns Addrtional biomass comes from pre-commercial thinning activities and brushfields In addition, signlficant amounts of biomass (both confers and hardwoods) are located on non-commercial forest land Since few or no timber management activities are planned, biomass would normally not be available for removal

It is anticipated that the amount of biomass available for generation of electricity would not interfere with the demand for firewood This assumption is based on the continuous supply of biomass that would be produced from timber harvest activlties

Forest personnel can make wood fiber material available and encourage its removal However, they cannot create a market for it or ensure that biomass is actually removed and used for energy purposes

Demand. The existing demand for biomass is in the form of hardwoods fortirewood Relatively little of the available biomass on the Forests is being used to generate electricity However, this use is increasing due to the construction of new power plants

Nine wood fiber power plants could draw biomass material from the Shasta-Trinity Forests These plants are located in Burney, Hayfork, Anderson and the Redding area No addrtional wood fiber power plants are planned for this area The fuel requirements for these plants are about 1,640,000 bone-dried tons per year.

Most of these plants are connected to lumber mills and rely heavily on mill waste rather than forest residues (biomass) Estimates indicate that less than 20 percent of the material required by these nine plants is currently being supplied from forest residue This is expected to increase to over 50 percent within the next few yean

The demand for wood fuel for power plants is greater than supply It is unknown what the future demand for biomass will be However, the demand will most likely be met by the Shasta-Trinity National Forests, other National Forests in the area, and pnvate lands

Management Opportunities

The Forests can provide incentives. through contracting and modifications to the timber sale contract, which would

encourage the removal and utilization of greater amounts of biomass material

Special management considerations may be necessary to mitigate conflicts between personal firewood use and biomass use for wood burning power plants This could include special management zones, especially near forest communlties, where firewood use would have pnority over biomass use

The removal and use of biomass can produce related benefits (1) potential loss from destructive wildfires can be reduced, (2) new employment can be provided, (3) air quality can be improved because of less acreage and material needing prescnbed burning, (4) land productivity can be enhanced, and (5) wildlife browse and range opportunties can be increased

Biomass plays a major role in forest ecology. Its ecological functions include recycling nutrients to the soil, increasing the soil's moisture holding capacity, maintaining and enhancing forest health and vigor, and providing habitat for plants and animals

4. Botany

Public Issue

One public issue relates to threatened, endangered, and senstive (TE&S) plants

How should the Forests' vegetative resources be managed for ecosystem diversity? Special consideration would be given to providing habitats that maintain or enhance populations of threatened and endangered (T&E) species and viable populations of sensitive species and/or management indicators. (Public Issue #2)

There is public concem that a wide variety of ecosystems should be maintained on the Forests to specifically provide for the.

a maintenance and/or enhancement of habitats for Federally listed T&E species (plants and animals),

b maintenance and/or enhancement of habitats sufficient to provide for viable populations of all other existing species (plants and animals)

Discussion of Public Issue

Species richness is one component of biological diversity Identifying and conserving habitat for the rarest plant species on the Forests is one aspect of maintaining botanical diventy The Shasta-Trinty National Forests' TE&S program focuses on three categories of rare plants

a Plants listed by the US Fish and Wildlife Service (USFWS) as Threatened or Endangered under the auspices of the Endangered Species Act Management and recovery of these species is governed by the provisions of that Act Consultation with the USFWS is required if there is a potential for adverse impacts to listed species or their habtats on National Forest lands

b Plants listed as Sensitive by the Regional Forester This list includes Federal candidates for listing under the Endangered Species Act, State-listed species, plants on lists I and 2 of the California Native Plant Society's Inventory of Rare and Endangered Vascular Plants of California, and plants tracked by the Callfomia Natural Diversity Data Base These species are managed in accordance with Pacific Southwest Region (Region 5) policy

c Plants endemic to the Shasta-Tnnty National Forests that are not listed as TE&S These are species for which all or nearly all populations lie within the boundaries of the Forests Management policy is developed at the Forest level Most of these plants are on list 4 of the California Native Plant Society's Inventory of Rare and Endangered Vascular Plants of Calfornia

Because of restricted natural ranges or low population numbers, rare species are vulnerable to habitat changes brought on by human activties This is particularly true of endemics and outlying populations at the edges of a species' range

Threats to rare plants on National Forest lands can include road building and maintenance, excavation of rock sources, grazing, logging, changes in hydrology, herbicide use, fire suppression activities, and plant collecting Not all plants respond in the same way to these impacts. In fact, about 20 percent of the senstive plants on the Forests rely on wildfire or other disturbances for maintenance of their habtat

Wth the suppression of wildfires for the last 80-100 years, these plants now rely on other natural and human-caused disturbances to create or enhance their habltat Management of these disturbance followers requires identification of the degree and interval of disturbance needed to promote species survival Species management guides must be tailored to address the particular factors affecting the success of each species

The sensitive and endemic plants of the Shasta-Trinity National Forests are disproportionately concentrated in a relatively small number of special habtats such as serpentine barrens, montane meadows, and limestone outcrops Management for maintenance of sensitive and endemic plants, therefore, conserves these special habitats

Current Management Situation

Threatened/Endangered

At present, no plants on the Shasta-Tnnty National Forests are Federally listed as threatened or endangered

Sensitive

Forty-two species, or approximately 2 percent of the native flora of the Forests, are on Region's senstive species list One third of these *are* endemic to the Shasta-Trinity

National Forests, that is, they do not occur anywhere else The majority of these endemics are restricted to serpentine soils

Management and protection of sensitive plants is accomplished through identification and inventory of suitable habitat, surveys of project areas for potentially affected populations, protection of habitat, and population monitoring It may also include manipulation of habitat to increase or stabilize populations Information on the locations, numbers, and habitats of sensitive plants is shared regularly with the Califomia Natural Diversity Data Base

The Forests' sensitive plants include two State-listed species Brandegee's eriastrum (*Eriastrum brandegeae*), listed as rare, and Trinity buckwheat (*Eriogonum alpinum*), listed as endangered

Eriastrum brandegeae has been observed on the Trinity National Forest in open xeric chaparral on the alluvial bottom of Hayfork Valley One population occurs on a portion of the isolated Forest Service compound on the northeast end of town Apparently there is no additional suitable habitat for this species on the Forests Unless further study reveals otherwise, efforts to sustain viable populations may be limited to protection of this existing population This species is more widespread to the south, on and adjacent to the Mendocino National Forest

Eriogonum alpinum is found above 6,400 feet on soils denved from serpentine in the Eddy Mountains This species is endemic to the Shasta National Forest

Refer to Appendix G for a listing of sensitive plants found on the Forests

Endemics

As noted above, about a third of the sensitive plants on the Forests are endemics. In addition to these, two plants are endemic to the Trinity National Forest, and two are endemic to the Shasta National Forest The Trinity endemics are Dubakella Mountain buckwheat (*Eriogonum libertini*) and serpentine haplopappus (*Haplopappus ophitidis*) Both are restricted to serpentine soils The Shasta endemics are Shasta eupatory (*Eupatorium shastense*), a limestone endemic, and veiny arnica (*Arnica venosa*).

All four of these endemics were listed as sensitive at one time, and they were managed as such Since their removal from the Regional sensitive plant list, they have not been systematically surveyed for, nor have they been protected In the future, endemics will be surveyed for, mapped, and avoided where possible In addition, habrtat management plans will be developed for endemics according to the schedule set forth in Appendix A of the Forest Pian

Management Opportunities

Opportunities exist for acquiring more and better information about rare plants on the Forests Forest personnel will continue to share rare plant locality and population information with the Califomia Natural Diversity Data Base, the California Native Plant Society, adjacent Forests, the Bureau of Land Management, and other interested agencies and individuals Further survey work is needed for most sensitive species Comprehensive surveys, in conjunction with the development of Species Management Guides, are planned according to the schedule set forth in Appendix A of the Forest Plan

While all sensitive plant populations are protected under Prescription VII (Threatened, Endangered, and Selected Sensitive Species), areas with concentrations of rare plants may benefit from designation as Special Interest Areas (SIAs) Several botanical SIAs have been recommended for establishment in the Forest Plan For a few species whose populations are largely in private ownership, land acquisition may be appropriate as a protection tool Acquisition of specific parcels for protection of sensitive plants s recommended in the Supplemental Management Direction sections for several Management Areas (see Zhapter 4 of the Forest Plan) Habitat manipulation may be needed to maintain or create habitat for disturbance-dependent plants This approach is being used with Zooke's phacelia, a sensitive plant It may also be used for other species once their disturbance requirements are known

n addition to information sharing among agencies and private groups, opportunities also exist for cooperation n species management For instance, two Species Yanagement Guides were developed in 1990 under cooperative agreements with The Nature Conservancy The Shasta Chapter of the Native Plant Society has assisted with sensitive plant monitoring Boundaries of the four recommended Botanical Interest Areas along the Scott Yountain crest, dividing the Shasta-Trinity and Klamath National Forests, were coordinated with the Klamath. These partnerships will be expanded in the future

5. Facilities

The Forests' facilties support a variety of management activties Includedwithin the context offacilities are roads, trails, bridges, major stream crossings, sewage systems, water systems. buildings, and dams

Public Issue

One public issue relates to facilities That issue is

How many miles of additional roads are needed and to what standard should they be constructed and maintained in order to meet future needs?(Public Issue #4)

Discussion of Public Issue

Management of the Forests' road system is important to accommodateforest users and to faciltate in the management of the resources Most Forest use and enjoyment could not or would not occur without a transportation system

The Forests' road system is not self-serving Its existence and changes to it are to better serve the various uses of the forests As use patterns and modes of transportation change, corresponding changes *may* need to be made in the transportation system A typical example is the larger recreation vehicles (RVs) in use today, they require different standards of roads within Forest Service campgrounds

Maintenance of the Forests' transportation system is a never ending job Maintenance relating to use is easy to understand(i e , surface blading to eliminate ruts) Non-use maintenance may involve such things as cleaning out drainage features (culverts or dtches). painting signs, or clearing roadside brush

Confusion still exists concerning terminology with regard to trails and roads as conveyors of vehicles Wtthin this document any reference to "trails" is for a single track facility used primarily for foot, horse, and in some cases, *two* wheeled cycles Two track roads, jeep roads, jeep trails (common usage), and 4 X 4 trails are all considered "roads" on the Shasta-Trinity National Forests

Current Management Situation

Transportation System - Roads. The Forests are traversed by a well-developed system of State, County, private, and Forest Service roads The primary roads are Interstate 5 and State Highway 3 in the north-south direction, and State Highways 299, 44, and 36 in the east-west direction

There are over 6,800 miles of inventoried system roads and an estimated 500 miles of uninventoried roads under Forest Service jurisdiction The uninventoried roads consist of a mix of old, unobliterated logging roads, roadways created by vehicle use, and others, such as old mining roads The uninventoried roads will be evaluated and added to the transportation system inventory fneeded for future management activities All others will be closed to use or oblitterated

About 15 percent of the Forests' inventoried road system is closed seasonally by gates, and as much as 30 percent more is closed by snow during normal winters An additional 10-12 percent of the road system is closed following completion of management activities, such as timber harvesting These roads are kept closed, providing there is adequate public access into the area, until future management activities necessitate reopening

The Forests' transportation system or Forest Development Roads (FDR) are classfied as follows

Functional Classification	FDR System (Miles)	County Systems (Miles)	Total (Miles)
Arterial	685	202	887
Collector	1,515	111	1,626
Local	4.619	72	4.691

This transportation system represents an investment of approximately $300 million **Table 111-9** provides further information (See the Glossary [Chapter VIII] for a definition of transportation terms)

About 1,500 miles of the road system are jointly owned or cost-shared with neighboring private landowners The exchanged easements and rights-of-use in a joint-ownership road provide that each party cooperatively maintain the facility and preserve it to standards of original construction or reconstruction To ensure that the proper road maintenance is camed out, the Forest Service and the cooperating joint owner enter into a maintenance agreement

Table 1119
Inventory of Facilities by Type

Facility Type	Units	'Facility Type	Units
Roads	Miles	Trails	Miles
Arterial	685	Pacific Crest Trail	154
Collector	1,515	National Recreation Trail	26
Local	4,619	Other Trails	1,139
Uninventoried (estimate)	500	Total	1,319
Total	7,319		
Bridges	Number	Buildings*	Number
Roads	84	*Residential*	
Trails	26	Permanent	90
Total	110	Trailers	22
		Total	112
Dams		*Nonresidential*	
Other Government	4	Permanent	202
Other Pnvate	10	Trailers	0
Forest Service	2	Total Number of Buildings	314
Total	16		
Water Systems	Number	Sewage Systems	Number
Surface	6	Municipal	4
Ground	80	Septic/Leach	64
Total	86	Vault	60
		Lagoon	1
		Total	129
Administrative Sites	26		

* Nonrecreabonal buildings only

Forest penonnel also work closely wtth State and County authorities, through Memorandums of Understanding or Cooperative Agreements, concerning changes in standards or jurisdiction of transportation facilities

Most new road construction is done as part of the contractual requirements of the timber sale contracts Lesser amounts of construction are done by appropnated fund public works contracts, such as campground road construction or upgrading existing roads to standards higher than are needed for timber sales Some new road construction is done by cost share cooperaton and special use permit such as within a permitted ski area or lake resort area New road construction requires that an environmental analysis be completed and approved New construction done by State or County jurisdictions is done under their respective environmental analyses

The Forest Service is responsible for road maintenance work that is generated by the Forests' administrative traffic, by the use of the Forests' resources, and by persons visiting the National Forests to use and enjoy their recreation, wildlife, and scenic resources Such maintenance will normally accommodate traffic associated with (1) special use areas not operated as a commercial enterprise, (2) incidental non-commercial use usually related to ownership or occupancy or land served by Forest development roads, and (3) incidental use generated by commercial recreation enterprises

Based on traffic management and use objectives, each road or road segment is assigned one of five maintenance levels All inventoried system roads are maintained to at least maintenance Level 1 (Definitions of road maintenance levels are found in the Glossary) Projects which will reduce the watershed impacts of existing roads and

contribute to a better road infrastructure have been and will continue to be identified Needed work includes increasing the size and number of culverts, surfacing roads close to streams, installing energy dissipaters, and obliterating some roads

Management and maintenance of the Forests' transportation system emerged as a public issue because it encompasses many acres of National Forest land and creates a visible, physical impact on the land Since Forest users traverse the road system for access, the maintenance condtion and closure status of the roads are readily apparent.

The Forests' commercial users (traffic generated by commercial operations under permit, license, or contract for the use of National Forest lands and resources) and non-Forest commercial users (traffic generated by movement of commercial commodities from private lands and using forest development roads) are required to maintain the roads in a satisfactory condtion commensurate with their use

Transportation System - Trails. Trails are separate from roads but are still commonly considered part of the Forests' transportation system Much of the unroaded portion of the Forests is traversed by about 1,319 miles of trails These trails, less than 50 inches wide, are for use by foot, animal, or mechanized vehicles, where permitted Any facility (road or trail) which will accommodate vehicles wider than 50 inches is considered a road (not a trail) and is referred to as such in this EIS

There are several categories or classifications of trails on the Shasta-Tnnty National Forests the Pacific Crest National Scenic Trail (PCT) (154 miles), National Recreation Trails (NRTs) - Sisson-Callahan and South Fork Trinity NRTs totaling 26 miles, and other Forest trails (1,139 miles) Addtional trails may be considered for designation as NRTs in the future

Along the route of the PCT no buffer is planned to separate trail users from management activrties This decision is specifically addressed in the standards and guidelines in the Forest Plan

The Forests' trail system is essentially complete wth the exception of the Mt Shasta area and a few isolated areas in and around developed recreation sites New trails are planned for Mt Shasta and Castle Crags because of their unique geologic and scenic appeal

Trail use throughout the Forests varies from very heavy to very light The majority of the users are backpackers. equestrian groups, hunters, and anglers Many of the trails have been surveyed and constructed in locations which best serve user needs and which cause few adverse environmental impacts However, many trails have deteriorated from overuse If these trails are needed, maintenance and reconstruction work will be accomplished to perpetuate their continued use The overall objective of the Forests' trail maintenance program is to maintain and upgrade all needed trails or portions thereof which are causing resource damage or inadequately sewing the public

Cooperative partnerships with organized groups can be used to accomplish a variety of trail maintenance needs

Other Facilities. In addtion to roads and trails, a number of other facilties under the Forests' jurisdiction must be managed and/or maintained **Table 111-9** lists these facilities

Many of the buildings are very old and in need of major repair or replacement A major capital investment program is needed to improve or replace these facilties A Facility Master Plan, which will prioritize the stes and the work that needs to be done, is being updated and will be kept current Managing the historical values of many buildings on the Forests is also very important

Many buildings are leased from the private sector Although leasing requires less capital investment, it significantly increases the annual cost of providing buildings

High priority has been given to upgrading the Forests' water systems consistent with laws and regulations Providing handicapped access and use, providing adequate storage for hazardous materials, providing adequate accommodations for mixed or both genders, where needed, eliminating asbestos risks. and montoring for radon are some of the high priority items actively being pursued

Management Opportunities

The number of miles of new road construction is diminishing annually This decrease will continue as remaining unroaded areas are accessed or management decisions are made to leave them roadless Reconstruction of existing roads will continue in order to meet the demands of increased use and new equipment Normal deteriora-tion will also cause a continued need for reconstruction

Products for dust abatement and surfacing, which use less oil and oil-dependent products, need to be developed Maintenance of the Forests' roads should continue to emphasize the prevention of resource damage Cooperative maintenance of a jointly-owned road system will receive more emphasis as the lands served are more heavily used. Increased subdivision of private lands within the Forests' boundary will create a need for privately funded road districts

Restrictions on trail use will be evaluated to eliminate use conflicts and resource damage and to improve the user's experience Some changes may occur in the seven Ranger District administrative units: this may cause possible changes in some of the existing administrative sites. Increased maintenance costs could be experienced due to the age of these facilities Cost-efficient energy retrofitting, already identified, may be needed In the interest of annual operating cost savings, all administrative site leases will be eliminated in favor of agency-owned facilities Public information contact sites may be exempt.

6. Fire and Fuels

Public Issue

One public issue emerged concerning fire and fuels

To what extent should prescribed burning be used as a way to reduce fuel hazards, prepare sites for reforestation, and improve wildlife habitat? (Public Issue #5)

Air quality and particulate matter was another concern relating to prescnbed fire

Discussion of Public Issue

The primary issue relating to prescribed fire is that firewood and alternate energy resources are being destroyed Historically, between 9,000 and 12,000 acres of timber sale slash and debris and wildlife habltat have been treated annually using prescribed fire Emphasis has changed since 1986, however, and the number of acres being burned has been reduced Between 6,000 and 8,000 acres are treated annually using prescnbed fire, and the acreage continues to decrease as timber harvest decreases As the population increases and town encroachments approach National Forest land, there is concem that the supply of firewood and alternative energy materials will be in short supply

Current Management Situation

During the penod of time between 1972 - 1989, 1,836 person-caused fires and 2,110 lightning-caused fires burned on the Shasta-Trinity National Forests, for a total of 3,946 fires These fires burned an average area of 4,952 acres per year for person-caused fires, and 5,040 acres per year for lightning caused fires, for a total of 9,992 acres bumed per year Nearly 90,000 acres bumed on the Forests during 1987, an extremely bad fire year

The fire management program consists of two basic elements (1) wildland fire protection and (2) wildland fuels management Activities relating to fire protection are detection, prevention, presuppression. and suppression Activities relating to fuels management are removing or rearranging them to meet protection requirements

Prior to 1992 the Shasta-Trinity National Forests had been providing wildland fire protection for approximately 2 7 million acres In 1992 this figure was reduced to 2 4 million acres This decrease is the result of a balance of acreage program that was coordinated with the State of California Prior to 1992 the Forest Service protected 724,000 acres of private or State-owned land In 1992 this figure was reduced to 364,081 acres Starting in 1992, the State has wildfire protection responsibilities on 200,000 acres of National Forest land within the boundaries of the Shasta-Trinity National Forests This is an increase of about 60,000 acres over its previous protection responsibilities

The size and mix of the fire organization allows Forest personnel to handle singular incidents but places limits on their ability to respond to multiple situations or incidents This shortfall occurs when forces and equipment are depleted because of assignments to other forests or agencies or when numerous lightning fires are burning at one time

There is a cooperative agreement between the Shasta-Trinity National Forests and the Calfornia Department of Forestry and Fire Protection (CDF) This agreement provides for the sharing of fire protection resources, thus augmenting the fire suppression capabilities of each agency Fires that threaten lands of more than one jurisdiction are managed jointly Initial attack planning is based on using the closest suppression forces or resources Training is coordinated and often conducted jointly In addition. the Incident Command System is used by all agencies for managing fire suppression actions

The wildland fire protection problems are dynamic and ever changing as the values-at-risk increase Increasing values-at-risk are a result of large numbers of acres having been planted with high investment timber plantations and changing environmental influences These factors, when coupled with changing public use patterns and prolific urban interface development on intermingled or adjacent pnvate lands, influence fire protection priorities They also increase the dollar value loss

Wildland fire suppression strategies and tactics have been to control all fires at the smallest size and wlth the least resource damage possible These control practices have modified the environment, allowing large accumulations of natural and unused material. along wlth undesirable vegetation, to accumulate throughout the Forests Within wildernesses, control strategies have produced areas of unnatural vegetation mosaics Some resource management practices have also contributed to the increased amount of fuel by not requiring adequate hazard abatement

Fuels management activities have included the construction and maintenance of fuelbreaks and road hazard reduction to break up the contiguous fuels or vegetation. Prescribed burning of timber sale slash, by broadcast and pile burning, has been done as part of the reforestation and fuels reduction program

The use of prescribed fire has been the most economical treatment method available for managing forest fuels Intensive utilization of forest residue can reduce the amount of prescribed fire necessary to meet protection and site preparation objectives for timber management

Historically, 80 to 90 percent of the annual prescribed burning conducted on the Shasta-Trinty National Forests was done to remove logging residues and prepare brush fields for reforestation The remainder of the burning was done to benefit wildlife and reduce fuels With decreased acres of timber being harvested on the Forests the percentage of logging residue created and treated would also decrease. The need to treat natural fuels occurring in the ecosystem would increase due to insect infestations, drought, and blow down due to natural causes Methods of treatment of natural fuels include prescribed burning, as well as mechanical fuel manipulation to achieve the desired effect The effects of smoke, resulting from prescribed fires, are considered in all prescribed burn plans to insure that State and local air quality requirements are met

Management Opportunities

In areas of increasing value-at-risk, wildland fuels will be managed for long-range mitigation of the increasing demand for and escalating costs of fire protection

Within wildernesses, the use of unplanned natural ignition may reduce the unnatural build up of down and dead materials. Natural barriers, vastness of continuous vegetation, topography, and weather are contributing factors

Prescribed fires, burning under specific conditions with defined results, can be conducted using planned ignition both inside wilderness boundaries and throughout the Forests Mosaic patterns can be achieved to meet resource constraints and concern on site specific projects In chaparral areas, where wildlife habitat or range forage can be improved while reducing the fire hazard, this option may be employed

Fires will always be part of the natural ecosystem, but controlling the timing and intensity of them will be necessary to minimize the impacts to human health and forest resources

7. Fisheries

Public Issues

One public issue focuses on fisheries

How should watersheds be managed to maintain or enhance water quality and fisheries? (Public Issue #6)

Other related issues having an affect on fishenes include

a There is public concern that a wide variety of ecosystems should be maintained on the Forests to specifically provide for the maintenance and/or enhancement of habrtats for Federally listed T&E species (plants and animals) (Public Issue #2a)

b How should livestock grazing be managed to minimize degradation of riparian areas? (Public Issue # 10)

c How wide should ripanan management zones (RMZs) be and what management activrties should be allowed within them? (Public Issue # 13)

Discussion of Public Issues

Watershed Management. The Forest Service's attempt to protect and maintain fish habrtat quality, using Best Management Practices (BMPs) during timber harvesting operations, is being questioned Some of the perceived problems identified are lack of erosion control, degradation of riparian habrtats, and slope cutting on steep grades

Specific questions raised by the public include

1 What are the potential effects of cumulative watershed impacts on spring-run chinook and summer steelhead within the South Fork Trinty River?

2 Do Forest Service management practices adversely affect anadromous fish habitat in the South Fork Trinity River?

3. How can fish populations increase. especially anadromous fish, wrth an increase in clearcuts, road building and degraded watershed conditions?

4. What should be done to insure on-the-ground compliance with BMPs?

5. How should fisheries monitoring be done dunng timber sale harvesting?

5 What magnrtude of streambank protection should be provided?

Other watershed management concerns include

1 The Forest Service should have a clear, concise fisheries management plan, and

2 The agency needs its own fishenes protection plans, it is not enough to rely on other agency plans.

Livestock Grazing. Public concerns have to do with

1 grazing in and near riparian areas,

2 the effect of grazing on water temperatures and fish habrtat production potential,

3 grazing in wildernesses, and

4 making important redband trout stream corridors, such as Sheepheaven and Trout Creeks, off limits to grazing to prevent streambank degradation, shade loss, and eutrophication

Streamcourse Protection. Public concerns reaffirmed that ripanan areas should be maintained to provide a sediment barrier and a shade canopy for the water and to protect stream channel integrity RMZs should be designated for all perennial streams and for intermittent streams that are used as fish spawning and/or nursery areas

Habitats. There is concern that habitats of sensrtive fish species such as the bulltrout, redbandtrout, rough sculpin, spnng-run chinook, and summer steelhead be protected and maintained Furthermore, can anadromous fish populations be increased by improving anadromous fish habitat capabilrty through structural habrtat improvement?

Current Management Situation

Available Resources. There are about 5,500 miles of rivers and streams on the Forests, 1,900 miles of which are fishable In addrtion, there are over 50,000 acres of lakes and reservoirs

Outstanding coldwater fisheries are found in the McCloud and Pit Rivers Eight miles of the McCloud River (below McCloud Reservoir) are classified as a Wild Trout Stream and offer a blue-ribbon fishing experience of National acclaim At one time, the upper Sacramento hver provided an outstanding wild trout fishery Unfortunately, a chemical spill near the community of Dunsmuir in July, 1991 impacted this fishery along 45 miles of its course down to the backwaters of Shasta Lake

The headwater areas of the Trinity River (above Clair Engle [Trinity] Lake), the North and South Forks of the Trinity River and their tributaries, Squaw Creek, and Squaw Valley Creek also support fisheries of regional interest

The fish in Shasta, Trinity, Lewiston, McCloud, and Iron Canyon Reservoirs, as well as in over 80 alpine lakes, are also of major recreational interest

The Sacramento and Trinity River Basins once sustained several of the largest populations of important anadromous fish (salmon and steelhead) in California In recent years there has been a decrease in the anadromous fish numben Typical of the situation is the winter-run chinook salmon of the Sacramento River which has been listed as a threatened species.

Some of the factors contributing to reduced habitat availability and fish population may be one or more of the following dam construction and other diversions, catastrophic *floods,* natural landslides, over harvest of fish, human activities on the landscape, and domestic livestock grazing Continued drought conditions have impacted salmon and steelhead streams causing signrficant reductions in waterflow regimes This has lead to a cumulative loss of spawning and rearing habitat and increased water temperatures These factors, coupled with poor ocean survival, have accelerated the decline of anadromous fish populations in the Sacramento and Tnnity Basins.

Current Use of Available Resources. Sixty million people enjoy fishing, the Nation's second most popular outdoor sport after swimming Sport anglers generate a $28 million contribution to the nation's economy annually Current fishing use throughout the National Forest System is estimated at 46 5 million angler days each year with a net economic value of over $1 2 billion

The State of California has experienced a shift downward in the number of fishing licenses sold over the past decade In 1989, the State reportedly sold 29 percent fewer angling licenses than in 1980, although the state's population increased by more than 7 million dunng the decade

In 1980 about one in 10 Californians bought a fishing license, for a total of 2 3 million. In 1989, about 1.6 million fishing licenses were sold, or one for every 20 Californians

On the Shasta-Trinity National Forests the Recreation Resource Information System (RRIS) has provided information about the current level (FY 1988) of fish user days (FUDs) on the Forests Warmwater fishing accounts for 267,000 FUDs (67 percent): resident coldwater fishing (streams, lakes, reservoirs) 91,000 FUDs (23 percent), and anadromous sportfishing 38,000 FUDs (10 percent).

Fish Population Concerns

General. In the Trinity hver Basin, Forest Service personnel are concerned about the reduced populations of spring-run chinook and summer steelhead over the last five years. The summer steelhead is listed as a Forest Service sensitive fish species

Inland coldwater streams, lakes, and reservoirs have also been impacted by the continued drought conditions In Siskiyou County, offspring from Oregon bull trout, introduced by the Department of Fish and Game (DFG) into two private streams, have been reported as demised after once dependable year-round flowing natural springs dried-up Reservoir levels at Shasta and Trinity Lakes are significantly below maximum pool because once abundant annual snow accumulations have not been sufficient to sustain, much less replenish, diminished water storages

The DFG continues to supplement recreational sportfishing through hatchery releases However, the reduced capability of the natural water environments in sustaining the wild salmon, steelhead and trout populations of the Forests is of paramount concern

Anadromous Fish. In 1991, the American Fisheries Society identified 159 stocks of anadromous fish in the Pacific Northwest as being at moderate to high nsk of extinction Another 54 stocks were listed as being of special concern A total of 39 stocks was listed in California The primary reason for the decline of these stocks varies by species and locality The continued existence of these stocks is threatened by an *unquantifiable* combination of hydroelectric development, over-harvest of fish, hatchery influences on susceptibility to disease and genetic fitness and habitat conditrons High quality habitat conditions on National Forest lands are important to conserving many of the "at-risk" stocks. Enlightened management of the anadromous fish habltat is important to the recovery of these stocks, even though the pnmary reasons for the decline may not be habitat related

Potential conflicts within aquatic/riparian zones and upslope of streamcourses can include human-caused disturbances such as vegetation removal and manipulation. construction and use of road; and trails, use of heavy equipment, domestic livestock grazing, and mineral extraction operations and non-human-caused disturbances such as wildfire, insects and disease. and climatic extremes such as drought Unmanaged, these activrties could cause signficant long-term damage to fish populations and their habitats Simply put, fish production could become limited if aquatic habttat condttions in a stream are of poor qualtty for fish A prime example of a stream under stress is the South Fork Tnntty hver Even though this nver is gradually recovenng from the catastrophic impacts of the 1964 flood event, populations of fall and spring-runs of chinook salmon, like the summer steelhead, have not responded Their numbers remain relatively low

Because of its geological nature, the South Fork Tnntty River Basin is at risk of further sedimentation If not managed, activities such as, vegetation removal and manipulation, road construction and minerals extraction could produce unacceptable levels of sediment Management activtties must be sensrtive to watershed and fishenes needs in order to maintain populations of fall and spring-runs of chinook salmon in this drainage

Seven of 61 watersheds inventoried on the Forests have relatively high disturbance levels Therefore, there is a significant risk of inrtiating cumulative effects within the main channels which drain into these watersheds All seven of these watersheds are wtthin the South Fork Tnnity River basin Butter Creek, the East Fork of the South Fork Trinity River, Gulch Watershed, Hyampom, Plummer Creek, Rattlesnake Creek, and Upper Hayfork Creek Four of these watersheds (Butter Creek, the East Fork of the South Fork Trinity River, Plummer Creek, and Rattlesnake Creek) have the potential, if cumulative impacts do occur, to directly impact spring-run chinook and summer steelhead habitat

Within Canyon Creek, New hver, and the North Fork Trintty River spring-run chinook adults, like summer steelhead, are vulnerable to poaching during the summer since they are extremely visible in clear canyon pools The DFG recognizes poaching as one of the most immediate threats to these fish These latter tributaries to the mainstem Trinity River have not been identified as major sediment producers accelerated by human-induced activrties, although areas of natural instability do exist within their systems

Inland Coldwater Fish. Forest Service fisheries management efforts have concentrated very little on the wild trout populations of the Forests Stream and high mountain lake habrtat surveys have not been conducted on most inland coldwaters since the mid-1970's because of budget constraints

The greatest concerns for the redband trout streams center on cattle grazing/disturbance, high point source recreational use, and water drafting for dust abatement

The DFG has recommended that special management protection be developed for all redband trout waters on the Shasta-Tnnity National Forests This worthy goal is complicated by the intermingled land ownership on or adjacent to most of the redband trout streams Implementation of special management protection measures could be compromised by private landowner investments

Inland coldwater fisheries management has been strongly emphasized at the McCloud and Weaverville Ranger Districts On the McCloud District, habitat typing surveys have been conducted on redband trout streams, the McCloud River and Squaw Valley Creek At Trout Creek, a redband trout stream, the District has developed a comprehensive educational work program for students *of* the McCloud School District under the auspices of the Adopt-A-Watershed and Bring Back the Natives program Other partners in this program include the DFG, PG&E, National Fish & Wildltfe Foundation and Trout Unlimited

The Weaverville District has begun development of a fisheries/watershed inventory and restoration program for Baker Gulch, Eastman Gulch, and the upper Trinity River (above Trinity Lake) Squaw Creek, on the Shasta Lake District, has been habttat typed, but no formal work agreement has been developed with the Shasta Flycasters for a habrtat improvement partnership

Inland Warmwater Fish. Shasta Lake supports a heavily fished largemouth and smallmouth bass fishery Panfish, catfish, and bullheads provide additional sport angling opportunities Trinity Lake supports a trophy smallmouth bass fishery and a limited largemouth bass fishery

Shasta Lake's production of largemouth bass is below potential Concerns exist over the largemouth and smallmouth bass populations which are especially sensrtive to angling pressure and water fluctuations The major contributing factor toward effective and successful management of Shasta Lake bass is a well-coordinated endeavor among governmental agencies, special interest groups, and local bass clubs A working partnenhip composed of DFG, the Forest Service, and the Golden State Adopt-A-Lake Conservancy Program has helped to high-

light the Forests' warmwater fish habttat improvement program.

Heightened efforts have been undertaken by personnel on the Weaverville District to develop a more sophisticated approach to warmwater fisheries management at Trinlty Lake A research and development program was added to the District's implementation program in 1989 Partners include DFG, the California Conservation Corps, and the Trinlty County Fish & Game Advisory Commission

Habitat Improvement

General. Stream improvement for fish habitat applies to the installation of instream devices or the application of streamside procedures for correcting natural damage or problems caused by humans (USFS, 1988) More specifically, habitat rehabilltation means repair of abused or deteriorated habitat by augmenting and speeding up natural recovery Enhancement means to create more suitable habitat than that which would occur naturally in a stream This includes increasing access as well as directly improving or developing spawning and reanng habltat (Reeves, 1982)

The purpose of installing log structures, sometimes accompanied by the addition of boulder clusters, is to create instream structural complexity Structural design and installation provide for improved spawning and pool rearing conditions

Indigenous riparian plant species are planted to accelerate the growth of shading vegetation thereby reducing the harm caused by long-term solar heating This is especially true during the summer when low flow conditions and radiant exposure can stress anadromous fish and/or trout In addition, replanting of the riparian habitat helps anchor unstable streambanks

The effectiveness of habitat improvement structures may not be readily apparent due to other shortterm influences These influences may include annual and seasonal natural watershed variations, complications within the lifecycle of an anadromous fish species, or human-induced fisheries which may constrain the returns of fish to a stream which cannot be effectively qualified or quantified For example, the Klamath-Trinity River basin, after several years of drought, is experiencing its lowest recorded anadromous fish returns Therefore, someone could conclude, erroneously, that installed structures are ineffective in increasing fish numbers because of the low numbers of adults or juveniles using the structures. To determine structural effectiveness considerable long-term monltoring and extensive documenting is necessary.

Anadromous Fish. The signing of the Trinity River Basin Fish and Wildlife Restoration Act (H.R 1438 into law [Public Law 98-54 I]) provides a major step in needed restoration and rehabilitation addressed in the Trinity River Basin Fish and Wildlife Management Program This program is designed to provide an increase in fishing opportunities as a result of increased populations of anadromous fish The Model Steelhead Stream Demonstration Project Plan is another document which complements the purpose and intent of the Trinlty River Basin Fish and Wildlife Management Program

The Model Steelhead Stream Demonstration Project Plan, released in December, 1985, stipulates the need to undertake anadromous fish habitat improvement work after stream and/or watershed inventories are completed This work is to be accomplished in a pnortized manner within tributaries of the South Fork Trinity Riverbasin. The DFG and California Trout, Inc were instrumental in developing this plan Between 1986 and 1990, the Forest Service installed over 500 fish habitat improvement structures within tributaries of the South Fork Trinity Rver basin

Inland Warmwater Fish. State Fish and Game Code 1743 states that, "The department (DFG) shall improve shoreline habtat for black bass in waters where insufficient habtat exists and shall encourage reservoir operating agencies to carry out shoreline habltat improvement projects" This has been the emphasis at Shasta Lake since 1982 and at Tnnity Lake since 1989 DFG was an active participant in the development of the warmwater fish habitat management plan for both lakes and continues to implement project-level work Over 1,000 manzanita brushrows have been built along Shasta Lake's shoreline to benefit black bass juveniles

Program Planning

General. National and Regional attention has focused on the need to provide direction to the National Forests to develop and implement viable fisheries programs

National emphasis has focused on the "Rise to the Future" program (March, 1987) The underlying pnnciple of Rise to the Future is to emphasize fisheries management through improvement of fish habitats and to increase opportunlties for the public to enjoy the fishery resource on the National Forests The program ensures that necessary protection measures are provided during the course of other land management activlties It also iden-

trifies projects designed to restore degraded habrtats, enhance existing habitats, and create new habtats In addition, the program emphasizes accomplishments through partnenhips with the states, Native Amencan tribes, and environmental, industry and fishenes interest groups, as well as the fishing public

The Pacrfic Southwest Region's (Region 5) "Rise to the Future" program reterates integration of the fishenes program with all other resource programs This document incorporates the state approved "Partners in Fish" program (May, 1987) which asks the Forest Service to take a strong leadership role in protecting, restoring, and improving fish habitats within the National Forest-

"Bring Back The Natives" is a new national approach by the Forest Service, the Bureau of Land Management (BLM), and the National Fish and Wildlife Foundation to restore the health of entire riverine systems and their native species on public lands This is not a separate program of any Federal agency, but rather a series of projects that use a watershed approach to restonng stream health The program serves as the pnmary instrument for implementing national strategies for ripanan habitat restoration and native fish habitat conservation

On the Shasta-Trinity National Forests three watersheds have been selected to promote the "Bring Back the Natives" program

(1) Big Creek - Hayfork Ranger District,

(2) Trout Creek - McCloud Ranger District, and

(3) Upper Tnnrty River (above Trinity Lake) - Weaverville Ranger District

Forest penonnel have also assisted in the preparation of fishenes plans wth other agencies, including the DFG Each of these plans sets goals for accomplishing the long-term recovery of selected fish species or bodies of water

Forest involvement with plans to initiate recovery of anadromous fish in the Sacramento hver Basin has been limted because of the small amount of National Forest land involved (Beegum Creek)

Overall, two types of habtat problems can impose long-term impacts to the anadromous or inland coldwater fish stocks, those that are human-induced and those that are naturally inherent to a system, (i e, unstable soils or geological formations) Human-induced activities are further delineated into those that are under Forest Service administrative control and those outside the purview of Forest Service authority This document will track only those Forest Service activities that have a potential to impact anadromous or inland coldwater fish habtat An increased demand for recreational sportfishing on National Forest lands will accelerate the need to manage lake habitat for inland warmwater fish

Selection of Fish Assemblages. Fish species have been grouped into three specific assemblages or groups to simplify tracking the effects of management activties on fish habtats wthin the Forests These are

(1) Anadromous Fish Assemblage,

(2) Inland Coldwater Fish Assemblage, and

(3) Inland Warmwater Fish Assemblage The species associated with each of these assemblages are listed in Appendix G

Selection of Management Indicators. To ensure that viable populations of wild, native fish are maintained. management indicators are selected to act as "barometers" for aquatic communities Management indicaton are selected from species with similar habitat requirements These indicators can then be used in determining the needs of a species and for predicting habitat capability responses to management activties Simply put, these management indicators are used to guide and montor forest management activties in a manner that will maintain biological diversrty and produce enough fish to meet recreational and commercial needs

Winter-run steelhead, spring-run chinook and summer steelhead were selected as management indicators for the anadromous fish assemblage, rainbow trout were selected for the inland coldwater fish assemblage, and largemouth bass were selected for the inland warmwater fish assemblage

Anadromous Fish Assemblage

Management Indicators. All anadromous fish in Calfomia are in a state of decline The Trinity River Basin sustains important anadromous fish populations However, natural catastrophes and other causes have contributed to a population decline of 60-70 percent in the last few decades Over fishing of major basin fish stocks, inundation of limted critical spawning and reanng habtats, poor water release schedules at dam **stes,** and terrestnal habitat

alteration in sensitive watersheds are contributing factors to this decline.

Winter-Run Steelhead Trout. The winter-run steelhead was selected as a management indicator for the anadromous fish program throughout the Trinity River basin because of its presence and wide distribution throughout most of the free-flowing streams within the basin It can be impacted by management activities, such as logging and road construction Steelhead trout habitat readily responds to instream, nparian, and upslope terrestrial improvement and stabilization efforts.

Impetus for the protection, maintenance, and enhancement of steelhead trout habitat comes from the population declines throughout California Concerns exist because of the low numbers of winter-run steelhead in the South Fork Tnnity River Basin Over time, natural catastrophes and human-induced activities have lead to a decline in population levels

forest Service personnel place great emphasis on watershed rehabilitation and fish habitat restoration for winter-run steelhead, particularly in the South Fork Trinity River basin

The Model Steelhead Stream Demonstration Project Plan is intended to guide the recovery of steelhead and their habitat in the South Fork Trinity River

The wildfires of 1987 and 1988, coupled with previously identrfied projects, have allowed the Shasta-Tnnity National Forests to apply about $900,000 to the rehabilitation of fish habitat and watersheds within the South Fork Trinity River Basin A major contributor to this rehabilitation effort was the California Conservation Corps

The most signrficant commitment to andromous fish restoration came in October, 1984 with the signing of the Trinity River Basin fish and Wildlife Restoration Act (PL 98-541) This law authorized the creation of the Trinity River Restoration Program (TRRP) with $57 million set aside for 10 years to allow for numerous restoration and rehabilitation activities on National forest land

Spring-Run Chinook Salmon. The chinook were once the most abundant salmon in California. Today annual runs of wild spring-run chinook are less than 1,000 fish, divided between the Sacramento and Klamath River drainages Their numbers are declining each year (Moyle, 1991).

This species was selected as a management indicator for the anadromous fish program within the South Fork Trinity River for a number of reasons. The chinook has low reproductive numbers which appear highly sensitive to changes in biological and physical parameten, it has limited instream system distribution, and it is vulnerable to poaching Because of the chinook's low numbers in the South fork Trinity River, it is difficult to measure direct impacts from land management activities.

In conjunction with DFG, the forest Service not only recognizes valuable spring-run chinook streams, but looks to further management actions to benefit their habitats Both agencies want to play a major role in restonng damaged watersheds and streams in order to increase fish runs

California's major spnng chinook salmon runs have been lost to barrier dams. Other, much smaller runs, have been lost to other causes such as degraded habitat Loss of the wild spnng chinook runs to barriers have been partially mitigated by the Trinlty River Hatchery Self-sustaining runs of spnng-run chinook are at a fraction of their historic levels Those runs that are stable or increasing are generally those that are affected by artificial propagation (DFG, 1990).

Prior to the 1964 flood and after the demise of the San Joaquin run, the South Fork Trinity River was probably the most productive spring-run chinook stream in the State The river was the largest single producer of spring-run chinook in the Klamath system until landslides, triggered by the 1964 storm, filled in the holding pools and buried the spawning areas This situation improved only slightly during the next 15 years At that time, a few of the holding areas became usable again and spnng-run chinook were once again observed in isolated pools (DFG. 1990).

Since 1988, spring-run chinook adults have been counted annually within their summer holding habltat in the South Fork Trinity River The DFG estimated that there were 11,604 spring-run chinook in the South Fork Trinity River n 1964 The forest Service counted 59 in 1988; 6 in 1989, and 82 in 1990 between Hyampom Valley and the confluence of the East Fork of the South Fork

Spring-run chinook are impacted as adult (or near adult) ish in ocean and in-river fisheries The ocean commercial ishety has a major impact on the adult returns Spring-run chinook are less impacted by the ocean fisheries than 'all-run stocks because they are legal-size fish to the commercial fishery for a shorter period of time

Native Americans are permitted to harvest returning spring-run chinook adults in the lower Klamath and Tnnity Riven usinggill-nets,sportanglers use hook-and-linegear Estimates by the U S Fish and Wildlife Service (USFWS) indicate that a combination ofthe commercial and in-river fisheries has reduced the runs of adult spring-run chinook of hatchery origin by about half (DFG, 1990)

Low flows, coupled with high water temperatures, are a primary impact to spring-run chinook within their holding areas in the South Fork Tnnty River Highwater temperatures can lead to high adult mortalities and low spawning success

Spring Run (Summer) Steelhead. Two races of steelhead trout are indigenous to the Trinty River Basin the spring-run (summer) steelhead and the winter-run steelhead

The summer steelhead is designated as a sensitive fish species by the Forest Service because of its limited habitat preferences and low population numbers This species was selected as a management indicator for the anadromous fish program within the South Fork Trinity River for a number of reasons It has low reproductive numben which appear highly sensitive to changes in biological and physical parameters. it has limited instream system distribution, and it is vulnerable to poaching Because of the steelhead's low numbers in the South Fork Trinity River, it is difficult to measure direct impacts from land management activities

Summer steelhead are found only in streams from the Eel River drainage to the Oregon border The total number of summer steelhead in California varies between 1,500 and 4,000 fish This figure is divided among 25 isolated populations Most of these populations contain less than 100 fish, so they are unlikely to persist in the long-term unless an aggressive protection program is initiated (Moyle, 1991)

Studies indicate that summer steelhead spawn in small headwater streams wrth relatively low (50 cubic feet per second [cfs]) winter flows Most of these streams are intermrttent and dry up in the summer

Summer steelhead habitat is very sensitive to disturbance Both natural and human-caused landslides have been the major cause of habitat alteration, especially in the South Fork Trinity River Adverse impacts to spawning srtes. stream shade canopy, water temperature, bank stability, pool frequency, and volume have been documented

The numbers of summer steelhead in Northern California were greatly reduced by the floods of 1964 These floods destroyed much of their holding habrtat Although the habitat has been improving slowly, the summer steelhead populations seem to be, at best, static (Moyle, 1991)

Since 1988, summer steelhead adults have been counted annually within their summer holding habitat in the South Fork Trinity River DFG estimated that there were 3,500 summer steelhead in the South Fork Trinity River in 1964 The Forest Service counted 30 in 1988, 37 in 1989, and 66 in 1990 between Hyampom Valley and the confluence of the East Fork of the South Fork

Habitat. A cursory inventory of the anadromous fish habrtat on National Forest streams indicates that 296 miles are or have been used by steelhead trout and 127 miles by chinook salmon

Historical information is unavailable to compare present-day anadromous fish habitat qualrty and quantity with that of the past or to project accurate trend information A 1988 update on anadromous fish habitat capability, compiled from existing stream survey data, indicates that 33 5 percent of the habitat was rated as high quality, 44 2 percent moderate quality, and 22 3 percent (mostly the mainstem Trinrty River) as low quality None of this habrtat is filled to spawner capacty

The Forest Service's role is to protect and maintain habrtat quality and quantrty and, where possible, to improve habrtat on National Forest lands These are only two of the many variables influencing anadromous fish production Working with other agencies the Forest Service is assisting in the design and implementation of anadromous fish habrtat improvement projects within the Trinity River Basin

The South Fork Trinity River is slowly recovering from the catastrophic flood event of 1964 which released millions of cubic yards of sediment into the mainstem Summer steelhead and chinook salmon habitat were affected by this event The South Fork Trinity River may no longer have the capability to produce the large numbers of wild spring-run chinook or summer steelhead it once did The river is now being managed as a wild free-flowing system without any hatchery mitigation efforts The mainstem Trinity River, on the other hand, is heavily subsidized by releases from the Trinity River hatchery

The Tnnity Alps Wilderness and Wild and Scenic River classifications on segments of New River and North Fork Trinty River are assisting in maintaining salmon and steelhead habitat in their natural pristine state

Habtat typing is a procedure which allows the Forest Service to identify some factors limting fish production This process has been completed on Canyon Creek, the North Fork Tnnity fiver, and wlthin most of the critical spring-run chinook and summer steelhead adult holding areas in the South Fork Trinity River The USFWS is in the process of completing its analysis of the New River Nearly all major anadromous fish streams tributary to the South Fork Trinity River have been habitat typed within the last *two* years No habitat typing is being planned for the mainstem Trinity fiver because of its size and complexity and the large amount of private land involved

Additionally, the Forest Service has conducted or coordinated an inventory of major anadromous fish watersheds wrthin the Trinity River basin These watersheds were inventoried to identrfy existing and potential problem areas

Enhancement. The anadromous fish habitat improvement program in the South Fork Trinity River is designed to assist in the recovery of the winter-run steelhead However, improved spawning and rearing condrtions in restored nursery streams would also be of benefit to summer steelhead

Stream habrtat improvement projects for salmon and steelhead have been implemented in the mainstem Trinity River, Rush Creek, Browns Creek, and within the South Fork Trinity River and several of its tributaries

The spectrum of habitat improvement projects for the anadromous fish population includes watershed rehabilitation, barrier removal, installing instream structures to modify channel morphology and increase suitable fish habitat, planting riparian vegetation to increase streambank cover and canopy over a stream, and stabilizing landslide toes to reduce fine sediment delivery to stream channels

Economics. The demand for anadromous fish, from commercial and sport fisheries, is greater than the supply

In the 1950s, the following spawning escapement to the Trinity River Basin was estimated chinook salmon (90,000) and steelhead (50,000) In 1983, the USFWS estimated the natural spawning escapement at 4,200 spring chinook and 19,400 steelhead

Escapement goals for the mqor anadromous species in the Trinity River basin have been developed by the DFG They are based on gains anticipated to be achieved with a management program The production goals, as stated in terms of natural adult spawning escapement, are 6,000 spring chinook and 40,000 steelhead

In 1984, a Forest Service evaluation, in cooperation wrth the DFG, identified the potential *of* anadromous fish spawner escapement from the Shasta-Tnnity National Forests as 14,700 spring chinook and 42,300 steelhead. Attainment of Forest Service fishenes management objectives can assist DFG in meeting its production goals

inland Coldwater Fish Assemblage

Management indicators. The rainbow trout was selected as a management indicator for the inland coldwater fish assemblage It was selected because it has the greatest distribution of any of the salmonid fish species on the Forests As such, it can be the species most directly impacted by hydroelectncal developments, logging, road construction, grazing, or mining activities

Concern for protection, maintenance, and enhancement of rainbow trout habrtat comes from land management activities centered near perennial and intermittent streams The rainbow trout is being used to monitor activities which could cause increased sediment loading and water temperatures, reduced water quality and waterflows, blockage to spawning or rearing areas, etc These factors could lead to the demise of important wild :rout populations

Dther Species

Bull Trout. DFG reports that, "In California, the bull trout was native only to the lower McCloud River in northern Shasta and southern Siskiyou counties This population was the southernmost wthin the range of the species and represented California's only native char In the McCloud River, bull trout were limited to the area below Lower Falls [however] it seems likely that major concentrations were located in the area below the present McCloud Reservoir downstream to Baird Hatchery (the latter now inundated by Shasta Lake)"

As authorized under the Calrfornia Endangered Species Act, Section 2050 to 2055, the State of California Fish and Game Commission has listed the bull trout (*Salvelinus confluentus*) as an "endangered" species

The bull trout was designated as an endangered species by the State of California because by the mid 1970's its numbers had declined drastically to the point where none had been reported since 1968. Two bull trout, captured

in 1975. gave hope that the species could effect a recovery However, extensive investigations conducted by the DFG between 1976 and 1987 were unsuccessful in capturing any additional bull trout As such, it appears the bull trout is extirpated from the McCloud River system (Rode, 1988)

There is no precise reason for the demise of the bull trout, but speculation suggests that several cumulative effects, acting in concert, may be responsible Factors leading to the bull trout's decline include inundation of habitat by Shasta Lake backwaters, potential competitors, such as squawfish: elimination of the runs of chinook salmon, which may have deprived the bull trout of enough protein to maintain the population, and the blocking of upstream spawning migrations In addition, the introduction of ecologically similar brown trout may have contributed to the decline (Moyle, 1976)

The DFG has recently introduced a non-native bull trout from Oregon into the McCloud River Basin However, it will take time and a greater distribution before the bull trout can be used as a management indicator of Forest Service activities Since the Oregon bull trout is a newly introduced species on private lands, population monitoring is at the discretion of DFG

Redband Trout. Redband trout consttutes a subspecies *of* rainbow trout native to western North America Originally native to much of the Pacific Northwest, redband trout distnbution has shown a dramatic reduction due to crossbreeding and competition with non-native trout Redband trout now appear as small, isolated, relict populations in a few stream drainages

The redband trout exists on and adjacent to the Shasta-Trinty National Forests in the mainstem McCloud River above the Upper Falls, and in Edson Creek, Moosehead Creek, Sheepheaven Creek, Swamp Creek, Tate Creek, and Trout Creek (Bacon, 1980)

The redband trout is recognized as an "emphasis" fish species by the Shasta-Trinity National Forests An "emphasis" species is one of high public interest and demand The management goal for an "emphasis" species is to maintain or improve habtat capabiltywhere economically and biologically feasible

The greatest concerns for redband trout streams center on cattle grazing/disturbance, high point source recreational use, and water drafting from streams

A Comprehensive Habitat Management Plan was developed for redband trout cooperatively between the Forest Service and DFG (Bacon, 1980) Management pnorties were established for each of the above-mentioned tnbutary streams to the McCloud River In the action plan, top priority was placed on acquiring private land at Trout Creek, especially land adjacent to the redband trout's essential habitat

The redband trout was not selected as a management indicator because of its low reproductive numbers, its limited instream system distnbution, and the large contingency of pnvate ownership adjacent to known redband trout streams

Rough Sculpin. As authorized under the Calfomia Endangered Species Ad, Section 2050 to 2055, the State of California Fish and Game Commission has listed the rough sculpin (*Cottus asperrimus*) as a "threatened" species

The rough sculpin is biologically rare due to its extremely limited distnbution and low population density within its range It is potentially threatened by habitat degradation in the form of increased shoreline development, changes in land and water use, and the introduction of exotic organisms A major potential threat is the introduction of non-native fishes which could either compete with or prey on this native species The low abundance of rough sculpin wthin some habitats is another source of concern since extirpation from a portion of its range would require a long time for recovery (Ellis, 1988)

Fishenes investigations by BioSystems Analysis, Inc , located rough sculpin in aquatic habtats on pnvate lands and Lassen National Forest administered lands in 1983 and 1984 in the Pit River system These investigations indicated the presence *of* Pit and marbled sculpin, but not the rough sculpin No habitat enhancement or species management plan is being developed for the rough sculpin

Other Trout. Trout species are widely distributed throughout the Shasta-Trinty National Forests Trout waters include low to high gradient streams, low to moderate level reservoirs, and high alpine lakes Self-perpetuating wild trout populations are found within many of these bodies *of* water Existing and suitable trout waters, containing brook and brown trout populations, are maintained and/or supplemented as necessary (i e , high alpine lakes) at the discretion of DFG

Until 1990, little effort had been devoted toward inland coldwater fish in the way of new high tech surveys, studies, research, habtat improvement, or monitoring A more

indepth analysis of the inland trout waters began at that time. However, this effort remains constrained because budgetary monies are predominantly allocated to the anadromous fisheries program in Region 5

The inland coldwater fishery is characterized by three majorgamefishtroutspecies(rainbow, eastern brook, and brown). Kokanee salmon are present in Clair Engle (Trinity) Lake, but they have not been significant contributors to the angler's creel in recent years

Native (or wild) and hatchery trout populations can be found in many streams wlthin the Forests. Hatchery trout are planted to supplement the wild populations in heavily fished waters Shasta and Trinrty Lakes, in particular, receive considerable angler pressure

Outstanding coldwater fisheries are found in the Sacramento, McCloud, and Pit Rivers Eight miles of the McCloud River (below McCloud Reservoir) are classified as a Wild Trout Stream and offer a blue-ribbon fishing experience of National acclaim

The headwater areas of the Trinrty River (above Trinity Lake), the North and South Forks of the Trinrty River and their tributaries, Squaw Creek, and Squaw Valley Creek also support fisheries of regional interest

Habitat. Within the Shasta-Trinrty National Forests there is rainbow trout habitat in 1,900 miles of fishing streams, 38,159 acres of lakes and reservoirs, and in numerous recreational important alpine lakes

Historical information is unavailable to compare present-day inland fish habitat quality and quantity with that of the past or to project accurate trend information A 1988 update on inland fish habitat capabilrty, compiled from stream survey data, indicates that 7 9 percent of the habitat was rated as high qualrty, 63 7 percent moderate quality, and 28 4 percent as low quality

It is illogical to conclude that all streams were once of high quality and that over time they have been degraded to their current levels of production strictly as a result of human-induced impacts It is difficult to judge whether inland coldwater fish habitat is stable or improving. In certain drainages, geological processes limit fish productivrty Unfortunately, these natural processes may have been accelerated or aggravated by people's presence in the drainage Impacts to inland fish habitat have occurred in streams on National Forest lands in the past, but increased public concem and more restrictive protective measures have decreased these impacts in recent years.

On National Forest lands, the long-term trend favors maintaining good quality inland coldwater fish habitat through reduced road construction and timber harvesting activities Management practices are not intended to compromise inland coldwater fish levels but rather to maintain and improve them where necessary and feasible

Undoubtedly, the best protection for wild trout populations exists in waters located wlthin wild and scenic rivers, wildernesses, and late-successional reserves. No mqor land disturbing activities, except for naturally occurring catastrophic events, such as wildfire, will signficantly affect habitat condrtions wlthin a wilderness and wild and scenic river With respect to the inland coldwater fish program, particularly rainbow trout in streams. the protection and maintenance of fish habltat has received greater emphasis than habitat improvement.

The Forest Service is working cooperatively wlth the DFG to achieve its general fisheries management objectives of the Wild Trout Program These objectives are to

1 maintain wild trout populations at levels necessary to provide satisfactory recreational angling opportunrties,

2 maintain and enhance, where possible, the habitat required for optimum wild trout production; and

3 preserve the natural character of the streamside environment

Enhancement. Rainbow trout habitat, like that of the steelhead trout, can respond readily to instream, riparian, and upslope terrestrial improvement and stabilization efforts

The spectrum of habitat improvement opportunrties for inland coldwater fish includes installing instream structures to modify channel morphology and increase suitable fish habitat, fencing streamside areas and planting riparian vegetation to increase streambank cover and canopy over the stream, and stabilizing landslide toes to reduce fine sediment delivery to stream channels

The most recent notable efforts for inland coldwater fish habitat improvement were undertaken on the Mt. Shasta Ranger Distnct to improve inlet spawning streams at high alpine lakes On the McCloud Ranger District efforts have been made to maintain and/or improve redband trout habitat at Trout Creek.

In July, 1986, the Forest Service conducted a stream habitat condition survey in Trout Creek and recom-

mended nparian and instream protection measures to enhance the redband trout population

In July, 1987 fishenes surveyon observed 267 redband trout in Trout Creek and judged the redband trout habrtat for older age fish to be a limiting factor on the stream The surveyors recommended the implementation of a fish habitat improvement program

In May, 1988, McCloud Ranger District personnel prepared a Trout Creek Management Plan for public recreation opportunrties and fish rehabilrtation projects This plan allows for the following actions (1) dispened public camping outside of a 50-foot ripanan management zone with a 14-day stay limit, (2) closes roads causing damage to the riparian habitat, (3) controls livestock grazing, (4) prohibits off-highway vehicle use within meadows and riparian areas, (5) permits water drafting in designated areas only, and (6) calls for the implementation of fish habitat restoration projects to protect the redband trout

In July, 1988, and again in September, 1988, Forest Service personnel completed fish habrtat improvement projects in upper Trout Creek In October 1988, fisheries personnel surveyed Edson, Moosehead, and Trout Creeks for potential habitat improvement and rehabilitation opportunities They identlfied a total of 48 fish habitat improvement projects on these streams In 1989, 40 acres within Trout Creek meadows were fenced off for added protection from random cattle grazing

Economics. AS recreational sportfishing increases in California, high quality stream and lake fishing for trout will be in greater demand Wild trout populations cannot withstand a high degree of angling pressure For inland coldwater fish, where access has been developed, the demand for high quality stream and lake fishing exceeds the supply Where access is restricted, the supply may exceed the demand In selected areas (i e , reservoirs, where angler demand exceeds the natural supply) hatchery reared rainbow trout are stocked at the discretion of DFG

However, current hatchery production will not be able to sustain the consumptive angler needs of the next century DFG personnel predict that State hatcheries. which now produce 6 million pounds of fish annually, will need to supply 9 million pounds of fish annually by the year 2000 and 13 5 million pounds annually by the year 2020 to meet sportkhing demands AS such, wild trout management on National Forest lands needs to be innovative. regulated, and monrtored to ensure a high quality recreational sportfishing experience

Inland Warmwater Fish Assemblage

Management Indicators and Other Species. The largemouth bass was selected as a management indicator for the inland warmwater fish assemblage This will help to evaluate the success of increasing warmwater fish in lakes and reservoin through a shoreline habtat improvement program Other species that can benefrt from this effort include smallmouth bass, bluegill. crappie, and catfish

Habitat. Habrtat capability for warmwater fish in lakes and reservoin on the Shasta-Trinty National Forests totals 11,518 acres

Since 1984, DFG personnel have maintained mazanita brushrows at Shasta Lake wrth the assistance of California Conservation Corps (CCC) crews Two new, large work forces have provided additional depth to the warmwater fsh habitat program the Sugar Pine Conservation Camp at Shasta Lake and the Tnnity River Conservation Camp at Trinity Lake

In 1989 and 1990 the Trinity Lake shoreline was habrtat typed as outlined in the "Trinty Reservoir Fisheries Habitat Management Plan" [Phase I/Task 2] The implementation of habitat improvement projects at Tnnity Lake began in 1990 Using the same methodology. habrtat typing was done on Shasta Lake in 1991 Habitat typing was undertaken as a prelude to selecting shoreline srtes for appropriate treatment (habtat improvement)

The Shasta-Trinty National Forests, in cooperation with the DFG. have produced two Warmwater Fish Habtat Management Plans aimed at increasing the largemouth bass production at Shasta and Tnnity Lakes

No long-term monitoring and analysis plans have been developed for Shasta Lake In 1990 DFG personnel began population monitoring at Trinity Lake to estimate relative abundance of target fish species between treated (habitat improved) and untreated (control coves)

The warmwater fish habrtat improvement program at Shasta Lake has involved constructing manzanta brushrows and artificial cover reefs, hydroseeding barley and rye grasses along the shoreline, planting button bush and willow shoots, and limiting oak tree felling The habrtat improvement work at Trinity Lake has included the development of brush cover, log cribs, and the planting of willows

Economics. For inland warmwater fish the demand for large and smallmouth bass exceeds the supply Substantial

habitat modifications are necessary to increase yields so supply can be in balance with demands Other warmwater species are available in greater quantity than present demand.

Management Opportunities

General. Two conservation strategies have emerged as critically essential to the management of salmon and trout resources on National Forest lands These strategies are to conserve whole river systems (holistic watershed management) as well as to protect the most precious segments of these river systems Both strategies are essential to achieve the general goals of conserving biodiversrty and implementing the precepts of the Wild Trout Program Scientists and the Oregon Rivers Council have developed a watershed strategy for meeting these needs They appear in the following order

- protect what remains of the intact headwaters areas,
- protect and ultimately restore the ripanan zones along every river and stream,
- protect and restore flow regimes that will sustain the life of rivers over the long-term

A multi-year schedule of ecosystem management projects, consistent with the land management plan, should take into account the following recommendations

Anadromous Fish Assemblage

- Rebuild the spring-run chinook and summer steelhead populations to levels where special protection is no longer needed
- Further protection could be afforded to summer steelhead populations in Canyon Creek and the North Fork Trinity River by designating these streams as Wild and Scenic Rivers
- Intensify law enforcement efforts, in cooperation with DFG, to assist in curtailing poaching activities on spring-run chinook within the South Fork Trinity River
- In cooperation with DFG, identify summer steelhead streams that are tributary to the mainstem South Fork Trinity River
- Work cooperatively with DFG and the Tnnity Rver Restoration Program to attain production goals for spring-run chinook and summer steelhead in the South Fork Trinrty River. This can be done by identifying and evaluating opportunities for Interim Artificial Propagation (IAP) within the South Fork Trinity River
- Catalogue structural improvements by stream reach and institute an annual instream structure maintenance program

Inland Coldwater Fish Assemblage

- Develop a lake and stream atlas, with DFG, distinguishing major wild trout waters from hatchery-planted trout waters
- Conduct frequent interagency recreation/fisheries discussions to outline a pattern for growth and development to meet future demands
- Catalogue potential public access areas that can be developed to help meet future recreational sportfishing demands
- Cooperative opportunities need to be identfied and developed with the DFG to improve trout populations in lakes, reservoirs, and streams. Improvement for inland trout in streams would focus predominantly on the Upper Trinity River watershed followed by those in the Upper Sacramento River Opportunities for increased inland trout production, other than the addition of structures, in lakes and reservoirs should be investigated at Shasta Lake, Lewiston Lake, Trinity Lake, and Iron Canyon Reservoir.
- Evaluate dams at the outlets of high alpine lakes (outside of wildernesses) to determine their condition and the need to replace or modify them Many of these dams are flow maintenance dams which release water during periods of low streamflow Each may be important in maintaining a wild trout population below the lake
- Future habitat improvement opportunrties in the major lakes include planting or protecting ripanan vegetation to minimize sedimentation, improving access for management, and regulating water levels or dredging to increase suitability

In cooperation with DFG, designate three watersheds with viable trout populations for long-term fish population and watershed condrtion monitoring

Personnel from the Shasta-Tnnty National Forests are in the process of developing a fisheries/watershed partnership program, wth the McCloud School Distnct, for Trout Creek under the auspices of the Adopt-A-Watershed program This program will provide the opportunity for annual monitoring and restoration activities to stimulate the recovery and promote the health of redband trout and their habitat in Trout Creek.

Acquire specfic parcels of private land that contain redband trout populations, especially adjacent to Sheepheaven Creek

Inland Warmwater Fish Assemblage

In conjunction with DFG and other appropnate agencies, evaluate opportunties to increase fish populations through nutrient enrichment, development of sub-impoundments, intensifying pen culture, and manipulating lake drawdown levels

Develop additional sportfishing access areas at Shasta and Tnnty Lakes for use by the full spectrum of recreational anglers

8. Forest Pests

Public Issue

No public issue *specifically* mentions forest pests However, a related issue addresses the use of herbicides That issue is

Should herbicides be **used** to [illegible] in order to [illegible] ? (Public **Issue #15)**

Vegetation can be considered a forest pest f i t prevents the Forests' land management goals or objectives from being attained The issue of herbicide use to control vegetation is discussed in the Timber Section

Current Management Situation

Forest organisms sometimes interfere with the attainment of the Forests' goals and objectives When these organisms affect planned objectives, they are referred to as forest pests A certain vegetation type may be a pest in one area or situation but may not be a pest where different objectives are being pursued Native organisms that function as pests are established elements of the forest and range ecosystem, and they co-evolve with their habitat These forest pests affect the natural ecological processes and *are* affected by the same processes themselves Non-native organisms can cause substantial changes in ecosystems because native vegetation may have little resistance, and natural biological controls are usually lacking

Pests can affect forest resources in a variety of ways The loss of timber through mortality and growth loss is obvious Pests can also adversely affect wildlife by altering the habtat required for certain groups of organisms Dead trees on a hillside may alter the visual landscape The loss of tree cover and creation of openings in the forest canopy in developed recreation areas can interfere with recreation objectives The actual effect of pest organisms on the Forests' resources is dependent on the management objectives for an area

Populations of some organisms increase to levels at which they are considered pests only on rare occasions For other organisms, the sequence of events leading to their population increase is so unusual that it is difficult to anticipate in advance These events are dealt wth on a case-by-case basis using the principles of integrated pest management An example of a unique population increase was the western budworm infestation in the vicinity of Trinity Lake This infestation began in 1981 and lasted about six years, it eventually covered over 100,000 acres of timber land in mixed ownership Moderate growth losses and some mortality in smaller trees took place in the Douglas-fir host species. Control of this infestation was initiated in May, 1985 by aerial spraying *Bacillus thuringiensis* on about *90,000* acres, about half of which were on National Forest lands

Certain organisms grow in portions of the Forests at levels which are likely to interfere with some management objectives Preventive measures for these stuations can be included in management prescriptions Several non-native organisms have a high potential to disrupt management activties if they become established. Established methods to exclude these organisms can be incorporated into plans for activities, or areas, which pose a high risk of introduction

Dwarf mistletoes, *Arceuthobium* spp , are a group of parasitic plants that attack most of the confer species on the Forests Individual species are usually *specific* to a certain host They are widespread in distribution They reduce the vigor of their host which results in reduced growth and increased risk of mortality Because of the way they spread, mistletoes can become particularly damaging in stands that are comprised of predominantly one tree species and where both overstory and understory are present They can easily be managed silviculturally, however, it is most advantageous to avoid their establishment for the situations where they can increase

White pine blister rust, caused by *Cronartium ribicola*, is a disease of sugar pine and other five-needled pines It can kill small trees before they reach commercial size or reproduce Blister rust can also result in the top-kill of larger trees and increase their susceptibility to successful bark beetle attack Genetic resistance to this disease has been identified and an active program is ongoing on the Forests to screen and locate resistant individuals As of *1992,* there were two resistant sugar pines identfied on the Forests Once resistance is identified, seed can be collected and propagated during regeneration efforts Other more specialized treatments, such **as** pruning, may also be used in certain stuations

Black stain root disease, caused by *Leptographium wageneri,* is common in ponderosa pine stands on the McCloud Flats The disease pnmarily attacks trees at least 40 years old Silvicultural systems, which reduce the proportion of *ponderosa* pine in a stand and favor other tree species, have shown some promise in reducing the local impact of the disease

Annosum root disease is widespread in the eastside pine stands on the Forests All species of conifers are susceptible to the disease, but wh te and red fir are especially prone to substantial root decay Disease centers are initiated when a spore of the fungus *Heterobasidion annosum* infects the stump of a freshly cut pine Once established. the fungus grows through root systems and mortality centers develop Centers may persist for decades and eventually occupy up to one tenth acre or more Intiation of disease centers can be prevented by treating pine stumps when trees are cut Annosum root disease also causes concern in developed recreation areas because of tree mortality and hazard to recreationists from the failure of root-decayed trees Treating conifer stumps can prevent infection in recreation areas

High stocking levels are a contributing factor to confer mortality When the stress from heavy stocking and competing vegetation is combined wth an addtional stress such as the drought of 1975-77, or the dry period from 1989-91, the amount of annual mortality can increase several times In areas where it is consistent wth other management objectives, thinning or releasing stands can reduce mortality

Pines are a signficant component of the mixed conifer and eastside pine types and are important in other areas of the Forests as well Pine slash created during management activties can be used by pine engravers. *Ips* spp for breeding This can resutt in some mortality or top-killing of residual trees In areas where the loss of residual trees would conflict with management objectives, the timing of activties and subsequent treatment of slash can reduce the probability of mortality

The gypsy moth is a non-native insect which has not been permanently established in California It has been eradicated several times from Calfornia, and there have been infestations in Oregon, Idaho and Utah The primary means of spread is by egg masses or pupae transported on outdoor furnture or recreational vehicles Feeding by the gypsy moth causes defoliation, and in some cases mortality, of a wide vanety of host trees and shrubs Most resources would be impacted by an infestation Early detection by pheromone trapping makes it possible to attempt eradication when the infestation is still small enough for treatment to be effective

Port-Orford-cedar root disease, caused by *Phytophthora lateralis*, is a non-native disease first observed in natural stands of Port-Orford-cedar in southwestern Oregon dunng the 1950s In Calfornia, the disease is currently present only in the Smth River drainage on the Six Rivers National Forest There is no evidence that the fungus, which is soil-borne and spread by water or soil movement, has spread to the Shasta-Trinrty National Forests Port-Orford-cedar trees of all sizes and ages are susceptible to the disease Management strategies focus on preventing introduction of the fungus into uninfested areas The Interregional Port-Orford-cedar Action Plan, approved in June 1988 by the Regional Forester, will continue to be followed This includes inventory and mapping, research, public education and management

Pocket gophers, *Thomomys* spp , can adversely affect regeneration efforts on many parts of the Forests They are most common in the eastside pine type on the McCloud District and in the higher elevation wh te and red fir types Avariety of measures have been taken to reduce their population, including habitat manipulation, trapping, and poisoning

Management Opportunities

The Forest Service has been directed to implement an integrated pest management (IPM) approach when dealing with forest pests IPM is a process that integrates pest information wth resource management considerations to achieve goals and objectives as part of the NEPA decision-making requirements This process has been broken down into a series of steps (1) prevention, (2) detection, (3) evaluation, (4) suppression, and (5) monitoring Coordination with other agencies, such as the California Department of Forestry and Fire Protection (CDF), is part of an IPM effort in some stuations

Prevention is a major element of IPM This involves avoiding the impact of pests before they occur Prevention includes regulatory measures, cultural measures, and the use of genetically resistant stock

Detection. or the early discovery of potential pests. is critical to successfully preventing damage The adverse *effects* of many pest organisms can be reduced quickly and easily if detected in their incipient stages Also, more options are often available for reducing their damage when discoveries are made early

The evaluation process involves the gathering and interpretation of information about the pest stuation in order to develop possible alternatives to meet management goals and objectives This includes biological, environmental, and economic information

Suppression activities are directed at reducing pest-related damage to acceptable levels The techniques to achieve

this can include, either singly or in combination, silvicultural, mechanical, chemical, and biological methods. A full range of methods, as well as "no action," is considered for each situation. The preferred course of action is selected on the basis of the ability to attain management objectives, biological effectiveness, cost efficiency, and human health and environmental safety The activities and techniques used are determined during the decision-making process and are tailored to the specific situation, including pest, host, and management objectives

Monitoring has two phases in IPM First is the need to determine if any suppression activity met the intended objective. In the broader context, monitoring also needs to be done to determine if the IPM process is adequate and if management goals and objectives are being met regardless of what activity, if any, was undertaken

Forest pest management goals should be directed toward reducing pest-related losses to levels commensurate with management goals and objectives Climatic conditions favorable to pest outbreaks will likely occur in the future However, the magnitude of the losses due to these outbreaks will depend, in part, on the effectiveness of mitigating actions to maintain tree vigor and health so that these destructive impacts are reduced

9. Geology

Public Issue

No public issue was raised which specifically focuses on geology

Current Management Situation

Personnel on the Shasta-Tnnty National Forests have nearly completed a third-order Geologic Resource Inventory (GRI) which contains maps at a scale of I 24,000 These maps detail the seismic hazards, volcanic hazards, avalanche hazards, groundwater resources, geomorphic features, and bedrock geology elements on the Forests Current emphasis is on performing second-order geologic inventories while participating in Ecological Unt Inventories

No slope stabilty hazard element has been completed for the entire Forests, however, a general one was completed for areas which have the greatest slope stability hazards This inventory was incorporated into the Planning Data Base for Land Management Planning Documentation of the GRI is in progress In addtion. the US Geological Survey (USGS) has compiled an inventory of Known Geothermal Resource Areas (KGRAs)

The Shasta-Trinty National Forests cover a broad expanse of land with a widely diverse and complicated geology The majority of the Tnnty Forest is underlain by a portion of the Klamath Mountain physiographic province. This province has been divided into four belts which are separated by northwest trending faults The Trinty Forest covers portions of the eastern, central, and both western belts The west and southwestern portions of the Shasta National Forest are underlain by the eastern belt of the Klamath Mountains province

Rocks of the Klamath Mountains province range in age from the Ordovician Period through the Jurassic Period, or 500 million years to 135 million years ago Rock types within this province include sedimentary and volcanic, both of which are highly metamorphosed locally Intrusive rocks range from ultra-mafic to grantic

The western and southwestern side of the Trinrty Forest is underlain by the Franciscan Complex of the Coast Ranges which is Cretaceous in age (65 to I35 million yean ago) and is generally composed of metasedimentary rocks The southeastern edge of the Trinity Forest is underlain by the Great Valley Sequence which is a thick sequence of sedimentary rocks of Late Jurassic to Cretaceous age (I45 to 65 million years ago) (See **Figure 111-3**)

The northeast portion of the Shasta National Forest is underlaid by volcanic rocks of the Cascade Range and Modoc Plateau These volcanic rocks are generally younger than **4** million years old The Medicine Lake volcano and Mt Shasta are located wthin the northeastern portion of the Shasta National Forest Both volcanoes are considered active

Geologic Hazards

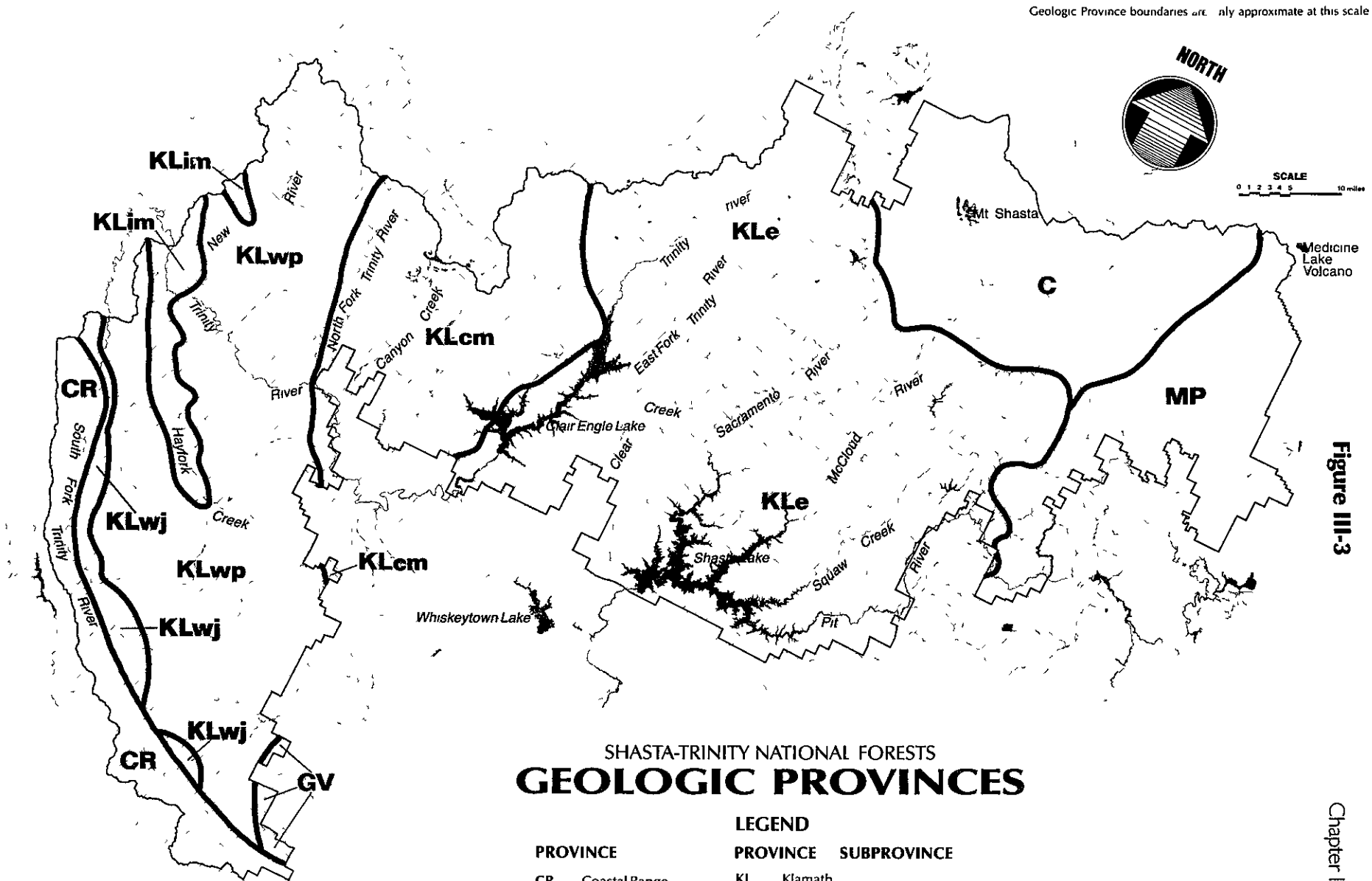
Four types of geologic hazards exist on the Forests volcanic, seismic, snow avalanche, and slope stabilty The identfication of geologically hazardous areas is important so that appropriate management direction can be formulated for land use in these areas

Volcanic Hazards

Volcanic hazards are quite widespread on the Shasta National Forest Three major active areas have been identified, however, many addtional recent cinder cones and lava flows are dispersed about the Forest Mt Shasta and the Medicine Lake Highlands lie in the north central and northeastern portions, respectively, of the Shasta National Forest Mt Lassen, the third major volcanic center, lies 50 miles south of the Forest

a Mt Shasta is a stratovolcano which was formed within the last 100,000 years during four cone building periods Extensive lava flows and pyroclastic flows originated predominantly at the central vents The lower flanks of the volcano consist mostly of a broad apron of coalescent fans of pyroclastic, mudflow, ash, and fluvial deposits It is believed to have last erupted in 1786

The volcanic hazards of Mt Shasta have been well documented (C Dan Miller, 1980) with areas subject to volcanic hazards zoned according to hazard level Three types of hazards were recognized (I) lava flows, (2) pyroclastic flows and mudflows, and (3) air fall tephra In addtion, recent studies have identded a large depost of volcanic rocks which extend 30 miles north of the summit These were deposrted by a large lateral blast or landslide from an ancestoral volcano The communities of Mt Shasta, Weed, and McCloud all lie directly on the flanks of the volcano and are likely to be affected infrequently by lava flows However, all



SHASTA-TRINITY NATIONAL FORESTS

GEOLOGIC PROVINCES

LEGEND

PROVINCE		PROVINCE	SUBPROVINCE	
CR	Coastal Range	KL	Klamath	
GV	Great Valley		wj	Western Jurassic
C	Cascade		wp	Western Paleozoic
MP	Modoc Plateau		cm	Central Metamorphic
			e	Eastern Belt
			im	Ironside Mountain

Figure III-3

of these communities lie within an area likely to be affected by pyroclastic flows and mudflows Historically, wind currents tend to be from the southwest, so that in the event of a tephra eruption, ash would likely be carned northeastward, away from local population centers

b The Medicine Lake Highlands is a broad shield volcano which has a large caldera at its summit and over 100 smaller lava cones and cinder cones on its flanks The volcano developed over a penod of 1,000,000 years, mainly through lava flows. The most recent activity was approximately 500 years ago when a large tephra eruption was followed by an extrusion of obsidian Volcanic activity will persist in the future Local lava flows can be expected, and there is a potential for great tephra eruptions Fortunately, the Highlands are somewhat remote, so activities of a volcanic nature would not directly impact any communities.

c Mt Lassen is a cluster of dacitic domes and vents which have evolved over the past 250,000 years The most recent eruption, in 1914, began as a tephra eruption, with steam blasts, and climaxed with a lateral blast, hot avalanches, and mudflows Some ash was camed to the east Future eruptions could result in wind-carried tephra to the north, toward the Forest, but it is more likely that it would be carried to the east

These three main centers of volcanic activity have been shown to be recently active Of equal concern, however, are all the smaller cinder cones that dot the landscape in the north and eastern portions of the Shasta National Forest. These are considered dormant However, if re-activated, their hazards, although less widespread. could be devastating

Seismic Hazards

Seismic hazards consist of the effects of ground shaking and surface rupture along and around the trace of an active fault. Seismic hazard areas appear to be very limited within the Forests Earthquakes of Richter magnitude 4 5 and 3 7 occurred in 1978 and 1981, respectively. in the Stephens Pass area in the northern portion of the McCloud District. Both resulted in surface rupture along the fault trace and moderate shaking in the town of Tennant

Minor tremors have been recorded all across the Shasta National Forest, and many surface traces of faults are evident, especially in the northeastern portion Some of these faults are believed to be active Many areas of the Tnnity Forest are prone to seismically-induced landsliding due to rapid ground acceleration from local and coastal seismic activity Surface traces of relatively recent faulting are minor on the Trinity Forest, with most seismic shaking induced by relatively deep seismic events No Alquist-Priolo Special Fault Study Zones are recognized within the Forests

Avalanche Hazards

Avalanche hazards are extensive in steep, high elevation, alpine areas within the Forests These areas are generally above treeline or in sparsely vegetated areas. Key avalanche areas on the Forests include the Tnnity Alps, the Tnnity Divide, and Mt Shasta Other than Mt Shasta, these areas are not highly used by winter recreationists due to poor access

Slope Stability Hazards

Slope stability hazards consist of active landslides and dormant landslides which have the potential for activation Slope stability hazards are found on every Ranger Distnct but are more common within the western portion of the Klamath Mountains and Coast Ranges on the Trinity Forest Major unstable areas include the South Fork Tnnity watershed, the steep canyon lands along the main fork of the Tnnity River, lands on the west side of Clair Engle (Trinity) Lake and canyon lands along the upper Sacramento and Pit Rivers In addition. valley inner gorges, which are those over steepened slopes adjacent to streamcourses, are highly unstable. These inner gorges, formed through mass wasting in response to channel downcutting and streambank undercutting. occur commonly throughout the Forests

Valley inner gorges, active landslides, and other highly unstable lands have been removed from the suitable timber base These areas are unsuitable for regeneration timber harvest activties This is because management activities contribute to the nsk of landslide activation and resultant water quality degradation

Groundwater Resources

Groundwater resources are relatively plentrful on the Forests although the geologic systems which control their occurrences, quantity, and quality are quite vaned and not well defined Economics or land ownership often interfere with the development of the resource, especially in areas of isolated National Forest lands or steep topography Based on numerous groundwater siting investigations, no regional aquifers are present in the Forests

Groundwater infiltrates through local bedrock fracture systems and concentrates along large fractures and faults. These fracture aquifers extend up to several miles across the landscape but do not appear to link to "regional" aquifer systems. There are over 80 developed system wells on the Forests having an output of about 1.8 acre-feet/day (657 acre-feet/year).

IO. Heritage Resources

Public Issue

One public issue reiates to hentage resources

How should the Forests effectively provide identification, protection, and interpretation of archaeological, historical, and religious sites? (Public Issue #I)

Discussion of Public Issue

How the Forest Service manages heritage resources is a concern with several publics, including the Native Amencan communrty, the State Histonc Preservation office (SHPO), and professional archaeologists and anthropologists Native American communities have raised several questions including (I) how is the Forest Service protecting its religious places? (2) should archaeologists be allowed to disturb burials in prehistonc Indian sites? and (3) will sacred objects and skeletons, excavated from Federal lands, be returned to them?

The SHPO has expressed concerns that the Forest Service does not fully comply wrth Section 106 of the National Historic Preservation Act and its implementing regulations, 36 CFR 800 The SHPOs concerns include such things as failing to adequately inventory undertakings such as timber sales, failing to evaluate hentage resources for the National Register of Histonc Places, and failing to include Native Americans as "interested parties" in the formal consultation process

The professional community, including archaeologists, anthropologists, and historians, has an interest in how herttage resources are conserved on the National Forests in Callfornia They have expressed the following concerns not enough historic properties are being nominated to the National Register of Historic Places, historic buildings, such as lookouts, need to be preserved, archaeological stes are being looted at an alarming rate: and archaeological sites continue to be disturbed by project activities regardless of the protection methods used

Current Management Situation

In assessing the present management situation for the Forest Plan, Shasta-Tnnrty National Forests' personnel awarded contracts to several professional anthropologists and archaeologists (Bauman, 1981, Martin and Hodder, 1981, Theodoratus Cultural Research, 1981, and Theodoratus Cultural Research, 1984) These individuals prepared overviews concerning history, Native Amencan religious places and uses, prehistoric archaeology, ethnography, and Native Amencan languages The completed documents present a comprehensive picture of culture history, land use, and current ethnic and professional concerns

Information has also been solicited from people associated with local historical societies (Shasta, Siskiyou, and Trinrty Counties). academic institutions (Shasta College and California State Universrty at Chico), the SHPO, and the Native Amencan communrty

As of 1990, several hundred thousand acres of the Forests had been surveyed for hentage resources, and about 2,650 historic and prehistonc herrtage resources had been recorded Most of those inventories have been conducted for timber sales, other areas (e g , wildernesses) have been inventoned to a much lesser extent Less than half of the recorded heritage resources have been formally evaluated for the National Register of Histonc Places, and about 500 have formally been determined to be eligible. in consultation with the SHPO In addition to the recorded historic and archaeological sites, several ethnographic studies have identified thousands of Indian "placenames" within the Shasta-Tnnity National Forests However, many of these cannot be physically located with any degree of precision

The inventory and evaluation of heritage resources has been guided by two research orientations that have been termed "cultural ecology" and 'the direct historical approach" The former is concerned with how societies. through time and space, have used culture to adapt to changing or static environments The latter involves studying the history of a particular ethnographic group, such as the Wintu of the Redding area, by using the wrritten historical record to interpret archaeological remains Both approaches seem particularly appropnate to the Shasta-Trintty National Forests, since there is a diverse and well documented ethnographic record and multiplicity of environments that must have fostered variable adaptive responses The two-fold research orientation revolves around the subject of land-uses and requires detailed chronological and environmental data, as well as a thorough understanding of prehistonc technologies

The Calrfomia Inventory of Histonc Resources (State Plan), 1976, listed nine themes for the State The vanous sites recorded in the Forests so far are representative of

all these themes (e.g , Aboriginal, Architecture, Government, etc) The Califomia inventory lists several places in or immediately adjacent to the Forests: Bass Hill, Battle Rock, Lake Britton Archaeological District, Southerns Stage Station (Shasta County); Strawberry Valley Stage Station (Siskiyou County), International Organization of Odd Fellows (I O O.F) Hall, Comet Lodge N o 84 (Trinity Center), La Grange Mine (Trinity County), and Weaverville Historic District (Trinity County)

The historic overview prepared for the Forests identified anumberofthemeswhichhighlightseventsofthelast 150 years The earliest theme identded was exploration, beginning in the 1830s The first explorers were fur trappers During the 1840s, several military expedrtions, such as that of John C Fremont, passed through the Forests Beginning in 1848, wrth the discovery of gold by PB Reading, Shasta and Trinity Counties witnessed the first signficant population influx As gold mining expanded, other historic themes became important, such as commerce, transportation, and homesteading

By the 1870s, trails, stage routes, and wagon roads were established throughout much of the Forests. These early endeavors culminated in 1887 with the completion of the Central Pacific Railroad linking Oregon with Calfornia The completion of the railroad and other transportation routes set the stage for several other historic themes that characterized the next few decades lumbering, recreation, and mining The construction of the railroad created a demand for wood products, as well as a haul route to larger markets, thus stimulating production even more

Early recreational use in the Forests was associated predominately with resorts, typified by those along the Upper Sacramento River Mining activities continued off and on dunng the last decade of the 19th century They reached a peak between 1895 and 1920 with the development of copper mines and smelters in the vicinity of present-day Shasta Lake When the Shasta and Trinity National Forests were created (in 1905 and 1907, respectively). the present era of Forest Service multiple-use management began

Within the general area of the Forests there are several California Indian groups including the Wintu, Chimariko, Achumawi, Yana, Hoopa, and several Shastan peoples At the time of initial contact, each group spoke a different language, while at the same time sharing certain cultural features For instance, all were hunters-gatherers, lacking agriculture, and all practiced some form of seasonal movement

Principal winter villages were situated adjacent to mqor watercourses, such as the McCloud and Trinity kvers Several cultural practices that were important historically affect Forest Service management concerns today, Of particular concern are places or activities associated wrth religious practices As mentioned previously, a contract report prepared by Theodoratus Cultural Research deals with this issue in detail.

Interest in local Native Amencan culture has continued unabated for over a century The various overviews previously cited discuss the histoty of ethnographic research Archaeological research began more recently, with studies of caves around Shasta Lake (i.e , Samwel and Potter Caves). Reservoir projects were the pnmary impetus for archaeological work between the 1940s and 1960s

In the 1970s, several programs were established that significantly increased the scope of archaeological work within the Forests' zone of influence. Projects begun by the Forest Service and the U S Bureau of Land Management (BLM) included inventory, evaluation, research, and enhancement of heritage resources These activities, started because of new legal mandates for Federal agencies, had the effect of dramatically increasing the number of known archaeological sites Also in the 1970s, Shasta College, under the direction of Ed Clewett, conducted archaeological investigations at a number of sites in Shasta County, most notably the Squaw Creek srte near Shasta Lake

While knowledge of prehistory in this area is still limited, enough is known to suggest a broad outline of developments It appears that the local area was initially populated some 7,000 or 8,000 years ago by people with a fairly sophisticated stone technology and a hunter-gatherer economy Evidence of these early cultures is rather scarce, but over the next several thousand years most areas throughout the Forests appear to have been inhabited, at least seasonally During the last 2,000 years, there is reason to believe that important changes took place in hunting and food processing technologies, in patterns of settlement, and in ethnic distributions

During the past several years, there has been an increased use of herrtage resources and associated records by outside parties Archaeological excavations have been carried out on National Forest lands by various organizations ncluding academic institutions and private consulting firms This work has been sponsored by the Forest Service, as well as the California Department of Transportation CALTRANS) and Santa Fe Pacific Timber Company. Other agencies, such as the U S Bureau of Reclamation,

Pacific Gas and Electric Company, and vanous private consulting firms have sponsored inventones of National Forest lands These types of activities and passage of the Archaeological Resource Protection Act of *1979* (Public Law *96-95)* require increased consultation with local Native American groups to insure that their heritage concems are adequately considered Publication of the Untform Regulations (36 CFR *296)* for Public Law 96-95 also requires determination of which herrtage resources are or are not of "archaeological interest"

Management Opportunities

Probably the most pressing and recurring problem with hentage resource management has been assessing the value of such properties. Future management strategies should include having this information available for decision makers It is expected that actions being taken by the State of California (Office of Historic Preservation) and the Pacific Southwest Regional Office of the Forest Service. to prepare schematic designs and update the State Histonc Preservation Plan, will provide some useful guidance for assessing values Addrtionally, the conscientious use and updating of the overviews mentioned above will provide a useful reference

The management of historic sites, particularly standing structures, will require special attention. Direction for those sites should comply with the Secretary of the Intenor's "Standards for Rehabilitation and Guidelines for Rehabilitating Histonc Buildings" (revised 1983) A recently signed Programmatic Memorandum of Agreement (State Histonc Preservation Gftice, Forest Service. and Advisory Council of Histonc Preservation) for fire lookouts and other historic properties also provides direction

Opportunities also exist to increase the Forests' involvement with Native Amencan tnbes and spiritual leaders Recent legislation and other actions by the Federal Government will require agencies. such as the Forest Service, to more directly involve Native Amencans in their decision-making process The Native American communrties in California and elsewhere are also becoming increasingly active in seeing to it that Federal agencies protect areas of religious significance and return items that were excavated without their knowledge

The archaeological and Native Amencan resources of the Shasta-Trinity National Forests have long been of interest to the scientific communrty In recognition of that interest the Forest signed Participating Agreements with Shasta College and California State Universrty, Chico, in 1988, to cooperate in a long-term program of archaeological exploration Additionally, Forest personnel have signed an agreement with Local Indians for Education, Inc , to develop projects concerning Native American history and culture

II. lands

Public Issues

No public issue specifically addresses lands

Current Management Situation

Landownership. There are a variety of complex landownership patterns within the boundaries of the Shasta-Trinity National Forests This diversity of ownenhip results from disposals of land under a variety of public land and mining laws enacted before and after the Forests' establishment The Timber and Stone Act, Homestead laws, General Mining Laws, grants to schools, and railroad land grants are examples. A large portion *of* the Shasta-Trinity National Forests has a "checkerboard" ownership pattern which is a result of the railroad grants

The complex landownership pattern can diminish the effectiveness and benefits that can be derived from the Forests The intermingled ownership results in increased costs for boundary line establishment and maintenance, the need for right-of-way acquisition, complexity *of* fire protection and general administration, occupancy trespass, a demand for special uses, and increases in complexity of other basic realty management and protection responsibilties.

Conversely, the need to consolidate in areas where the intermingled lands are large tracts of single private owners may not be needed when there are advantages of retaining the mixed ownership pattern, and there is an opportunity to promote better land use of the total area through coordinated efforts with the private landowner Simplification of ownership may be of secondary importance when considered wth respect to achieving an ownership mix that will maximize overall benefits to the public

There are approximately 631,000 acres of non-Federal ownership within the boundaries of the Shasta-Trinity National Forests This represents about 22 percent of the gross acreage Approximately 20 percent is in large ownerships and 2 percent in small ownerships Management problems include

Large Ownerships:

a. Require a large and expensive landline location program and rights-of-way program, and

b. There have been disagreements over road maintenance responsibilties and standards in using joint road systems

Small Ownerships:

a Preference for privacy substantially increases the difficulty in acquiring needed rights-of-way,

b There may be attempts by residential occupants to eliminate logging trucks from roads crossing their property,

c There may be attempts by landowners to restrict/control forest management practices on adjacent National Forest land,

d Landowners may expect high quality maintenance on National Forest access roads,

e Landowners may desire or need to use adjacent National Forest land for private uses, and

f Inadequate surveys improperly locate private landlines

Land exchange is the principal method for accomplishing landownership adjustments The Forests' land adjustment program is the vehicle used to develop and implement a coordinated program of adjusting ownership patterns to optimize the public benefits and administrative effectiveness of the Forests, consistent with private landowner's needs Land exchange proposals must be mutually agreeable to the Forest Service and the private landowner, neither can force an exchange on the other The land adjustment program has varied from a low *of* 700 acres acquired in 1989 to a high of about 30,000 acres in 1982

The major portion of the Forests' large *landownership* adjustment program, dunng the past 12 years, has been with Santa Fe Pacific Timber Company (formerly Southern Pacific Land Company) In addition, exchanges with Roseburg Resources Co, John Hancock Mutual Life Insurance Company (successor to Champion International), and Sierra Pacific Industries (successors to Santa Fe Pacific Timber Company) have been completed as well **as** iumerous small exchanges with individual owners

During the Carter Administration, there was a proposal to do an interchange with the Bureau of Land Management (BLM) However, most of the lands managed by the BLM are outside of the National Forest boundary, and there is

no authority to acquire these lands At present, there is a land exchange going on with the State of Calrfomia for lands in and around Castle Crags Wilderness and various isolated parcels in the Shasta and Tnnrty National Forests

Non-Recreational Special Uses. The Forests' ownership pattern necessitates that some occupancy and use of National Forest lands be permrtted so that private *or* other public lands can be appropriately developed or used Special use permits are issued, when proper, upon compliance with reasonable conditions for the protection and administration of the National Forests

The issuance of special use permits can affect some management activities on the Forests For example, there may be restrictions on logging or aerial spraying of herbicides near domestic water developments Some problems related to special uses are loss *of* land for other forest uses, erosion or other resource damage from inadequate maintenance. and inadequate funding for proper on-the-ground administration Currently there are about 800 non-recreation permits, half of which are for roads These permits occupy about 3,000 acres of National Forest lands

Withdrawals. Forest lands are withdrawn from mineral entry when they are near roadside zones or administrative. recreation, and power sites Some lands are also withdrawn by Congress or at the U S Department of Agriculture level for wildernesses, research natural areas (RNAs), and wild and scenic riven In compliance with Public Law 94-579 (Section 204), each agency level withdrawal is reviewed in conjunction with the Secretary of the U S Department of the Interior to determine whether the withdrawal should continue and for how long The law required that the reviews be completed by October 21, 1991 The review has been completed for the Shasta-Trinity National Forests, and recommendations have been submrtted to the BLM Final action by that agency has not yet been taken Currently there are 276 withdrawals that encompass 927,000 acres Of these acres, 920,290 are for wilderness, power, wild and scenic rivers or the Whiskeytown-Shasta-Tnnity National Recreation Area (NRA)

The only significant management problem related to withdrawals concerns power-sites They must be revoked or vacated by the Secretary of the Interior on those lands transferring to pnvate ownenhip through an exchange This has delayed some exchanges because the process usually takes at least two years

Rights-of-way. There is a continuing need to acquire nghts-of-way for all improvements, such as roads and trails, over private or other lands not administered by the Forest Service The acquisition document is usually an easement deed The objective is to acquire rights-of-way adequate for the protection, administration, and utilization of the National Forests or, where necessary, for the use and development of the resources upon which communities within or adjacent to the Forests are dependent Right-of-way acquisition varies from 4 to 30 cases per year, the average is about I5 cases per year

Occupancy Encroachment. A signficant number of occupancy encroachment cases is being discovered in conjunction with the landline program The encroachments vary from minor uses to signficant improvements and/or structures Some encroachments will qualify and can be resolved under the Small Track Act (Public Law 97-465) This Act was passed by Congress on January I2, 1983

Land Line location. There are about 3,100 miles of property line boundary between National Forest administered land and private property Nearly 40 percent of the mileage is surveyed and posted to standard The remaining property lines will be surveyed and posted as funding allows Approximately 150 miles *of* landline have been surveyed annually during the last five years

Transportation and Utility Corridors. Three major corridors have been identified on the Shasta-Tnnrty National Forests

a Interstate 5-Sacramento River Corridor.

b Oregon-California Gas/Power Transmission Intertie Corridor, and the

c Trinity Highway-State Route 299 Comdor

These corridon contain many land uses including pipeline transmission. electrical transmission, railroads, State and Federal highways, and water-oriented recreation No single-purpose use can be identfied within any one corridor

Electronic Sites. Eleven designated multi-user electronic sites make up the existing network on the Forests Each of these sites has the potential for expansion A management requirement for electronic sites is to maintain separation of uses to avoid interference

Illegal Occupancy. There are many illegal occupancies associated with mining claims on the Shasta-Trinity National Forests Most of these occupancies occur on the Tnnrty side Persons are considered in trespass when they con-

struct and/or use residences or other facilities on mining claims when such facilities are not essential for exploration and development of those claims. They are clearly in trespass when there is no evidence of valuable mineral deposit within the intent of mining laws To be authorized, occupancies must be covered by an approved plan of operations according to the regulations found in 36 CFR 228

Hydroelectric Power. Hydroelectric power is the major energy resource associated with the Forests The Pit River contains five power houses operated by PG&E with a combined maximum capacity of 627 megawatts of power The Bureau of Reclamation operates the Shasta Dam with a maximum capacity of 625 megawatts and Trinity Dam with a maximum capacity of 100 megawatts of power Water from the McCloud Reservoir is diverted to the Pit River operation via Iron Canyon Reservoir Water is also diverted from Trinity Lake to Whiskeytown Lake via the Judge Francis Carr Powerhouse In addition to these large developments, there are four exempted (from FERC licensing) small hydro projects and one licensed small hydro project on the Forests, all west of the I-5 corridor There are four small hydro projects on private land in the Big Bend area east of the 1-5 corridor and south of the Pit River Only three small projects are being considered for development: all of them are on the Trinity side.

Management Opportunities

Large landowners, such as timber companies, are aware of the management and economic benefits resulting from mutually agreeable land exchanges Consequently, there are more opportunities for large exchanges than can be handled in the future There are also many opportunrties for small exchanges with individual landowners

Long-range landownership adjustment planning is needed to supplement management direction in the Forest Plan and to make visible the role of land adjustment actions in support of resource management

The anticipated future outlook is for an increasing number of special use permits as private lands within the Forests' boundary are more intensively developed

About 100 miles of road and 45 miles of trail rights-of-way are still needed for the existing transportation system The mileage will increase slightly until the transportation system is basically completed in about 20 years The existing right-of-way acquisrtion program should be completed in 10 years

Numerous peaks and ridges in the Forests could be used as electronic sites. Seven of these have been identified for expansion of the electronics site network, should the need arise

Opportunities for small hydro development are numerous, especially west of the 1-5 corridor The natural features of the area, such as high gradient streams draining large watersheds, make the Trinity side attractive Other factors such as local environmental concerns, reduced tax breaks, lack of capacity on existing transmission lines, and high construction costs reduce the viability of many opportunities

12. Law Enforcement

Public Issue

N o public issue was raised dealing wrth law enforcement

Current Management Situation

Shasta-Trinity National Forests penonnel administer their responsibilities for regulating and protecting National Forest lands under Title 36 of the Code of Federal Regulations (CFRs) and appropriate sections of Titles 16, 18, and 21 of the United States Code

According to the US Constitution the authority and responsibility to protect citizens and their property and the general police power is reserved to the States Except in specific areas, the States have delegated their general police powers to city police departments or local county sheriffs

While the Forest Service does not assume the sheriffs responsibilrties in such matters, it is essential that the Agency continues to provide and enforce 36 CFRs which govern public behavior Specific examples relate to the rights, safety, and enjoyment of other users in full partnership wrth local law enforcement agencies

Although only a small percentage of visitors and users on the Shasta-Trinty National Forests commrt violations, the number of law enforcement incidents is rising steadily due to an increase in the following

a visitors and users,

b conflicts between users

c enclaves of lawlessness on National Forest and adjacent lands,

d users involved in illegal activities: and

e the trend toward increased criminal activity in areas suffering from economic depression or uncertainty

The Shasta-Trinity National Forests have cooperative law enforcement agreements with Shasta, Siskiyou, Tehama, and Trinity Counties The services provided by the Sheriffs of these counties protect recreation users and their property These services are reimbursable under the unsdiction Act of August 10, 1971, (Public Law *92-82)* from National Forest appropriations. The Forests have good working relationships with all four County law enforcement agencies

Shasta-Trinity National Forests' personnel also cooperate routinely with other State and Federal agencies such as the California Department of Fish and Game, Callfornia Highway Patrol, Federal Bureau of Investigation, U.S Marshal's Office, and various drug enforcement agencies

Local law enforcement agencies are small and operate with constrained budgets Incidents and crimes normally associated with urban areas, such as robberies, assaults, burglaries, narcotics trafficking, and cannabis cultivation, occur on the Forests and are increasing This situation leads to limited resources and delayed responses by responsible agencies, which in turn can expose Forest officers and visitors to potential personal risk

Management Opportunities

The time-tested success of the philosophy that all Forest Service employees have law enforcement responsibilities will continue and will be strengthened

The increase in volume and seriousness of law violations and the complexty and diversity of law enforcement situations occurring on the Forests today requires professional law enforcement support This support requires that additional employees be trained and equipped to function in a full law enforcement capacty

13. Minerals

Public Issue

One public issue relates to minerals That issue is

How can mineral development and exploration be encouraged while minimizing adverse impacts to non-mineral surface resources? (Public Issue #8)

Discussion of Public Issue

Mineral development is permitted on all lands not withdrawn from mineral entry These rights are subject to pnor existing rights in wildernesses The United States Mining Laws (30 U.S.C. 21-54) confer a statutory right to enter upon public lands to search for minerals Regulations found at 36 CFR 228 Subpart A set forth the rules and procedures so as to minimize adverse environmental impacts on National Forest resources In particular, part 228 8 sets forth requirements for environmental protection. including reclamation A combination of regulations and standards and guidelines define the bounds for developing the mineral resource They call for operating in an orderly and environmentally sound manner

Current Management Situation

Forest Service policy is to encourage mineral exploration and development The Forest Service integrates the development and use of mineral resources to the fullest extent possible under the laws governing mineral disposal

The prospecting, locating, and development of mineral resources within National Forests is authorized by the Organic Act of June 4, 1897 The Act also allows the Secretary of Agriculture to set rules and regulations in connection with operations authorized by mining laws These regulations, which minimize adverse impacts on the resources or define procedures, can be found in 36 Code of Federal Regulations (CFR) 228 - Subpart A - Locatable Minerals, 36 CFR 228 - Subpart C - Disposal of Mineral Materials, 36 CFR 228-Subpart E-Oil and Gas Resources, and 36 CFR 293.14, Mineral Leases and Mineral Permits (in wildemess).

The delegated authority to manage locatable and leasable mineral resources is retained by the Secretary of the Intenor. More specfically, the Department of the Interior, Bureau of Land Management (BLM), has the major role in issuing and supervising operations on mineral licenses, permits, and leases The principal authorities which relate to the exploration and development of the leasable minerals (i e , oil and gas and geothermal) are (1) The Mineral Lands Leasing Act of 1920, (2) The Mineral Leasing Act for Acquired Lands of 1947, and (3) The Geothermal Steam Act of 1970, as amended Oil and Gas and Geothermal leasing is administered by the BLM through a competitive and non-competitive leasing system

The Federal Onshore Oil and Gas Leasing Reform Act of 1987 authorized the Secretary of Agriculture to develop regulations (36 CFR 228-Subpart E) governing leasing for oil and gas resources, including bonding and reclamation requirements, wthin the National Forest System. This activity was formerly exercised by the BLM These regulations ensure effective compliance wlth applicable environmental protection statutes, as well as meeting the intent of the Leasing Reform Act

Agreements embodied in Memorandums of Understanding between the Secretaries of Agriculture and Interior that share various work processes are found in Forest Service Manual (FSM) 1500, External Relations The authority for the management and disposal of mineral materials including, but not limited to, common varieties of sand, stone, gravel, pumice, pumicite, cinders, and clay lies with the Forest Service The detailed authorties and direction for locatable minerals, mineral leasing, and mineral sales are in FSM 2800, Minerals and Geology

Access for mineral exploration and development is generally unrestricted, subject to the mitigation of advene impacts to surface resources Exceptions to unrestricted access are wildernesses, Wild portions of Wild and Scenic Rivers, botanical areas, Research Natural Areas (RNAs), the National Recreation Area (NRA), and areas which are withdrawn from mineral entry Minerals in the NRA are not locatable but they are leasable

Access to wilderness, the NRA, and other lands withdrawn from mineral entry, for mineral related activities, is subject to valid existing rights The type of access xuthorized must be consistent w t h proposed use and of a type that will maintain the special character of the area to the extent possible.

Voteworthy minerals in the Forests, based on past and present mining or exploration interest, are gold, limestone, copper, zinc, iron, manganese, chromite, barite, oil and gas, geothermal energy, sodium, and rock aggregate.

Locatable Minerals

Gold. Gold is the primary mineral of interest involved with prospecting and mining on the Forests Average gold prices for the last seven years have ranged between $350 and $450 per troy ounce. Thus, the number of exploration and mining operations has remained relatively stable Since gold deposts on the Forests are not the high volume/low grade deposits amenable to cyanide heap leaching, there has not been the large increase in gold production that has occurred elsewhere in the western Untted States

There are a large number of small, active placer gold mining operations in the streams flowing through the allwial gold-bearing areas of Shasta and Trinity Counties Many operations use suction dredges to recover the gold from the placer deposts Dredge size varies from 2 to 12 inches in intake diameter, with 3 to 6 inches being the most common Some placer deposts are mined using heavy equipment High investment needs and operating costs are major deterrents to these larger operations

Lode deposts, by contrast, are those containing veins or mineralized zones in consolidated bedrock and not alluvial placer deposts These deposits were historically mined in the Hayfork, Upper Canyon Creek and east and west Shasta massive sulfide Districts Prospecting, exploration or mining activities continue to occur in these areas as well as the area southwest at Mt Shasta

Desptte inadequate statistics on the subject, it is obvious that gold mining is economically significant in areas of the Shasta-Trinity National Forests The gross retail sales of mining equipment and supporting vehicles amount to many thousands of dollars annually To this may be added the sales of gasoline, spare parts, tires, supplies, and accessories, as well as the repair and maintenance services required

The relatively stable price range of gold should continue to support ongoing mining operations The small dredging operations on the Forests will probably continue at about the same pace

limestone. A 50 to 100 million-ton limestone deposit has been identified southeast of Hayfork There are several other good limestone deposts around Shasta Lake Past interest in the limestone depost near Hayfork indicates that it could be mined for use in sugar processing when market condtions improve The deposit is too far from sugar refineries to be economically competitive wth other limestone sources at this time

Iron. A 30-million-ton iron deposit (34 percent iron) has been identified in the Shasta Unit of the NRA The depostt is on a highly visible point which is seen from Interstate 5, this portion of the lake is heavily used by recreationists No plans have been made to allow for the development of the iron deposit at Shasta Lake

Copper/Zinc/Barite. The east and west Shasta copper/zinc districts extend onto National Forest lands west and south of Shasta Lake A copper deposit has been identified at Bully Hill Barite deposts have been mined near Girard Ridge where the potential for new discoveries still exists No mining activity is anticipated for the known deposts of copper, zinc, and barite because of the current market and economic situation

Manganese/Chromite. Both manganese and chromite ore were mined from the Forests during the two World Wan and the Korean Conflict for the purpose of increasing Federal stockpiles Development of these minerals was heavily subsidized by the Govemment for war purposes, but the deposts are probably subeconomic at the present time The minerals are considered strategic because the United States imports more than 50 per cent of its needs from foreign sources The local deposits could become valuable during National emergencies

Leasable Minerals

Oil and Gas No oil or gas deposits are known to exist in the Forests Young, sedimentary sections, particularly the Hornbrook formation, are prospective source rock for the origination of hydrocarbons Not until one or more exploratory wells are drilled through the thick layer of volcanic and sedimentary rock on the east side of the Shasta Forest will it be known whether the area is a hydrocarbon source

The Federal Onshore Oil and Gas Leasing Reform Act was passed in 1987 Subsequent to this Act, the United States Department of Agriculture, Forest Service, promulgated regulations 36 CFR 228 Subpart E on January 9, 1990 Part 228 102(b), Scheduling Analysis of Available Lands, requires that Forest Supervisors shall develop, in cooperation with the BLM and public input, a schedule for analyzing lands under their jurisdiction that have not been already analyzed for leasing The Forest Supervisors shall revise or make addttions to the schedule at least annually Part 228 102 (c), Leasing Analyses, defines the procedure in detail and states that the analysis shall be conducted in accordance with the requirements of 36 CFR 219 (Forest Land and Resource Management Planning) and/or, as appropriate, through preparation of NEPA documents

Analysis for the development of potential oil and gar deposits on the Forests will be done upon receipt of an application for development and/or as funding is available In either case, the analysis will comply with NEPA requirements

Geothermal Energy. Geothermal energy is the natural heat of the earth captured by means of superheated steam, hot liquid, or hot dry rocks in reservoirs at depths ranging from a few hundred feet to over ten thousand feet This energy is legally specified as a mineral resource The eastern portion of the Forests (Shasta side) is of recent volcanic origin with lava flows, cones, volcanic vents, and hot springs As such, there may be potential for the presence of geothermal resources

The Geothermal Steam Act of 1970 (Public Law 91-581), as amended, authorizes the Secretary of the Interior to issue leases for the exploration, development, and utilization of geothermal resources on National Forest lands

The Shasta-Trinity National Forests have existing geothermal leases in or adjacent to the Glass Mountain Known Geothermal Resource Area (KGRA) located near Medicine Lake *Most* of the KGRA is on the Modoc National Forest All leases in a designated KGRA are issued through a competitive bidding process This designation in itself suggests a high potential for the presence of geothermal resources

Fifty percent of the rental fees, bonus bids, and royalties denved from oil and gas or geothermal leases is placed in the Federal Treasury The other 50 percent is returned to the State Forty percent of the State's share is then dispensed to the County of origin

Sodium. There is an inactive sodium lease on the Trinity Forest The deposit may eventually be mined

In contrast to mineral activities, authorized by the Mining Law of 1872, the leasing of leasable minerals (oil, gas, geothermal, sodium, and hard rock minerals existing on acquired lands or within an NRA), is a discretionary action of the Secretary of Interior The removal of leasable minerals is authorized only by a lease If an application for lease is received, the Forest Service makes a recommendation to the Department of the Interior as to whether a lease should be issued and whether special stipulations should be required Post-lease activities are managed by the BLM through a permit process

Future oil, gas, and geothermal activities are unknown

Common Variety Minerals

Forest personnel have complete . rock aggregate inventory This inventory is a compilation of the location of past and present rock pits, pertinent test information, and estimates on the quantity and qualrty of material available This inventory can be used to assess the availability of rock aggregate throughout the Forests Removal of common variety minerals materials is regulated by 36 CFR *228,* Subpart C by issuance of a mineral materials permit

Based upon historical data in the use of aggregate for various types of surfacing, the Shasta-Trinity National Forests use 60,000 to 75,000 tons of aggregate each year Much of this aggregate comes from sources on land administered by the Forests

Meaningful estimates on the quantrty of earth borrow used on the Forests are impossible to determine. Most earth borrow is used in roadway construction and is balanced to minimize waste between excavation and embankment for each project

The mineral materials involve discretionary actions on the part of the Forest line officers and may be disposed of by free use permit, negotiated sale, or competitive sale These activities are managed by the Forest Service through a permit process

Based on past use and trends, it appears that the Forests will use between 50,000 and 65,000 tons of aggregate per year for the next 10 to 20 years It is anticipated that much of this material will continue to come from sources on National Forest lands

Withdrawals, Mineral Reservations, and Outstanding Rights

Withdrawals from mineral entry are restricted to Wilderness, developed recreation sites, *RNAs,* Wild portions of the Wild and Scenic Rivers System, the NRA, and administrative sites such as offices and work centers There are 927,000 acres currently withdrawn in all categories Restoration of a withdrawal to mineral entry will be requested when the need for it ceases to exist Mineral activities within withdrawals are subject to valid existing rights obtained prior to date of withdrawal

There is a small amount of acreage of outstanding mineral rights on the Forests with considerable variation in the type of reservation These reservations are considered in the

management of the surface resources on a case-by-case basis

Management Opportunities

Mineral development will be a permitted activty on all prescnptions except Prescription X, Special Area Management, and Prescription XI, Heritage Resource Management The right to develop minerals will continue to be subject to pnor existing nghts in wrthdrawn areas, pnmarily Prescription V, Wilderness Management

Future mineral development depends on having reasonable access to deposits covered by mining claims or leases The Forests' can accommodate this need through approved plans of operation when such plans are required under 36 CFR 228 Miners can use Forest roads the same as other members of the public, subject to the Secretary's rules and regulations

If there are changes in the demand for traditional forest uses, there may be a corresponding increased future need to withdraw certain areas from mineral entry These areas would be withdrawn in order to maintain other public values or to reserve an area for a particular public purpose or program (e g , campgrounds, administrative sites, and RNAs) Such actions reduce the opportunity for mineral development Withdrawal should, therefore, be done carefully on a selective basis and only where the need to protect the public value of the special feature outweighs the potential mineral values foregone

The 1990 RPA target (estimate) for the decade 1990-2001 was 109 plans of operation per year Expectations for the future are for less activity for the following reasons:

The California Wilderness Act of 1984 withdrew 483,618 acres of Shasta-Trinity National Forests land from appropnation or disposrtion under the mining laws and mineral leasing laws The withdrawal mainly affects locatable minerals on the Forests

No new mining claims may be located wrthin wildernesses, and no new ground-disturbing exploration or prospecting activities may be conducted All existing claims wrthin a wilderness must contain a verifiable discovery as of September 28, 1984 If a discovery has not been exposed within the limits of the claim pnor to the withdrawal date, the claim is not valid Plans of operation for invalid claims within a Wilderness cannot be approved As such, pnor to approving a plan of operations providing for mineral activities wrthin a Wilderness, a determination will have to be made as to the validty of any claimed rights

About seven plans of operation have been approved each year for mining activities wrthin what is now the Trinity Alps Wilderness These plans are approved only when pnor existing nghts have been determined

Geothermal lease applications have already been filed on all known areas of geothermal potential within the Forests Many of these leases, which were on the slopes of Mt Shasta, have been vacated Few new applications are expected to be processed in future years

14. Range

Public Issues

Two major issues have emerged with regard to range

a. **Is livestock grazing an appropriate use of wilderness? If so, how should conflicts be minimized between livestock use and recreationists? (Public Issue #9)**

b. **How should livestock grazing be managed to minimize degradation of riparian areas? (Public Issue #10)**

Discussion of Public Issues

a. livestock Grazing/Wilderness

There are eight livestock grazing allotments wthin, or partially within, the Trinity Alps Wilderness

Allotments wthin the Trinity Alps Wildemess administered by the Shasta-Trinity National Forests are

- Big Bar Allotment - 30 head from June 1 to October 31.
- Battle Canyon Allotment - 42 head from July 15 to October 15,
- Trinity River Allotment - Inactive

Allotments partially wtthin the Trinity Alps Wilderness administered by the Klamath are

- Carter Meadow Allotment - 31 head from July 16 to October 15,
- South Fork Allotment - 32 head from July 16 to October 15,
- Granite Fox Allotment - 36 head from July 16 to October 15,
- Eagle Creek Allotment - 40 head from July 16 to October 15,
- Mill Creek Allotment - 50 head from July 16 to October 15

Livestock grazing on these allotments is a continuation of use that predates the establishment of the Trinity Alps Wilderness

b. livestock Grazing/Riparian Areas.

Within the lands grazed by livestock are many miles of streams and numerous lakes, ponds, spnngs and wet meadows There are about 25,000 acres of ripanan areas wthin the grazing allotments on the Forests Because of the proximity of water, livestock tend to graze in and/or near these riparian areas Wthout proper management, this could result in overgrazing and in a reduction in riparian resources

Current Management Situation

Historically, livestock grazing on public land reached its peak during the late 1800s and declined over the next 50 years The decline in permitted stock on public land was largely a result of a reduction in livestock numbers (primarily sheep) to achieve proper stocking rates In addtion. more reliance on family-owned ranching operations led to decreased demand.

About 2,350 head of cattle, 2,120 sheep, and 45 horses graze under permit on 26 allotments on the Shasta-Trinity National Forests. These figures total 8,245 animal months (AM) (NOTE An AM is one months use and occupancy of the range by one animal) There are five empty grazing allotments on the Forests Twenty-nine permittees are dependent upon the Forests' range resource to complete their ranching operations An addtional 585 AMs of grazing, for 195 cattle, are permitted on seven (five wtthin Wilderness and two outside) allotments administered by the Klamath National Forest Park of these allotments are located within the Shasta-Trinity National Forests This use involves four addtional permittees

There are 245,834 acres of National Forest lands suitable and/or potentially suitable (may need investment-type improvements) for grazing (see Table III-10). This total includes. transitory range (177,583 acres), primary range (51,521 acres) and secondary range (16,730 acres) If all the land suttable or potentially surtable for grazing was made available, more than 72,900 *AMs* could be realized This figure consists of 46,390 *AMs* from transitory range, 21,070 from primary range, and *5,460* from secondary range These outputs assume 1,000 pounds of forage per

AM, using 50 percent of the current annual growth for plantviabilrty and taking into accountreductions for wildlife forage Such outputs also assume the need for additional investments for water, distribution, and other needs

Table Ill-I0 further describes current capabilities and suitabilities of livestock grazing areas on the Shasta-Trinity National Forests Conditions ofthis range vary from poor

Primary Range, Acre	7,951	8,524	-	776	5,265	26,536	2,469		51,521
Secondary Range, Acre	690	-	756	1,339	13,945		-		16,730
Transitory Range, Acre							-	177,583	177,583
Total Range/Acre	**8,641**	**8,524**	**756**	**2,115**	**19,210**	**26,536**	**2,469**	**177,583**	**= 245,834**
Estimated Current Forage Productivrty (M Lbs /Acre)**									
Pnmary Range.	3,975	5.144	-	388	2,369	7,961	1,235	-	21,072
Secondary Range	345	-	151	670	6,275				7,441
Transitory Range							-	84,352	84,352
Total Potential Productivity (M lbs./Acre) Estimated AMs* **	4.320	5.144	151	1,058	8,644	7,961	1,235	84,352	= 112,865
Adjusted Potential Productivity **** (M Lbs Acre)									
Adjusted Estimated AMs	2,376	2,829	83	581	4,754	4.378	679	46,393	= 62,073
Potential Forage Productivity Increase (25%) Over adjusted Productivity (M Lbs /Acre) *****									
Primary & Secondary Range	594	707	21	145	1.189	1,095	170	-	= 3,921
Transitory Range							-	11.598	11,598
Total Potential Productivity (M Lbs /Acre) Potential Adjusted AMs	2,970	3,536	104	726	5.942	5,472	849	57.991	= 77.590

* Includes Chaparral, Bitterbrush. Ponderosa pine, Jeffrey pine, and mixed confer

** M Lbs /Acre = 1,000 pounds per acre

*** AMs = animal months, total potential productivity from **all** range lands

**** Total potenbal productivity from all suitable range land i e adjustments made for slope, remoteness, wildernesses, distance to water, access, vegetabve quality, and allotments managed by the Klamath National Forest

***** 25 percent productivity increase was calculated for pnmary and secondary ranges only For transition ranges. two adjustments for potential forage productivrty were made (1) 75 percent reduction was applied to existing transition range due to intensive timber management practices, and (2) additional productivrty amounts were added back in for brush conversion

to good, with 5 percent being poor, 70 percent being fair, and 25 percent being good

Less livestock grazing over the past decade has resulted in improved range land conditions in some areas. Only about one-third of the suitable range land is grazed because of the low demand for livestock grazing in this area

Primary and secondary ranges consist of meadows, glades, and grasslands ranging from open types to open-timber/bunchgrass types on slopes under 40 percent. Most of the latter type occurs on the north-central and northeastern portions of the Shasta National Forest Mt Shasta and McCloud Ranger Districts have significant areas of open park-like grazing lands While some natural encroachment by trees is occurnng, these areas should remain suitable as forage areas for decades to come

Most transitory range exists as a result of recent regeneration cutting or other timber management activities These activities have opened up the overstory tree canopy, allowing the establishment of a forage base of grasses, forbs. and browse

Most of the allotments on the Forests (except Mt Shasta and McCloud) occur predominately on transitional ranges which include some scattered grass/forb openings or parks **A** reduction in the amount of land being managed for timber production will reduce the amount of area in early seral stages (grass/forb/young browse) This, coupled with the in growth of timber stands into areas previously cut, will reduce the overall amount of available/suitable transitory range land

Livestock grazing problems on the Shasta-Trinity include (1) grazing within high use recreation areas and wilderness where there is a potential conflict with recreational and other resource values, and (2) grazing within riparian areas where there is a potential conflict with sensitive plants and other riparian values

The Shasta-Trinity National Forests have had very few predation problems associated with any livestock allotments Over the last ten years, there have been no requests by permittees to bring in or provide for any type of predator control measures Should such problems arise in the future, the Forests would work through the existing process and appropriate agencies to provide for such an effort.

Management Opportunities

It is expected that the demand for Forest range lands will remain at, or decrease slightly from, current levels over the next decade If increased demand for range land should occur, it could be accommodated in some areas by the development of suitable range that would not be in conflict wrth other resource uses Costs of development could be shared between the permittee and the government, thereby increasing the feasibility of such improvements

Most poor and fair range conditions and damaged riparian habrtats can be improved by using management practices such as: shifting or establishing grazing systems, fencing riparian pastures, developing site specific allotment management plans, and combining or changing allotment boundaries

Few opportunities exist for increased or reestablished grazing within the Trinity Alps or Yolla Bolly-Middle Eel Wildernesses

15. Recreation

Public Issues

Three major public issues emerged with regard to recreation

a **How much of the Forests should be open, closed, or restricted to off-highway vehicle (OHV) use? (Public Issue #11)**

b **How should the Forests supply water-oriented recreation facilities and opportunities to meet increasing demand? (Public Issue #12)**

c To **What extent should Mt. Shasta be allocated to prescriptions that would allow or encourage downhill skiing or other management activities that might conflict with the wilderness or cultural resource values in the area? (Public Issue #22)**

Discussion of Public Issues

a **Off-Highway Vehicle Use.** Concerns have been expressed that OHV use can cause damage to soil, water and wildlife resources The use of OHVs has increased while the lands open to this use have decreased In addition, conflicts can occur between various OHV users and other recreationists

b **Water-oriented Recreation.** There is a state-wide public need for additional water-oriented recreation activities The Forests have the potential to supply most forms of such recreation However, the current supply of support facilities will not meet estimated demand Use conflicts can occur between various types of recreationists

c **Downhill Skiing / Mt. Shasta.** Over the past 15 years, since the demise of the old Mt Shasta Ski Area Many events have occurred that will effect the long term management of Mt Shasta Those events include the creation of the Mt Shasta Wilderness area, and the recognition of the Cultural and Native American values of Mt Shasta At issue is what kinds of activities should be allowed in the Mt Shasta area and where can they occur

Current Management Situation

The Shasta-Trinity National Forests are recognized nationally for the wide variety of outstanding recreation opportunities they provide Other Federal agencies, State and local governments, and the private sector also share in the type of recreation activities offered

Recreation on the Forests can best be described in terms of supply and demand Supply is the quantity of recreation facilities or settings available for visitor use. In the case of developed sites, supply is expressed in terms of capacity This is determined by the number of camping units or parking spaces available For dispened recreation, supply is expressed as a mixture of settings that are conducive to various activities The recreation opportunity spectrum (ROS) is used to describe recreation settings offered, they range from primitive to rural The recreation setting supply is measured in acres within each ROS class

Demand for recreation is more difficult to determine than supply Demand varies according to numerous factors associated with the preferences of recreationists and the settings offered One indication of probable demand, which is easily measured, is recreation use Current and projected use levels give an estimate of the recreation settings that may be needed in the future

Table 11-11
Recreation Opportunity Spectrum

ROS Class	Acres	1989 Recreation Use	Potential Capacity (PAOT)*
Primitive (P)	498,776	231,000	12,469
Semi-primitive Non-motorized (SPNM)	25,514	131,500	2,551
Semi-primitive Motorized (SPM)	544,139	696,500	136,034
Roaded Natural (RN)	1,052,498	1,757,100	2,631,245
Rural (R)	620	1,916,500	6,200

* PAOT - People-at-one-time

Recreation Supply

Recreation Opportunity Spectrum (ROS). ROS is a system that inventones National Forest lands for a variety of existing and potential recreation opportunities based on the size, distance from roads, and degree of development of a given area The ROS classes pertinent to the Shasta-Trinrty National Forests are Primitive (P), Semi-primitive Non-motorized (SPNM), Semi-primitive Motorized (SPM), Roaded Natural (RN), and Rural (R) These are defined in the Glossary in Chapter VIII

Inventoried SPNM and SPM categories include the majority of the 306,060 acres (within 29 areas) that were released for non-wilderness resource management under the 1984 California Wilderness Act (Refer to the Wilderness and Roadless Areas Section in this Chapter and to the Recreation Section in Chapter IV)

Current inventoried acres, recreation use, and potential capacity by ROS class are shown in **Table III-II**

Recreation Resource Information System (Infrastructure database). Recreation inventory and use data on the Forests has been collected for over 30 years The advent of the Recreation Information Management (RIM) System in the mid-1960s developed a valuable data system, however, RIM was abandoned in 1987 The Recreation Resource Information System (Infrastructure database) is currently being developed to meet a growing need for inventory and other data needs for the Forest recreation program A strong commitment to better data collection, as well as thorough demand analysis, is needed for future planning updates

Developed Recreation Facilities. Developed sites include campgrounds and picnic areas, observation and interpretive sites, fishing areas, boating and swimming sites, trailheads, recreation residences, marinas and resorts The ROS settings include the semi-primitive (motorized and non-motorized) and roaded settings (roaded natural and rural)

Approximately 1,300 acres are allocated to developed recreation areas on the Forests These include. 81 campgrounds with 1,355 camping units, 20 picnic areas with 127 units, 14 parking areas for boaters, 3 day use swim areas, and 20 resorts and marinas The total capacity of developed recreation facilities, estimated by the number of PAOT multiplied by the season of use (days), is 1,147,500 PAOT-days

Developed recreation use (1 5 million recreation visitor days [RVDs]) is at 65 percent of the theoretical maximum capacity for developed facilities (2 3 million RVDs) Regional standards state that if a Forest's developed facilities are reporting use greater than 40 percent of the theoretical maximum capacity, demand is exceeding supply Some developed sites on the Forests are overcrowded and many are in poor condition Most of the Forests' campgrounds were designed and constructed 30-50 years ago and are not suited to today's recreational pursuits Recreation budgets have not kept pace wrth facilities maintenance and reconstruction needs It is estimated that 90 percent of the developed recreation facilities on the Forests are operated below standard

Downhill ski facilities were in operation in the ski bowl on Mt Shasta between 1957 and 1978 Studies for possible redevelopment were delayed pending final wilderness allocation of the California Wilderness Act of 1984 *An* environmental statement was completed in 1988 The Record of Decision selected an alternative involving development of downhill skiing on 1,950 acres of National Forest land on Mt Shasta, with the potential to serve 4,800 skiers-at-one-time (SAOT)

A decision on subsequent appeals required the Forest Service to complete a supplemental environmental analysis Following completion of this document in 1990, several lawsurts were filed objecting to redevelopment of downhill skiing A decision by the US District Court on the first issue addressed in court proceedings has directed the 1990 Record of Decision to be subject to administrative review (appeals) A thorough review of the historic significance of Mt Shasta was completed by the Forest Service during 1993 With the concurrence of the State Historic Preservation office (SHPO), the Shasta-Trinrty Forests forwarded an eligibility recommendation for a portion of the Mountain (over 19,000 acres) to the Keeper of the National Register of Historic Places In March 1994, the Keeper issued a decision finding the entire Mountain (approximately 150,000 acres) eligible, based on its Native American traditional cultural values *As* a result of considerable public interest concerning the content and process of the Keeper's decision, an additional public comment period has been announced in the Federal Register New information and comments are being sought by the Keeper's office during a 60-day period Upon completion of the comment notice and disposition process the keeper could issue a revised or reaffirmed decision

Following completion of the Keepers review and decision, and a Forest Service review and evaluation of impacts of the proposed ski area on the historical property, a new Record of Decision may be issued announcing the start of

the administrative review period Following completion ofthe appeal process the original lawsuits may or may not be refiled in the U S Distnct Court

Mt Shasta Ski Park, located on a lower-elevation section of pnvate land, became operational forthe 1985/1986 ski season It has an estimated capacity of 2,000 SAOT

Dispersed Recreation Settings. Dispersed recreation settings include Forest roads and highways, backcountry areas, rivers, lakes, streams and wildernesses The ROS settings include the primitive, semi-primtive (motonzed and non-motorized) and roaded settings

Roaded settings include scenic byways, highways, wild and scenic rivers, lands adjacent to timber harvest areas, and many lakes within the NRA Developed recreation srtes are generally located wthin the roaded settings In addition to the developed srtes, there are opportunities for many kinds of dispersed recreation Because roaded settings are located on relatively gentle terrain with abundant access, most of the total acreage within the setting is usable The Forest has two designated scenic byways and potential for at least three addtional routes

Semi-primitive settings include wild and scenic rivers, large lakes and backcountry areas These settings provide remoteness, challenge, and solitude Some ofthese areas are managed for motorized travel by boat or OHV travel Other areas are managed for non-motorized travel by foot, horseback or mountain bike Location, access, and attractions affect the semi-primrtive areas level of use As with developed sites, some semi-primitive areas are lightly used Other areas attract enough use so that crowding and user conflicts occur In these settings, terrain and trail access may limit the usable area Although total acreage may be high, recreation use might be concentrated along a trail or shoreline Over the past ten years the need to manage dispersed sites has become important in popular areas in order to accommodate more people and maintain a quality experience for all user groups Support facillties, in the form of parking, signs, and sanitation facilties, have been inadequate

Many semi-primitive areas on the Forests have desirable attractions, but use is limited These areas generally lack an identrity, adequate signing, or published information Therefore, many potential vistors turn toward more publicized, Congressionally designated areas like NRAs and Wildernesses

The largest and most remote backcountry areas are classified as pnmrtive All ofthe pnmitive ROS settings on the Forests are within Congressionally designated Wildernesses There are five Wildemesses on the Shasta-Tnnty National Forests Castle Crags, Chanchelulla, Mt Shasta, Tnnrty Alps and Yolla Bolly-Middle Eel

The Forests' OHV Plan designates 239, 175 acres to cross-country travel An addtional 1,383,596 acres restrict OHV use to existing roads and trails because of highly erodible soils, steep terrain, critical wildlife habrtat or other resource conflicts About 500,000 acres on the Forests are closed to OHVs, primarily because of wilderness designation

A Draft Statewide OHV Motor Vehicle Recreational Trails Plan has been developed for the State of California Department of Parks and Recreation This plan presents the concept of a statewide OHV trail system that connects use areas to provide opportunities for long distance trail touring Although the State Plan identrfies specrfic route locations, it recognizes that the actual route may vary. Existing OHV trails and low-standard roads can serve as part of the statewide system and provide long distance touring opportunrties There are 4,300 miles of road on the Forests that are ideal for OHV travel Lands designated as semi-primrtive motonzed would be managed to provide a pnmtive recreation experience while maintaining motorized access.

Recreation Demand Current and Projected Use

The Shasta-Tnnity National Forests include 2 12,000 acres of the Whiskeytown-Shasta-Trinty National Recreation Area (NRA) The NRA was established in 1965 by Public Law 89-336. It is one of only 16 NRAs Nationwide Legislation provides that administration of the NRA be camed out under separate management plans These plans are to be reviewed and revised periodically

Recreation use on the Shasta-Tnnty National Forests is extremely high when compared to other National Forests in the United States It ranks among the top 10 in the Nation An estimated 4 1 million recreation vistor days (RVDs) occurred in 1989, this figure does not include 0 7 million RVDs related to hunting and fishing This use is the result ofthe unique and abundant recreation opportunrties which are easily accessible from Interstate 5, the primary north/south transportation corridor for the West Coast 1-5 passes directly through the Shasta Lake Unrt of the NRA and in close proximity to the Castle Crags Wilderness and the Mt Shasta Wilderness and Recreation area Between Shasta Lake and Mt Shasta the interstate parallels the upper Sacramento River From I-5, State Highway 299 west provides access to the Trinrty Scenic Byway, the

Trinity Unit of the NRA, the Tnnity Alps Wilderness, and the Trinity Heritage Scenic Byway.

The current (1989) recreation use of 4 1 million RVDs is distributed as follows

Developed Recreation (Public)--15 Percent. This includes campgrounds, group campgrounds, and picnic areas

DevelopedRecreation(Private)--IO Percent. This includes facilities under special use permit, such as resorts, campgrounds and recreation residences

Dispersed Recreation--70 Percent. This includes boating, hiking, car camping, backpacking, pleasure driving, horseback riding, cross-country skiing, snow play, river rafting, mountain biking, and OHV use

Wilderness--5 Percent. This includes hiking, backpacking, horseback riding, camping, mountaineering and rock climbing

Patterns and distnbution of recreation use on the Forests fluctuates during periods of drought

The 1989 RPA document, "*An* Analysis of the Outdoor Recreation and Wilderness Situation in the United States 1989-2040," lists 11 activities that are expected to exhibit the greatest growth in the number of recreational trips away from home In order from greatest to least are pleasure walking, pleasure driving, picnicking, stream/lake/ocean swimming, family gatherings, pool swimming, wildlife observation and photography and other outdoor photography, motorboating, bicycle riding and day hiking Of particular interest is the projected growth in demand to the year 2040 for the following water and snow activities 27 percent increase for motorboating and 233 percent increase for downhill skiing The Shasta-Trinity National Forests will play a major role in meeting these increasing recreational demands

Additional private sector demand is expected in the areas of downhill skiing, outfitter guide services, and resorts This increased demand is addressed in various NRA Plans, wilderness plans and other environmental documents Currently, there are over 1,000 recreation special use permits authorized on the Forests These include resorts/marinas, boat docks, houseboats, campgrounds, and recreation residences The majority of these permits are located in the NRA

The demand for use of five existing recreation residence tracts is expected to continue. However, the tracts occupy prime recreation lands adjacent to Shasta Lake and the South Fork Trinity River This situation puts the tracts in direct competition with recreation uses which would serve a greater segment of the public Periodic review of the demand for public use versus existing exclusive uses will be necessary through future use studies

Management Opportunities

An intensive and innovative recreation program is necessary to resolve resource management needs, people management needs, and the competition for diverse but ample recreation opportunities One way to meet this challenge is to emphasize the unique opportunities offered by various geographic theme areas This approach would disperse recreation use throughout the Forests, and would more fully utilize the many recreation opportunities (including interpretation of resource management practices for visitor education) Many of the opportunities listed in the theme areas correspond directly to the growth areas listed in the previously mentioned RPA document In addition, many partnership opportunities exist along the major Forest travel corridors (Interstate 5, State Highways 36, 89, 97, and 299) that could involve cooperative efforts between private businesses and public agencies (County, State and Federal)

Recreation Theme Areas. The conceptual organization of the recreation potential of the Shasta-Trinity National Forests into theme areas presents a framework for *ex*amining management opportunities over the next five decades Twelve geographic recreation theme areas are listed in **Table III-12** These theme areas respond directly to projected recreation demand increases identified in the 1989 USDA Forest Service RPA Assessment The objective is to identify and develop unique recreation experiences and activities offered by each theme area rather than to provide identical activities in all locations

The potential exists, depending on funding levels and visitor demand, to promote some or all of the theme areas to a greater or lesser extent, including developed and/or dispersed support facilities, interpretation and environmental education The potential also exists to identify and promote additional recreation opportunities offered by each theme area but not currently being used

Primary development opportunities would be promoting recreational potential at the rural community interface With sociological studies showing a trend by the American public to favor shorter recreation trips, day trips, and scenic driving tours (all close to community centers) opportunities abound for development of city-to-forest

Table III-12
Recreation Theme Areas

Major Theme	Recreation Opportunities
Rural Community Interface	City-to-Forest hiking and mountain bike trails, developed day use (pocket parks, group sites, daytnps. unique sites), environmental education and interpretive programs, partnerships with local businesses
Trinity Divide & Castle Crags	Dispersed car camping at lakes, high country summer/winter hut system, rock climbing, wilderness and non-wilderness backcountty
Mt Shasta Recreation Area and Wilderness	Visitor Information Center/Conference Center/Elderhostel, interpretation (volcanic, Nabve hencan, reforestation), winter sports, (skiing, snowmobiling), wilderness mountaineenng, scenic dnves
McCloud Rver (upper, reservoir, lower)	Rverside trail hiking, scenic tours, Visitor Information Station, coldwater fishing. developed sites
Mediune Lake Highlands	Volcanic interpretabon, scenic tours/byway mountain biking. snowmobiling, dispersed spelunking. hunbng
Main Fork Tnnty River	Highway access to nver opportunities (kayaking, rafting, recreabonal mining, group camping, river side biking), Trinity Scenic Byway, steelhead and salmon fishing, Visitor Information Stabon
Trinity Alps Wilderness	Wilderness backcounttytravel, wilderness educabon, alpine lake activities (photography, swimming, fishing)
Yolla Bolly & Chanchelulla Wildernesses/Tedoc Mountain	Day trips, unique sites, equestrian use, wlderness backcounttytravel, old growth forest
South Fork Trinity River/Chinquapin	River/forest solitude, fishing, spelunking, trails, old growth forest (environmental educabon, watershed)
Shasta Unit of the NRA	Developed sites. Visitor Information Center, interpretation, handicapped access, low-water access, lakeshore hiking trails, OHV site, cold and warm water fishing, water sports, houseboabng, commercial resorts and mannas. spelunking
Trinlty Unit of the NRA	Developed sites, Visitor Information Stabon, interpretation. handicapped access, low-water access, lakeshore hiking trails, cold and warm water fishing, water sports, houseboabng, commercial resorts and mannas
Scenic Byways	Trinty Heritage Scenic Byway, Mt Shasta Scenic Highway (Eventt Highway). Proposed Mt Shasta Byway, Trinity Scenic Byway (State Highway 299), Proposed Modoc Volcanic Scenic Byway (Proposed State Highway 36 West Scenic Byway) Red Bluff to Pacific Coast

hiking, equestrian and OHV trails. "pocket" parks, and environmental education activities at the community interface In areas where paved or well-maintained native-surface transportation corridors are located, the opportunrty exists for promoting and interpreting scenic dnving tours, botanizing, and wildlfe viewing. for example, in the Tnnrty Divide and Medicine Lake Highlands areas

16. Riparian Areas

Public Issues

One major public issue focuses on riparian areas

How wide should riparian management zones (RMZs) be and what management activities should be allowed within them? (Public Issue #13)

There are three related issues

a. How should livestock grazing be managed to minimize degradation of riparian areas? (Public Issue #10)

b How should the Forests supply water-oriented recreation facilities and opportunities to meet increasing demand? (Public Issue #12)

c What river segments should be recommended for inclusion in the Federal Wild and Scenic Riven System? (Public Issue #20)

Discussion of Public Issues

Riparian Reserve Areas. Some of the most productive, sensitive, and diverse sites on the Shasta-Trinity National Forests are within riparian areas All aquatic and ripanan ecosystems, floodplains, and wetlands are included within the defined riparian area These areas are adjacent to streams and other bodies of water and include adjoining areas that need special management for the protection of riparian vegetation and streamcourses

Valley inner gorges, the over-steepened slopes immediately adjacent to some streamcourses, are highly sensitive and management activity within them is generally avoided to protect riparian and water resources.

Just as streams flow together to form a connected network of flowing streams and riven, so do the riparian areas adjacent to the streams Aquatic and nparian ecosystems of ephemeral and intermittent streams are also a part of the entire system, even when surface water does not flow in their channels Changes in these ecosystems are reflected in changes in downstream ecosystems over a period of time Protection of ephemeral and intermittent streamcourse riparian areas not only provides protection in place, but also protects the integrity of interconnected downstream nparian areas

Management objectives within riparian areas are directed toward maintenance and improvement of the riparian ecosystem and protection of streamcourses, water quality, and wildlife habitat. Timber management and other non-dependent resource practices are, therefore, not emphasized or not permitted The publication "Water Quality Management for National Forest System Lands in California" includes several Best Management Practices (BMPs) specific to management of riparian areas These BMPs are used for the riparian areas identified in project planning In addition, npanan reserves as identified in the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl (ROD) are established as protection zones around riparian systems as a component of the Aquatic Conservation Strategy

In order to protect water quality and, subsequently, ripanan areas, one BMP requires that RMZs be defined in terms of boundaries and appropriate management activities RMZs provide a "buffer" between riparian areas and forest management activities The ROD establishes nparian reserve widths from 100 to over 300 feet on both sides of streams and waterbodies or at widths determined through watershed analysis Timber management within a riparian reserve is prohibited, except; where catastrophic events such as fire, flooding, volcanic, wind, or insect damage result in degraded nparian conditions, allow salvage and fuelwood cutting if required to attain Aquatic Conservation Strategy objectives, salvage trees only when watershed analysis determines that present and future coarse woody debns needs are met and other Aquatic Conservation Strategy objectives are not advenely affected, apply silvicultural practices for Ripanan Reserves to control stocking, reestablish and mange stands and acquire desired vegetation characteristics needed to attain Aquatic Conservation Strategy objectives

Related Issues

a Livestock Grazing in Riparian Areas Refer to the discussion of this public issue in the Range Section of this Chapter

b Increasing Demand for Water-Oriented Recreation Refer to the discussion of this public issue in the Recreation Section of this Chapter

c Wild and Scenic River System Refer to the discussion of this public issue in the Wild and Scenic Rivers Section of this Chapter

Current Management Situation

There are about 2,000 miles of perennial streams, 3,500 miles of intermittent streams, and 53,000 acres of lakes and reservoirs within the Forests. for fish-bearing streams riparian areas generally comprise the area within 300 feet of the high water mark For nonfish-bearing perennial streams nparian areas generally comprise the area within 150 feet of the high water mark For constructed ponds, reservoirs, and wetlands greater than 1 acre riparian areas generally comprise the area within 150 feet of the high water mark For lakes and natural ponds ripanan areas generally comprise 300 feet of the high water mark For seasonally flowing or intermittent streams, wetlands less than 1 acre, and unstable and potentially unstable areas ripanan areas generally ccmprise the area within 100 feet of the high water mark Using these standard widths the estimated extent of riparian areas on the Forests is approximately 274,308 acres Actual acreage will be mapped during future inventory work and at the project level to ensure full protection These inventories will include information not only on the extent of the nparian area, but also on the conditions within the area This information will be used in planning management activities within riparian areas to benefit the riparian-dependent resources

Existing ripanan area uses include habitat for fish and other aquatic ecosystem life-forms and wildlife habitat, including some life-forms that live exclusively in riparian areas

Inter-related riparian-aquatic ecosystems found within these areas provide important habitat elements for fish species such as cover, temperature control, substrate composrtion, and water quality and quantity

Ripanan areas provide important habrtats for many wildlife species including the California red-legged frog, willow flycatcher, fisher, and bald eagle

Riparian areas and their forested surroundings are a critical link for maintaining wildlrfe species diversrty and abundance Birds use ripanan areas more than the adjacent upland habitat Twenty-five percent of the local mammals are dependent or highly associated with riparian habitat Most amphibians require aquatic or semi-aquatic conditions for reproduction A few reptiles, such as the western pond turtle and aquatic garter snake, require aquatic systems Refer to Appendix G for a list of species highly associated with ripanan and aquatic ecosystems

In addition to providing aquatic and terrestrial habitats, riparian areas are often the focus of water-related recreation uses Some developed recreation sites. such as campgrounds, are within riparian areas Trails for nature study, wildlife viewing, and sightseeing often include riparian areas Other uses are for livestock foraging and watering, water developments for a variety of consumptive and oonconsumptive uses, and production of wood products

Past land management activities have been inconsistent in the application of riparian area resource management Consequently, there is a wide diversrty of ripanan area conditions throughout the Shasta-Tnnrty National Forests An estimated 5% of the total 274,308 acres of riparian areas on the Forests are in a degraded condition and in need of rehabilitation Ripanan areas may adjust to disturbance over time. wrth some vegetation and streamcourse stabilty returning to a nearly undisturbed condition within years or decades

The condrtion of the Forests' riparian areas varies from sites that have never been disturbed, to areas which have already recovered or are in the process of recovering from disturbance Other areas are in need of restoration efforts to help them recover more quickly Only where drastic changes have occurred has there been a long-term loss of riparian area Road construction, recreational developments, large landslides, cattle over-grazing, and mining activities have produced most of these changes

Due to the proximty of over-steepened inner gorge slopes to npanan areas, disturbance of the inner gorge and any associated landslide has devastating effects on the riparian dependent resources Current direction is to manage inner gorge lands as protective zones for riparian areas Riparian areas, including inner gorges, riparian ecosystems, and wet meadows, are identlfied during project-level planning

Management Opportunities

Nearly all of the resources on the Forests are putting an ever-increasing demand on the lands within riparian areas Because of this, there is a need for increased coordination of uses so that the qualrty of the ripanan areas can be maintained Future management opportunities will focus on the maintenance and improvement of nparian ecosystems

Shasta-Trinrty National Forests' personnel use BMPs for the protection of water qualty, as described in the most current version of 'Water Qualty Management for National Forest System Lands in California" These BMPs provide for watershed and ripanan area improvement and

the conduct of land-disturbing activties in a manner that will not result in the pollution of water from nonpoint sources

Improved application and implementation of these BMPs will be necessary in the future to avoid the degradation of nparian resources that has occurred in the past. To that end a Forest Supplement to the BMP Handbook has been developed It describes addtional measures which can be used to protect ripanan habitat and water quality Use of these BMPs will also minimize future conflicts and provide for the protection or enhancement of riparian areas

In addition to BMPs, special management standards and guidelines are directed toward protecting npanan areas and providing additional wildlife habttat benefits These include increased snag densities, dead and down material, overstory cover, and older over-mature timber stands

In addtion, new measures have been prescnbed for riparian ecosystems (refer to Management Prescription IX [Riparian Management]). These measures are meant to address nine specific goals. RMZs are prescribed for all streams, lakes, ponds, reservoirs, and wet areas These RMZs range from 150 to over 300 feet in width for each side, depending on site conditions Site condtions include such things as surface erosion potential, landslide potential, beneficial uses, wildlife habitat values, and stream character Specific standards and guidelines define appropriate practices within and adjacent to RMZs

Implementation of the new npanan ecosystem standards and guidelines will offer greater protection for riparian areas in the future This increased protection, in conjunction with management opportunities emphasizing riparian ecosystem restoration, will result in improved ripanan area condtions throughout the Forests.

17. Soils

Public Issue

No major public issues focus specfically on soils

Current Management Situation

Soils are the basic resource that support or directly influence most, if not all, other resources This support is through soil productivity for wood, forage, or habrtat vegetation Influence is provided by a complex of numerous soil and environmental charactenstics

The soil types on the Shasta-Trinity National Forests range from very low to high in productivity Soil productivrty is defined as the capacity of the soil to produce a plant community or sequence of plant communities under a specfied system of management The facton that influence the productivrty of the soil are soil depth, percent rock fragments, texture, available water-holding capacity, nutrient status, maintenance of the duff layer, mineral toxicity, and pH Other environmental factors are preciprtation, aspect, slope gradient, and elevation

A total of I05 different soil types have been identified in the Shasta-Tnnity National Forests Dubakella, Deadwood, Goulding and Etsel are typical examples of soils that range in timber productivrty from low to unsuitable (50 to less than 20 cubic feet/acre/year) They are very shallow to moderately deep with 40 percent to 90 percent coarse fragments by volume Unsuitable soils and soils of low productivrty comprise about 42 percent of the Forests' land base

Typical examples of soils of moderate timber productivity (50 to 85 cubic feet/acre/year) are Neuns. Speaker, Marpa, and Washougal They are moderately deep to deep with 20 to 60 percent coarse fragments Soils of moderate productivity comprise about 4 I percent of the Forests' land base

Boomer, Hugo, Shasta, and Cohasset are examples of soils of high productivity (more than 85 cubic feet/acre/year) They are deep with coarse fragments with less than 40 percent of the volume Highly productive soils are found on about I7 percent of the Forests' land base

A Soils Resource Inventory (SRI) has been completed for the Shasta-Tnnity National Forests This SRI is an Order 3 (reconnaissance) level survey which is surtable for displaying Forest soils and their general location for broad land management planning This inventory is not intended for project level planning or layout. Soil/Water Resource Specialists in the Forest Supervisor's Office or those on the Ranger Districts provide soil information and management prescriptions They also recommend mitigation measures for project planning

The greatest threat to the maintenance of soil productivity is erosion--both sheet and gully. Almost any soil is subject to erosion if a sufficient amount of surface water flow is present Some soils have a higher propensrty to erode than others Examples of highly erodible soils are' Hotaw, Chawanankee, Chaix, and Oval: they have developed from coarse-grained granitic bedrock

About 195,000 acres on the Shasta-Trinity National Forests have a high to very high erodibility factor Several management tools are used to prevent unacceptable soil loss resulting from management activities These tools include (I) an Interagency Erosion Hazard Rating system for identifying soil erosion hazards, (2) Management Guidelines for granitic soils for controlling management activities, and (3) Soil Quality Standards (SQS) which require the amount and kind of ground cover to be retained for soil protection

Soil productivity cntenawere used extensively in suitability modeling for vanous resource uses **An** example of soil inputs into suitability modeling for timber is shown in Appendix I of the Forest Plan

All the soils on the Forests are capable of maintaining their productivity over time if they are protected from erosion or degradation from logging or site preparation

Management Opportunities

There will be an increased need to manage the soil resource so that the highest yields are realized, while at the same time protecting basic soil productivity

An Ecological Unit Inventory (EUI) is in progress on the Shasta-Trinity National Forests The goal of EUI is to provide land managers with project level maps and data elements that accurately integrate geology, soils, and vegetation into ecological landscape units with management interpretations This provides the basis of Ecosys-

tem Management The survey and coordination is performed by an interdisciplinary team of professionals

The Soil Quality Standards (SQS) are threshold values that are being established to protect soil productivity from significant change or impairment of the soil's productivity capacity through land management practices Long term impairment or soil change can occur in several ways

Compaction results in a loss of porosity which reduces the rate at which water can enter and pass through the soil Compaction influences the ability of tree roots to respire, which, in turn, reduces tree or other vegetative growth Guidelines call for soil porosity to be within *90* percent of its natural condition

Loss of organic matter. The duff layer is the primary source of nutnent replenishment There is a need to improve upon current knowledge of soil behavior in relation to forest management activities Duff and other woody debris provide much of the ground cover necessary to protect the soil from erosion ***As*** the duff decays, it is carried down into the sutface honzon, forming the dark humus layer Humus has a very high nutrient and water-holding capacity Guidelines call for approximately 50 percent of the disturbed area to be uniformly covered with organic matter

Loss of large, woody material. Large, woody matenal (greater than 16 inches in diameter and 10 feet or longer) provides habitat for microorganisms, insects, and small animals that convert nutrients into usable forms and spread nitrifying bacteria. Guidelines call for 5 to 20 logs, in varying degrees of decomposition, per acre in contact with the soil

Soil erosion. The degree and rapidity with which a soil will erode is dependent on many factors soil texture, structure and rock fragments, the amount of ground cover, and the degree of compaction The guidelines indicate that management activities should be modrfied and enough ground cover maintained to provide for low to moderate erosion hazard ratings

The Forest Service has completed a soil moisture/seedling survival study and a soil fertility study on a variety of plots in Northern and Central California The results of this study will be used to identify opportunities for increasing productivity.

There is a program in place to monitor the implementation and effectiveness of the SQS

18. Special Areas

Public Issue

One public issue is related to Special Areas That issue is

What areas should be recommended for Research Natural Area (RNA) and Special Interest Area (SIA) establishment? (Public Issue #14)

Discussion of Public Issue

Research Natural Areas (RNAs)

Through research National Forest administraton can understand the Forests' resources better, and, consequently, they are able to manage them more appropriately For more than 50 years, the Forest Service has participated in the creation of a RNA system in the United States The first Federally recognized RNA was established on the Coronado National Forest in 1927

The objectives of RNAs include the following

1 To contnbute to the preservation of examples of significant natural ecosystems for purposes of research, education. and maintenance of biological diversity Land use patterns are changing so quickly that some ecosystems may essentially disappear before they can be studied

RNA targets are identified by vegetation type and physiographic province The majority of the Shasta-Trinty National Forests lie in two physiographic provinces, the Klamath Mountains and the Cascade Range A small percentage of the Forests lies in three other provinces the Modoc Plateau, the Great Valley, and the Coast Range The RNA system is intended to include representative examples of common, widespread vegetation types in each province and unusual or unique types

2 To maintain natural genetic diventy Both ecological and economic stability require conservation of gene pools.

3 Where appropriate, to protect habitats of threatened, endangered, and sensltive plant and animal species for research purposes The life histories and ecological relationships of most of the Forests' rarest plants and animals are still poorly understood, and this hampers effective recovery of these species

4 To provide benchmarks for forest management activities RNAs serve as undisturbed baselines for measuring the *effects* of management practices on similar areas

RNAs are not recreation areas In fact, recreational use may be incompatible with RNA objectives

Special Interest Areas (SIAs)

The Forest Service is directed by policy to designate special areas with outstanding natural, recreational or cultural values as SIAs Management objectives for SIAs are (1) to protect these outstanding values, and (2) to encourage public use and enjoyment of the areas so long as such use is not detrimental to the values being protected

SIAs may be established for scenic, historical, geological, botanical. zoological, paleontological, or other special charactenstics Recreational developments wlthin SIAs such as trails, sanltary facillties. and picnic grounds are kept to the minimum needed for public enjoyment of the area

Current Management Situation

Research Natural Areas (RNAs)

The Pacific Southwest Region's RNA Committee has identified several gaps in the array of natural habitat types represented in the Calrfomia RNA system In addition. new target types were added in 1990 as a result of a refinement in the classification of non-forested ecosystems A list of RNA targets and their correlation with RNA candidates on the Shasta-Tnnty National Forests is shown in Appendix F

Only one RNA, the Shasta Mud Flow RNA, is established on the Shasta-Trinty National Forests Approximately 3,703 acres (3,115 acres, net) were designated as the Shasta Mud Flow RNA by the Chief of the Forest Service in 1971 This RNA represents young growth Pacific ponderosa pine (Society of Amencan Forester's cover type 245) for the Cascade Physiographic Province and the scientific geologic values of a volcanic mud flow

Fourteen areas have been screened and found to be viable candidates for RNA status Eight of these are designated for establishment by this plan. See **Table III-13**

Following is a brief descnption of the research values for each of those 14 areas

1. Bald Mountain Creek. The Bald Mtn. Creek area was proposed by the Citizens for Better Forestry as a RNA to serve as a completely undisturbed benchmark watershed representative of other adjacent watersheds under timber management The Bald Mtn Creek watershed would be monitored as a control watershed

2. Bear Creek. The Bear Creek area was proposed as a RNA to serve as a monitoring benchmark watershed to determine the effects of management activities on highly erodible granitic soils The Bear Creek watershed would be monitored as a control watershed

3. Cascade. The Cascade area was proposed to meet the requirements for the red fir vegetation type (SAF 207) in the Cascade Range Physiographic Province This area gets heavy recreation use winter and summer, this use is incompatible with RNA objectives

4. Cedar Basin. This area best fulfills the Port-Orford-cedar vegetation type (SAF 231) target within the Klamath Mountains Physiographic Province Other botanic elements represented within this area include the Sierra Nevada mixed confer (SAF 243) and the Darlingtonia bog vegetation types The basin contains excellent examples of inland Port-Orford-cedar in both pure and mixed stands between 5,400 to 6,400 feet

At least two beneficial research objectives could be met (1) because of infestation of many of the coastal Port-Orford-cedar stands by *Phytophtora lateralis* and the possibilty of further spread in the coastal areas, these stands may provide the best opportunities for protection of the species from the fungus, and (2) these stands of Port-Orford-cedar provide additional genetic material for off-site testing to determine relative susceptibility and resistance of individual trees to *P lateralis* The area also includes a large number of plant communities and 11 different species of conifers

5. Devils Rock-Hosselkus The Devils Rock portion of the RNA fulfills the California black oak vegetation type (SAF 246) target within the Klamath Mountains Physiographic Province The oak stands are dense, and there is little diversity of woody shrubs and herbaceous vegetation Most of the California black oak (*Quercus kelloggii*) trees in this area are 40 to 80 years old, although much older monarchs are present The complex geology in this area adds to the ecological-vegetational values

The Hosselkus portion does not specifically meet a terrestrial vegetation target. The area is being proposed primarily for the unique paleontological values found in rich abundance in the limestone formations here Also, it is known that unique edaphic features often give rise to unique biological entities The recent discovery of a previously unknown relict shrub species, the Shasta snowwreath (*Neviusia cliftonii*), growing in the limestone formation, is an indication of the area's uniqueness and is proof of its value for research opportunities Moreover, the limestone formaticns support several distinctive ecosystems, containing suitable habitat for the Shasta salamander (*Hydromantes shastae*), a sensitive species, and Shasta eupatory (*Eupatorium shastense*), a limestone-dependent plant endemic to the Shasta-Trinity National Forests The area also satisfies secondary vegetation targets for California black oak (SAF 246), Sierra Nevada mixed conifer (SAF 243). and Pacific ponderosa pine/Douglas-fir (SAF 244) types within the Klamath Mountains Physiographic Province The area has been a focal point for paleontologists since 1895

6. Manzanita Creek. Although this area was proposed to meet the RNA target for Pacific ponderosa pine/Douglas-fir (SAF 244) vegetation type for the Klamath Mountains Physiographic Province, its strongest value is its diversity of vegetation types The SAF 244 type is also represented by the proposed Smoky Creek area on the Hayfork District Other target elements represented here include white fir (SAF 211), Pacific Douglas-fir (SAF 229), and Sierra Nevada mixed conifer (SAF 243) vegetation types Past fires in the area have created a high diversity of subclimax plant communities

The proposed RNA boundary encompasses the entire watershed within the Trinity Alps Wilderness Some 4,000 acres of the watershed were disturbed by the Treloar Fire of July, 1985 There is a gauging station available for controlled watershed studies

7. Murphy Glade. The Murphy Glade area was proposed to meet the requirements for the red fir vegetation type (SAF 207) in the Klamath Mountains Physiographic Province Haypress Meadows RNA, proposed by the Klamath National Forest, also fulfills the red fir target for this province

8. Mt. Eddy. The proposed area fulfills the target requirement for foxtail pine for the Klamath Mountains Physiographic Province The Mt Eddy foxtail pine population covers 240 acres within the proposed RNA The

foxtail pine population in this area is large and healthy and represents an excellent example of this target The need for this target is high No other RNA proposals wrthin this physiographic province contain significant populations of foxtail pine

Deadfall Basin, which was included within an earlier boundary for this RNA, is recommended instead for SIA status because of its existing recreational use Several populations of sensitive plants could be included in this RNA if its boundanes were expanded to the north This land is now in private ownership but will likely be acquired by the Forest Service

9. Preacher Meadows. The area meets the Sierra Nevada mixed confer forest cover type (SAF 243) target for the Klamath Mountains Physiographic Province The need for this target is moderate to high Undisturbed samples of adequate size in commercial timber stands are difficult to locate in the Klamath Mountain Province The darlingtonia bog and the Calfornia lady's-slipper (*Cypripedium californicum*) add to the value of the area

10. Red Butte-Red Fir Ridge. The area meets the RNA requirements for the red fir vegetation type (*SAF* 207) in the Cascade Range Physiographic Province It represents the undisturbed condltions occurnng at the higher elevations of the red fir range A secondary element of the Callfomia mixed subalpine forest (SAF 256) is also found wlthin the area This area is the only one wlthin the Pacific Southwest Province that is being considered to meet the red fir target The RNA is entirely within the Mt Shasta Wildemess. Recreational *use* pnmanly *affects* Squaw Creek meadows but not the red fir target

11. Rough Gulch. The proposed Rough Gulch RNA area contains a Douglas-fir/giant chinquapin/beargrass community This area appears to be different from the communities within the Pacific Douglas-fir vegetation type (*SAF 229*) represented by the proposed South Fork Mountain

Table III-13

Area	Name	Size (Acres)	Management Area	Ranger Dirtnct
1	Bald Mountain Creek	800	10	McCloud
2	Bear Creek	4,500	17	Hayfork
3	Cascade	2,000	3	Mt Shasta
4.	*Cedar Basin	1,160	5	Mt Shasta
5.	*Devils Rock-Hosselkur	5,550	12	Shasta Lake
6.	'Manzanita Creek	7,250	4 (Trinity Alps)	Big Bar
7	Murphy Glade	1,260	22	Yolla Bolla
8.	*Mt. Eddy	890	5	Mt Shasta
9.	*Preacher Meadows	1,850	4 (Trinity Alps)	Weaverville
10.	'Red Butte-Red Fir Ridge	1,640	4 (Mt Shasta)	McCloud
11.	*Rough Gulch	3,960	20	Hayfork/Yolla Bolla
12.	*Smoky Creek	960	19	Hayfork
13.	South Fork Mountain	1,180	20	Yolla Bolla
14.	*Stuart Fork	1,500	4 (Trinity Alps)	Weaverville
	Total	34,500		

* Recommended far RNA establishment

RNA Many of the chinquapins in the Rough Gulch area are in excess of 3 feet diameter at breast height (dbh) and 100 feet or more tall The area would meet the target requirements for the Pacific Douglas-fir vegetation type (SAF 229) for the Klamath Mountains Physiographic Province The area has secondary targets which are representative of the Pacific ponderosa pine/Douglas-fir vegetation type (SAF 244) and the beargrass community The preferred boundary encompasses the entire Rough Gulch watershed, and includes populations of two sensitive plants Umpqua green gentian (*Frasera umpquaensis*) and pale yellow stonecrop (*Sedum laxum* ssp *flavidum*)

12. Smoky Creek. This area was first proposed to meet the RNA target for Pacific ponderosa pine/Douglas-fir (SAF 244) in the Klamath Mountains Physiographic Province However, Jeffrey pine type (SAF 247), also is well-represented here and is an unmet primary target for the RNA network The Pacific ponderosa pine/Douglas-fir type is represented in the proposed Manzanita Creek RNA Therefore, the focus of the proposed Smoky Creek RNA has shifted to encompass the Jeffrey pine that grows on serpentine soil The proposed RNA boundary follows the perimeter of the North Fork Smoky Creek watershed and includes all of the watershed below the Bramlet Road (FS Road 29)

13. South Fork Mountain The area meets the Pacific Douglas-fir vegetation (SAF 229) target for the Klamath Mountains Physiographic Province No sensitive plants are known to grow in this area This target could be satisfied by the establishment of the Rough Gulch RNA descnbed above

14. Stuart Fork. The area appears to meet the targets for montane chaparral for the Klamath Mountains Physiographic Province Good examples of this vegetation type are extremely difficult to fd in suitable sizes and in an undisturbed state The major drawback with this area is the difficult access Conversely, location of the area wrthin the Trinity Alps Wilderness would maintain the undisturbed conditions found here

Special Interest Areas (SIAs)

There are no established SIAs on the Shasta-Trinity National Forests However, several places on the Forests have attracted public interest because of their special features Examples include limestone caves, waterfalls, volcanic craters, fossil localities, and serpentine plant communities Nineteen areas are being recommended for formal establishment as SIAs Another 22 candidate areas are being considered as potential SIAs Where boundaries are unclear or resource conflicts exist, currently used areas are proposed for SIA evaluation during the Plan period (see Management Opportunities below)

Table III-14 lists the 19 areas recommended for SIA designation Each is described briefly below.

1. Bigelow Meadow. This is a large, intact nparian meadow system adjacent to the McCloud River The meadow lies within the upper McCloud Rver recreation area Wildlife diversty is high

2. Black Butte. This cinder cone is one of the most visible landmarks on the Forests, it lies adjacent to Interstate 5 However, most people driving by probably do not know that it is part of the National Forest system

3. China Mountain. Located along the crest separating the Shasta and Klamath National Forests, this botanical SIA includes both China Mountain and South China Mountain Foxtail pine and whitebark pine communrties, and a large number of rare and sensttive plant species, are its outstanding values Adjacent Klamath National Forest lands are also designated as a SIA

4. Cory Peak. Cory Peak lies at the south end of the China Mountain/Cory Peak crest zone The California Department of Fish and Game (DFG) has identified Cory Peak as a significant natural area because of the presence of the Sierra Nevada red fox and several high elevation serpentine endemic sensrtive plants One of these is the State-listed Tnnty buckwheat (*Eriogonum alpinum*) The Klamath National Forest is also recommending Cory Peak as a SIA

5. Deadfall Basin. The Basin, below the summit of Mt Eddy, features subalpine vegetation on peridotite, plus several sensitive plants The southeastern boundary of this proposed SIA adjoins the Mt Eddy RNA Access is by the PCT/Sisson-Callahan National Recreation Trail The area is used by hikers, campers, and wildflower enthusiasts

6. Deep Crater. This volcano is the largest example of an explosion crater within the Medicine Lake Highlands Funnel-shapes wtth scattered rock "bombs" typify these craters The primary uses are hunting and access to adjacent private lands

7. Giant Crater Lava Tube System. Located within the Giant Crater Lava Flow is the longest lava tube system in the world, it has a lineal length of about 18 miles Giant Crater constitutes the largest subsidence crater wtthin the Medicine Lake Highlands The area has been or is being

studied by the US Geological Survey, NASA, and vanous universities The pnmary activity is hunting and access to adjacent private lands

8. Grizzly Peak. This SIA is located at the boundary of Shasta Lake and McCloud Ranger Districts, six air miles north of Iron Canyon Reservoir It features a panoramic view, unusual disjunct subalpine vegetation, and several rare and senstive plants The PCT traverses this SIA

9. Kangaroo Ridge. This area is on the boundary of the Shasta and Klamath National Forests It is identified by the DFG as a significant natural area for its concentration of rare and sensitive plants, including Scott Mountain bedstraw (*Galium serpenticum* ssp *scotticum*) The Klamath National Forest is also recommending this area as a SIA

10. little Glass Mountain. This feature is an example of a type of volcano which was formed by repeated overflows of thick lava from a vent at its summit. It is composed of obsidian and rhyolite interlayered with pumice, it is estimated to be between 500 to 1,000 years old Most of the thick pumice deposrts surrounding this mountain originated from it. The primary activities include mining, hunting. and access for timber production on adjacent lands

11. Natural Bridge. Natural Bridge is the largest limestone bridge on the Shasta-Trinity National Forests Natural Bridge is a limestone formation riddled with caves, it was the site of a 1852 Wintu Indian massacre The primary activities are rock climbing and picnicking

12. Paint Pot Crater. This volcano or cinder cone was formed as a result of the accumulation of red cinder thrown into the air during moderately explosive eruptions about 2,000,000 to 11,000 years ago Portions of the red cinder were later covered by white pumice blown from Little Glass Mountain. thus giving it a distinctive "painted quality The primary activities *are* hunting and timber access on adjacent lands

13. Pumice Stone Mountain. This mountain was formed as a result of the accumulation of cinder thrown into the air dunng moderately explosive volcanic eruptions The cinder cone was later covered by a thick mantle of pumice blown from Little Glass Mountain during its eruption Pnmary activities include hunting and access for timber harvesting on adjacent lands

14. Samwel Cave. Overlooking the McCloud Arm of Shasta Lake, Samwel Cave is an extensive series of limestone fissures and openings. The cave was originally researched by paleontologists, producing important late Pleistocene fossils, as well as a few human-made tools The locale also figures prominently in Native Amencan mythology and is considered a sacred area by present-day Wintu Indians The site is being recommended for designation as a National Natural Histonc Landmark (NNHL) under the auspices of the National Park Service

15. Scott Mountain. This proposed SIA is located at the Scott Mountain crest, just west of Highway 3 The DFG recognizes this as a significant natural area because of several Darlingtonia seeps and several serpentine-endemic sensitive plants, including the Klamath manzanita (*Arctostaphylos klamathensis*) The Klamath National Forest is also recommending adjoining land as a botanical SIA

16. Spatter Cones. These miniature "volcanoes" are formed by hot gasses mixed with molten lava which escaped up through a fissure in the earth's surface A row of five of these chimney-like spatter cones is located on the northern limit of the Giant Crater Lava Flow The area is also an archaeological site Primary uses are hunting and access for timber harvesting on adjacent lands,

17. Tedoc Mountain. This peak is part of the largest of several unique tetonic harzburgite blocks on the Yolla Bolla Ranger District. Rock types range from nearly unaltered dunite to highly serpentinized peridotite Consequently, the resident soils and plant communities are unique and diverse The latter are represented by forest, woodland, chaparral, herbaceous and riparian plant associations There are also relatively barren areas here

A number of serpentine endemic plant species are resident, including several classified as sensitive by the Forest Service These botanical features, which characterize the unique geology and soils of the area, constitute the most outstanding special values The pnmary activities are hunting, road access to adjacent lands, and botanizing

18. Toad Lake. Toad Lake is recognized by the DFG as a signrficant natural area for its lake and wet meadow vegetation on serpentine It is also recognized for its concentration of sensitive plants, including the riparian-dependent showy raillardella (*Raillardella pringlei*) Access is by Forest Service Road 40N64 and the PCT This area gets moderate recreational use

19. Western Azalea. This botanical SIA was recommended by the Citizens for Better Forestry, an environmental organization It is a spring-fed riparian plant community with a showy population of the native western azalea, it is located close to the Bramlet Road

Some of the areas mentioned above may also qualify under the National Park Service's NNHL System.

As previously mentioned, Shasta Mud Flow has been classified as a NNHL Mt Shasta has overlapping classifications as a Recreation Area, a National Natural Historic Landmark (NNHL), and a Wilderness Because of its unique multiple values, Mt Shasta is discussed as a separate topic following this section

Management Opportunities

Research Natural Areas

In addition to the areas listed in Table III- 13, Forest personnel will review additional RNA proposals over the next 5-10 year The Shasta-Trinrty National Forests contain 87 of the elements (ecosystems) that are targeted by the Pacific Southwest Region for investigation, screening, and possible inclusion into the RNA system Gf the 87 elements, 19 are meadow and wetland types, 11 are riparian and bottomland types, 8 are scrub and chaparral types, 1 is a grassland type, 9 are woodland types, 36 are forest types, 2 are alpine types, and 1 is a limestone type

Forest personnel will consult with the Regional RNA Committee to set priorities for identdication and establishment of RNAs on the Forests The most critical RNA needs identfied by the Committee, that could potentially be met on the Shasta-Trinity National Forests, are for Oregon white oak (SAF 233) and Pacific ponderosa pine (SAF 245)

Classification and ranking of RNA targets is incomplete for aquatic, geologic, and biological elements However, information about the distribution and abundance of these elements, within the State of California, is available through the California Natural Diversity Data Base (CNDDB) This data base was established jointly by The Nature Conservancy and the DFG in 1980 The Shasta-Trinity National Forests' staff consults the Data Base regularly It helps identify areas suitable for designation as RNAs or for other special management designations

Special Interest Areas

Many other areas on the Shasta-Trinity National Forests, less well-known by the public, may also be suitable for SIA designation The following discussion focuses on 22 potential areas, recommended by the public or by Forest Service personnel, as having outstanding special characteristics. The DFG inventory of significant natural areas was also used to generate potential SIAs

Most of these areas receive little recreation use, largely due to lack of publicity about their special features Timber resource and mineral values, and other conflicting uses are insignificant These areas will be evaluated for their suitability as SIAs during the Plan period

Table III-14 lists recommended and potential SIAs The potential SIAs are described briefly below

Big Sand Flat. Big Sand Flat is a Pleistocene lake bed on the McCloud Flats At first glance it appears to be nearly barren, but on closer inspection there is an unusual community of dwarf lupines, many-flowered gilia, and other herbaceous plants adapted to the sandy soil *Also* present is a population of the very rare/sensitive plant Columbia cress (Rorippa columbiae)

Blake Mountain. Located about two miles northwest of Blake Mountain, on South Fork Mountain, this meadow area possesses exceptional botanical diversity, as well as fine representative old growth conifers (sugar pine, Douglas-fir, and incense cedar), and their associated plant species in an undisturbed setting It is part of a string of meadows and springs which run parallel to South Fork Mountain on the northeast side Suitable habitat occurs here for the sensitive plant Umpqua green gentian (Frasera umpquaensis)

Burnt Lava Flow. The majority of this flow lies on the adjacent Modoc National Forest and is classdied as a "virgin" area. Approximately 250 acres of the flow extend onto the McCloud Ranger District. on the flanks of Medicine Lake volcano The flow area encompasses a set of three cinder cones which range from 300 to 500 feet in height, they are referred to as Triad Cones

Cable Creek. This area includes the headwaters of Cable Creek, an area of high botanical species diversity, including many different species of bryophytes Suitable habitat may exist for the senstive plant Umpqua green gentian (Frasera umpquaensis) This area may serve as a resource study area for restoration/revegetation projects in nearby riparian areas

Del Loma Cave. This cave is located above the village of Del Loma, along the Trinity River Canyon It is a small, complex cave about 400 feet long and nearly barren of formations Crawls connect small rooms, and there are a couple of short, climbable drops It was reportedly dis-

covered by the Forty-Nines dunng the years of the Gold Rush The date 1849 is wntten on the wall

Dobkins/Durney Basin. The Dobkins and Durney Lakes basin, on the north slope of Mt Eddy, has a high concentration of senstive plants on diorte and on serpentine The area is also noted for Its scenic beauty

Dubakella Mountain. Dubakella Mountan was proposed by the Calrfornia Native Plant Society (CNPS) as a botanical SIA because of Its rich flora It was first described by Dr Ledyard Stebbins in a 1972 CNPS publication

Hall City Cave. This small, interesting cave is located on Hall City Creek above the old Hall Crty Mine, three miles east of Wildwood A 100 foot passage leads to a small lake on a 50 foot long underwater pit

Hirz Mountain. Hirz Mountain is a limestone mass wth distinctive flora, including the Shasta National Forest endemic Shasta eupatory (Eupatorium shastense) It is located on the north side of Shasta Lake within the Shasta Unt of the Whiskeytown-Shasta-Trinity National Recreation Area (NRA)

Lower McCloud River Wild Trout Area The Lower McCloud river is a Class I trout stream Fish habitat is in excellent condtion Pool riffle ratio is near parity, and there is an abundance of large, deep pools Suitable spawning gravel is abundant The lower 12 miles have been designated as a wild trout stream by the Calrfornia Department of Fish and Game This stream has adfluvial and residentforms of rainbow and brown trout which are the dominant fish species Bull trout is a State listed endangered species which once inhabted the Lower McCloud river However, no bull trout have been seen since 1975

McCloud Falls. The McCloud Falls lie within a one mile reach of the Upper McCloud River There are three sets of falls formed as a result of the river eroding through resistant lava flows and highly erodible interflow material The Upper Falls drop about 40 feet into a relatively large pool The Middle Falls is actually a continuous cascade extending nearly one-quarter of a mile with a total elevation loss of about 200 feet The Lower Falls is located within Fowlers Campground Lower Falls drops some 20 feet into a deep, but moderately sized pool McCloud Falls is primarily a day use area

McGinnis Springs/Wagon Camp. The McGinnis Springs/Wagon Camp area at the base of Mt Shasta is a 100-acre complex of meadows, springs, and serviceberry thickets Only about half o f t is in Federal ownership. The area has histoncal and biological significance because C Hart Merriam's biological expedtion camped at Wagon Camp for about a month in 1898 Some of the earliest plant collections from Mt Shasta were made at this time Merriam's report, Results of a Biological Survey of Mount Shasta, Northern Calrfomia, was published in 1899 and remains one of the classics of ecological literature

Mount Shasta Scenic Area (Proposed). See Section which follows

New River. The New river area, near the western edge of Trinity National Forest, reportedly supports an excellent example of mixed evergreen forest wth two senstive lewisias and four species of stonecrop (*Sedum* spp) New hver was proposed for botanical SIA status by the CNPS

Papoose Hill. This is a relatively young cinder cone volcano of basaltic composition located within the even younger Giant Crater Lava Flow Papoose Hill, about 50 acres in size, is the only undisturbed cinder cone volcano on the southern flank of the Medicine Lake shield volcano

Potem Falls. Potem Falls is an unusually scenic waterfall on Potem Creek, a tributary of the Pit River The Falls is located at the extreme east end of the Shasta Unit of the NRA

Potter Creek Cave. In 1878, Potter Creek Cave yielded the remains of a new species of extinct bear About 25 yeas later, it yielded the largest collection of Pleistocene fossils of any cave in California including remains of elephant, mamoth, camel, and sloth It is located on Potter Creek on the east side of the McCloud River arm of Shasta Lake, it is reached by boat

From the south, the large entrance of the cave is a prominent landmark on the north side of Potter Creek Canyon It sits on the ridge between Potter and Marble Creeks Its arch is about 25 feet wide and 12 feet high To the rear, 30 feet inside. a small 70 foot-long passageway leads to an opening high on the eastern wall of the Galgotha Room A 42 foot ladder descent is necessary The Galgotha Chamber is 107 feet long and about 30 feet wide at its widest point The maximum ceiling height is about 75 feet

Tilted Rock Lava Flow. This lava flow, one of the more recent within the area, is estimated to be about 1,000 years old and 1,250 acres in size It is an example of an 'aa' type lava flow (See Glossary for definition) Tree molds, created by the advancing lava, remain visible along

certain sections The flow begins north of Pumice Stone Well and terminates at Grasshopper Flat Much of it has been covered by a more recent pumice eruption

Tombstone Peak Caves and Fossil locality. This site is located at the divide separating the Sacramento River from Squaw Valley Creek Lrttle is known about the area except that it is composed of a large outcrop of the McCloud limestone of Permian age It is reported that the site is rich in fossils and that there are a number of caverns in the outcrop

Trout Creek. Trout Creek is a small perennial Class I stream with a signrficant population of redband trout in the upper stream reaches. The lower reach of Trout Creek is intermrttent and does not support a permanent population offish Redband are a genetically distinct race of trout, and though no longer classified as a sensitive fish species, they still receive special management emphasis Fish habitat in the perennial portion of Trout Creek is in fair condition The stream is dominated by rnffles and lacks large. deep pools Fish habitat improvement projects, that address the development of pools and cover, have already been completed. Additional projects are planned

Twin Lakes Basin. Twin Lakes is adjacent to Tamarack Lake, eight miles southwest of Castle Crags State Park The scenery is outstanding, and the vegetation is diverse It includes a meadow system, riparian and lakeshore communities, and montane mixed conifer forest on serpentine Two sensitive plants are found here thread-leaved penstemon (*Penstemon filiformis*) and Scott Mountain phacelia (*Phacelia dalesiana*) Port Orford-cedar is common along the creek that drains the lakes

Wells Creek Falls. Wells Creek Falls is located about one mile southwest of Tedoc Gap and adjacent to the Wells Creek Campground Wells Creek flows over a massive rock outcrop and falls for nearly 150 feet to a large pool below

Mt. Shasta - National Forest Scenic Area (Proposed)

Public Issue

There were no public issues which specifically relate to Mt Shasta

Several organizations have proposed that Mt. Shasta be designated as a Special Interest Area or National Scenic Area

The upper slopes of Mt Shasta have three special land use designations In 1926, the Secretary of Agriculture designated 29,620 acres as the Mt Shasta Recreation Area In 1976, the Secretary of Interior designated 8,000 acres as a National Natural Historic Landmark In 1984, the U.S Congress designated 38,000 acres as a Wilderness These designations focus attention on the upper slopes of Mt Shasta The lower slopes of Mt Shasta also possess qualities that make it worthy of a special recreation or scenic designation

Current Management Situation

Mt. Shasta dominates the landscape. Mt. Shasta's discovery, exploration and admiration are documented in many historic records and drawings From Native Amencan legends through early explorer's sightings to today's recreationists, the mountain represents something very unique and special The mountain continues to be a focal point for Native Americans, mountain worshippers, skiers, sightseers, climbers, photographers and campers Yearly over 120,000 people travel the Eventt Memorial Highway to the 7,500 foot elevation on Mt Shasta

Facilities include one 9 unrt campground, one 10 unrt walk-in campground, a scenic vista and interpretive trail, 10 trailheads, and a climber's staging area The campgrounds, trailheads, and trails have had limited rehabilitation and maintenance over the last 30 years Much of the management of the Everrtt Memorial Highway corridor is on hold pending development of the Mt Shasta Ski Area

Mt Shasta has received national publicity for its volcanic activity It is an active stratovolcano and the second highest mountain in the Cascade Range Formed by periodic volcanic activity over the last 100,000 years, Mt Shasta displays many unique geologic features These include iumerous lava flows, mud flows, seven glaciers, three waterfalls and canyons

Management Opportunities.

The Secretary of Agriculture may administratively designate 110,000 acres as the Mt Shasta National Forest Scenic Area Management efforts would focus on restoring and maintaining the outstanding scenic value of this

Table III-14
Recommended and Potential Special Interest Areas

Area Name	Acres**	MA#	Ranger District	Special Interest feature
1. 'Bigelow Meadow	136	10	McCloud	Ecological
2 Big Sand Flat		2	McCloud	Botanical (Sensitive Plants)
3. 'Black Butte	560	3	Mt. Shasta	Geologic
4 Blake Mountain		20	Hayfork	Botanical
5 Burnt Lava Flow		1	McCloud	Geologic
6 Cable Creek		20	Hayfork	Botanical
7. *China Mountain	680	5/6	m Shasta	Botanical
8. 'Cory Peak	280	6	Mt Shasta	Botanical
9. 'Deadfall Basin	460	6	Mt. Shasta	Botanical (Sensitive Plants)
10. "Deep Crater	333	1	McCloud	Geologtc
11 Del Loma Cave		15	Big Bar	Geologic
12 Dobkins / Durney Basin		5	Mt. Shasta	Botanical
13 Dubakella Mountain		19	Hayfork	Botanical
14. *Giant Crater Lava Tube System	179	1	McCloud	Geologic
15. 'Grizzly Peak	220	11	Shasta Lake	Scenic, Botanical
16 Hall City Cave		21	Yolla Bolla	Geologic
17 Hirz Mountain		8	Shasta Lake	Botanical
18. 'Kangaroo Ridge	190	6	Mt Shasta	Botanical
19. 'Little Glass Mountain	1,440	1	McCloud	Geologtc
20 Lower McCloud River Wild Trout Area		10	McCloud	Ecological
21 McCloud Falls	-	10	McCloud	Scenic
22 McGinnis Springs/Wagon Camp		2	Mt. Shasta	Botanical
23 Mt Shasta Scenic Area		3	McCloud/Mt Shasta	Scenic
14. 'Natural Bridge	64	18	Hayfork	Geologic
25 New River		14	Big Bar	Botanical
26. 'Paint Pot Crater	444	1	McCloud	Geologic
27 Papoose Hill		1	McCloud	Geologic/Ecological
28 Potem Falls		12	Shasta Lake	Scenic
29 Potter Creek Cave		8	Shasta Lake	Paleontologic/ Geologtc
30. 'Pumice Stone Mountain	107	1	McCloud	Geologic
31. *Samwel Cave	20	8	Shasta Lake	Geologic. Archaeological
32. 'Scott Mountain	128	6	Weaverville	Botanical
33. *Spatter Cones	5	1	McCloud	Geologic. Archaeological
34. *Tedoc Mountain	1,060	22	Yolla Bolla	Botanical
35 Tilted Rock Lava Flow		1	McCloud	Geologic
36. 'Toad Lake	650	5	Mt Shasta	Botanical
37 Tombstone Peak Caves and Fossil Locality		9	Mt Shasta	Geologic

* Recommended for establishment as Special Interest Areas in Alternative PRF
** Acreage figures are not available for the potenbal SIAs

Table III-14 (continued)
Recommended and Potential Special Interest Areas

	Area Name	Acres**	MA#	Ranger District.	Special Interest Feature
38	Trout Creek Redband Trout Area	-	2	McCloud	Ecological
39	Twin Lakes Basin	-	6	Mt Shasta	Botanical
40.	Wells Creek Falls		22	Yolla Bolla	scenic.
41.	*Western Azalea	25	21	Yolla Bolla	Botanical
	Total	6,981			

* Recommended for establishment as Special Interest Areas in Alternative PRF
** Acreage figures are not available for the potential SIAs

mountain landscape, while emphasizing qualrty recreation expenences.

Potential programs, initiatives, and resource management activities would include the following

1 Designate the Everrtt Memorial Highway as the "Mt Shasta National Scenic Highway". Include two miles of new highway construction to provide direct access off Interstate 5.

2. Develop an International Visitor Complex within one mile of Interstate 5 This Center would provide for interpretation and education about Mt Shasta's unique histone, cultural, geologic and scenic values

3 Emphasize "pleasure driving, sightseeing, pleasure walking and picnicking" These are four of the top six activities listed in the 1989 RPA assessment that are expected to exhibit the greatest growth in numbers of recreational trips away from home in the next 50 years Develop quality trailheads, day hike trails, scenic vistas, picnic sites and interpretive signs

4. Showcase meadow restoration, landscape management, compatible timber harvest techniques. red fir reforestation, and winter sports opportunities

19. Timber

Public Issues

Four public issues are directly related to timber management They are

a **Should herbicides be used to control vegetation in order to meet timber management objectives? (Public Issue #15)**

b **What should the timber harvest level or allowable sale quantity (ASQ) be? (Public Issue #16)**

c **What silvicultural practices should be used to assure reasonably successful reforestation of harvested lands and to maintain tree species diversity? (Public Issue #17)**

d **What harvest methods, including clearcutting, should be used to meet management objectives? (Public Issue #18)**

Discussion of Public Issues

a **Herbicides/Timber Stand Improvement.** Timber stand improvement (TSI) consists of suppressing competing vegetation (release) and thinning young stands The benefits of TSI are increased survival and growth of desired trees and reduced susceptibility to insects and disease

Over the previous five years, an average of about 8,000 plantation acres were released on the Forests per year, and about 1,600 acres were precommercially thinned

The Annual TSI Needs Report identifies the amount of acreage that has been inventoned and which is in need of TSI treatments The most recent Needs Report (October 1993) shows about 23,000 acres are in need of release, an addtional 22,000 acres need thinning In addtion, an unknown number of acres in need of TSI treatments have not yet been inventoried

Release and thinning treatments are normally accomplished by manual, mechanical, livestock, or chemical methods The treatment method selected for any given site depends primarily on effectiveness and costs of the treatment. Other factors. such as other resource concerns and public opinion, also play a part in selection of treatment methods Precommercial thinning is normally done manually by chainsaw, but some thinning is done mechanically on flat ground

Until 1984, plantation release on the Forests was normally accomplished by chemical methods, using herbicides In 1984, a moratonum was imposed on the use of herbicides until an Environmental Impact Statement (EIS) and Risk Analysis could be completed Since 1984, release treatments have been accomplished by manual or mechanical methods The EIS and Risk Analysis have been completed and the moratorium on herbicides has been lifted

Many of the species which compete with desirable, young trees are vigorous sprouters and rapid growers Experience and studies indicate that non-chemical release methods are often ineffective and/or too costly in terms *of* meeting timber management objectives The analysis done as part of the Regional EIS on Vegetation Management for Reforestation indicates that a ban on herbicide use would result in reduced timber yields and increased costs (See Chapter II, Section E, Direction Common to all Alternatives)

b **Harvest level.** The annual programmed harvest level under the Shasta-Trinity's 1975 Timber Management Plan was about 242 million board feet (MMBF) after adjustments were made for the California Wilderness Act This harvest level was based on a suitable timber land base of about 1,074,000 acres

The actual volume sold between 1975 and 1992 averaged about 200 MMBF per year (95 MMBF on the Shasta Forest and 105 MMBF on the Trinrty Forest) The actual sell volume was less than the programmed harvest level due primarily to budget limitations, poor timber markets during the early 1980's, and certain restrictions on the timber land base (such as herbicides and roadless areas)

The listing of the northern spotted owl and subsequent implementation of the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl have further reduced the Forests' timber sale program The actual volume sold on the Forests between 1990 and 1992 averaged about 90 MMBF per year and for 1993 the volume sold was 55 MMBF

c **Reforestation.** The National Forest Management Act (NFMA) regulations specify that when trees are cut to

achieve timber production objectives, the cuttings will be made in such a way as to assure that the lands can adequately be restocked to minimum Regional standards within five years after final harvest This standard applies to even-aged and uneven-aged silvicultural systems

Regeneration of trees is achieved by either natural or artificial methods Artificial regeneration by planting is the most commonly used method to assure adequate and prompt regeneration Most of the artificial regeneration on the Forests has occurred in areas harvested by clearcutting and shelterwood cutting, and non-stocked areas which have resulted from wildfires Over 130,000 acres have been planted by artificial regeneration Many of these plantations are less than 20-25 years of age Over the previous decade an average of about 9,500 acres was regenerated by planting annually

Shade intolerant species, such as ponderosa/Jeffrey pine and Douglas-fir, are the most commonly planted species The more shade tolerant species, such as red and white fir and incense cedar, are planted in smaller amounts with a greater reliance on natural regeneration Minor amounts of lodgepole pine and sugar pine are also planted on the Forests

Depending on the species and site conditions, between 400 and 600 seedlings are planted on each acre The recommended stocking standards are between 200 to 250 trees per acre This "overplanting" allows for seedling mortality due to poor planting stock, improper planting procedures, animal damage, and/or moisture stress from other competing vegetation.

The seedling survival rate after one growing season has consistently been about 85-90 percent for the pines and 70-75 percent for Douglas-fir The success of planted seedlings, along with the natural regeneration that occurs, has resulted in a high percentage (95 percent +) of the Forests plantations meeting minimum stocking standards within five yean after harvest

Natural regeneration is not normally practical due primanly to the unreliability of natural seed sources Past experience wth natural regeneration in shelterwood and selection cuttings has resulted in failures Stands that were not adequately regenerated in a timely manner were understocked In addition, shade tolerant species and hardwoods occupied the sites, while little or none of the more valuable species, such as pine and Douglas-fir, regenerated

d. **Clearcutting/Harvest Methods.** Forest stands are managed by one of two silvicultural systems even-aged and uneven-aged management. Regeneration methods under even-aged systems include clearcutting, green tree retention (regeneration wrth reserve trees), shelterwood cutting, and seed-tree cutting Methods under uneven-aged systems include group selection and single-tree selection. These systems, and their application, are described and analyzed in Appendix J

Based on experience and silvicultural information, even-aged management is the preferred silvicultural system for the commercial forest types found on the Shasta-Trinity National Forests This is particularly true when timber growth and yield are a primary management objective Also, using the criteria from the Regional Guide for the Pacific Southwest Region, August 1984, the silvicultural system which is most appropriate for the timber types and the timber management objectives on the Forests is the even-aged system Uneven-aged management may be appropriate where resources other than timber are emphasized and a continuous forest cover is desired.

Uneven-aged management is not feasible on a sustained basis on slopes over 40 percent, due to high costs and operability problems resulting in extensive damage to residual trees Uneven-aged management is also infeasible in stands which are severely understocked, over-mature, or infected with dwarf mistletoe or root diseases Areas managed under the uneven-aged system require that more land be dedicated to roads, landings, skid trails, etc , than lands under even-aged (estimated 20 percent more) This is because of the smaller openings found in uneven-aged management

The 1975 Timber Management Plan and Environmental Impact Statement (EIS) selected even-aged management as the preferred method for the Plan period (1975 to present). Clearcutting has been the primary method used to regenerate stands under this Plan Between 1984 and 1990, about 8,700 acres per year, or about 49 percent of the acres harvested, were clearcut This figure represents about 0.4 percent of the total Forest acres The average size of the clearcut openings has been about 10 to 12 acres in recent years

Other even-aged management systems in use have been the seed step and overstory removal step of shelterwood cutting and intermediate commercial thinning Only a limited amount of true selection

cutting has occurred on the Forests under uneven-aged management (less than one percent of the acres harvested) This method has been used primanly in highly sensrtive visual or npanan areas where other resource objectives preclude even-aged systems

Current Management Situation

Forest Land Description. Of the 2,121,547 acres of National Forest lands on the Shasta-Trinity National Forests, about 76 percent, or 1,623,000 acres, is forested with commercial conifers Of that amount 1,077,775 acres are classified as tentatively sutable and available for timber production

Tentatively suitable timber lands occur in four major commercial forest cover types mixed conifer, Douglas-fir, ponderosa pine, and red fir Lodgepole pine, knobcone pine. and hardwoods are also found, but they are in limrted supply wrth minor timber yields About six percent of the tentatively suitable timber land base is occupied by brush and other non-commercial species and is devoid of commercial trees Grey pine is the predominant non-commercial confer forest type found on the Forests

See **Figure III-4** for the general location of the major commercial forest types on the Forests

Mixed confer is the most prevalent forest type Approximately 87 percent of the tentatively suitable timber lands on the Forests fall into this category Mixed-confer stands dominate most of the mid-elevation zone on both Forests These stands contain various mixtures of ponderosa or Jeffrey pine, Douglas-fir, white fir, sugar pine. and incense cedar Productivity vanes greatly, wrth the average timber site being Dunning Site Class III on the Trinity side and Site II on the Shasta side (Refer to the Dunning Site Class Table below)

Dunning Site Class

Site Class	Mean Annual Growth (Cubic Feet/Acre)
I	120+
II	85-119
III-IV	50-84
V	20-49
VI	<20

The Douglas-fir type is found only in the South Fork Mountain area of the Trinity Forest Pure stands of productive Douglas-fir grow there Only about two percent o he tentatively surtable timber lands on the Forests fall into :his type The average timber site is Dunning Site Class I

The ponderosa pine type is found only in the Mt Shasta and eastern McCloud Flats area on the Shasta Forest This ype makes up about one percent of the tentatively suitable timber lands on the Forests The average timber site is Dunning Class IV

The red fir type grows at higher elevations above 6,000 feet About four percent of the tentatively sutable timber ands fall in this category Most of the red fir found on the Trinity Forest grows within Wildernesses Red fir grows in pure stands, in a mixture with white fir, or with lodgepole pine Productivity vanes greatly but is generally high The average timber site is Dunning Class III

Hardwood types grow on about nine percent (190,000 acres) of the Forests Nearly four percent of the tentative-$ suitable timber land is occupied with pure hardwood stands, however, hardwoods are not considered a commercial timber species The primary commercial value of hardwoods is for firewood and biomass for energy producing wood-burning plants Hardwoods also provide non-commercial values, such as for soil productivity and wildlfe and habtat diversity

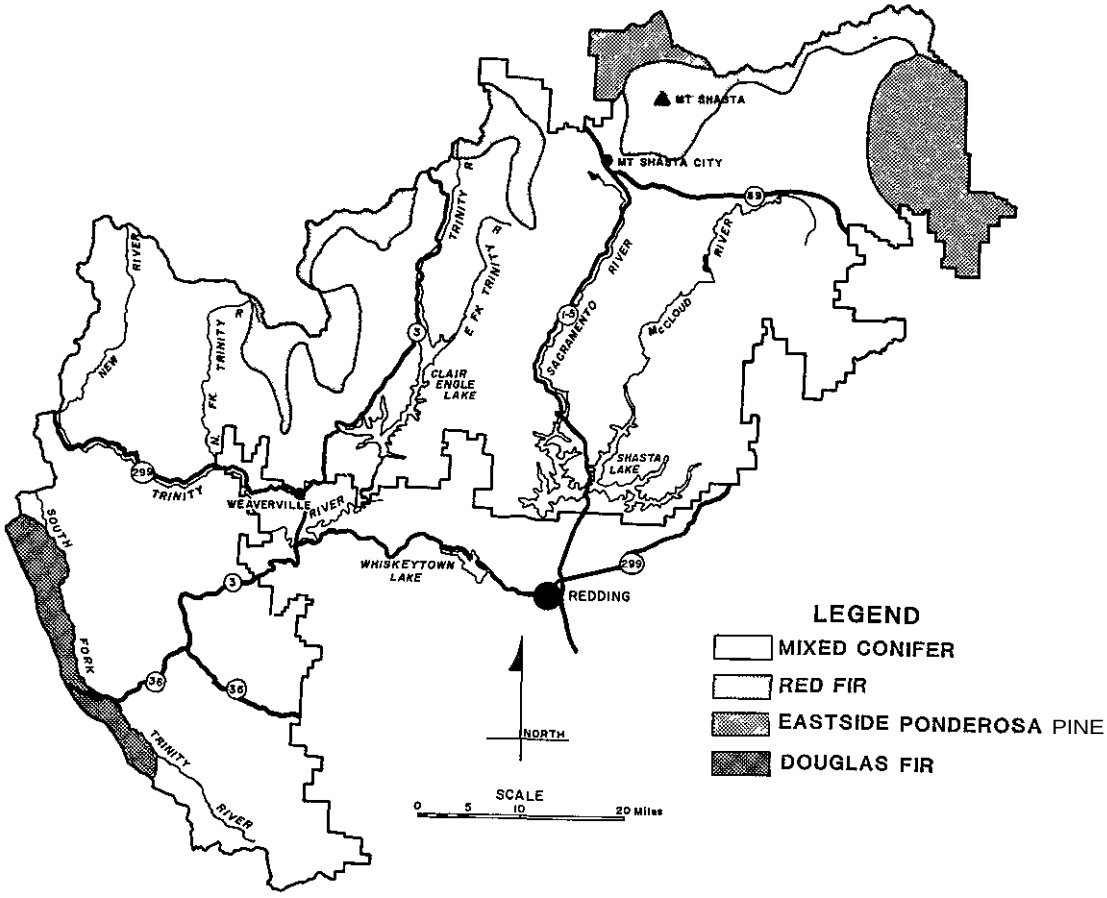
The predominant confer species on the Forests are Douglas-fir, ponderosa pine. red and white fir, sugar pine, and incense cedar The predominant hardwood species are black oak and live oak A breakdown of the pnmary timber species found on the Forests is shown in **Table 111-15.**

The current size and age class distnbution of the Forests' commercial conifer timber is not in an even, or regulated, condition There is a vast amount of land in the small sawtimber class and less in the smaller and larger size classes, as displayed in **Table III-16.**

There are over 300,000 acres of understocked stands, or about one-third of the tentatively suitable timber land base, on the Forests These areas are understocked because of natural events such as wildfires, or because of past management practices relating to partial cutting These stands are growing at a rate significantly less than their potential Many acres of these understocked stands are in need of a regeneration cut and reforestation in order to bring them up to full stocking and optimum growth

Except for the seedling/saplings class, most of the existing stands on the Forests have culminated in mean annual increments of cubic foot growth In fad, many stands are

Figure III-4
Major Commercial Forest Types



over-mature and have reached the point where they are not putting on any new growth (mortality is equal to or greater than growth) These stands are not fully utilizing site potential for timber production and are growing at a rate far less than their potential growth rate In order to maintain or increase harvest levels, these stands should be regenerated and converted to fast-growing, young-growth stands

Early Logging/Timber Management Plans. Timber harvesting began on the Forests in the early 1900s Most of this early logging was done by railroad to remove high value pine from the flats of the Shasta Forest There were no long-term timber management objectives at the time

The concern for a sustained yield of timber and the need for a timber harvest schedule, based on inventory and growth, prompted the fst formal timber management plans in the early 1950s The latest timber management direction was established in the May 8, 1975, Shasta-Trinity National Forest Timber Management Plan and Final Environmental Impact Statement Among other things,

Table 111-15
Percent Species Composition
(based on basal area/acre)

Species	Percent Shasta NF	Percent Trinity NF
Douglas-fir	33	38
Ponderosa Pine	29	12
Jeffrey Pine	nominal	3
Sugar Pine	5	6
Lodgepole Pine	1	nominal
Western White Pine	nominal	1
Knobcone Pine	nominal	nominal
white Fir	6	2
Red Fir	5	1
Incense Cedar	4	14
Black Oak	14	3
Live Oak	1	13
Tanoak	nominal	2
Pacific Madrone	nominal	3
Other Species	2	2
Total	100	100

Data Source Forest Timber Inventory - 1980 (updated 1989)

this Plan set an annual potential timber yield for the Forests based on timber inventory condrtions in the 1960s

Several of the assumptions on which these potential yield calculations were based have changed or have proven incorrect Recent changes in multiple-use direction for timber producing lands (such as for spotted owls), as well as reductions in the amount of land suttable and available for timber production (such as for new wildernesses, land withdrawals [e g , late-successional reserves], and recent land exchanges), have significantly changed the Forests' timber base

Suitable Timber Land Base. The National Forest Management Act (NFMA) of 1976 required the Forests to do an assessment of lands which are capable, avalable, and tentatively suttable for timber production Based on this assessment, which was completed in 1990, 622,870 acres on the Shasta side and 454,905 on the Tnnty side, for a total of 1,077,775 acres, have been identifed as tentatively surtable for timber production Of this amount, 924,230 acres are suttable for all silvicultural systems (including clearcutting), 37,945 acres are surtable for all systems except clearcutting (pnmanly high elevation red fir), and 1 15,600 acres are suttable for stand maintenance or salvage only (due to site limitations such as low soil

Table III-16
Timber Size/Age Class Distribution

Size Category	Approximate Diameter Range	Approximate Age Range bears)	Percent of Conifer Land
Seedlings, Saplings	0-5"	0-30	9
Poles	5-11"	30-80	8
Small Sawtimber	11-24"	80-180	69
Medium-Large Sawbmber	>24"	180 +	14
Two-Storied Stands	mixed	mixed	<1

productivrty, high rock content, and soils with poor water-holding capacty)

Lands classified as unsuitable for timber (1,05 1,749 acres) because they are non-productive, non-regenerable, unstable, or unavailable are removed from the timber base, and no timber harvest is planned Only stand maintenance or salvage for other resource purposes is permitted on unsuitable timber lands

Timber Supply. The Shasta-Trinity National Forests are among the major timber producing forests in California The Shasta-Trinity, Klamath, Six Rivers, and Plumas National Forests account for approximately one-half of the potential yield and timber sale volume from the National Forests in the State

An estimate of the Shasta-Tnnity National Forests' timber supply situation resulted from timber inventories completed in 1980 and updated in 1989 to reflect current conditions According to these Inventories, there are about 19 0 billion board feet of standing timber on the Forests on lands classified as tentatively suitable for timber production

Table III-17 summarizes the current (1989) situation for the timber resources on the Forests, including inventory volumes, suitable acres, and growth for each timber strata

The Forests supply timber to about 20 local mills This timber helps satisfy local, regional, and national demands for lumber and other wood products Nearly all of the Forests' timber is processed in the local impact counties of Shasta (40 percent), Trinity (26 percent), Tehama (16 percent), and Siskiyou (12 percent) The annual capacrty of the mills in the local area is estimated at between 700 and 800 MMBF

The Shasta-Trinity National Forests have supplied approximately one-fourth of the total timber volume harvested in the local area over the last several years The average volume harvested between 1975 and 1992 was about 97 MMBF per year on the Shasta Forest and 115 MMBF per year on the Trinity Forest In 1993 the volume harvested was 34 MMBF on the Shasta Forest and 37 MMBF on the Trinity Forest This volume is expected to remain lower than average outputs of the past decade because of the listing of the northern spotted owl, and concerns for retention of "old growth" and ripanan ecosystems

As of September 30, 1993 the volume under contract on existing timber sales on the Forests was about 48 MMBF The volume under contract has been steadily declining in recent years

Over 200 MMBF of merchantable timber outside of Wildernesses was burned and killed during the wildfires of 1987 and 1988 Over 90 percent of this timber has been logged or has been prepared for salvage

Timber Demand. Demand for timber is relatively high because mill capacity in the local area is about four times the Forests' annual sell volume, leading to highly competitive bidding on most sales Purchasers of Shasta-Trinity National Forests' timber sales are centered in the Red Bluff-Anderson-Redding areas In addtion, appreciable quantities are processed in the smaller, surrounding communities of Hayfork, Weaverville, Burney, and Yreka The mills in these smaller communities rely heavily on the Forests' timber, with as much as one-half of the processed timber coming from the Shasta-Trinrty Timber harvest levels have a signliicant effect on those communlties most dependent on the wood products industry

In recent years, due to high demand, all of the timber offered for sale on the Forests has been sold Sales typically sell for several times more than the advertised rates Timber sale receipts normally exceed the cost of preparing and administering sales, regenerating the timber, and building timber haul roads Even in this healthy timber market, the possibility exists for individual timber sales to be sold below cost, however, below cost timber sales are rare

Real timber prices have steadily increased over the years, as reflected in the average dollars per thousand board feet (MBF) paid for timber sales on the Forests These long term price trends reflect the increasing scarcity of timber in relation to demand

Demand for the mqor conifer species on the Forests can be reflected in their relative stumpage values Sugar pine and ponderosa pine are high value species, Douglas-fir and incense cedar are moderate value species, and the true firs, red and white fir, are low value species.

The demand for hardwoods for home heating has risen dramatically, since the cost of electricity has increased However, there are large quantlties of hardwoods on the Forests The majorrty of the hardwood is located in inaccessible areas or on steep slopes Black oak, tanoak, chinquapin, madrone, and live oak are the most common hardwoods available Hardwoods also provide an important element to the habitats of certain wildllfe species Increased demands for hardwood could create use conflicts in the future

Management Opportunities

Several opportunities, associated with timber management activities, exist in terms of timber and other resource values

Timber growth and yield can be enhanced by replacing understocked and poorly-growing stands with fully stocked, thrifty confer stands Understocked stands should be a high priority for regeneration in order to capture growth potential and maintain or enhance future yields This would, in turn, ensure a continued supply of wood fiber from the Forests and help meet consumer demand

The loss of trees to forest pests can be reduced by maintaining healthy, vigorous stands through timber management activities such as thinning and salvage, and by managing other vegetation which competes with the trees

Vegetation manipulation, through timber management, can also provide the means to enhance or improve other resource values, such as creating suitable wildlfe habitat

Opportunities also exist to reduce the visual (environmental) effects of timber harvesting. particularly even-aged regeneration cutting such as clearcutting Some ways in which this could occur would be to (1) reduce the number of acres clearcut, (2) reduce the size of clearcut openings, and (3) increase the number of standing residual trees left in a clearcut after harvest and site preparation

Opportunities exist to increase the use of uneven-aged silvicultural systems, such as selection cutting, pnmarily to meet wildlife and visual objectives Opportunities also exist to test growth and yield assumptions under uneven-aged management by practicing intensive uneven-aged management in selected areas and monitoring yield results

Over the past several years, an increasing number of procedural requirements have been placed on the planning and implementation of timber management practices New laws, Executive Orders, and policies have been enacted or adopted that have assigned values higher than timber to special or unique resources Other procedural requirements, growing from a recognition of the environmental effects associated with intensive timber management, have affected the amount of land available for timber production

The most signlficant changes that have affected the future production of timber are management of threatened and endangered (T&E) and sensitive plant and animal habrtats, reservation of wide zones around npanan areas, protection of significant cultural resources, management of Wilderness and roadless areas, and the maintenance of natural-appearing areas as seen from heavily-traveled roads or recreation areas These requirements will be reflected in the current timber inventory and land base in the Forest Plan

This round of planning allows Forest personnel to balance the opportunities for a sustained yield of timber along with other important forest resource requirements and opportunities using the most recent information and data available

The 1990 Forest and Rangeland Renewable Resources Planning Act targets (1990 RPA targets) for the Forests' timber resource call for a Total Sale Program Quantity (TSPQ) of 195 MMBF per year The 1990 targets also call for a 14 percent reduction in the number of acres being clearcut Opportunities for meeting these targets, and ways to best achieve them, will be examined during this planning process

Table 111-17
Timber Condition Classes, Area, Estimated Volume, and Growth Rates
Shasta-Trinity National Forests

Condition Class		Area Tentatively Suitable (M Acres)		Average Conifer Volume Per Acre (MBF)		Estimated Total Volume (MMBF)		Average Current Annual Growth (CF/AC/YR)		Potential Mean Annual Growth of Replacement Stands (CF/AC/YR)	
Timber Strata*		Sharta	Trinity	Shasta	Trinity	Shasta	Trinity	Shasta	Trinity	Sharta	Trinity
Mixed Conifer	M2G	11 8	23 1	17 1	22 4	201 8	5174	17	58	79	52
	M2P	9 7	7 8	4 6	8 2	44 6	640	11	14	79	52
	M3G	161 7	149 2	29 1	289	4,705 5	4.31 1 9	47	40	79	52
	**M3P	2103	1073	10 7	16 8	2,2502	1,802 6	30	34	79	52
	M4G	42 6	78 6	29 1	28 9	1.239 7	2.271 5	46	40	79	52
Douglas Fir	D3G		1 7		35 7		60 7		68		104
	D3P		1 2		15 1		18 1		30		104
	D4G		10 0		48 0		480 0		50		104
Ponderosa & Jeffrey Pine	P3P	9 2		7 5		69 0		22		52	
Ped Fir	R2N	4 5		6 9		31 0		9		83	
	R3G	20 0		33 8		676 0		38		83	
	**R3P	10 4		9 7		100 9		17		83	
	R4G	1 3		33 8		43 9		37		83	
Knobcone Pine	KPX	6 0		3 6		21 6		9		Unest	
Lodgepole Pine	LPX	7 8		9 8		76 4		26		37	
Plantations	PL	74 2	65 2	0	0	0	0	Unest	Unest	79	52
Hardwoods	HX	36 6	8 2	Unest	Unest	Unest	Unest	Unest	Unest	Unest.	Unest
Brush	SX	16 8	2 6	Unest	Unest	Unest	Unest	0	0	Unest.	Unest.
Total		622 9	454 9			9.460 6	9.526 3				

* S : Cla s s (crown diam)
2=pole-size timber (6-12 :)
3=small sawtimber (13-2 et)
4=medium/large sawtimber (25+ feet)

Density Classes:
G = good stocking (40-100%)
P = wor stocking (10-40%)
N&X = all density classes

** These Strata inslude size class 3 and 4

20. Visual Quality

Public Issue

One public issue relates to visual quality

How and where should visual quality be protected and enhanced? (Public Issue #19)

Discussion of Public Issue

Visual effects of management practices have become more apparent in recent years There is public concern that scenic quality has declined overall and that certain silvicultural practices and road building activities have contributed to this decline There is also concern that visual quality does not receive adequate emphasis This is most notable along sensitive travel corridors Others feel that visual resource practices are too restrictive on management activities, particularly timber harvesting and mining

Current Management Situation

Several factors help contribute to a better understanding of the visual quality situation (1) the current visual management policy. (2) the existing visual condition, (3) the trend of the Forests' visual condition. (4) the potential supply of scenic quality, and (5) the public demand for scenic quality

Visual Management Policy

Views from designated State and Federal highways. identified as being eligible for designation as Scenic Highways, are managed to protect scenic quality In addition, developed recreation areas and wildernesses are managed to protect scenic values

About 370 miles of roads on the Forests are managed so that adjacent beauty and attractiveness can be maintained or enhanced In addition, many miles of streamsides and lakeshores are managed to maintain or enhance beauty and attractiveness Views from designated scenic byways and wild and scenic rivers are managed to maintain or enhance beauty and attractiveness

The Shasta and Trinity Units of the Whiskeytown-Shasta-Trinity National Recreation Area (NRA) were designated by Congress "for the public outdoor recreation use and the conservation of scenic, scientific, historic, and other values " (Public Law *89-336)* The NRA is managed accordingly

The Mt Shasta Recreation Area possesses "much scenic beauty which should be conserved and developed for use and enjoyment by the general public for purposes of outdoor recreation " It is presently managed for those purposes

Existing Visual Condition

The lands within the Shasta-Trinity National Forests have been divided into three variety classes Distinctive (Variety Class **A),** Common (Variety Class B), and Minimal (Variety Class C) These variety classes are a measure of the scenic attributes of the landscape such as landform, water, and vegetative pattern Over time, landscapes within the three variety classes undergo physical alteration because of road building, timber harvesting, campground construction, mining, etc

The term existing visual condition is a measure and classification of the degree of physical alteration There are six visual condition classes on the Forests These vary from Class I areas, which are unaltered, to Class VI areas which are physically altered on a large scale (Refer to the Glossary, Chapter VIII, for a description of each of the six classes)

Table III-18 shows the existing visual conditions, by variety class, that are found on the Forests ***As*** shown in the table, the most dominant physical alterations have occurred in the least scenic areas (Common and Minimal Variety Classes) while the least amount *of* physical alterations has occurred in the most scenic areas (Distinctive Variety Class)

Trend of the Forests' Visual Condition

Inventories indicate there is an historic trend toward more change and a less natural appearing landscape This trend has been accelerating during the past 35 years **As** one means to measure this trend, a visual quality index has been developed for the Forests **Figure III-5** illustrates the estimated change in the visual quality index over time

Table III-18
Existing Visual Condition by Varlet) Class

Visual Condition	Variety Class		M Acres'
I Untouched	A	Distinctive	206.5
	B	Common	673 9
	C	Minimal	28 7
II Unnoticed	A	Distinctive	33 4
	B	Common	750.9
	C	Minimal	222.3
HI Minor Disturbance	A	Distinctive	4.9
	B	Common	93.7
	C	Minimal	26.8
IV Disturbed	A	Distinctive	0 4
	B	Common	33.6
	C	Minimal	27. I
V Major Disturbance	A	Distinctive	0.0
	B	Common	6 5
	C	Minimal	12.8
VI Drastic Disturbance	A	Distinctive	0 0
	B	Common	0 0
	C	Minimal	0 0
TOTAL			2,121 5

Visual Quality Objectives

The inventoried visual quality objectives (VQOs) are based upon estimates of public concern for scenic quality (sensitivity levels), the scenic qualrty of the landscape (variety class), and distance of the landscape from the principal viewing area. Acres of inventoried VQOs by variety class are shown in **Table III-18a** VQOs identify

Table III-18a
Inventoried Visual Quality Objectives *(VQOs)*
by Variety Class

	Variety Class				
	A	B	C	Total (M Acres")	Percent
Inventoried VQO					
Preservation	1432	354.9	0.6	498 7	23 5
Retention	75 0	100.5	0.0	175 5	8 3
Partial Retention	36 4	432 9	121 3	590 6	27 8
Modification	0 0	493 4	1042	597 6	28 2
Maximum Modification	0.0	167.0	92. I	259 I	12 2
TOTAL	254.6	1,548.7	3182	2,121.5	100.0

* M Acres = thousand acres National Forest land only

how much a management activity can contrast visually with the character of the landscape **figure III-6** illustrates an example of each VQO

Management Opportunities

Supply of Scenic Quality

New management techniques are being adopted that will modify the impacts affecting the scenic resource. Smaller openings. as in uneven-aged selection cutting, will normally meet a higher visual quality standard than larger openings

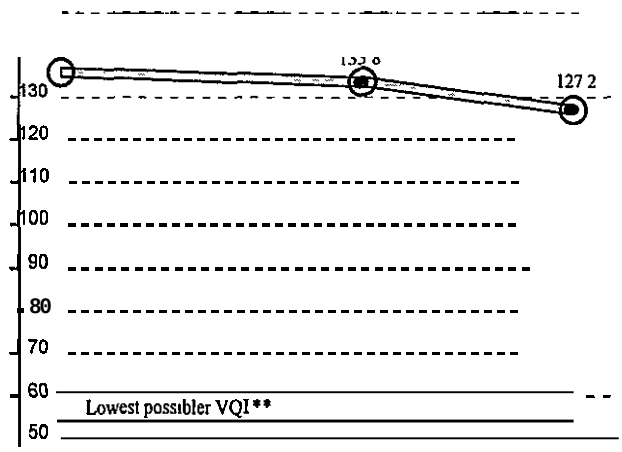
Many opportunlties exist to protect and enhance the visual quality on the Forests There are ways to support the tounsm industry by managing the scenic setting along travel routes and near major tourist destinations Similarly, there are opportunlties to manage the scenic setting near important recreational features and high use areas In some instances, scenic settings could be enhanced by creating vistas or managing vegetation for the visual characteristics recreationists find most appealing Finally, there are opportunlties to manage additional areas, to maintain or enhance the present visual qualities, and to improve access on and around Mt Shasta

There are also opportunlties to lessen the visual effects of timber harvesting activlties through the location and design of harvest units Smaller openings, as in uneven-aged selection cutting, will normally meet a higher visual quality standard than larger openings

Public Demand for Scenic Quality

Indicaton of the demand for visual quality are expressed in the following ways (1) the desire of more Forest visitors to seek pleasant visual settings for their recreation pursuits, (2) the increasing desire of urban minorities and low-income residents to travel and sightsee in scenic **areas:** (3) the increasing concern for scenic resources, (4) the increasing number of laws designating management areas where visual quality and aesthetics are primary considerations, and (5) the report by the President's Commission on the American Outdoors which emphasizes the value and importance of scenic quality

Figure III-5
Trends in Visual Quality Condition
Visual Quality Index (VQI)

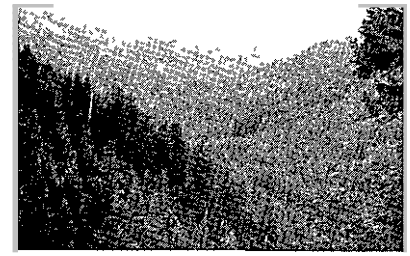


VQOs may deviate from the inventoried VQOs depending on the management objectives and direction for the and These adopted VQOs dictate the level of visual quality to which the landscape will actually be managed Under the current management direction, no more than seven percent of the net acres on the Forests would be managed under a maximum modification VQO

Figure III-6
Visual Quality Objectives (VQOs)

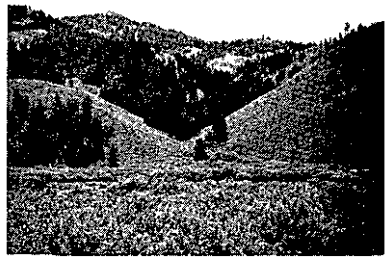
Preservation P

Only ecological changes permitted



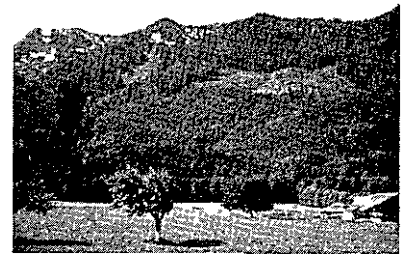
Retention R

Management activities are not visually evident



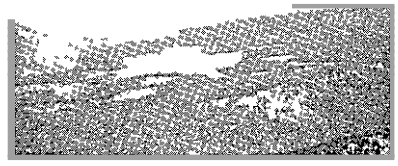
Partial Retention PR

Management activities remain visually subordinate



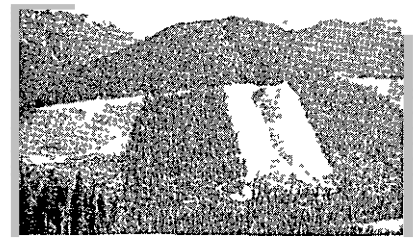
Modification M

Management activities in foreground and middleground are dominant, but appear natural



Maximum Modification MM

Management activties are dominant, but appear natural when seen as background



Unacceptable Modification UM

Activities that contrast excessively in form, line, color or texture from the characteristic landscape do not meet visual quality objectives

21. Water

WATER QUALITY

Public Issues

One major public issue focuses on water quality

How should watersheds be managed to maintain or enhance water quality and fisheries? (Public Issue #6)

One other issue relates to water

How wide should riparian management zones (RMZs) be and what management activities should be allowed within them? (Public Issue # 13)

Discussion of Public Issues

Water Quality Maintenance and Enhancement. The water on the Shasta-Trinrty National Forests is probably its most valuable, widely used, renewable natural resource Water produced from the Forests' watersheds is used throughout the State for power generation, irrigation. domestic consumption, and many other beneficial uses The varied users of the Forests' water require a consistently high level of water quality The water resource is also used for sustaining a variety offish, wildlife, and other instream water uses

Forest management activties have the potential to affect water quality, and, subsequently, to affect the utility of the many beneficial uses of the water produced Management activities, including road building in steep, rugged terrain, have long been recognized as sources of non-point water quality pollution Non-point pollution is controlled by containing the pollutant at its source, thereby precluding delivery to surface water and protecting water quality The means of watershed management to meet the end of water qualrty maintenance or enhancement is an issue that concerns all recipients of the Forests' water

Related Issue

Riparian Reserve Area. Refer to the discussion of this issue in the Riparian Area Section

Current Management Situation

Water Quality Management. The qualrty of water that is produced as runoff from the Shasta-Trinity National Forests is measured against water qualrty objectives established by the Clean Water Act and the Rver Basin Plan objectives established by the State of California

Water quality on the Shasta-Trinity National Forests varies wth water source, flow, sources of pollution, and timing of water yield Parameters of water quality, which pertain to the forest environment, include sediment, temperature, pH, dissolved solids, heavy metals, chemicals (pesticides and fertilizers), and bacteria and protozoans from human and animal waste All of these parameters. wth the exception of pesticides and fertilizers, occur at some natural level in the aquatic environment The natural level of these parameters in the water consttute the background or natural water quality This natural water quality also varies with water source, flow, and timing of water yield

Water quality is regulated by the Clean Water Act, under the direction of the Environmental Protection Agency (EPA) and the California State Water Resources Control Board Local regulation is provided in the Trinity River Basin by the North Coast Regional Board, and in the Sacramento River Basin by the Central Valley Regional Board Water Qualrty Control Plans for both Regions contain Water Qualrty Objectives (standards), Beneficial Uses, and a "Statement of Policy with Respect to Maintaining High Quality Waters in California" These Plans regulate water quality of the waters of the Shasta-Trinity National Forests just as they regulate all other water; of the respective river basins

Water quality is maintained and improved through the application of state certified and EPA approved Best Management Practices (BMPs) for controlling non-point sources of pollution to surface water Methods and techniques for applying the appropnate BMPs are identified during on-site investigation of forest projects that have the potential to degrade surface water quality

BMP implementation is montored during and after project execution Effectiveness montoring is also conducted following project completion to ensure that the BMPs meet their stated objective to protect water qualrty Implementation and effectiveness reviews are conducted in cooperation with the Central Valley and North Coast Regional Water Quality Control Boards If monitoring indicates that water quality standards are not being met, or have the potential of not being met, then corrective

action is taken Corrective action considers the cause of failure orthreatened failure of BMP objectives. The cause could be due to the inadequacy ofthe BMP Itself, a failure of the implementation process, or an inadequacy of the standard being measured More detailed discussions of BMPs and the implementation process are presented in Appendix E of the Forest Plan

Protection offloodplains and wetlands, from management activities involving dredging and filling, are regulated through the permitsystem ofthe Clean Water Act, Section 404, administered by the U S Army Corps of Engineen There are exemptions and blanket authorizations wrthin the law that afford "general permits" for most forest management activities. 40 CFR 232 3, Subsection "c" identifies six activities exempt from permit requirements Among them are normal silvicultural activities, construction and maintenance of forest roads, maintenance and emergency reconstruction of dams, bridges and abutments/approaches Some examples of Forest activities that could be affected by the permit system include road or campsite development within floodplains or wetlands that requires fill material placement, installing or removing boat ramps, or fish habitat enhancement projects such as gabion placement

Impacts to wetlands are minimized to the extent appropriate and practicable with the use of BMPs Where unavoidable adverse impacts remain, compensatory mitigation measures are undertaken in accordance with the guidelines provided in the Management Agency Agreement between the EPA and the Army Corps of Engineen These determinations are made on a case-by-case basis at the project planning level

The water quality of streams within watersheds disturbed by forest management activities meets quality objectives dunngthe dry part oftheyearwhen erosion and sedimentation processes are curtailed. Exceptions include water draining from old mining sites, direct discharges of pollutants, or areas where direct streamside canopy has been removed Further degradation of water quality can occur in the rainy season within disturbed watersheds. Most National Forest management activlties have either no affect or only a short term affect on water quality Unsurfaced roads, especially those that are poorly maintained. cause long-term water quality degradation

Watershed Condition. Watershed condition is a description of the health of a watershed, or portion thereof, in terms of the factors which affect hydrologic function and soil productivity Hydrologicfunction controls the manner in which water travels through the watershed as surface and groundwater resources Forest management activities influence the natural hydrologic function of watersheds in a number of ways Examples of these influences include changes in peak stream flows, erosion (sheet, rill and mass wasting). soil compaction, and vegetation removal. Additionally, cumulative effects which include the relative timing, location, type and level of management activities are signlficant because they can influence the magnitude of any of the above factors

Watershed condition can be classified by evaluating the cumulative watershed impacts This method calculates soil disturbance and compaction from roading and timber harvest activities in equivalent road acres (ERAs) A watershed's sensitivity is evaluated and classfied and a threshold of concem (TOC) value is assigned This value is expressed in percent ERA, wrth lower sensitivity watersheds having a higher TOC than the highly sensitive watersheds The TOC value is meant to indicate a point

Tabl 1-19
Watershed Condition Classes

	CLASSES		
Characteristics	**1**	**2**	**3**
ERA Levels as a Percent of TOC	<40	40 - 80	>80
Stream Channel Conditions	Good to Excellent	Fair to *Good*	Fair to Poor
Soil Productivity	Maintained at optimum levels	Maintained at lower levels than Class I	Maintained at lower levels than Classes I and2
Water Qualrty	Exceeds objectives	Meets objectives	Meets or is below objectives
Potential for Degraded Water Quality or Soil Productivity	Low	Low to moderate	Moderate to high

where, tfapproached or exceeded, the nsk ofwatershed degradation is considered significant and mitigation measures should be implemented to lessen the hazard (See Appendix H)

Watershed condition classes are defined in terms of the level of ERAs for individual watersheds with respect to their TOC **Table III-19** summarizes the typical characteristics of the three watershed condrtion classes

Sixty-one watersheds have been identrfied wrthin the Forests (refer to map, **Figure 111-7). These watersheds range from II to 410 square miles** in size An inventory of the existing watershed condrtion of these watersheds indicates that most are presently Class I and Class 2 **(Tables H-I and H-2** in Appendix H) However, seven watersheds have relatively high disturbance levels which cause them to be a Class 3 These watersheds are the East Fork of the South Fork Trinty River, Rattlesnake Creek, Butter Creek, Plummer Creek, Gulch, Hyampom and Upper Hayfork Creek Cumulative effects have occurred wrthin subwatersheds of these watersheds, and there is a significant risk of initiating cumulative effects wrthin the main channels which drain these watersheds

In addition, some watersheds were extensively affected by the 1987 and 1988 wildfires Although these watersheds are in condition Class 2, they could undergo cumulative watershed effects in some of their subwatersheds (e g , Salt Creek and the Upper South Fork Trinrty River watershed)

Management Opportunities

All areas of declining watershed condition would be treated to regain natural watershed stability Restoration would be conducted at a rate commensurate with RPA targets for watershed improvement Watershed improvement on the Shasta-Trinity National Forests would be accomplished through the implementation of a Forest Watershed Improvement Program to identify, assess, and fund improvement of degraded watersheds

The 1990 RPA targets for watershed improvement on the Forests are to restore 700 acres per year during the first decade, 710 acres per year dunngthe second decade, and 450 acres per year during the third decade Implementing the target rate on the watershed improvement needs identrfied to date would result in complete watershed restoration sometime during the second decade A more extensive/complete inventory is needed, however, to identify all areas wrthin detenorated watersheds that are in need of improvement

The 1984 Regional Guides include direction for treating all lands that are in a declining watershed condrtion by the year 2000 Because of the constraints involved and the magnitude of the areas needing improvement (some 11,000 acres), this direction would probably not be met The intent, however, is to treat areas of declining watershed condrtion as rapidly as possible

BMPs are used for the protection of water qualrty as described in the most current version of "Water Quality Management for National Forest System Lands in California" (This document is available at any Pacrfic Southwest Region National Forest office) In addrtion. a Forest Supplement to the BMP Handbook describes addrtional measures which can be prescribed to protect water qualrty These BMPs prevent land-disturbing activrties from polluting water from non-point sources. Use of these BMPs would also insure the protection or enhancement of ripanan areas

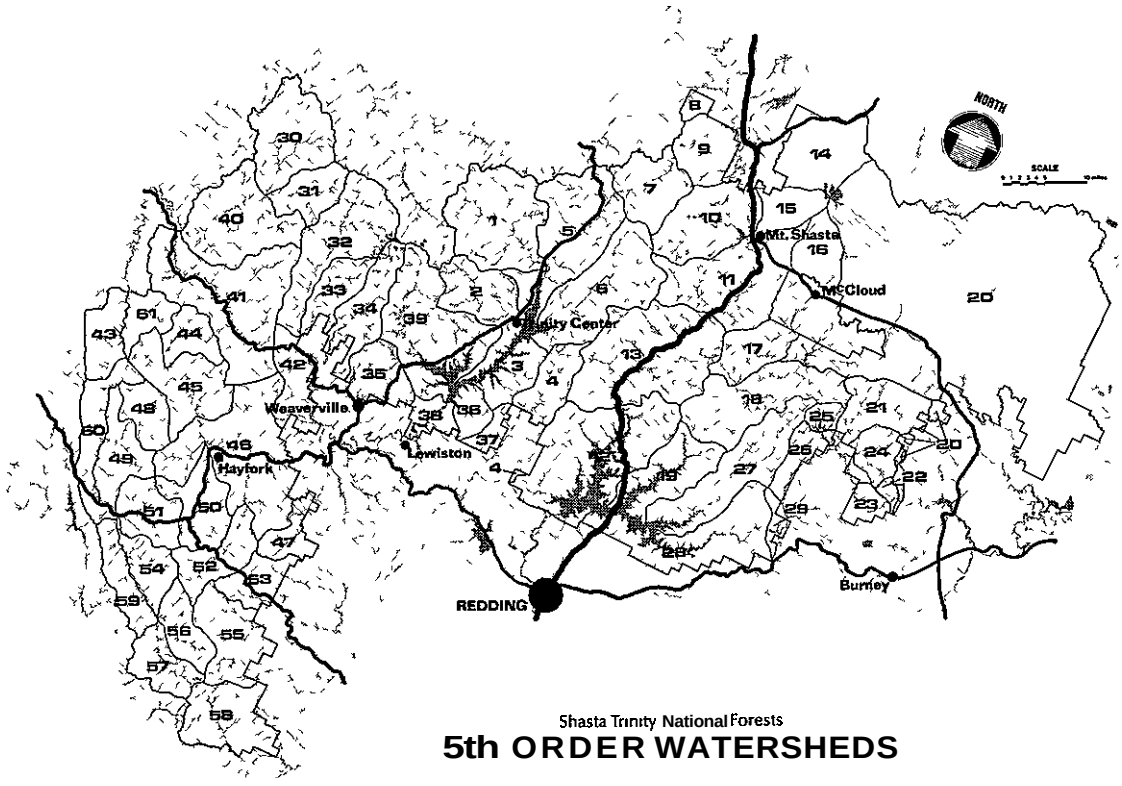
A new BMP monitonng handbook has been developed and is being implemented throughout the National Forests in the Pacific Southwest Region (Region 5) The handbook provides for a uniform procedure for monitoring BMP implementation and effectiveness The procedure includes BMP activity reviews, monrtoring of specific BMP applications, and monitoring of water quality and beneficial uses downstream from the BMP applications Monitoring efforts and results would continue to be shared with the Centra Valley and North Coast Regional Water Qualrty Control Boards

The degradation of watershed condition and cumulative watershed impacts would remain a concern in the future However, they could be minimized through the application of cumulative impact assessments on all projects occurring on National Forest lands Through the dispersement of management activities. both in time and space, the identification and proper management of sensrtive lands and the proper application of BMPs, watershed condition can be maintained and cumulative impacts can be prevented from occumng

WATER YIELD

Public Issues

No public issues focus specifically on water yield



Shasta Trinity National Forests

5th ORDER WATERSHEDS

Watershed boundaries are only approximate of this scale

Current Management Situation

The Shasta-Trinrty National Forests are wrthin the Upper Sacramento and Trinity River Basins The basins produce an average annual runoff of *6,972,000* acre-feet ofwater Of this total, about 5,450,000 acre-feet of water flows from National Forest lands *(See* Appendix H for a display of average water yield by National Forest watershed)

Beneficial Uses. Of the 5 45 million acre-feet of water yielded from Shasta-Tnnrty National Forests' watersheds annually, almost all is used for human beneft in some manner Water is extensively used both for consumptive and nonconsumptive uses Beneficial uses denved from water flowing from National Forest land occur within the forest environment as well as downstream many miles from its source The Water Quality Control Plans for the North Coast and Central Valley Regions list potential as well as existing beneficial uses for the waters of the major tributaries on the Forests

Shasta and Clair Engle (Trinity) Lakes provide water for fish habitat, many forms of recreation, hydroelectric power production, and extensive downstream agricultural irrigation Major sources of hydroelectric power on the Shasta-Trinrty National Forests also come from the Pit River Lake Britton, Lake McCloud, and Iron Canyon Reservoir are all diversions for hydroelectric power About 60 to 70 small-scale hydropower projects are being developed on smaller water sources

About 1,900 miles of fishable streams, 131 natural lakes, and 11 manmade reservoirs, wrthin the Forest boundaries, provide a variety of recreational opportunrties

Nine communrties wrthin the Forests have organized water supply agencies that obtain community water from surface sources They are Big Bar, Castella, Covington Mill, Craigview, Del Loma, Hayfork, Lakeshore Heights, Trinity Center, and Weaverville Shasta and Trinrty Lakes also provide domestic water to several communrties and/or resorts Jones Valley, Silverthorn Resort, Bridge Bay Resort, Mountain Gate, Shasta Dam Public Utilities District, and Fairview Marina There is no formal agreement with these users regarding the management of the appropriate watersheds The quality of the water for this domestic use meets State objectives In addition to community systems, many individual domestic water systems are scattered throughout the Forests Current management direction is to protect water qualrty for domestic use, and this has been effective in precluding unacceptable impacts

Demand for consumptive water is expected to increase in proportion to the population growth and the distribution of this growth throughout the State Demand for instream uses and uses associated wrth impounded water will also increase The water produced from the Shasta-Trinity National Forests is of sufficient quality and quantity to meet demands during the next 10 years More information about consumptive and nonconsumptive water needs is required in order to develop future plans for meeting these needs

What role the Shasta-Tnnrty National Forests will have in meeting future water needs for the State of California is unknown The Forest Service would cooperate fully wrth the State Water Resources Control Board in its efforts to manage the water resource and protect beneficial uses

Forest personnel have identified 133 future water use needs which would require an additional 137 acre-feet of water annually These needs are related to management activities, such as future recreation developments and range improvements, where water diversion and consumptive use is required

Water Yield Increases. The opportunrty to increase water yields through vegetative management is limited Estimates of increases of runoff, through extensive vegetation conversion, indicate that a two percent increase in runoff could be achieved This estimate was based on a long-term conversion of forest land to vegetation with a lower transpiration rate, such as the conversion of brushland to grassland

The opportunrty to manage the Forests' snowpack to control water yield timing is extremely limrted as well The amount of precipitation incorporated into season-long snowpacks represents only a tiny portion of the total annual precipitation and subsequent runoff

Water Rights. The Shasta-Trinrty National Forests hold 43 reservation principal water rights and 83 appropnative water rights These rights cover uses from domestic supplies for campgrounds to livestock watering The Forests also hold a number of "Statement of Water Use" files, primarily for dust abatement on roads and for fire protection These uses are transitory, sporadic, and temporary depending on the immediate needs These uses have a lower prionty than filed water rights and instream beneficial uses There are records of over 200 water rights held by private interests within the Forests' boundaries, but the records do not include ripanan rights users

Future National Forest water needs are limited Most of the water needs would be met by dnlling wells to extract

ground water All future needs would be met pursuant to State law

Management Opportunities

Management opportunities for the immediate future are descnbed under 'Water Quality."

22. Wild and Scenic Rivers

Public Issue

One public issue emerged relating to Wild and Scenic Riven That issue is

What river segments should be recommended for inclusion in the Federal Wild and Scenic Rivers System? (Public Issue #20)

Discussion of Public Issue

Portions of the North Fork, South Fork, the mainstem Trintty Rver and the New River were added to the National Wild and Scenic Rvers System in 1981 Several other rivers and streams on the Forests have the potential for Wild and Scenic designation The effects that designation would have on private land use concerns some private landowners, especially those along the McCloud River

Current Management Situation

In 1968, Congress established the National Wild and Scenic. Rivers System and encouraged states and local governments to participate in the program In 1972, the State established a California System under the Callfornia Wild and Scenic Rvers Act (Behr Bill) In 1976, the Forest Service and the Calfornia Department of Fish and Game (DFG) entered into a Memorandum of Understanding on cooperative relationships in handling Wild and Scenic Rver matters for both the National and State systems This agreement included cooperation in carrying out studies and in prepanng management plans

The Wild and Scenic Rivers Act precludes or substantially limits the construction of dams and other water resources projects which might affect the free-flowing nature of a river

Designation does not open private lands to public access Landowners can continue to post their property Developed access points and recreation user facilities usually help reduce the trespass and impact on both private and public lands

The Federal government would consider acquiring private lands, if necessary, to protect the values of the nver corridor or to provide public access Acquisition may be by purchase, exchange, or donation, and may be for fee title to all or part of the land, or for easements. In almost all cases, this is accomplished on a willing seller - willing buyer basis

With a scenic easement the landowner maintains ownership, but agrees to limit the type of use or development that can occur When an easement is acquired, the landowner retains title to the land The landowner also retains the right to sell it, rent it, leave it to heirs, or restnct public access Scenic easements not only protect the river values, but they can also act to protect private properties from adverse development on adjacent private lands

Federal agencies use condemnation only as a last resort to prevent land use or developments from degrading the outstanding values of the river corridor

Condemnation of lands is a rare occurrence There are 100,000 acres of private land wthin the corridors of the rivers that the U S Forest Service manages in California, Oregon, and Washington These lands have never been acquired through fee ttle condemnation

The Wild and Scenic Rivers Act places greater restrictions on the use of condemnation than exists for other areas of the National Forests, National Parks and other Federal areas For example, in the National Forests or National Parks, condemnation is available to acquire fee ttle to any private lands needed for public purposes This is not true for private lands within Wild and Scenic Rver boundanes because the Act includes specfic restrictions on the use of condemnation Fee title condemnation is prohibited if more than 50 percent of the corridor land is publicly owned Most rivers considered for designation are more than 50 percent publicly owned

The effect of designation on road construction. timber harvesting, and mining varies by whether the river is classified as wild, scenic, or recreational The types of classification are defined as follows

--WILD Those rivers or sections of rivers that are free of impcundments, with watersheds or shorelines essentially primtive, generally inaccessible except by trail, and with unpolluted waters These represent vestiges of primitive America Most of these wild river segments are located on public lands

--SCENIC Those rivers or sections of rivers that are free of impoundments, wth shorelines or watersheds

still largely primitive and shorelines largely undeveloped, but accessible in places by roads

--RECREATIONAL. Those rivers or sections of rivers that are readily accessible by road or railroads, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past

On Wild segments no roads or other provisions for over land motorized travel would be permitted within one-quarter mile of the nver bank However; one or more inconspicuous roads leading to the river area, for the purpose of providing access, may be permitted Also, unobtrusive trail bridges could be allowed The cutting of trees would not be permrtted except when needed for a primrtive recreation experience or to protect the environment New mining claims would be prohibited within one-quarter mile of the river. Existing mineral activity must be conducted in a manner that minimizes sedimentation and visual impairment and protects Wild and Scenic River values

On Scenic segments roads may occasionally bridge the river area Short stretches of conspicuous or longer stretches of inconspicuous and well-screened roads could be allowed Consideration would be given to the type of use for which roads are constructed and the type of use that would occur in the river area A wide range of silvicultural practices could be allowed provided that such practices are carried on in away that there is no substantial adverse effect on the nver and its immediate environment New mining claims could be allowed and existing operations would be allowed to continue However, mineral activity must be conducted in a manner that minimizes sedimentation and visual impairment and protects Wild and Scenic River values

On Recreational segments paralleling roads could be constructed on one or both river banks There could be several bridge crossings and numerous river access points Timber harvesting would be allowed However, some restrictions could apply to immediate river environments to preserve scenic and fish and wildlife values New mining claims could be allowed and existing operations would be allowed to continue Mineral activty must be conducted in a manner that minimizes sedimentation and visual impairment and protects Wild and Scenic River values Refer to Appendix E for a detailed discussion of wild and scenic rivers

Current Supply. In July 1980, the Governor of Califomia petitioned the Secretary of Interior to include certain segments of the previously designated California Wild and Scenic Rivers System as part of the National System In January 1981, approximately 106 miles of the Trinity River system on National Forest lands were designated as part of the Wild and Scenic Rivers System within the Shasta-Trinity National forests The designated Wild and Scenic Rivers are shown in **Table III-20**.

Wild and Scenic River Demand. Public demand for existing Wild and Scenic Rivers, as measured through current recreation use, is low to moderate Projected demand for free-flowing rivers, as measured through growing public interest, is expected to increase significantly in the next five decades As more dams and diversions are constructed in the Western States, the availability of Wild and Scenic Riven will decrease Therefore, it is likely that the desire for additional river designations will continue as long as the related concerns of water quality maintenance, fishing habitat protection, and scenic protection remain in the forefront

Management Opportunities

In 1982, the Department of Interior completed an inventory and screening of potential rivers and river segments A total of 134 6 miles of additional rivers within the Forests' planning area were identified under the National Rvers Inventory Public comments on the Shasta-Trinity National Forests' Draft Environmental Impact Statement (DEIS), issued in August 1986, recommended that Squaw Valley Creek also be considered as a potential nver

Field analysis indicates that 10 5 miles of Squaw Valley Creek are eligible for designation Segments of the public also recommended Canyon Creek and Hayfork Creek for designation While these streams were not listed on the Nationwide Rivers Inventory, they total about 21 5 miles and 14 0 miles, respectively, and have been determined to be eligible for designation

Forest personnel have made a preliminary administrative recommendation that will receive further review and possible modification by the Chief of the Forest Service, Secretary of Agriculture, and the President of the United States The Congress reserves the right to designate rivers to the National Wild and Scenic Riven System

A Coordinated Resource Management Plan (CRMP) has been adopted for long term management of the Lower and Upper McCloud River (See Appendix N of the proposed Forest Plan) This agreement is between private landowners, the Forest Service, Pacfic Gas & Electric, Nature Conservancy, CalTrout, and the DFG This plan will effectively maintain the outstandingly remark-

able values ofthis potentialwild and scenic nver If,for any reason, the terms ofthe CRMP are notfollowed and the wild and scenic nver eligibiltty is threatened, the Forest Service will recommend these segments for FederalWild and Scenic designation

A Wild and Scenic Rver Plan has been completedfor the South Fork of the Trinity Wild and Scenic Rver System Plans are still needed for New Rver, North Fork Tnntty Rver, and the Trintty Rver

Future issues relating to ripanan resources will be addressed through implementation of management prescriptions and Forestwide standards and guidelines which deal with water qualtty, fishenes habitat, and scenic resource management Additional formal designations, under a NationalWild and Scenic Rven System, may be requiredto more fully addressthese concerns and to bnng intothe System more diverse examples of unrepresented ecosystems and physiographic provinces Close coordination with responsible State agencies will be needed

Table III-20
Current and Potential
Wild and Scenic Rivers (Miles)

	Currently Designated					Potential	
River Segment	Wild NFS	Scenic NFS	Ret. NFS	Total NFS	All'	NFS Only	All*
Beegum Creek Main Fork			-			10.0	10.0
Beegum Creek South Fork					-	7.0	7 0
Canyon Creek				-		17 5	21 5
Hayfork Creek			-		-	11.5	14.0
McCloud River (above dam)			-		-	14 7	24 3
McCloud River (below dam)		-	-			6 1	23 3
New River	7.3	5.0	8.7	21.0	21.0		
Sacramento River						6, 1	37 3
North Fork						6.0	6 0
Middle Fork					-	5.4	5 4
South Fork		-				10.2	10.4
Trinity River (main stem)	0.0	5.3	27.9	33.2	111.0		-
No. Fork Trinity (lower section)	12 7	0 0	2 3	15.0	15 0		
No. Fork Trinity (upper section)	-	-	-	-	-	11 7	11 7
So Fork Trinity (lower section)'	19 3	11 8	6 1	37 2	53 0	-	-
So. Fork Trinity (upper section)	-	-	-	-	-	24.8	26 3
Squaw Valley Creek	-	-	-	-	-	10 0	10.5
Virgin Creek	-	-	-	-	-	11 7	11.7
Total	39 3	22.1	45.0	106 4	200.0	152 7	219.4

* Includes National Forest and private lands

** Number per approved South Fork Environmental Impact Statement (for information only)

23. Wilderness and Roadless Areas

Public Issue

One public issue relates to Wilderness and Roadless areas That issue is

How should the Forests' roadless areas be managed, including the Mt. Eddy Further Planning Area? (Public Issue #21)

Discussion of Public Issue

Approximately 498,776 acres, or 24 percent of the Shasta-Trinity National Forests, are Congressionally designated as Wilderness These lands are within the Castle Crags, Chanchelulla, Mt. Shasta, Trinity Alps, and Yolla Bolly-Middle Eel Wildernesses One roadless area, Mt Eddy, was designated for further planning and is evaluated for wilderness classification as a part of the current planning process

The 1984 California Wilderness Act stated that those roadless areas not designated as either wilderness or further planning be managed for multiple use purposes and that they be reviewed again for wilderness when the Forest Plan is revised Most of the roadless areas are designated as habitat conservation area/late-successional reserves for spotted owls and other old-growth forest related species (refer to the discussion in the Wildlife Section)

Current Management Situation

The Wilderness Act of 1964 established a National Wilderness Preservation System to be composed of Federally owned areas designated by Congress as "wilderness" Under the Act, wilderness is defined as "an area where the earth and its community of life are untrammeled by man - where man himself is a visitor who does not remain" It is further defined as "a unit of undeveloped Federal land that retains its primeval character without permanent improvements on human habitation, which is protected and managed to preserve its natural conditions"

Supply. The 1964 Wilderness Act designated the Yolla-Bolly-Middle Eel Wilderness, 36,805 acres of which are located on the Shasta-Trinity National Forests

In the late 1970s, 48 roadless areas were identified during the roadless area review and evaluation process (RARE II) as potential new wildernesses A roadless area is an area of 5,000 acres or larger that is substantially undeveloped and natural The study of these areas culminated with the passage of the California Wilderness Act (PL 98-425) in 1984

The 1984 Act established the Castle Crags, Chanchelulla, Mt Shasta, and Trinity Alps Wildernesses totaling 461,971 acres In addition, the Act placed the Mt Eddy Roadless Area, containing about 7,720 acres, in a further planning category and released 29 other roadless areas to be managed for multiple-uses other than wilderness during the Plan period (10 - 15 years)

Existing Wildernesses

Castle Crags

This wilderness. located on the Mt Shasta Ranger District, lies southwest of Dunsmuir just off Interstate 5 It contains 10,483 acres, and elevations range from 2,300 to 7,200 feet It shares its southeast boundary with Castle Crags State Park This wilderness is characterized by outstanding and spectacular sheer granite cliffs and spires along an east-west ridge Many small lakes and streams are found in the area Campanula shetleri, a sensitive plant, is found in three separate microsites here The area is bisected in an east-west direction by the Pacific Crest National Recreation Trail (PCT) The area is used primarily by hikers and backpackers

Chanchelulla

The Chanchelulla Wilderness lies in rural Trinity County about 10 miles southeast of the community of Hayfork The area is within the Hayfork and Yolla Bolla Ranger Districts With an elevation of 3,200 to 6,400 feet, topography within its 7,800 acres is moderate to steep The natural low flow of local streams offer limited fishing opportunities The summit of Chanchelulla Peak has religious significance for Native Americans (Wintu)

Mt. Shasta

The Mt Shasta Wilderness has 38,560 acres of contrasting topography and is managed for year-long recreation use It lies within the McCloud and Mt Shasta Ranger Districts The wilderness surrounds Mt Shasta from about the 6,000 to 8,000-foot level to its peak (14,162 feet) In

addition to its wilderness designation, the mountain was designated the Mt Shasta Recreation Area by a 1926 Secretary of Agriculture Order, and a National Natural Landmark in 1976 by the Secretary of Interior It has received national publicity for its potential volcanic activity It is an active strato volcano and the second highest mountain in the Cascade Range Formed by periodic volcanic activty over the last 100,000 years, Mt Shasta and its surrounding lands display many unique geologic features including numerous lavaflows, mud flows, seven glaciers, and three waterfalls The area offers a variety of activities including cross-country skiing, mountain climbing and hiking

Trinity Alps

The Tnnity Alps Wilderness is within portions of the Shasta-Trinity, Klamath and Six Riven National Forests This wilderness area has 405,128 acres of contrasting topography and vegetation, elevations range between 2,000 and 9,000 feet The eastern portion of the Alps is characterized by high granite peaks, alpine meadows, and mountain lakes The west side is rugged timbered terrain Unique geologic features include Limestone Ridge, Manzanita Cave and Soldier Creek Cave Major peaks dominate the area More than 528 miles of hiker/equestrian trails are maintained for recreation use About 19 miles of the PCT pass through the area Within the wilderness there is a 3 mile segment of New River and a 14 mile segment of the North Fork Trinity River, both are components of the National Wild and Scenic Rivers System Twelve miles of Virgin Creek, 18 miles of Canyon Creek and 12 miles of North Fork Trinrty are being considered for Wild and Scenic River status Seasonal mining takes place in portions of the wilderness Fisheries and wildlife as well as sensitive plants are important considerations here

Yolla Bolly-Middle Eel

The 146,696 acre Yolla Bolly-Middle Eel Wilderness lies within the boundaries of the Mendocino, Six Rivers, and Shasta-Trinty National Forests (36,805 acres are on the Shasta-Trinrty) Its elevation ranges from 2,600 to 7,863 feet Devils Hole and Buck Creek are extremely rugged although most topography is generally moderate A short segment of the South Fork Trinity River is being considered as an addition to the National Wild and Scenic Rivers Systems

Further Planning Areas

Mt Eddy Roadless Area, containing 7,720 acres, is the only area in this category Areas in the further planning category are to be considered for both wilderness and non-wilderness options during the Forest planning process (See Appendix C for detailed information on Mt Eddy)

Released Roadless Areas

The 1984 California Wilderness Act released 29 inventoried RARE II roadless areas totaling 306,060 acres, to be managed for multiple uses other than wilderness (see **Table III-21**) A brief description of each of these areas is found in Appendix C By law, wilderness designation will not be considered for these areas during this planning cycle

A substantial portion of a number of these areas has been roaded since the RARE II inventory These areas are Bonanza King, Dog Creek, Eagle, East Girard, Salt Gulch, Slate Creek and Wells Mountain

Controversy over the management of 16 of these areas emerged during a public comment period held between August 1986 and January 1987 This public comment period was associated with the previous Draft Environmental Impact Statement (Draft EIS) which was withdrawn Some segments of the public urge intensive resource management in these roadless areas, including road construction and timber harvesting Others support proposals for non-development, such as semi-pnmitive non-motorized recreation prescriptions and/or Research Natural Area designation

These 16 roadless areas contain 167,076 acres Of that total, 74,369 acres have been inventoned as tentatively suitable for timber management The areas contain the following mix of inventoried visual quality objectives (*VQOs* - a classification based on scenic variety class and sensitivity level)

9,900 Acres of Retention
57,070 Acres of Partial Retention
72,260 Acres of Modification
27,850 Acres of Maximum Modification

Demand. Public demand for the existing wildernesses, as measured through recreation use, is low to moderate

Recreation Visitor Days (RVDs) for 1989

Wilderness	RVDs
Castle Crags	8,000 RVDs
Chanchelulla	1,000 RVDs
Mt Shasta	41,000 RVDs
Trinity Alps	181,000 RVDs
Yolla Bolly Middle Eel	3,000 RVDs

Projected demand for wilderness and roadless recreation opportunities is expected to increase significantly in the next five decades

Projected total RVDs (based on RPA disaggregation)

Year	RVDs
1989	234,000
2000	255,000
2010	318,000
2040	372,000

Projected demand for wilderness and roadless recreation opportunities is expected to increase signficantly in the next five decades The 1989 RPA document "**An** Analysis of the Outdoor Recreation and Wilderness Situation in the United States 1989-2040" projects future increases in wilderness demand, based on projected future demand for activities commonly occurnng in Wildernesses Day hiking is projected to increase 193 percent, backpacking 155 percent, general outdoor photography 105 percent, and wildlife observation and photography 74 percent The report goes on to say that increasing environmental concem, needs for biological monitonng, decreasingly available undisturbed spaces, and other trends strongly support a prediction for demand growth of non-recreational uses of wilderness

There are scattered parcels of private land within the Wildernesses Because of potential conflicting resource management objectives. it is desirable to acquire these inholdings There are also conflicts between recreationists and cattle grazing pnmarily related to adverse effects on drinking water sources Trail maintenance has been deferred for many years, therefore, many trails require extensive rehabilitation A number of trails. some built dunng intensive gold mining days and others located for early grazing use, should be closed and/or relocated to reduce safety and erosion problems

Management Opportunities

In the Mt Eddy Further Planning Area, a number of potential uses exists, e g , dispersed recreation, developed recreation, wilderness. research natural area, wildlife and timber management

Opportunities exist to manage the remaining 16 released roadless areas under a vanety of prescriptions which are explained in alternative development Most of these roadless areas are designated as habitat conservation areas/late-successional reserves for spotted owls and other old-growth forest related species (refer to the discussion in the Wildlife Section) The wilderness prescnption would not be used for these areas during this planning cycle

An Environmental Impact Statement and Wilderness Management Plan have been prepared for the Mt Shasta Wilderness Management would focus on restonng and preserving resource conditions while providing a qualrty wilderness experience ***An*** Environmental Assessment and Wilderness Management Plan for the Castle Crags Wilderness and an Environmental Impact Statement and Wilderness Plan for the Trinity Alps Wilderness are also in the process of being prepared Forest personnel are just beginning the planning and environmental documentation process for the Chanchelulla Wilderness The Yolla Bolly-Middle Eel Wilderness Management Plan is being reviewed and updated jointly by the Mendocino, Six Rivers, and Shasta-Trinity National Forests These wilderness management plans would provide specific management direction in support of the general standards and guidelines found in the Forest Plan

Figure III-8
Forest Wildernesses

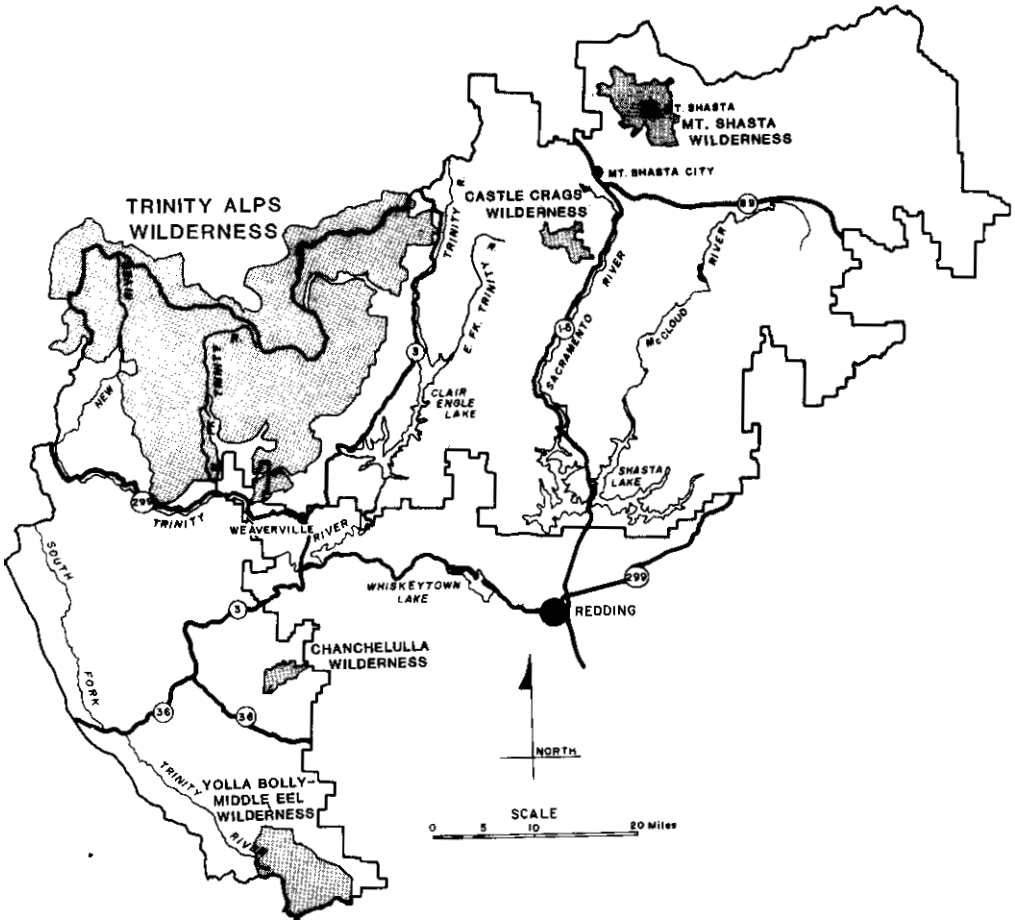


Table III-21
Released Roadless Areas

	Name	Total Acres	Acres Tentatively Suitable for Timber Management
	Backbone	9,976	3,960
	Bell-Quinby B	11,707	6,455
	Bonanza long	16,386	6,219
*	Castle Crags B	1,732	851
*	Chanchelulla	3,865	2,160
	China Springs B	707	413
*	Chinquapin	21,520	13,290
	Cow Creek	23,152	5.557
*	Devils Rock	13,896	9,250
	Dog Creek	5,543	4,919
	Eagle	6,798	3,396
*	East Beegum	7,963	1,274
*	East Fork	5,195	3,041
	East Girard (total acres)	27,914	22,513
*	(Nature Conservancy Portion only)	(226)	(140)
*	Fisher Gulch	4,472	1,437
	Kettle Mountain	4,865	2,590
*	Little French Creek	11,227	2.301
*	Mt Shasta B	2,958	1,734
	Murphy Glade	1.018	980
	Panther	11,727	2,683
*	Pattison	28,326	13,823
*	Penney Ridge	4,844	724
	Salt Gulch	6,657	4,178
	Slate Creek	6.616	6,064
*	South Fork	17,261	5.372
*	Underwood	3,219	2,035
	Wells Mountain	6,144	4,921
*	West Beegum	5,480	1.124
*	West Girard	34,892	15.813
	TOTAL	**306,060**	**149,077**

*Sixteen areas of concern to the public

24. Wildlife (General)

Public issues

Two major public issues focus on wildlife:

1 **How should the Forests' vegetative resources be managed for ecosystem diversity? Special consideration would be given to providing habitats that maintain or enhance populations of threatened and endangered (T&E) species and viable populations of sensitive species and/or management indicators. (Public Issue #2). (Refer to the Biological Diversity and Riparian Area Sections in this Chapter and to the T&E write-up at the end of this Section.)**

There is public concern that a wide variety of ecosystems should be maintained on the Forests to specfically provide for the

a maintenance and/or enhancement of habitats for Federally listed T&E species (plants and animals),

b maintenance and/or enhancement of habitats sufficient to provide for viable populations of all other existing species (plants and animals),

c maintenance and/or enhancement of the Forests' existing ecosystems and the biodiversity (plants and animals) associated with them, and

d maintenance and/or enhancement of special elements or components of these ecosystems (i e , snags, down logs, cliffs, vegetative seral stages, etc)

2 **How much of the older vegetative seral stages existing on the Forests should be retained? (Public Issue #3)**

There is public concern that sufficient amounts of old growth habitats be retained and/or enhanced on the Forests to provide for

a viability of all species (plants and animals) requiring this type of habitat for all or part of their yearly life cycle, and

b sufficient representation and retention of this ecosystem component for the sake of maintaining vegetative biodiversity.

There is also a related issue'

How wide should riparian management zones (RMZs) be and what management activities should be allowed within them? (Public Issue #13). (Refer to the Riparian Area Section in this Chapter.)

Discussion of Public issues

Wildlife Habitat/Ecosystem Diversity. Along with their concern about global warming, ozone depletion, acid rain, and deforestation, people are also concerned about wildlife and plant species The public wants habitat to be retained and restored so that species populations are well distnbuted and maintained at healthy levels

Certain components and types of habitat are important to wildlife breeding and survival Over time, forest management activities have decreased the amount of snags, down logs, hardwoods, and older over-mature forests that are available for wildlie This decrease has led to concerns about the effect this is having on wildlife

The Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted owl (ROD) signed on Apnl 13, 1994 and Interim Forest Direchve (Forest Service Handbook, FSH, *2409* 24) requires implementation of standards for diversity, snags, seral stages, and dispersion for wildlife habitat Although these measures are being implemented to retain some snags, down logs, and older over-mature forests, concern remains that these measures may not be sufficient enough to be beneficial for wildlife

Older Over-Mature Habitat. The public is also concerned about wildlife species that require older over-mature habitat for their survival Older over-mature habitat has declined in the west, and people are concerned about retaining it for themselves and for the wildlife that inhabit it The ROD reserves over 535,000 acres of the Shasta-Trinity National Forests as late-succession reserve for management of "old growth" ecosystems

Current Management Situation

The Forests' diversity of habitats helps provide for the needs of about 370 wildlife species either seasonally or on a year-round basis (Refer to the Biological Diversity Section in this Chapter) The Forests' wildlife are made up of 240 species of birds, 85 species of mammals, and

45 species of reptiles and amphibians The quality and quantity of habitat vanes from optimum for some species to marginal for othen

Alongwrth amphibians, reptiles, birds and mammals, there are hundreds, if not thousands, of invertebrate species of a less conspicuous nature including arthropods (insects, crayfish, spiders, scorpions, ticks, centipedes, and millipedes), and mollusks (clams, slugs, and snails) There is limited data available on the needs and occurrence of these invertebrates In addrtion, very little is known about arthropods or mollusks Therefore, this section will focus only on birds, mammals, reptiles, and amphibians

Development and implementation of the wildlife program on the Forests is a complex and comprehensive effort For ease in understanding the program is displayed and referenced in a five year wildlife program strategy

On National Forest lands, the Forest Service is responsible for managing wildlife habrtat The California Department of Fish and Game (DFG) and the U S Fish and Wildlife Service (USFWS) share the responsibility for managing wildlife populations Because the success of species management is dependent on habrtat and population management, close coordination is required between the three agencies Memorandums of Undemanding outline each agency's roles and responsibilities in this cooperative effort

The Forest Service, including the Shasta-Trinity National Forests, has formed partnenhips with many public groups interested in wildlife and habltat conservation National or local Memorandums *of* Understanding have been developed with the DFG, the Mule Deer Foundation, Defenders of Wildlife, National Wildlife Federation, Rocky Mountain Elk Foundation. National Audubon Society, and many more groups Several on-going partnerships between the Shasta-Trinity and outside organizations are active in conservation programs

The public enjoys wildlife for consumptive (hunting, trapping. etc) and/or non-consumptive (photography, viewing. scientfic study, etc) purposes

Consumptive Species

Generally, consumptive wildlife species can be divided into several groups

Big game – includes black bear (*Ursus amencanus*), elk (*Cervus conadensis*), mule deer (*Odocoileus hemionus*), and wild pig (*Sus scrofo*)

Deer hunting is one of the most popular hunting sports on the Forests The DFG administen the hunting of resident animals. The actual seasons, levels of harvest, etc are regulated by the Califomia Fish and Game Commission (FGC) Together, the DFG and USFWS administer regulations for hunting migratory species

Small game -- includes gray squirrel (*Scaurus griseus*), Douglas squirrel (*Tamiasciurus douglasii*), hares (*Lepus* spp), and rabbits (*Sylvilagus* spp)

Upland game -- includes band-tailed pigeons (*Columba fasciata*), blue grouse (*Dendragapus obscurus*), mountain quail (*Oreortyx pictus*), mourning dove (*Zenaida macroura*), ruffed grouse (*Bonasa umbellus*), turkey (*Meleagris gallopavo*), and Califomia quail (*Callipepla californica*)

Waterfowl --includes ducks and geese (*family Anatidae*), and

Furbearers -- includes bobcat (*Lynx rufus*), beaver (*Castor conadensis*), coyote (*Canis latrans*), and gray fox (*Urocyon cinereoargenteus*)

Non-Consumptive Species

Non-consumptwe species. as well as consumptive species, provide opportunrties for viewing, photography, nature study, and associated experiences of camping. hiking, and boating Most wildlife species are in the non-consumptive category Included in this category are species that are listed as threatened or endangered by the State and/or Federal Government, or as sensitive by the Regional Forester

Management Indicators

The management indicator approach is used to reduce the complexity of discussing all the wildlife species on the Forests Assemblages or groups of wildlife associated wrth vegetative communrties or key habitat components have been identfied and selected as Management Indicators These assemblages were chosen because (a) they represent the vegetation types, seral stages, and special habrtat elements necessary to provide for all wildlife species on the Forests, and (b) their population changes are believed to indicate the effects of management activities on other wildlife populations Management options for the as-

semblages will be directed under the standards and guidelines and implemented through the five year Wildlife Program Strategy. Not all of these assemblages are used as management indicaton for every project, however. (Refer to Appendix G for a complete list of common and scientfic names of the species within the assemblages.)

Assemblages of Management Indicators include:

(1) Late Seral Stage wildlife assemblage:

(2) Openings and Early Seral Stage wildlife assemblage,

(3) Multi-habrtat wildlife assemblage,

(4) Snag and Down Log wildlife assemblage:

(5) Riparian wildlife assemblage,

(6) Aquatic wildlife assemblage,

(7) Hardwood wildlife assemblage,

(8) Chaparral wildlife assemblage, and

(9) Cliffs, Caves, Talus, and Rock Outcrops wildlife assemblage

Each assemblage represents at least one of three categories of management indicaton.

1. **Featured Species --** Species commonly hunted or trapped, or of high value for non-consumptive recreational uses;

2 **Species Habitat Indicators** --Species with specfic and potentially limiting habitat requirements that may be significantly affected by Forest management activrties; or species associated wrth special habttat elements; and

3 **Ecological Indicators --** Species whose population parameten can be used to show the environmental condrtions (qualty and quantity) of habitats for other species or ecosystems

A Discussion of the Wildlife Assemblages -- Management Indicators

1. Late Seral Stage Wildlife Assemblage

Many wildlife species are associated with forested habrtats that are in the late seral stages (see Appendix G for a descnption of seral stages) There are three later seral stages included in this assemblage 4a, 4b-c, and 4c-older The average age of these older forest stages is greater than 110 yean, 4c-older (old grow or older over-mature) is greater than 180 yean. These forests have large diameter trees which are at least 21 inches Tree cover and density range from fairly open canopies to dense canopies of multiple layers of trees Older over-mature habttat is included in this category These seral stages are important to wildlife as they provide cover, thermal cover, large trees

Table III-22
Wildlife Assemblages and the Management Indicator Category

	Wildlife Assemblage	Category
1	Late Seral Stage	Ecological Indicator
2,	Openings and Early Seral Stage	Ecological Indicator
3.	Mulb-Habitat	Featured Species
4.	Snag and Down Log	Habrtat Indicator
5.	Riparian	Habitat Indicator
6	Aquatic	Habitat Indicator
7	Hardwood	Habrtat Indicator
8	Chaparral	Habitat Indicator
9.	Cliffs, Caves, Talus, and Rock Outcrops	Habrtat Indicator

for nesting, large snags and down logs, vertical diversty, older over-mature habitat, etc

Forested habitats are managed indirectly through application of standards and guidelines for such things as snags, hardwoods, and seral stages Current management policy is to maintain sufficient seral stage diversty, including 4c-older seral stage, to maintain viabiltyofthe wildlife species associated or dependent on these later stage habitats (refer to Forest Service Handbook [FSH] 2409 24)

At least 15 percent of each forest type is maintained in these three later seral stages Five percent or more is maintained in the 4c-older stage At least five percent is maintained in the 4a stage which has afairly open canopy Five percent or greater is maintained in the 4b-4c stage which has a moderately dense canopy closure of at least 40 percent Along with these requirements, reserved areas such as wilderness, wild and scenic rivers, research natural areas, and spotted owl habitat conservation areas/late-successional reserves have some late seral forest diversity which provides habitat needed for species dependent or associated with older over-mature forests

Through forest management activrties, the later seral stages and the wildltfe species assemblage associated wrth them need to be monitored Some species represented in this assemblage are northern spotted owl, goshawk. fisher, marten, Trowbridge shrew, and Northern flying squirrel

2. Openings and Early Seral Stage Wildlife Assemblage

Meadows, shrublands, and early forest seral stages provide diversity within the forest landscape Natural openings are maintained to provide wildlife habitat Early forest seral stages are created through even-aged timber management activities These openings are temporary as they grow into older conifer plantations Other openings are created in a mosaic pattern over the forest landscape At least five percent of the Forests is maintained in meadows, shrublands, and young grass/forb plantations Another five percent is maintained in plantations of shrubs, seedlings, and saplings (refer to FSH 2409 24 for standards and Appendix G for description)

Many wildltfe species are associated with or dependent upon openings Openings are a unique habrtat among forest stands They provide forage areas for some big game species and habrtat for small birds and mammals which, in turn, become prey species for carnivores

Through forest management activities, there is a need to monrtor the openings. early seral stages, and the wildltfe species assemblage associated with them Some species represented with this assemblage are the racer, western meadowlark, California quail, song sparrow, western harvest mouse, brush mouse, brush rabbit, California vole, and deer

3. Multi-Habitat Wildlife Assemblage

Some wildltfe species depend upon a vanety of vegetated habrtats, seral stages, and special habitat components Their needs may vary from winter to summer, from night to day or during breeding season, for example A number of harvest species are represented in this multi-habitat assemblage black bear, mule deer, elk, and turkey With forest and specific habrtat management, there is a need to monitor these species and the habitat attnbutes of the assemblage

Black Bear - The black bear is a big game species found throughout the Forests Between 300 and 400 of them are harvested annually Bear harvest is regulated by the State. Black bear are extremely vulnerable to hunting and poaching in well roaded areas Black bear require a diversity of habrtats to provide for their diet and hibernation needs Oaks and berry producing shrublands are especially important

The year-round need of bears is provided partially by management direction for down logs, openings. early seral stages, caves, and by additional requirements for vehicle access management

Bear and people have had encounters at some campgrounds on the Forests These encounters are significantly greater during years of drought when forage becomes scarce The problem is being partially resolved through better trash management and education of the visrting public

Because of the demand for bear hunting, there is economic value associated with bear management Bear; around campgrounds also result in increased costs to recreation management

Mule Deer- Two sub-species of mule deer live in the Forests Rocky Mountain mule deer (*O h hemionus*) and black-tailed deer (*O h columbianus*) These deer interbreed Generally, in the extreme northeast corner of the Forests, some deer genetically appear to be Rocky Mountain mule deer On the rest of the Forests, the deer appear to be black-tailed mule deer. Because of the confusion over

sub-species, the deer on the Forests are referred to at the species level, mule deer

Deer are found throughout the Forests and their popula- ti is estir d t t : 62,000 Suitable range and habitat is available t tl deer p p la n Between .000 d 1.0C d are harvested annually Deer numbers are capable of sustaining a much higher harvest particularly on th it c t wev ; the t timing, and duration of the hunting season is not conducive to heavier harvests

Deer are managed under four separate deer herd management plans in cooperation with the DFG Hayfork, McCloud, Weaverville, and Yolla Bolly *Also,* the counties exercise deer management authortty via Sections 458 and 459 of the Fish and Game Code of California Under this authority the Boards of Supervisors have veto power over any doe hunts in their respective county

Deer herd management plans identify general herd and habitat management goals Managementfor deer includes both direct and indirect management

Direct management consists of water developments, fencing of riparian areas, prescribed buming of chaparral, road closures, and administrative vehicle control areas dunng hunting seasons In addtion, selected bitterbrush areas are specifically managed for deer on the McCloud Flats and in the Military **Pass** area on Mt Shasta District. Browse improvements on winter range habitat also occur Financing for these projects comes directly from Forest Service funds, DFG (Hill Bill), partnership contributions (Mule Deer Foundation), and county fines monies (administered by County Board of Supervisors)

Indirect habitat improvement occurs through coordination with other resource programs Over time, coordinated resource planning results in the management of key habitat elements for deer Direction is provided for hardwood retention and seral stage diversty to beneft deer.

Deer poaching is a problem in some areas on the Forests This problem is being addressed in transportation planning for large projects, and measures are being taken to reduce overall road density During the deer hunting season, a road closure area is established to decrease disturbance to deer and increase the quality of hunting This multi-Forest coordinated closure is being considered for expansion by private landowners in the McCloud area.

Deer hunting boosts the local economies during hunting season Addtional discussion on the economic value of deer is found later in this section under "Economics. Supply and Demand"

Elk - Historically, elk were native to this area By the late 1800's elk were no longer believed to be present on the Forests Rocky Mountain elk were reintroduced in 1916 near what is now the east-side of Shasta Lake. **A** small herd of Roosevelt elk was reintroduced onto the Klamath National Forest north of the Trinity Alps in 1990. The herd is expected to grow larger in the future and may expand into habitat in the northern Tnnity Forest Elk have also been observed on the McCloud Ranger Distnct These sightings could be members of the Shasta Lake herd or Grass Lake herd from the Klamath Forest The Grass Lake herd became established several miles north of Mt Shasta after emigration from Oregon The Shasta Lake elk herd s hunted under a permit system (10 permits per year)

Elk occupy about 150,000 acres of habtat mostly on the Shasta Lake District. Meadow restoration projects have begun through cooperative efforts with the Rocky Mountain Elk Foundation. Another 280,000 acres of potentially suitable habitat needs to be analyzed and considered for reintroductions and elk herd expansions in the Trinity area

Turkey - Merriam's turkey populations expanded onto the Shasta Lake Distnct after they were introduced to Shasta County in the 1960's The population is estimated at ibout 4,000 Turkeys now inhabit about 250,000 acres iround Shasta Lake east of Interstate 5 Another 80,000 acres, in other portions of the Forests, can be managed or introduction of them Reintroduction efforts should be analyzed in cooperation with the Wild Turkey Federation.

1 Snag and Down log Wildlife Assemblage

hags and down logs are components of decadence and ure diversty requirements for many wildlife species. Past imber management practices have eliminated a large portion of this resource The current management practice is to maintain sufficient large snags and logs for the vildlife species requiring this key habitat component. Refer to the FSH 2409 24 for the standards.)

There is a need to monitor the impacts that timber and re management activities may have on the snag and down og components and the wildlife assemblage associated vth them Some species represented by this assemblage .re long-toed salamander, rubber boa, pileated woodpecker, black bear, western screech owl, pygmy owl, awwhet owl, and tree swallow

5. Riparian Wildlife Assemblage

Nationwide, there is an increased emphasis on riparian management Riparian vegetation is dependent on a high water table Within ripanan areas are a wide diversity of plant and wildlife species Many wildlife species are dependent on this habitattype and adjacent vegetation With the dense canopy providing cover, shade, and cooler temperatures, npanan forests provide comdors. connective habitat, and migration routes

Timber and range management activities can impact ripanan areas through changes to habitat and change in plant species composition This habitat can also be affected by the removal of surrounding canopy and increasing air and water temperatures Roads, trails, and campgrounds within npanan areas can also alter this habitat Current management direction from the ROD is to provide ripanan reserve areas ranging from 150 to over 300 feet in width for each side, depending on site conditions for all streams, lakes, ponds, reservoirs, and wet areas In addition, the use of Best Management Practices (BMPs) helps provide for water quality protection

Because of the emphasis placed on ripanan management and the significant use this habitat receives by wildlife, the npanan wildlife assemblage should be a management indicator The riparian assemblage would represent species using the terrestnal vegetation of the nparian zone With timber, range, and recreation management activities, there is a need to monitor the riparian areas and the wildlife species assemblage associated with them Wildlife species dependent on various nparian habitats will be monitored to determine the impacts of Forest Service management activities Some species represented by this wildlife assemblage *are* California red legged frog, black salamander, yellow warbler, willow flycatcher and fisher

6. Aquatic Wildlife Assemblage

There are several large reservoirs, and many lakes, rivers and streams within the Forests Along with fish, many wildlife species are dependent on water for their living or fish for their diet Current management direction is to manage nparian reserves of a minimum 150 feet along perennial streams and lakes, a minimum 300 feet along all perennial fish-bearing streams, and a minimum 100 feet along all seasonally flowing or intermttent streams, wetlands less than 1 acre, and unstable and potentially unstable areas The use of BMPs also helps provide for water quality protection Aquatic systems are managed to meet the goals and objectives of the Aquatic Conservation Strategy of the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl

Aquatic dependent wildlfe rely on good water qualrty, adequate water quantity, nparian and forested cover, fish or aquatic insects, and large woody debns These wildlife can be grouped within an aquatic wildlife assemblage Some species represented by this assemblage are tailed frog, western pond turtle, bald eagle, nver otter and water shrew A partnership with Duck's Unlimited can be established to manage areas for ducks, shorebirds and other aquatic dependent wildlife

7. Hardwood Wildlife Assemblage

Hardwoods are found throughout the Forests either in pure stands or as individual trees in conifer forest types (see the Biological Diversrty Section in this Chapter) Wildlife species use hardwoods for forage, nesting, and shelter Acorn production from the oaks is especially mportant as a food source Many hardwood species are bund on sites that are unsuitable for management activities, so there is lttle likelihood they will be signficantly altered by timber management practices Some hardwoods, such as black oak, can be found on sites suitable for timber production

Hardwoods are managed for sustainablity on a landscape basis to meet desired future ecosystem conditions

Hardwoods have a high value to wildlife Some species represented by this assemblage are acorn woodpecker, scrub jay, evening grosbeak, white breasted nuthatch and Hutton's vireo

8 Chaparral Wildlife Assemblage

Chaparral is the general name given to a diverse combination of shrubs that provide habitat for many wildlife species Chaparral is maintained as a shrubland It is also included within the early seral stage category Through time, plantations cycle from the early seral stage to the later forested seral stages

Chaparral habitat is important for a vanety of wildlife Yany rodents inhabit chaparral, and deer and other herbivores find forage here Chaparral can vary in elevation, and can provide winter range, summer range, escape cover and fawning areas for deer The shrubs provide flowers, seeds, and leaves for birds in addition to providing cover and nest sites

With chaparral and species habitat management, there is a need to monitor chaparral and the wildlife species in its assemblage Some species represented by this assemblage are bushtit, green-tailed towhee, wrentit, and mountain lion

Prescribed burning of selected shrublands is the major form of chaparral management on the Forest The majority of this work has been accomplished for the enhancement of forage for deer Prescribed buming creates a mosaic that benefts many other species inhabiting the chaparral community

9. Cliffs, Caves, Talus, and Rock Outcrops Wildlife Assemblage

Cliffs, caves, talus, and rock outcrops are geologic features that provide unique habitat for wildlife. These features provide nesting, denning, and shelter, and they are managed on a site-by-site basis Some sites are considered as special features and are managed for their protection Because of rough, broken terrain and less vegetation, these features are normally undisturbed For example, cliffs and talus are avoided by construction activities Some species represented by this assemblage are Shasta salamander, canyon wren, peregrine falcon, and Townsend's big eared bat

Economics: Supply and Demand

Current Supply-Demand Situation. Game species on the Forests provide hunting opportunities for local sport hunters from Klamath, Lassen, Modoc, Shasta, Siskiyou, Tehama, and Trinity Counties Hunters from as far south as the Los Angeles Basin, as well as the states of Oregon and Nevada, also frequent the area Expenditures by the sport hunting public are an important source of income for local businesses and contribute significantly to the economy of local counties

There are an estimated 282,000 consumptive, wildlife user days (WUDs) on the Forest In order of highest to lowest are big game hunting, upland game, small game, trapping (furbearers), and waterfowl hunting The estimated value of these WUDs is $16,474,000 Pnmary consumptive species are mule deer, black bear, quail, wild turkey, band-tailed pigeon, and gray squirrel

Based on the total number of hunters and hunting licenses sold between 1981-1989, demand for consumptive use in Northern Callfornia, for most of the above species, has steadily decreased at an average rate of 3 percent per year. The demand for high quallty (high success rates) deer hunting remains unfilled. This is evidenced by the number of hunters applying for special hunts in the north state Also, the demand for turkey hunting is continuing to grow Shasta County is the turkey hunting center for the State

It is estimated that there are between 20,000 and 30,000 deer hunters on the Forests each year. Small and upland game hunters combined are estimated at 30,000 The total number of trappers is unknown, but proportioning out the reported harvest results in a value of $50,000 per year being taken in pelts of various furbearers

Non-consumptive use and demand on the Forests nearly equals that of consumptive use The monetary value, though, is much higher at $37,250,400 Current demand for non-consumptive species is primarily in the form of observation, nature study, photography, and so on Bird watching is one of the most popular and widespread hobbies There are many outdoor recreation and wildlife groups, based out of Redding and Mt Shasta, that enjoy wildllfe viewing and study on the Forests. With the current high use and expected increase in the use, there is a need to develop wildlife viewing sites and interpretation on the Forests

Future Supply-Demand Situation. The demand for consumptive species (hunting, trapping, etc) is expected to decrease The 1990 RPA program predicts a six percent decline in big game hunting and a 17 percent decline in small game hunting The demand for high qualty (high success rate) deer hunting will continue

The demand for non-consumptive use of wildlife species on the Shasta-Trinity National Forests is increasing at a faster rate than consumptive use and may result in protective legislation and allocation of habitats Nation-wide non-consumptive use is increasing signlficantly The 1990 RPA program predicts an increase of over 150 percent in 50 years

Management Opportunities

There are many opportunities to manage habtat and ecosystem diversity Wildlife habitats are managed through project design, habitat improvements, protection, and mitigation Wildlife habitats are also managed through application of standards and guidelines for riparian areas, mags, down logs, hardwoods, and seral stages, for example

Several habitat improvements are needed on the Forests to benefit avanety of species There ıs an opportunity to increase the viewing and hunting possibilities for the featured hunted species deer, bear, elk and turkey Water, as a drinking source, has a low availability and poor distribution, especially during a drought cycle Guzzler installation, spring development, riparian improvements and closures can help meet drinking water needs Prey and vegetative forage needs to be maintained or increased in chaparral, hardwood, and conifer forest communities Prescribed fire or crushing of decadent browse, orchard pruning, oak thinning, etc will improve food availablity, abundance, variety, and nutritional value

Two emerging programs are the Watchable Wildlife and Neotropical Migrant Bird Programs The Watchable Wildlife Program emphasizes increasing the access, interpretation, and education for public enjoyment of viewing, nature study, and photography of wildlife The goal of the Neotropical Migrant Bird Program is to maintain. enhance, and restore declining populations of these birds The need and Opportunity exists to determine the status and possible causes *of* population changes *of* these migrant birds Mapping habttat changes, bird banding, and breeding bird surveys will help determine the status and changes There is also an opportunity to market the species, habitat, and program for Watchable Wildlife and Neotropical Migrant Birds Creation of view srtes, viewing pamphlets and brochures, news releases, magazine articles, local presentations, etc , can be used to promote the enjoyment of wildlife viewing and nature study opportunities *An* opportunity exists to increase partnerships with civic, recreation, and conservation groups interested in these species

Several funding sources are available for habitat management program management funds, challenge cost share funds, partnership contributions and Knutsen-Vandenberg (KV) funds The opportunity to manage habitat beneficially is increasing because of the increased emphasis on wildlife Funding has increased in the challenge cost-share/partnership programs During the past several years between $100,000 and $300,000 worth of wildlife associated work has been accomplished annually under the Forests KV program

There is also an opportunity to increase the wildlife habitat management program through increasing partnenhips with other agencies and sports groups Currently about 2,000 acres are receiving benefits from partnerships with private. state and Federal agencies *An* addrtional 1,500 acres of direct habitat improvement (ı e , prescribed burns) and 5-10 structures (guzzlers, bamcades. etc) are also being constructed.

Even though there will be a decrease in the volume of timber harvested. there will remain a high need and opportuntty for mrtigation, enhancement, and protection The need and opportuntty to implement the deer herd management goals and objectives will continue The need and opportunrty to implement the Trintty River basin wildlife management plan for riparian and upland habrtats will also continue

The potential exists to manage a substantially larger wildlife program on the Shasta-Tnnrty National Forests The number of acres and structures completed annually could increase significantly over the present There is an opportunity to stock other areas with elk and turkey transplants With the growth of existing and stocked populations of elk and turkey, there will be an opportunity for increased viewing and hunting *of* these species Along with elk, turkey, and deer, there is a need and opportunity to manage habitat (berry fields, down logs, den srtes) for bear

Wildlife habrtat is affected not only by the amount of timber harvested, but by the type of harvest as well The harvest effect on habitat successional stage may be either positive or negative depending upon the species habttat requirement Opportunities exist to minimize the negative effects and to accentuate the positive through consideration of wildlife habitat requirements dunng compartment and project planning

There are standards for maintaining later forest seral stages (including older over-mature habitat) for wildltfe There ıs an opportunity to design land allocations and prescnptions to benefit wildlife habttat, including older over-mature habitat associated species Alot of the Forests' land base is wrthin current management allocations (wildernesses, wild and scenic nvers, research natural areas, and late-successional reserve areas, and riparian reserve areas) to be managed for the benefrt of the later seral stage habrtat There is also an opportunrty to implement standards for hardwood management, snags and down log density, and management of meadows, wetlands and npanan areas *for* wildltfe beneft

Road construction is also a wildlife management concem The effect of new roads is two-fold First, there is a reduction of habltat as vegetation ıs removed for right-of-way clearing Second ıs the increased use of the newly roaded area by recreationists Recreation vehicle traffic and other dispened recreation activities increase near the roads Through consideration of wildlie habttat needs in planning for roads and through temporary or permanent closure of roads, impacts can be minimized Road density needs to be decreased to lessen wildltfe disturbance and harassment Seasonal or permanent road closures and

managing road traffic through design and maintenance car be done to decrease access. An opportunty exists tc expand the McCloud Flats seasonal road closure ontc private lands

The developments on lands of intermingled ownership! within the Forests is another wildlife concern Not only is there potential habitat loss from vegetation removal, bu disturbances reduce the effectiveness of this land and the surrounding land as habitat. This is a particular concerr with regards to deer herds, Availability of winter range is alimitingfactortodeerherd size When deer herd wintei range is on private land that has potentialfor development, the biological potential becomes limited on Nationa Forest land Opportunities exist to lessen this impact through acquisition or exchange for lands that are key wildlife habtats

There is a need to monitor the implementation and effectiveness of standards and guidelines, management prescriptions, projects, etc The wildlife assemblages will be used as management indicators and some ofthem will be monitored A monitoring and implementation plan is needed to guide the wildlfe program accomplishments There is a need to verify management assumptions, models, prescriptions, and concepts Other opportunities and needs are to upgrade the Geographic Information System (GIS) technology and application, increase use of the ecosystem approach, gain additional data on species population levels and habitat conditions, and use an ecosystem approach for land stewardship

Future management direction should reflect a need to maintain special habitats, habitat components, and distribution of habitats while maintaining viable populations of all wildlife species

Threatened, Endangered, and Sensitive Wildlife

Public Issues

There is one public issue which focuses on threatened, endangered, and sensitive animals It is

How should the Forests' vegetative resources be managed for ecosystem diversity? Special consideration would be given to providing habitats that maintain or enhance populations of threatened and endangered (T&E) species and viable populations of sensitive species and/or management indicators. (Public Issue #2)

There is also one related public issue

How much of the older vegetative seral stages existing on the Forests should be retained? (Public Issue #3)

Discussion of Public Issues

Nationwide there has been a reduction in certain fish, wildlife, and plant species due, in part, to pesticide contamination, excessive timber harvesting, reduction in water quality, and a reduction in the quantity and quality of available habitat This reduction has resulted in placing certain species on Federal and/or State lists of threatened and endangered (T&E) species The US Forest Service has management authority only over those elements related to habitat alteration on National Forest lands

Forest management activities can alter the amounts of available and suitable habitats such as older over-mature stands (old-growth) or special components of such stands (snags and dead/down material) In addition to direct alterations of habitat, the potential exists for indirect disturbance from noise and vehicle and people harassment

Current Management Situation

Policy direction for the Forest Service is to manage 'habitats for all existing native and desired nonnative plants, fish, and wildlife species in order to maintain viable populations of such species" Forest Service activities and programs are to assist in the recovery of T&E species and to avoid actions that may cause a species to become threatened or endangered.

State/Federal Lists. Various species "lists" are maintained by the US Fish and Wildlife Service (USFWS), the U S. Forest Service, and the State of California There is considerable overlap between the species found on the State and Federal lists, however; neither list is identical

Both the Federal Government and State of Califomia maintain 'threatened" and "endangered" species lists (as authorized by the Endangered Species Act of 1973 and California Endangered Species Act of 1984, respectively)

Generally, a 'threatened species is one which is likely to become endangered within the foreseeable future. An "endangered" species is one whose prospects of survival and reproduction are in immediate jeopardy.

The Federal Government also maintains a list of "candidate species" which are species that, in the opinion of the USFWS may become threatened or endangered. The "candidate species" includes two categories, (1) those species which the USFWS has substantial information about to support the listing and (2) those species which the USFWS has inconclusive information about that is necessary to support a listing.

Management direction for Federally listed threatened and endangered species is in individual species recovery plans or local territory management plans. All projects in the vicinity of habitat essential to the survival of these species are evaluated for their potential effect on the species and/or its habitat. If necessary, modifications are made to the project to eliminate any possible negative impacts.

Many times the reason for the decline of a species is outside the control of the Forest Service. Migratory species, such as the bald eagle and peregrine falcon, and their prey species. were subjected to pesticide contamination after World War II. This contamination, from sources outside the Forests, led *to* their low population levels and eventual listing as endangered. Since the nationwide ban of DDT in 1972, populations of bald eagles and peregrine falcons have been increasing.

The State also maintains a list of "rare" plants, as authorized under the Native Plant Protection Act of 1977. These species are not threatened with extinction, but their numbers are so small that they may be endangered if their habitat is degraded. (Refer to the Botany Section.)

In addition to the Federal and State listed T&E species, the Pacific Southwest Region (Region 5) has designated certain animal and plant species as "sensitive." These include species requiring special management considerations due to low or unknown population numbers and/or the potential for their habitats to be degraded. State listed threatened, endangered, and rare species may also be included in this category. As new information becomes available, the sensitive species list is updated according to Forest Service direction.

Policy direction for sensitive species is to "implement management practices to ensure that species do not become threatened or endangered because of Forest Service actions." The Regional Forester's "sensitive" species list includes 42 plants, 2 birds, 2 mammals, and 1 fish for the Shasta-Trinity National Forests. (Refer *to* ***Appendix G*** for a listing of threatened, endangered, and sensitive species found on the Forests).

Management Indicators

The management indicator approach is used to reduce the complexity of discussing all wildlife (some 370 species) on the Forests. Certain assemblages or groups of wildlife have been identified and selected as management indicators. These assemblages were chosen because (1) they represent the vegetation types, seral stages, and special habitat elements necessary to provide for all wildlife species on the Forests, and (2) their population changes are believed to indicate or represent the effects of management activities on other wildlife populations.

Six of *the* Forests' threatened, endangered, and sensitive (TE&S) wildlife species have been selected as management indicaton and will be discussed in more detail throughout the document. The management indicaton that are not TE&S were discussed at the beginning of this section. **Table III-23** lists the TE&S species by category. Those categones are defined as follows:

Recovery Species -- Species identified for population increases because they are on a State or Federal threatened or endangered species list.

Species Habitat Indicators -- Species with specfic and potentially limiting habitat requirements that may be significantly affected by Forest management activities (may include Forest Service sensitive species).

In addition to the above, the USFWS has identified seven category 2 species known to live in the Forests. These species include (1) the California red-legged frog (*Rana aurora draytoni*), (2) Pacific western big-eared bat (*Plecotus townsendii townsendii*), (3) California wolverine (*Gulo gulo luteus*), (4) White-footed vole (*Arborimus albipes*), (5) Franklin's bumble bee (*Bombus franklini*), (6) Siskiyou ground beetle (*Nebria gebleri siskiyouensis*), and (7) the Klamath Mountains ground beetle (*Nebria sahlbergii triad*).

Other sensitive/State threatened species include the Sierra Nevada red fox (*Vulpes vulpes necator*), Shasta salamander (*Hydromantes shastae*), and the Trinity bristle snail (*Monadenia setos*). These species were not selected as management indicators, and, therefore, will not be discussed in this document.

I. Threatened

Northern Spotted Owl (NSO). The spotted owl was listed as a threatened species by the USFWS on July23, 1990 The NSO prefers dense stands of mature, mixed confer and Douglas-fir However, recent surveys have indicated some variance in their habitat use Habitat capability is thought to have been reduced through forest management practices that benefit early and mid seral stage habltat Because of the concern overviabilrty for the NSO and other species which prefer this type of habitat, the NSO is an important species for management within the late seral stage assemblage

Based on habitat capabilty estimates and increased inventory efforts, the Forests provide habitat for about 142 nest sites and/or reproductive pain (1991) Timber type mapping indicates the potential may exist for additional nesting sites and/or breeding pairs The potential exists to provide habitat for about 200 reproductive pairs over time

Historically, because of other demands for the resources found in spotted owl habtat, special management considerations were needed to maintain species viability In 1982, a network of 72 spotted owl habitat areas (SOHAs) was established for the NSO according to direction provided in the "Regional Guide for the Southwest Region" This network, approved by the Regional office in January 1982, was spread across the Forests wherever existing habitat or potential habitat occurred within the species' native range. The network was tied in with adjacent Ranger Districts, National Forests, and Forest Service Regions from Washington to Northern Calfornia

Wherever possible, network sites were located where known pairs existed SOHAs were placed to reduce as many potential conflicts with other resources as possible, while still meeting the needs of the owls (i e in wildernesses, riparian areas, research natural areas [RNAs], highly unstable areas, etc). Not all known spotted owl pairs and suitable owl habitak were placed in the network The intent was to provide habitat "to support an adequate number of reproductive individuals and to distribute the habitat in such a way that those individuals could interact with othen on the Forest(s) "

A major consideration was to manage for NSOs throughout their entire historic range To do so it was necessary to establish some habitat areas in places where insufficient habitat existed because *of* checkerboard land ownership, environmental limitations on vegetation, past wildfires, or past management practices

The Shasta-Tnnrty National Forests' matrix consisted of 72 SOHAs The Forests' goal was to provide 1,000 acres of suitable owl habitat in each territory Thirteen of the 72 natnx territories were unavailable for timber harvest (i e , :he existing Shasta Mud Flow RNA and five Wildernesses)

Table III-23
Threatened, Endangered and Sensitive Species

Species	status		Category
Peregrine Falcon (*Falco peregrinus*)	FE	SE	Recovery Species
Bald Eagle (*Haliaetus leucocephalus*)	FE	SE	Recovery Species
Northern Spotted Owl (*Strix Occidentalis*)	FT		Recovery Species
Marbled Murrelet (*Brachyramphus marmoratus*)	Fr		Recovery Species
Willow flycatcher (*Empidonax traillii*)	FS	ST	Species Habitat Indicator
Goshawk (*Accipiter gentilis*)	FS		Species Habitat Indicator
Pacific Fisher (*Martes pennanti*)	FC2	FS	Species Habrrat Indicator
Marten (*Martes americana*)	FS		Species Habitat Indicator

FE = Federally listed endangered; FT = Federally listed threatened, FC2 = Federal candidate 2; FS = Federal sensitive; SE = State listed endangered, ST = State listed threatened.

Twelve matrix territories were unsuitable for timber production (i e , inner gorges, wild rivers, the Shasta Unrt of the NRA, and proposed RNAs) Twenty matrix terrrtories had less than 2,000 acres of existing and potential habitat Therefore, the only option which was considered on 1,000 acres of suitable habttat and 650 acres of replacement habrtat on the above 45 matrix territones was no scheduled timber harvest The remaining 27 matrix terrrtones were managed for timber harvest

The NSO was petrtioned for listing in 1989 As a result, the Interagency Spotted Owl Scientific Committee (ISC) was established wrth the charge of developing a long-term management plan for the NSO In May 1990 the final report, A Conservation Strategy for the Northern Spotted Owl (Thomas et al 1990), was released This document determined that the SOHA management plan would be ineffective in providing long term viability for the species Therefore, the Conservation Strategy developed habitat conservation areas (HCAs) centered around concentrations of known pairs and blocks of contiguous nesting/foraging habitat throughout the range of the species Four different types of HCAs (categories 1, 2, 3 and 4) were identified and delineated Each category of HCA was based on the number of existing and future expected pairs of owls The Shasta-Trinity National Forests have all or portions of 22 category 1, 2, and mapped 3 HCAs containing approximately 529,800 acres of National forest lands

In addrtion, this strategy identified the need for linking blocks of habitat by maintaining vegetative attributes necessary for dispersal across the forest landscape These dispersal attributes are referred to as the 50-11-40 rule This rule established a quarter-township as the unit of analysis and states that "for every quarter-township, timber harvest shall be permitted only when 50 percent of the forest landscape consists of forest stands with a mean diameter at breast height (dbh) of 11 inches and a canopy closure of 40 percent"

In addrtion to the areas identified by the ISC Committee, the USFWS designated critical habrtat for the NSO on January 15, 1992 While most of this habttat overlaps the previously identified HCAs, there were 121,509 additional acres identified outside of HCAs

The Forest Service issued a Record of Decision for the Final Environmental Impact Statement (FEIS) on Management for the Northern Spotted Owl on March 3, 1992 The FEIS was updated and amended as a result of a court order

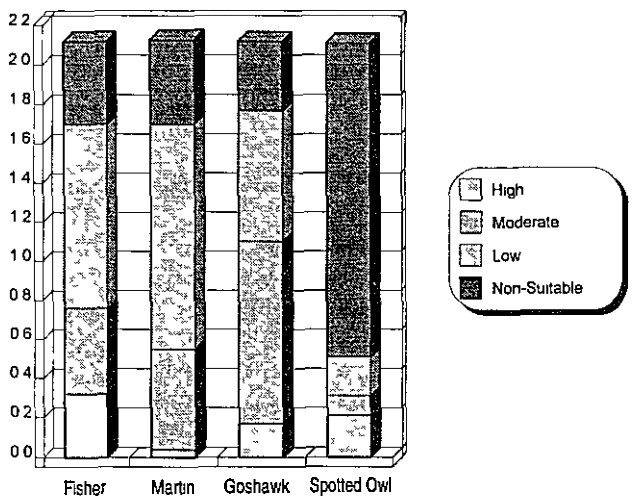
The Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Wrthin the Range of the Northern Spotted Owl (ROD) was issued for the Final Supplemental Environmental Impact Statement on April 13, 1994 by the Secretanes of Agriculture and Interior The ROD established a system of late-successional reserves that incorporate most of the former system of HCA's but permit management activities that benefit late-successional habitat In addrtion the 50-11-40 Rule was replaced wrth a strategy establishing a system of corndors along ripanan areas and green tree retention requirements within matrix areas to meet dispersal requirements

Based on habitat capability models, it is estimated that there are about 31 1,000 acres of high and moderate suitable habitat on the Forests (See **Figure 111-9**) This is defined by seral stages 4c and 4c-older using existing vegetative maps

The Forest Service in Caltfornia, Oregon, and Washington is involved in a research, development, and assessment (RD&A) program for spotted owls In this program long-term research will identify, more precisely, the habrtat needs of the NSO In addition, the the ROD identifies the need to prepare analysis and plans for late-succesional reserves

Spotted owls are closely associated with older over-mature forests, so in order to understand the owl, it is necessary to study its specrfic older over-mature habrtat

Figure III-9
Suitable and Non-Suitable Habitat for Selected Sensitive Species (Million Acres)



requirements Studies of the owl's home range, habtat requirements, birth rates, dispersal, survival, and population-prey relationships are providing insight into the physical and biological charactenstics needed to support this species

Owl studies are also underway in second-growth stands to try and determine whether these stands can be silviculturally treated to make them suitable for owls This understanding can provide a basis for developing silvicultural approaches to timber management that maintain this older over-mature associated species and protect long-term timber production

Marbled Murrelet. On September 28, 1992, the North American subspecies of the marbled murrelet (Brachyramphus marmoratus) was listed as a threatened species by the USFWS

The marbled murrelet is a small sea bird of the Alcidae family Its normal range extends from British Columbia south through Washington, Oregon, and Central California

Marbled murrelets feed primarily on fish and invertebrates near shore marine waten, and the majority of them are found within or adjacent to the marine environment

They spend the majorrty of their lives on the ocean, however, they come inland to nest in larger, older trees Some have been observed nesting inland up to 50 miles in Washington and up to 30 miles in Northern Caltfornia

Portions of the Trinity National Forest fall within 35-50 miles from the coast and have the potential to provide suitable nesting habitat As of November 1, 1992, there had been no verified sightings and/or nests on the Forests

2. Endangered

Bald Eagle. The bald eagle is listed as endangered by State and Federal Governments Bald eagles in the Western United State are being managed under the guidelines of the Pacific Bald Eagle Recovery Plan (1986) The recovery plan divides the western states into 47 management zones with each zone assigned a recovery target based on capability and historic eagle distribution The Shasta-Trinlty falls within all or portions of three zones, California/Oregon Coast (zone 23), Shasta/Trinrty (zone 24), and Pit River (zone 25)

Eagles are dependent on large lakes, reservoirs, and/or river systems Most bald eagles found on the Forests are within the Whiskeytown-Shasta-Tnnrty National Recreation Area (NRA) at Shasta and Trinlty Lakes Addrtional suitable habitat and active nesting terrrtories exist on Siskiyou Lake, McCloud Reservoir, Iron Canyon Reservoir, Pit River, and the Trinlty River.

It is estimated that up to 25 pair of bald eagles (25 percent of the breeding pain in California) nest on the Forests However, not all these pairs nest every year Enough habitat exists for some expansion of these populations The Forests' goal for the recovery effort of this species is 5 additional pair (for a total of 30) As new territories are discovered, territory plans are developed and the new sites are managed accordingly

An administrative study has been initiated on the Forests to further help determine the habrtat requirements of nesting bald eagles on Shasta and Trinity Lakes This information will be the basis for developing a new bald eagle management plan for each lake These plans will include all of the known existing territory sites plus any future potential srtes

From the information gathered so far it appears that the bald eagles which nest on the Forests do not migrate There are no large wintering concentrations like there are in the Klamath Basin and selected reservoin throughout California However, the Papoose Arm of Trinrty Lake, recognized by the State as a wintering area, has historically wintered about 30 eagles annually

Peregrine Falcon. The peregrine falcon is both a State and Federally listed endangered species Seven known nesting pair live within the Forests (1990) It is estimated that there is suitable habitat for an addrtional seven nesting pairs However, no Intensive survey has been completed for all potential nesting habitats Based on 1990 survey data and a rapidly expanding Northern California interior mountains population, the Forests' capabilrty is unknown but appears to be able to support about 14 pairs Throughout Caltforniathere are about 100 known nesting sites

Peregnne falcons nest on cliffs Most of the cliffs on the Forests have been located and rated for potential occupancy (1979), however, only a few of these srtes have been thoroughly surveyed Outside of the breeding season the peregrine falcon migrates Peregrine falcons banded on the Forests have been recovered as far south as Mexico

The peregrine falcon receives full protection as delineated in individual nest territory plans. These plans carry out direction identfied in a recovery plan for the peregrine falcon

Habitat management for the peregrine falcon is applied mainly to the nest stes As new nest sites are discovered, nest territory plans are written Peregnne falcon management has, at times. impacted the timing of some projects. such as timber sales, but overall there has been very little impact on other resources A primary concern is to protect the habitat area from disturbance dunng the breeding season

Peregnne falcons on the Forests are monltored for nest occupancy and productivity This monitoring is coordinated through an interagency Memorandum of Understanding w t h the BLM, the USFWS. the National Park Service, and the DFG

3. Sensitive

Sensitive wildlife species on the Shasta-Trinity include the goshawk, marten. pacific fisher, and willow flycatcher The amount of potentially high, moderate, and low suitability habltat is presented in Figure III-9

Goshawk. The goshawk is designated as a sensitive species by Region 5 The goshawk can be found throughout the Forests in late and other successional stages of most conifer timber types Most of the known stes on the Forests are on the McCloud Ranger District Goshawk distribution and habitat use varies from the Trinty side to the Shasta side

Management practices can reduce the amount of available goshawk nesting habtat Because of a concern to maintain viability of this species and othen that depend on older over-mature timber for habtat, the goshawk has been selected as a representative in the late seral stage wildlife assemblage

Based on the amount of mature and older over-mature habrtat available, the Forests have sufficient habtat to support about 200+ nesting pairs and the potential to support over 250 pain The Forest provide protection for each known nest site, dunng project planning and implementation So far, this has not caused a signlficant economic impact. but as more stes are found the impact will increase

Besides protection of individual goshawk nests, addtional habrtat can be found in reserved areas (i.e wildernesses) and other places managed for older over-mature habltat to meet diventy requirements

Marten. The marten is a close relative of the Pacific fisher and both belong to the mustelid family It is partially diurnal (daytime) and is seen occasionally by Forest Service employees and vistors The marten is also on Region 5's sensitive species list

The marten is generally found on large, contiguous tracts of mature and over-mature mixed confer, Douglas-fir, red fir and lodgepole pine above 4,000 feet Red fir is the preferred vegetation type There are about 95,950 acres of red fir on suitable and unsutable land on the Forests Existing data shows that there is a skewed distribution of martens on the Forests

Marten sightings on the Trinrty side appear to be isolated to the red fir zone while those on the Shasta side (north of Shasta Lake) are well distnbuted throughout many vegetation types Based on habtat capabilty models, rt is estimated that there are 590,000 acres of high and moderate suitable habitat (see Figure III-9) This is defined by seral stages 4b, 4c and 4c-older above 4,000 feet, using existing vegetative maps Field venfication of suitability will take place as part of the Forests' monitoring program

Some segments of the public are concerned that the reduction and fragmentation of older over-mature habrtat may jeopardize viability of the species Because of this concem the marten has been selected as a representative in the late seral stage wildlife assemblage Current management direction is based on the same strategy as the spotted owl However, in order to provide linkage with the surrounding Forests. addtional areas have been identified for special management consideration

The marten is no longer trapped, and, therefore, no revenue is generated The marten is another species that is provided for through management of diversrty Overall, the timber volume may be reduced by managing for some older over-mature habitat

Pacific Fisher. The fisher is a Region 5 sensltive species and was petltioned for listing as a threatened species in 1990 Due to the lack of information about the Pacfic fisher. the USFWS was unable to make a determination on its status Therefore, it was classfied as a category 2 species It appears that the fisher prefers riparian, deciduous, and dense stands of many coniferous types It is a nocturnal and reclusive animal that few people have seen

The fisher prefers large, contiguous tracts of mature and older over-mature mixed conifer, Douglas-fir, red fir, and in some areas lodgepole pine forests Based on habitat capability models, it is estimated that there are *790,000* acres of high and moderate suitable habitat on the Forests (See Figure 111-9). This is defined by sera stages 4b, 4c, and 4c-older using existing vegetative maps Field venfication of suitability will occur as part of the Shasta-Trinity's monitoring program

Some segments of the public are concerned that management of habitat for spotted owls and other older over-mature habitat species may not be sufficient to maintain viable populations of the fisher Because of this concern the fisher has been chosen as a representative of the late seral stage wildlie assemblage to gauge the effectiveness in managing for species dependent on mature and over-mature conlferous forests The fisher could also be impacted by fragmentation of habitat

Current management direction is to provide a diversity of habitats and habitat elements including late-successional reserve areas and to maintain fftteen percent of each fifth order watershed in mature to late-successional vegetation In addition, the snag requirement is I 5 snags per acre, with at least 3 snag over 24 inches dbh

This direction, plus the implementation of the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northem Spotted Owl and habitats found in other areas (e g wildernesses, riparian reserves, unroaded non-motorized prescriptions) should provide for viability of the species There are no constraints on other resources other than those required for diversity/older over-mature requirements and the needs of other species which may have similar habitat requirements for all or part of their lifecycle.

It is no longer legal to trap fisher, so no revenue is generated from a consumptive standpoint

Willow Flycatcher. The willow flycatcher is a Region 5 sensitive species and has been listed as threatened by the State of Callfornia. This species is associated with riparian woodland vegetation, primarily willow and alder, but is known to use upland shrub-type vegetation

The willow flycatcher is a neotropical migrant normally arriving at breeding temtory locations between late May and early June It nests in willow thickets along the edge of streams, lake, ponds, and other wet areas throughout the Forests Decreases in its population have been recognized throughout its range These downward trends have been attributed to over grazing, flood control structures, development within the riparian zones, and nest parasitism by the brown-headed Cowbird (Molothrus ater)

Livestock grazing has the potential to impact this species, because livestock and the willow flycatcher both use the willow species. Where willow is present, livestock tend to browse the lower four feet of the willow plant. This is the same portion of the willow used for nesting by the willow flycatcher Because of the concern to maintain viability of this species and others dependent on riparian habrtat, the willow flycatcher has been selected as a representative in the riparian wildlife assemblage kparian ecosystems and willow flycatcher density and distnbution will be monitored as part of the Forests' monitoring program

4. Extirpated

Several wildllfe species no longer exist on the Shasta-Trinity National Forests These include the California grizzly bear (Ursus chelan), bighorn sheep (Ovis canadensis), and wolf (Canis lupis) The State Fish and Game Commission has no plans to reintroduce these species

Management Opportunities

Future management goals for TE&S species will be directed towards (I) reaching viable populations in the case of T&E species, and (2) maintaining or, if possible, increasing existing viable populations of sensitive species.

Forest personnel will continue to survey for additional populations and habitats of TE&S species Comprehensive surveys have begun for bald eagles, peregrine falcons, and NSOs These surveys will intensify as management activities continue on the Forests Additional inventory and/or surveys will be necessary to determine location, distribution, and habitat requisites of additional species and populations.

T&E species will continue to be managed under existing recovery goals identified in individual species recovery plans Following is a bnef discussion of the management options that exist for the Federally listed species known to inhabit the Shasta-Trinity

Northern Spotted Owl. Opportunities exist to (I) inventory and assess late-successional reserves, (2) develop and implement late-successional reserve analyses and plans; (3) develop silvicultural prescriptions commensurate with

NSO habitat attributes, (4) monitor NSO habitat use within the managed forest landscape, and (5) create nesting habitat through the development of snags where nesting habrtat attributes are limrted

Marbled Murrelet. In the future there will be a need to survey the western side of the Trinity National Forest for the marbled murrelet If discovered, appropriate action would be taken to provide for the recovery of the species and/or its habtat

Sensitive species will continue to be managed sothatviable populations will be maintained wrthin the forest landscape Opportunities exist to maintain and/or enhance habrtat for the goshawk, marten, Pacific fisher, and willow flycatcher

Bald Eagle. Opportunrties for the bald eagle are to (1) increase inventory efforts along the mainstem of the Trinity River, (2) provide additional nest groves adjacent to major bodies of water, (3) continue research on Trinity and Shasta Lakes to determine how nesting bald eagles interact with resource management activities, and (4) develop management plans for the long-term management on Trintty and Shasta Lakes

Peregrine Falcon. Opportunities for this species are to (1) increase interagency cooperation and coordination toward down and/or delisting, (2) update old inventory (1979) of habitat to determine habrtat capability for the northern interior mountains. and (3) provide for enhancement of cliffs for addrtional peregrine nesting habitat

Goshawk. Opportunities for the goshawk are to (1) provide protection at the project level as determined through watershed analysis, (2) increase inventory and monrtonng efforts across the Forests, and (3) continue monitoring goshawk as part of the Forests' monitoring

Marten. Opportunrties for the marten are to (1) consider martin as a part of late-succesional reserve analysis and planning, (2) inventory, assess, and map habitat and population distribution. (3) develop silvicultural prescriptions for the managed landscape commensurate to marten habrtat requisites, and (4) monitor marten as part of the Forests' ongoing program

Pacific Fisher. Management opportunities are to (1) consider fisher as a part of late-succesional reserve analysis and planning, (2) inventory, assess, and map habitat and population distribution, (3) provide for administrative study to determine habtat use within the managed and unmanaged landscape, (4) develop silvicultural prescnptions for the managed landscape commensurate to fisher habitat requisites, and (5) monitor fisher as part of the Forests' monitoring program

Willow Flycatcher. Management opportunlties for the willow flycatcher are to (1) inventory, assess. and map habtat and population distribution, (2) determine effects of management activties on the willow flycatcher, (3) re-establish willow stands around springs and seeps in the McCloud area consistent with riparian reserve standards and guidelines to improve habtat, and (4) monitor willow flycatcher populations and/or habitat as part of the Forests' monitonng program

Managing wildlife habitats in accordance with capability models would provide for continued viability and ensure that none of the species become threatened or endangered because of Forest Service activities

Chapter IV

Environmental Consequences

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Chapter IV - Environmental Consequences

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CHAPTER IV
Environmental Consequences

Introduction
A

This chapter describes the environmental consequences of implementing the four alternatives discussed in Chapter II (Individual Alternative Descriptions) The discussions center around what will change, how much, and why. This chapter is also the basis for the comparison of alternatives displayed in Chapter II, Part F A summary of the environmental consequences, by alternative, is included in Chapter II, **Table 11-27**

Chapter III, Affected Environment, describes the situation and conditions which exist in the planning area It provides the basis for understanding the consequences of implementing the Forest Plan or its alternatives Chapters III and IV lead to an understanding of the environment that will be created as a result of implementing any of the alternatives The environment to be created for each alternative is discussed in Chapter II under the individual alternatives

Environmental consequences, commonly called impacts or effects, result from applying various combinations of management prescriptions The different mix of prescriptions in each alternative produces different levels of resource outputs, goods, and services These, in turn, cause different affects on the quality of the environment In other words, the level of output attained, the land base from which it is produced, and the intensity with which management practices are applied, translate into varying environmental consequences for each alternative

No extreme environmental consequences will result from implementing any of these alternatives This is assured by the inclusion of Forest Standards and Guidelines in all alternatives They mitigate adverse impacts and ensure long-term productivity of the land

Incomplete or Unavailable Information. There is less than complete knowledge about many of the relationships and conditions of wildlfe species, forests, physical and biological ecosystem functions, the economy, and communities The ecology, inventory, and management of large forests is a complex and developing discipline The ecology of specific systems, their dynamics and relationships, and the interaction *of* resource supply, the economy, and community stability is not fully understood

The Shasta-Tnnity National Forests Planning Team and EIS Interdisciplinary Team examined the data and relationships used to estimate the effects of the alternatives There is a substantial amount of creditable information about the topic of this environmental impact statement: the centra relationships and basic data are well established The best available information was used to evaluate the alternatives While additional information would in some cases add precision to estimates or better specify a relationship, the basic data and central relationships are sufficiently well established relationships Though new information could be helpful, no missing information was evaluated to be essential to a reasoned choice among the alternatives as they are constituted

Economic Consequences
B

Comparisons between alternatives for all major economic effects are summarized in several tables in Chapter II The modeling and analysis assumptions behind these estimates of effects are described in Appendix **B.** The effects of each alternative on present net value (PNV), county receipts, employment, income, and the Forest budget were chosen for display in this chapter (See **Table IV-I**)

Present Net Value (PNV). PNV is a measure of relative economic scale and efficiency All future costs and benefits of each alternative were discounted to the 1989 base period The dfierence between discounted benefits and discounted costs is the PNV This discounting of values to a common period makes possible a comparison of benefts and costs that occur at different times

Subject to each alternative's unique set of constraints, the Forest Planning Model (FORPLAN) allocated land uses and scheduled activities to maximize PNV

County Receipts. Returns are distributed back to four counties (Shasta, Siskiyou, Trinity, and Tehama), in the amount of 25 percent to help finance roads and school budgets The majority *of* these payments come from the value of harvested timber Additional payments come from land use permrts, grazing fees, recreation permits, and user *fees.*

Income and Employment. The production of goods and services from the National Forests affects the economy of the local area by generating income and employment. To

measure this effect, an input/output model was used to develop income and employment multipliers (see Appendix B for details) The results shown in **Table IV-1** include direct. indirect and induced income and employment Timber harvest, recreation visitor days, wildlfe and fish user days, total expendrtures, and grazing animal months are the driving forces in generating income and employment

Forest Budget. The Forest budget consists of the tota annual cost *of* managing the Shasta-Trinty National Forests under each altemative excluding the cost of fighting fires and cooperative funds Asubstantial portion of the budget enters the local economy

By order of importance the vanation of PNV by alternative occurs for the following reasons (1) the amount of timber harvested, (2) the percent of full versus low standard visttor days of recreation, (3) the number of wildlife and fish user days, and (4) the amount of water produced Receipts to counties. employment, income, and budget vary primanly as a function of timber harvested The economic difference between alternatives is minimal due to the constraints on the land base Previous Final plans wth a much larger tentatively sutable land base allowed for much larger variations in the economic consequences of the alternatives See Chapter II, Economic Comparisons, for more information on why and how these outputs vary by alternative

Adiscussion of the economic consequences by altemative follows Since timber outputs are signrficantly reduced from historic levels, county receipts and employment levels are also reduced PNV, income, and the Forest budget have not decreased proportionately due to increases in untt values of outputs

Alternative PRF (Preferred Alternative). PNV ranks third highest when compared to all four alternatives PNV is lower than Alternative CUR Reduced timber harvest and associated revenue is the pnmary reason why

County receipts and employment and income are the third highest when compared to the other alternatives These outputs are all lower than Alternative CUR because of lower timber harvest

The Forest budget is the second highest among all the altematives This budget is higher than Alternative CUR because of the complexties involved in ecosystem planning and increased timber associated costs

Tat IV-1
Comparison of Economic Effects - First Decade
(Percent Indicates Relationship *to* Alternative CUR)

	PRF	RPA	CUR	CBF
Present Net Value				
(MM$* - 1989)	8,221	8,469	8,239	8,128
(percent)	0	+3	0	-1
Annual County Receipts				
(MM$ - 1989)	5	8	7	4
(percent)	-29	+14	0	-43
Annual Employment				
(Jobs)	3,633	3,888	3,682	3,208
(percent)	-1	+6	0	-13
Annual Income				
(MM$ - 1989)	138	148	140	122
(percent)	-1	+6	0	-13
Annual Forest Budget				
(MM$ - 1989)	42	43	40	38
(percent)	+5	+8	0	-5

* MM$ = million dollars

Alternative RPA *(1990* Program Emphasis). PNV is the highest of all alternatives The highest timber harvest level and an emphasis on dispersed high standard recreation are the primary reasons why this alternative has an increase over Alternative CUR

County receipts and employment and income are the highest when compared to the other alternatives This is a reflection of the high timber harvest level

The Forest budget is the highest among all the alternatives The budget is higher than Alternative CUR because of increases in the timber, recreation, wildlife, and water programs

Alternative CUR (No Action/No Change). PNV ranks second when compared to the other alternatives The emphasis on low standard recreation and meeting only 75 percent of the demand for developed and wilderness recreation after decade 2 is the primary reason for the lower PNV

County receipts and employment and income are the second highest when compared to the other alternatives. This is because this alternative has the second highest timber harvest level

The Forest budget is the second lowest among the alternatives dunng the first decade This is a reflection of the high timber harvest level and the low recreation, wildlife, and water programs

Alternative CBF (Citizens for Better Forestry). PNV ranks fourth when comparing the four alternatives PNV is lower than Alternative CUR. This alternative has the same recreation and fire program as Alternative PRF However, the smaller suitable timber base, lower timber harvest, emphasis on less intensive timber practices, and longer rotation ages result in a lower PNV than Alternatives PRF and CUR

County receipts and employment and income are the lowest when compared to the other alternatives These outputs are all lower than Alternative CUR because of the lower timber cut

The Forest budget is the lowest among the alternatives during the first decade This budget is lower than Alternative CUR because the reduced timber program lowers the budget more than the higher recreation and wildlife programs increase the budget

Social Consequences

C

Overview. Chapter III identified the social groups most likely to be affected by the different outputs, land allocations, and management practices associated with the alternatives shown in Chapter II It also described the basic characteristics of the social groups and their linkages to the Forests These social groups are categories of people who share the same interests and concerns They are not mutually exclusive, and individuals may be included in more than one group or none of the categorized groups The social groups identified are resource utilization emphasis, resource amenity emphasis, recreationists, and Native Americans This chapter displays the social effects of the alternatives on these groups It is assumed that these groups include minorities, women, handicapped, elderly, those for whom English is a second language, and those of different ethnic origins

Minority groups may not be affected any differently as special groups than they will be as a part of one of the social groups discussed in Chapter III Shasta-Trinity National Forests' personnel are committed to giving equal treatment to all individuals and social groups, including minorities, women, handicapped, elderly, and English as a second language groups in providing services, opportunities, and jobs None of the alternatives has discriminating effects

The alternatives do, however, raise social issues When two or more groups within the Forests' sphere of influence differ significantly in their expectations for resource use, and when the alternatives have different effects on the social groups, there is a potential for conflict

There are generally ways to resolve or reduce the conflict if adequate social information is available Thus, social analysis is a major part of the Forests' planning process Four social variables are used in determining the social consequences of implementing the alternatives These variables are (1) lifestyles, (2) attitudes, beliefs. and values, (3) social organization, and (4) population These social variables are defined in Chapter III, Part D **Table, IV-2** is a simplified summary of the effects alternatives have on social group variables It may aid in understanding the discussion of each alternative which follows

Consequences Specific to an Alternative

Alternative PRF (Preferred Alternative). Timber harvests have decreased significantly for all alternatives when compared with historic levels There is a relative difference

Table IV-2
Effects of Alternatives on Social Group Variables

	ALTERNATIVE			
	PRF	RPA	CUR	CBF
Lifestyles				
Resource Utilization Emphasis	Little Support	Most Supports	Supports	Least Supports
Resource Amenity Emphasis	Substanbally supports	supports	supports	Most Supports
Recreationists	Substanbally supports	supports	supports	Substanbally supports
Nabve Americans	Mixed Support	Mixed Support	Mixed Support	Mixed Support
Attitudes, Beliefs, and Values				
Resource Utilization Emphasis	Coincides Least with	Coincides Least With	Coincides Least With	Coincides Least with
Resource Amenity Emphasis	Substantially Coincides With	Coincides With	Coincides Wth	Coincides Most with
Recreationists	Substantially Coincides With	Coincides With	Coincides With	Substanbally Coincides With
Nabve Americans	Coincides Wth	Coincides Wth	Coincides Wth	Coincides With
Community Stability and Cohesion				
Resource Utilization Emphasis	Less Stable	Stable	Stable	Least Stable
Resource Amenity Emphasis	Stable	Less Stable	Stable	Most Stable
Recreabonists	N/A	N/A	N/A	N/A
Nabve Americans	Stable	Less Stable	Stable	Stable

* The communrty is generally the most stable and cohesive under Alternative CUR, since the Forest Service outputs would not be growth inducing There would be considerable new economic growth, but it would be from sources other than the Forest Service The alternatives which are more growth inducing or cause an economic reversal would offer less communrty stability and cohesion

Population Service Needs	
Resource Utilization Emphasis Resource Amenity Emphasis Recreabonists Native Amencans	---------- All Alternatives - Little Change

between alternatives, but because of the low level of output common to all alternatives, the social effects are similar

Timber outputs will be about 78 percent of Alternative CUR and 37 percent of historic levels Groups linked economically to the Forests' outputs will beneft slightly less than under Alternative CUR. Opportunities for recreationists will be enhanced moderately

Expectations of persons in favor of preservation values will likely be supported by the amounts of wilderness designated by recent legislation. dispened recreation opportunities, and protection of scenic resources

There will be a change to population and land use from the mix of resource outputs associated with this alternative. Direct, indirect and induced employment, dependent on timber outputs from the National Forest, will be reduced from historic levels

Alternative RPA *(1990* RPA Program Emphasis). Implementation of this alternative will produce the highest level of timber outputs of all the alternatives However, timber outputs will only be about 50 percent of the average level sold over the past 13 years This will result in a reduction in employment for those groups dependent on the forest products industries

Recreation opportunties will be enhanced. The reduced emphasis on timber harvest will cause an increased land base for recreation and other amenity resource opportunities This increase will be noticed most by recreationists, amenity emphasis groups, and Native Americans This alternative will produce the highest market outputs of all the alternatives It will have the lowest negative impact to the lifestyle stabilty of people linked economically to natural resources

The outputs of this alternative will be the most growth inducing of all the alternatives Although, since timber outputs are significantly lower than historic levels, this alternative will actually have negative impacts to population growth rates as compared wth historic levels

Alternative CUR (No Action/No Change). Under Alternative CUR continuing management direction will have a negative impact on groups employed in and those dependent on traditional forest products industnes Actual harvest levels, rather than external market factors, will begin to play a greater role on National Forest lands. Existing recreation opportunities will continue, especially hunting, fishing, and boating activities

In the short term, most social groups will feel negative impacts from greater community instability since the reduced Forest Service outputs will be growth curtailing There will probably be new economic growth, but it will be from sources other than the Forest Service

Alternative CBF (Citizens for Better Forestry). Recreationists and amenity emphasis groups will benefrt from the increased recreation opportunties which emphasize their attitudes and values Amenity emphasis groups and Native Americans will beneft from the emphasis on less development and more dispersed recreation opportunties such as hunting and fishing Native Amencans employed in the forest products industry will be adversely affected.

The lifestyles and values of recreationists and amenity emphasis groups will be recognized by less intensive (long rotation) management. This will result in the least disturbance of esthetic resources (visual qualrty and recreation opportunrties). However, due to the constraints on the land base the total difference from all other alternatives is minimal

Lower timber outputs, about 28 percent of historic levels, will be detrimental to most groups, especially those people economically linked to the Forests. This alternative will deter economic growth the most due to changes in land use from timber to non-timber uses A loss of community stabilty and cohesion will result from a greater out-migration of timber workers Some unemployment problems will be softened by other new sources of economic growth such as recreation

Resource Consequences

D

This section discusses, for each of the Forests' resources, the environmental impacts which will result from implementation of any of the four alternatives considered in detail in this Final EIS . These impacts are discussed on the basis of direct and indirect effects, short-term uses versus long-term productivity, and irreversible or irretrievable commitments of resources

Each resource is also discussed from the standpoint of

- Consequences which do not vary or are common to all alternatives, and
- Consequences which vary among alternatives and/or are unique or specific to a given alternative

Outputs and changes in condrtions are estimated into the future, and the differences between altematives are displayed Analyses and detail on the means of estimating the effects of each alternative are included in the planning records on file in the Forest Supervisor's Office, Redding, Calrfornia The maps of the alternatives, included in a separate packet, graphically illustrate how the alternatives vary in spatial distribution of management emphasis across the Forests.

I. Air Quality

Consequences Common to All Alternatives

In general, forest management activities consistently implemented with any of the alternatives will have very little, if any, measurable effects on air quality

The dispersed nature of outdoor recreation use, even at highest total volumes, will yield low quantities of pollutants from such sources as campfires, motorboats, and driving for pleasure The measurable air movement, which normally occurs in the mountainous settings of both Forests over 90 percent of the time, adequately disperses these pollutants

Within the Class I, Yolla-Bolly-Middle Eel Wilderness significant air quallty related values will be determined in cooperation with the Mendocino National Forest These values will be monitored to assure prevention of signficant deterioration as required by the Clean Air Act

Activities such as timber harvest cleanup, woody lake debris cleanup, and wildllfe habitat improvement could produce some air pollution (visibility impairment and particulate matter) for short periods of time All alternatives emphasize utilization of woody debris over burning when feasible

Where burning is required to meet management objectives, regulations require that the pollution itself be minimized by the methods used In addition, burning should be carried on only when favorable meteorological conditions exist (e g , wind, fuel moisture, temperature. inversion layers) These management activities will be timed and coordinated with other agencies to meet air qualrty standards Wildfires, which could adversely affect air qualrty, will occur under all atternatives The number of acres that will be burned annually from wildfire is estimated at 11,000 acres per year for all alternatives except Alternative CUR (15,000) Since wildfire is unplanned, it is exempted by the Clean Air Act from meeting air qualrty standards

The number of fuels treatment acres by prescribed fire is de-emphasized for all alternatives compared to the past 10 years This change is due to biomass utilization, reduced timber harvest, and road building The total acreage of fuel treatment for wildlife. timber, and fire management vanes from approximately 5,880 acres per year in Alternative CBF to approximately 30,000 acres per year in Alternative PRF While utilization of this matenal is being emphasized, a signficant portion of the fuels reduction will still occur through prescnbed burning The alternatives with the highest number of acres being treated will have the highest prescnbed burning programs Although these acreages are signlficantly different, no degradation of air quality within the Class I area will occur because

1 The Yolla Bolly-Middle Eel Wilderness is geographically located on the southernmost tip of the Tnnity National Forest Therefore, it is located away from areas of potential burning

2 Burning prescriptions will be designed to avoid smoke intrusion into sensitive areas

3 Burning will be coordinated with other agencies to achieve compliance with all applicable air quality standards

4 Only short-term degradation will occur in the burn areas

5 A no burn alternative will be selected if degradation is anticipated

Consequences Specific to An Alternative

The following analysis makes a comparison of altematives based upon (1) the amount of fuels treated (acres), (2) the number of acres harvested, (3) the number of miles of road constructed, and (4) the number of recreation visitor days (RVDs) in the first decade

Alternative PRF (Preferred Alternative). When compared to Alternative CUR, this altemative will have 324 percent more fuel treatment acres, nearly the same number of predicted RVDs, 39 percent less acres harvested, and 86 percent less new road construction Using probable annual pollutant generation from these sources, air quality related to activities on the Forests will improve when compared to Alternative CUR

Alternative RPA *(1990* RPA Program Emphasis). This altemative will result in relatively no change in air pollutants from those occurring in Alternative CUR Acres treated for fuels will decrease 7 percent, RVDs will increase 9 percent, road construction will remain the same, and acres of timber harvested will decrease by 8 percent when compared to Alternative CUR

Alternative CUR (No Action/No Change). Under this alternative it is estimated that fuels will be treated on a total of 7,080 acres annually. About 23 miles of new road construction will be added to the existing system each year, there will be 5,362,000 RVDs, and a total of 9,660 acres of timber harvested annually. While this alternative has the greatest potential for creating air pollution, it will still be signlficantly less than that which occurred in the recent past

Alternative CBF (Citizens for Better Forestry). This alternative, when compared to Alternative CUR, will result in 17 percent less acres of burning for fuel treatment, about the same RVDs, 35 percent less new road construction, and 39 percent less timber harvest acres. It will, therefore, generate less air pollutants than Alternative CUR This alternative will have the least impact on air quality

2. Biological Diversity

Consequences Common To All Alternatives

There are many factors that relate to the concept of ecological biodiversrty For purposes of this document, a basic assumption was applied The most effective and efficient manner in which to maintain biological diversty and its associated attributes throughout forested and other vegetative landscapes is to allow for a diverse spectrum of ecosystems, their attributes, and associated species

The diversty of terrestrial and aquatic species and/or their habrtats is addressed in the wildlife and/or fisheries sections Therefore, this section will deal pnmarily with the maintenance, enhancement, or change within the major vegetation types and/or their seral stages over time, and how they affect richness, evenness, and pattern (components of diversity)

In each alternative 70-80% of the acres of vegetated lands will be allowed to "cycle naturally" after landscapes are brought into a condition where their response to natural disturbance will be acceptable Thinning and other fuels management related activities will be required where fire has been unnaturally excluded from the ecosystems for the past 80-100 years These treatments will put the vegetation in a condition where natural events will not alway result in undesirable catastrophic damage

Cycling naturally is defined as continuing through the processes of succession without major human-induced management Natural processes will occur such as insects, disease, flood, fire, windthrow. etc Some management such as fish/wildlife habrtat improvement projects. will be allowed to occur The potential estimated effects of "cycling naturally" for a 50 to 150 year period (very short ecological timeframe) will include but not be limrted to

- Loss of human-induced early seral stage areas.
- tending stands to move towards climax conditions (older seral stages),
- accumulation of dead standing/down materials,
- loss of existing human-induced fragmentation (clear-cuts, roads),
- more homogeneous stands,
- reduction in total numbe n of some plant/animal species (early seral stages) wrth increases in others (moderate to older stages),
- an increase in the area occupied by climax species.
- initial increase of shrub/hardwood species in some areas,
- reduction of shrub/hardwood species in closed canopy srtuations,
- occurrence of natural fire wrth some human-induced fire suppression, and
- reduction in active road systems

The above types of affects will be beneficial for some species, detrimental for some, and neutral for others

On the 500,000 acres subject to vegetative activities, the major effects on diversty components are related to commercial wood products emphasis and wildllfe habitat management activrties Therefore, the following factors, which are common to all the alternatives analyzed in this Final EIS, will be tracked

1, Timber management activities, including silvicultural systems,

2. Natural and induced changes in seral stage composition on the Forests,

3. Interspersion or mosaic effects of suitable timber lands wrth lands that are unsuitable for timber. and

4 Management of chaparral

Under all alternatives, treatment of chaparral (major vegetation type) will result in a variety of benefits and effects through (1) conversion of existing chaparral to timber, (2) conversion of existing chaparral to a grass-rejuvenated brush mix, and (3) conversion of existing decadent brushfields to younger, more available stands of brush

Conversion of chaparral to timber is not emphasized and will be done only where cost-effectwe and compatible wrth wildlife values Most of the chaparral and brush is decadent and of limited value for grass and browse for livestock and deer and of no value for timber production

Any amount of treatment will help bring these lands under more productive management

Some of the major effects of managing chaparral include

1 Increased edge and diversity for wildlfe (mosaic pattern),

2 Reduction of fuels to minimize fire hazards,

3 Increased short-term (less than 7 years) water yields,

4 Creation of younger, more vigorous chaparral fields on unsuitable timber lands,

5 Re-establishment of timber stands on suitable timber lands, and

6 Increased forage and browse for domestic livestock in some areas and wildlife utilization in other areas

Richness

None of the alternatives will reduce the number of existing mqor vegetation types or species that exist on the Forests below the level of viability On the 1,400,000 acres not being actively managed, components of richness such as snag densities, seral stages, hardwoods, riparian, etc , will cycle naturally

On the 500,000 acres being actively managed, standards and guidelines for diversty components such as snag densities, seral stages, hardwoods, ripanan, etc., will be required in each altemative. This will assure a certain level of diversity which, along with the lands not being actively managed, will maintain the viability of all existing non-threatened, endangered, and sensitive (TE&S) plant and animal species in all alternatives Therefore, richness will not be discussed further in this section (refer also to the Wildlife section)

Evenness

Effects of Timber Management Activity. A mqor element of timber management activity is the rate at which timber stands are managed One measure is the average age at which timber stands are harvested This is often referred to as the rotation age.

Shorter rotations (average 110 years), as used in Prescription VIII (Commercial Wood Products Emphasis/Timber Management), will convert some areas occupied by older seral stages to areas occupied by the early and mid-seral stages (seral stages 1, 2 and 3) Late seral stages (seral stage 4) will generally not be produced on the 500,000 acres available for timber management under these shorter rotations In the past, such treatments were applied primanly under a clearcut concept Clearcutting will be reduced in Alternatives RPA, and CUR. Clearcutting will be eliminated in Alternative CBF, and minimal in PRF Many areas will be subject to leaving an average of 15 percent of the area of regeneration harvest units in existing green trees (called green tree retention or GTR) This will provide a greater degree of vertical structural age class diversty and some retention of older over-mature trees It should be noted, however, that the majority of existing older seral stages are placed in set-asides and late-successional reserves under all alternatives

Longer rotations (average 120 years), as used in Prescriptions III (Roaded Recreation) and VI (Wildlife Habtat Management), will convert areas occupied by older seral stages to areas occupied by the early to mid-seral stages (seral stages 1, 2, and 3) A minimal amount of late seral stages (seral stage 4) will be produced on these lands. More retention of hardwoods and less intensive site prep vegetative management, resulting in more grass/forb areas, will occur here than under the shorter rotations GTR will also be applied with clearcutting signdcantly reduced

Long rotations (200+ years) will provide for more mid to late seral stage (seral stages 3 and 4) areas Less early seral stages will occur than in intensive and modified management.

Seral stages 3a and 4a will not be produced under normal silvicultural treatments However, the GTR treatment will allow for 3a and 4a stands In addition, these seral stages will also be provided for on lands which are cycling naturally

On lands where timber management will not normally occur and/or occurs at low levels, vegetative diversity will change primarily through natural succession This will favor the late seral stages (seral stage 4) in some areas, especially those areas not subject to frequent fire events

The amount of "unsurtable" timber land varies between alternatives It includes wilderness, research natural areas, riparian corridors, wild and scenic riven, National Recreation Areas, late-successional reserves, and inclusions of unsuitable lands inside large areas of sultable lands These

large block of land will allow for natural succession and diversity to occur

Chaparral. There *are* some 149,300 acres of chapanal types on the Forests These will tend to cycle naturally wrth the exception of a fairly low level of induced management pnmanly in the form of prescnption fire

Hardwoods. Mature hardwood trees within conifer stands, in excess of stocking levels established for desired future conditions during landscape analysis, can be removed and young hardwood habtats will not be allowed to reach maturity on lands subject to timber management activities.

Application of land allocation prescnptions and speclfic management standards to mitigate against the above losses, and the interspersion of undeveloped lands and inclusions of other habitat types, provides for dispened mature hardwood habitats in all of the altematives

Hardwood types (stands of almost pure hardwoods) will not be managed intensively for timber production in any of the alternatives

Natural and Induced Changes in Seral Stages. As previously descnbed in Chapter II, one of the standards for diversrty requires that a minimum of 5 percent of each of the Forests' major vegetation types be maintained in each identified seral stage for that type

Refer to **Table IV-3** for a breakdown of seral stages by alternative While maintaining diversity for each majortype is important, **about** 96 percent (1,558,510 acres) of **all** major commercial bmber vegetabon types on the Forests fall into mixed conifer (including red and white fir) Hardwoods and chapanal provide the next two major types wrth 190,000 acres and 149,000 acres, respectively These will tend to cycle naturally over time Therefore, the seral stage assessment will be made and tracked over time for the mixed confer types only All other major vegetation types will be evaluated and tracked on a project by project basis dunng planning and implementation

Seral stage 3a will average 15 percent for all altemabves by the end of the 5th decade Seral stage 4a will average 6-7 percent for all alternatives All alternatives will be within 2 percent of each other for seral stages 3a and 4a over 5 decades Seral stage 4a will also be enhanced by the application of GTR

The amount of land in seral stage 1 averages 6-7 percent at the end of the 5th decade in all alternatives Under all alternatives, seral stages 3b and 3c, combined. will average 29-30 percent by the end of the 5th decade Seral stages 4b and 4c, combined, will average 15-16 percent by the end of the 5th decade

Pattern

Effects of Interspersion *oi* Suitable and Unsuitable Timber Lands. The Forests have identfied two major classes of land. (1) lands sutable for timber production, on which timber vegetation manipulation will occur, and (2) lands

Table IV-3
Seral Stage Acres by Alternative*
(rounded to nearest thousand acres)

		Year 2040 (end of 5th Decade)			
		ALTERNATIVE			
Seral Stage	**Current Situation *(1989)***	**PRF**	**RPA**	**CUR**	**CBF**
1	58,000	116,000	103,000	104,000	115,000
2	48,000	61,000	82,000	77,000	58,000
3a	311,000	242,000	244,000	236,000	242,000
3b & 3c	520,000	498,000	480,000	475,000	483,000
4a	148,000	105,000	101,000	111,000	105,000
4b & 4c	334,000	250,000	252,000	250,000	251,000
4c-older	211,000	368,000	358,000	364,000	370,000

* Total all major timber vegetation types combined.

unsuitable for timber production on which timber vegetation will not be actively managed The amount of suitable timber land vanes between alternatives (see **Table II-18**)

The proportion of unsurtable timber lands occurnng as inclusions within moderately managed prescriptions (i e., Prescriptions III [Roaded Recreation], VI [Wildlife Habitat Management] and VIII [Commercial Wood Products Emphasis/Timber Management] ranges from 13 to 31 percent depending on the alternative Thus, about one-fifth of the lands in these prescriptions will help provide an interspersed pattem of suitable and unsurtable lands This mosaic will greatly reduce the possibilty of large contiguous, homogeneous timber stands subject to intensive timber management and will help to provide movement corridors and islands of habitat within and between larger stands of vegetation

Rparian areas occurring within Prescriptions III, VI, and VIII will also create mosaic patterns and provide movement corridors In addition to the above, all alternatives have about 1,400,000 acres or 70 percent of the Forests' land base in a combination of Land Allocations Congressionally Reserved or Late-successional Reserves and Prescription VII (Threatened, Endangered and Selected Sensitive Species).

Effects of Silvicultural Systems. The choice of silvicultural systems to best provide for habitat diversty depends on which wildlife species and assemblages are to be emphasized Regardless of which treatment is used in a stand, some species and/or assemblages will benefrt and others will not.

Overall, a mix of silvicultural systems in the Forests will probably best achieve habitat diversty objectives See 'Effects of Timber Management Activty' earlier in this section for more discussion on silvicultural systems

Consequences Specific to an Alternative

Evenness

Seral stage analysis was assessed in two ways (1) on a Forest-wide basis using the percentage of the amount of a given seral stage at a particular point in time as compared to the total Forests' vegetated land base: (2) the percentage or amount of a given seral stage at a particular point in time as compared to the amount of the Forests in that seral stage in 1989

Both of the above assessments indicate that the standard of having at least 5 percent in any given seral stage for all major vegetation types will be met in all alternatives at the end of the 50 yean (year 2040). The only exception to this might be within the mixed conifer type for seral stage 2

The Forest-wide assessment previously discussed indicates little difference between alternatives The major difference is between the alternatives being considered in this Final EIS as compared to Alternative CUR in the previous Draft The magnitude of reduced intensively managed timber lands is very signficant The following assessment of seral stage acres shows differences between the alternatives (See **Table IV-3)**

All seral stage percentages vary little between alternatives through decade 5

The quantity or amount of vegetated land that will occur under the various management intensities can be generally assessed by comparing the amount of acres of each prescription group by alternative **(Table 11-14)** Alternative RPA has almost exactly the same percentage (26) of Prescription VIII (Commercial Wood Products Emphasis/Timber Management) lands as does Alternative CUR Alternatives PRF and CBF are similar wrth 8-10 percent less land base in Prescription IV (Roaded, High Density Recreation) and VIII than occur in RPA and CUR Alternative CBF has almost twice as many acres in Prescription I (Unroaded Non-Motorized Recreation) as does Alternative PRF and at least 6 times as much as Alternatives RPA and CUR All other land allocations *are* quite similar between alternatives with no more than an average variation of 5 percent

Pattern

The greatest change in existing pattem of vegetative seral stages wll occur on lands wth a veiy high degree of habitat manipulation Opportunity for greatest changes in existing pattern, especially in the seral stage 4 stands, will occur in Alternatives RPA and CUR which have 26 percent of the land base allocated to Prescription VIII, and 23 percent of the land base allocated to Prescriptions III and VI.

Under Alternative RPA, proposed chaparral management programs will vary from 5,000 to 10,000 acres treated per year Under Alternative CBF 3,000 to 5,000 acres will be treated per year Alternative CUR will involve 1,000 to 3,000 acres per year Under Alternative PRF 3,000 to 5,000 acres will be treated in the Ist decade, this will increase to between 5,000 and 10,000 acres per year in

decades 2 to 5 While the range being treated varies, the overall combined environmental consequences will not change signrficantly between alternatives due to the relatively low rnagnltude of the chaparral program in any alternative Potential increased outputs of wildlie user days, deer population increases, etc ,will also be relatively low and very localized Net effect or benefit will be to help maintain existing levels of outputs.

All alternatives range from 18 - 26 percent of allocated lands being in Prescnption III or VI combined which will be the next most intensive in terms of timber management GTR will contnbute to vertical seral stage diventy and to pattern as will application of the wide ripanan reserve corndon.

The total amount of acres of 4c-older will increase from a start[illegible] of 211 000 [illegible] 350,000 acres for all alternatives by the end of the 5th [illegible] Alternative CBF will have the most with an estimated 3[illegible]00 acres

3. Biomass

Consequences Common To All Alternatives

The issue related to biomass involves what wood material can be used for energy production while still meeting ecological needs, as well as what prionties would be followed in its allocation The two main sources of biomass on the Forests are logging residue (slash from timber sales) and precommercial thinning residues

Under all alternatives, the Forests' policy would be to ensure that enough firewood is available to meet the demand for personal use In addition, sufficient biomass material must also be left on the ground to meet ecological needs for soils, plants, and animals Therefore, the only material considered available for biomass utilization would be logging residue and thinning slash that is surplus to firewood and ecological site needs

Overall, the availabilty of biomass material from logging residues is on the decline due to reductions in the timber land base This is caused by setting aside suitable timber lands for the protection of other resource values, such as the spotted owl

Consequences Specific To An Alternative

The supply of biomass is affected primarily by the level of timber harvest and by the amount of land from which it is obtained. Therefore, Alternatives RPA and CUR would result in the largest amounts of available biomass Alternative CBF would provide the least opportunity for biomass utilization **Table IV-4** shows the allowable sale quantty (ASQ) and the number of acres harvested each year in the first decade for each alternative

The amount of precommercial thinning in the Ist decade would not vary signficantly between alternatives The amount of thinning would vary from a high of about 3,100 acres per year in Alternative CUR to a low of 2,500 acres per year in Alternative CBF

Much of the biomass material currently generated is economically unavailable for collection Increased value of residue as a source of energy could increase the amount that could be utilized Improved biomass collection technology could also make unavailable material utilizable Should biomass use increase in the future, altemative s with less potential available biomass may experience conflicts between the use of residues for power generation and personal use firewood

Sawmill residue, which is currently a major source of energy fuel, is expected to continue to provide a larger source of biomass than in-forest logging residue Again, alternatives with higher harvest levels (ASQ) would provide more potential mill wastes for energy production than alternatives with a low ASQ

Table IV-4
Factors Which Affect the Amount of Material Available for Biomass

	ALTERNATIVE			
	PRF	RPA	CUR	CBF
Allowable Sale Quantity (ASQ) Ist Decade (MMBF*)	82 0	I 124	1058	65 3
Annual Harvest Acres Ist Decade	6,430	8,890	9,660	5,880
Precommercial Thinning Acres Ist Decade	2,600	2,800	3,100	2,500

* MMBF = million board feet

4. Botany

Consequences Common to all Alternatives

All alternatives would provide for the protection of plants that are listed as sensitive by the Regional Forester This is in accordance with Forest Service policy as set forth in Forest Service Manual 2670

There are no Federally listed threatened or endangered plant species on the Shasta-Trinity National Forests Trinrty buckwheat (*Eriogonum alpinum*) is listed as threatened by the State of Callfornia

All sensitive plant populations, currently known or identified in the future, would be placed in Prescription VII (Threatened, Endangered, and Selected Sensitive Species) All project proposals would be assessed for their potential impacts to known sensitive plant populations or suitable habitats

Suitable habitat would be managed and monitored to increase or sustain viable populations of sensitive plant species throughout their recognized range

Project proposals would be modified if loss of sensitive plants or habitat in the project area would lead to a decline in viability of the species on the Forest

Consequences Specific to an Alternative

All alternatives protect existing populations of sensitive and endemic plants, but unoccupied surtable habrtat is not conserved unless specified in a conservation strategy for the species Therefore, this unoccupied habitat is vulnerable to impacts

Sensitive plant populations are not static and may move into new habitat over time as the result of successional changes or other factors Types of impacts that may cause loss or degradation of potential sensitive plant habrtat include road building (and associated quarrying of road material), livestock grazing, off-highway vehicle use, fire suppression, and timber harvest

It is difficult to predict the consequences of habrtat loss and disturbance Permanent loss or degradation of habitat can be assumed to have negative effects Temporaiy surface disturbance of habitat may have negative, neutral. or even beneficial effects depending on the species

In general, higher outputs for commodities such as timber (including road construction for access) and forage are correlated with greater losses of suitable habitat for sensitive plants Alternatives RPA and CUR are, therefore, likely to have greater negative consequences for sensitive plant viability than Alternatives PRF and CBF Because of large amounts of set-aside acreage in all alternatives, the chances of loss of suitable habttat are much less than that associated with past management

The need to identify each sensitive plant's ecology and life requirements is addressed in the Standards and Guidelines section of Chapter 4 of the Forest Plan

5. Facilities

Transportation System

Consequences Common to All Alternatives

Little new arterial road construction will be anticipated under any of the alternatives considered but reconstruction is anticipated The collector/local road system will be increased under all alternatives, but at a much slower rate than the past 10-15 years In all cases the amount of new road construction will decrease significantly in the 3rd, 4th, and 5th decades

In general, the number of miles of local roads needed for timber management purposes will vary directly with the level of timber harvesting proposed under a given alternative, therefore, the amount of land disturbed will increase accordingly as harvest levels increase In all alternatives the amount of land disturbance from road building will be much less than the recent past due to the low level of timber harvest being proposed As the amount of road and/or trail construction increases, the more likely a particular road/trail location will have to be modified to avoid cultural resources properties, sensitive plant sites, and threatened and endangered species habitats This type of mitigation through avoidance will be present in any of the alternatives considered in this Final EIS Since this will be an impact resulting from the application of non-discretionary policies (i e , mandatory legal requirements or minimum management requirements [MMRs]), they will be common to all alternatives Consequently, there will be no significant differences between alternatives with respect to these non-discretionary features

Consequences Specific to An Alternative

The principle indicator of both short and long-term environmental impacts caused by the transportation system will be watershed condition Watershed condition is based on the cumulative watershed impact using equivalent roaded acres (ERA) below the threshold of concern (TOC) The ERA threshold calculation is an appropriate indicator of the number of acres that will be disturbed based on the miles of road built See **Table IV-5** under the geology discussion in this chapter for the comparison

With respect to road closures or obliterations, these directions are included under Forest standards and guidelines (e g , 7e) and within each management prescription as defined by the associated standards and guidelines (refer to the Forest Plan)

Some road improvements will be treated as necessary to preserve environmental conditions, improve safety conditions, and increase the structural strength for road maintenance and haul efficiency This need will vary by alternative The greater the number and diversity of public users, the greater the need for this type of improvement

By the end of the fifth decade, the total miles of roads varies considerably between alternatives, with Alternatives RPA and CUR having the most and Alternative PRF having the least In all alternatives, about 85 percent of the road system will be complete by the year 2010

The rate of road construction and the eventual road density will be greater in areas where timber is managed under uneven-aged selection systems

From the standpoint of opportunities to develop a road system, Alternative PRF will constrain and/or prohibit road construction the most Road construction will be least constrained under Alternatives RPA and CUR Alternative CBF will constrain road development slightly more than Alternatives CUR and RPA None of the alternatives materially affects the unroaded character of most of the California Wilderness Bill released acres (see Appendix C) This is because many of those acres are in late-successional reserve land allocation and/or administratively withdrawn Prescriptions I and II Consequently, they will have little or no road construction

Other Facilities

Consequences Common to All Alternatives

No major effects, changes, or differences between alternatives will be anticipated with respect to buildings and administrative facilities Future changes, such as improved communication and transportation, may eliminate the need for some of the remote administration sites There will be an on-going need to upgrade and replace some of these facilities

6. Fire and Fuels

Introduction

Implementation of any alternative will influence the number of acres expected to be burned by wildfire and the acres that will receive fuel treatment The environmental consequences from these events are common to all alternatives The magnitude of the consequences depends on the event and is described for each alternative

Consequences Common to All Alternatives

Wildfire. Under all alternatives, fire and aviation management direction will be to initiate a suppression response for control of all wildfires including private lands under direct Forest Service protection Interagency fire cooperation will be emphasized under all alternatives Suppression response within wildernesses may be changed from control to containment or confinement when specific Wilderness Area Management Plans are approved

In past plans there was a large variation of acres allocated to timber harvest and associated fuels treatment and acres treated for natural fuels In addtion, there were different suppression efficiency levels applied to the alternatives The suppression level is the most efficient level (MEL) as determined by the National Fire Management Analysis System (NFMA) in all alternatives except Alternative CUR Alternative CUR is set at current levels which is 29 percent lower than MEL This results in a large variation in predicted wildfire acres by alternative

Due to the allocations to late-successional which limit timber harvest and fuel treatments for the predicted life of the Plan, and reduced harvest levels and harvest intensity on those acres available for timber harvest it is predicted that the variation in wildfire acres will not be measurably different by alternative Except for Alternative CUR, the only variation in the fire and fuels program predicted by alternative will be in the number of acres of fuels treatment for timber related and natural fuels Although there will be differences they will not measurably affect the number of wildfire acres predicted in the short term It is estimated that approximately 11,000 acres will be expected to burn by wildfire annually in all alternatives except CUR (15,000 acres)

In each alternative, the placement of fire lines and camps for the suppression of wildfires and the implementation of prescribed fires, can be affected by the presence of cultural properties, sensitive plant sites, threatened and endangered species habitats, and other features which must be protected under mandatory legal requirements The effects of wildfire on individual resources will vary, with negative effects generally increasing as fire intensities increase Regardless of intensities. wildfire can cause negative consequences to young plantations, water quality, air quality, and visual quality Air quality will receive short-term degradation during burn-out Visual and water quality will be temporarily degraded until restoration and recovery occur and the burned areas are revegetated

Young plantations (less than 30 year old) can sustain very high, if not total, mortality when burned by wildfire This is because the small, thin-barked trees are very vulnerable to heat when surrounding vegetation is burned When management activities occur within established plantations, measures are taken to reduce fuel accumulations and thereby reduce flammability and fire intensities

Positive consequences from low intensity wildfire include (1) increased or rejuvenated wildlife habitat, **(2)** improved range land, (3) increased water yields, and **(4)** reduced potential for damaging wildfires As fire intensity increases, *effects* on wildlife and grazing become less and less positive until negative consequences often occur at the very high intensity levels (Level **5** and Level 6)

Fuels Management. Prescribed fire is one of the most common methods of fuel treatments and it is expected to continue in the future Utilization of wood fiber material (biomass) is becoming more common as a source of energy production Utilization of biomass will not only assist in reduction of fuels after harvest activities but also after other management activities (i e , stand tending) Utilization is the preferred fuel treatment method in all alternatives

The environmental effects of prescribed fire are evaluated on a site-speck basis as burn plans and prescriptions are developed Negative effects of prescribed fire are related to air quality, visual quality, water quality, and soil productivity The overall effects of prescribed burning will depend on the amount of fuel treatment planned under each alternative The acres of fuel treatment expected under each alternative are shown in the following section, Consequences Specific to An Alternative

The environmental consequences resulting from prescribed fire differ between broadcast burning and the burning of piled material The application of these techniques is determined by slope of the burn site Slopes less

than 40 percent can be piled for burning, slopes over 4C percent are broadcast burned

Broadcast burning is limited to a much narrower time frame than pile burning because weather and fuel characteristics have less tolerance in the prescription As a result, smoke is concentrated in a shorter period of time than it will be if piles were burned

Pile burning permits more positive protection of sensitive soil productivity and water quality (because of the escape factor -- i e., riparian management zones) Situations permitting piling also provide better economic circumstances for increased marketability of the residue (tractor ground). Burning prescripbons for piles occur over a much longer penod of time than do prescriptions for broadcast burning. This permits positive compliance with air quality requirements

The prionty of natural fuel treatment will be (I) public safety, (2) areas with signlficant capital investments (i e , structures, plantations etc); (3) high fire occurrence areas, and (4) for coordinated resource benefts

Consequences Specific to An Alternative

Alternative PRF (Preferred Alternative). About 30,000 acres (26,500 acres of ecosystem management related fuels and 4,400 acres of activity fuels) will be treated annually by utilization and/or prescribed fire during the Ist decade

Overall it is intended to treat all landscapes in a manner that returns them to a condition that would have happened naturally had fire not been excluded for the past 80-100 years Fuels from timber harvesting will be decreased due to a decrease in overall harvesting on the Shasta-Trinity National Forests. All vegetation treatments including fuels treatment and timber harvest will be done in conjunction with the overall requirements or desired future condition of the ecosystem

Alternative RPA *(1990* RPA Program Emphasis). Natural and activity-created fuels will be treated by utlization and/or prescribed fire during the Ist decade at an estimated rate of about 6,580 acres annually (I ,880 acres of ecosystem management related fuels and 4,700 acres of activity fuels)

Alternative CUR (No Action/No Change). Natural and activity-created fuels will be treated by utilization and/or prescnbed fire during the Ist decade at an estimated rate of about 7,080 acres annually (I ,880 acres of ecosytem management related fuels and 5,200 acres of activity fuels)

RIternative CBF (Citizens for Better Forestry). Natural and activity-created fuels will be treated by utilization and/or prescribed fire during the Ist decade at an estimated rate of about 5,880 acres annually (I ,880 acres of ecosystem management related fuels and 4,000 acres of activity fuels)

7. Fisheries

Consequences Common to All Alternatives

Under all alternatives potential impacts to the fisheries resource, from sediment loading as a result of human activrties within the forest, will be greatly reduced This is due in part to the reduction in timber harvest levels and road building and the large increase in set-aside lands Risk of sediment loading on the 500,000 acres still subject to vegetative modification activrties such as timber harvest, wildlife habitat improvement, and road construction will remain but will be more than adequately mrtigated by the riparian standards and guidelines in the Forest Plan

Other associated risks to the fisheries resource include (1) increased recreational sportfishing which can be detrimental to certain declining or sensrtive fish stocks, (2) livestock use in ripanan areas, and (3) fuel treatment which can cause nparian area and streamcourse damage This risk is minimal, however, since broadcast burning is not allowed in nparian areas

Potential impacts of resource management activities will be greater to streams than to lakes Visual quality standards in the Shasta and Trinlty Units of the Whiskeytown-Shasta-Trinity National Recreation Area (NRA) and in riparian areas near lakes and perennial streams will be managed to maintain their scenic values and near natural appearance Management activities adjacent to ephemeral and intermittent streams have the potential to cause soil disturbances which may result in lowered water quality standards and increased sedimentation of downstream fish habitats Forest-wide standards and guidelines, land allocation constraints, Best Management Practices (BMPs) and supplemental management area direction will be implemented to minimize impacts of program activities and ensure viable population levels of fisheries management indicators

The original base year (Fiscal Year [FY] 1982) of 363,000 pounds of commercial salmon being produced from National Forest lands has been added to by the increase in production from the Trintty River Hatchery Hatchery production has increased salmon productivity on National Forest lands by an additional 328,000 pounds or a new total of 691,000 pounds All alternatives reflect this new base equally Hatchery production is projected to be maintained in a "steady-state" for the next 50 yean and thereby continue to reseed the mainstem Trinrty River

The original base year (FY 1982) of 113,000 pounds of sport salmon being produced from National Forest lands has been added to by the increase in production from the Trinity River Hatchery Hatchery production has increased salmon productivity on National Forest lands an additional 240,000 pounds for a new total of 353,000 pounds All alternatives reflect this new base equally

Until salmon habrtat assessments are completed, the greatest emphasis on habitat improvement for anadromous fish will be placed on steelhead trout

Once the prescnbed structural goals are attained, new projects will be identified and implemented for the anadromous and inland fish habitat improvement programs New project construction and maintenance will be implemented to replace and maintain lost and damaged structures

The ripanan standards and guidelines identify Key Watersheds as cornerstone to the viability of anadromous fish populations not only on the Shasta-Trinity, but also to the vital network of connected riverine ecosystems wrthin the Klamath/Trinity River Basin Key Watersheds are areas that provide aquatic and npanan habrtat essential to the maintenance, recovery, or enhancement of anadromous fish populations Most importantly is that the potential affects upon aquatic ecosystems will receive first priority in the development and application of management alternatives

The following Key Watersheds or Key Watershed areas have been proposed for the Shasta-Trinity National Forests

1 Upper South Fork Trinity River
[Hayfork Creek to Headwaters]

2 East Fork South Fork Trintty River
[Mouth to Headwaters]

3 New Rver
[Mouth to Virgin Creek]

4 Slide Creek
[Mouth to Headwaters]

5 Virgin Creek
[Mouth to Headwaters]

6 North Fork Tnnrty River
[Mouth to Headwaters]

7 Canyon Creek
[Mouth to Headwaters]

The interrelated riparian and aquatic habrtats are limrted ecosystems in the Forests They yield, or have the potential to yield, high productivity levels of fish and wildlife Anadromous and inland fish populations are dependent upon good water qualty and quantty, instream and bank (shoreline) habltat diversty, minimal sediment yield from surrounding watersheds, diverse aquatic and terrestrial food items, and a dynamic breeding population for their continued existence Alteration or disturbance of their restricted habitat, depending on the extent, may lead to population declines Several aspects of multiple-use management on National Forest lands may impair the capability of a watershed ecosystem or a riverine habitat to produce healthy fish stocks

Recreation Management

California's recreation-oriented population will continue to increase and demand better or greater diversty in freshwater fishing opportunlties over the next 50 years Continued declines of salmon and steelhead populations and associated stream closures have reduced this diversty. The Shasta-Trinity's fisheries program is intended to improve recreational sportfishing opportunities above current levels Three challenges arise (1) historically used anadromous fish habitat is currently under-utilized as a result of reduced fish numbers, (2) the *effects* of six years of drought on anadromous and inland fish populations has not been assessed, and (3) the recovery of salmon and steelhead stocks must proceed wlth a scientifically sound ecological strategy plan This plan must endorse the key aspects of protection and restoration Maintenance and/or enhancement of wild fish stocks is essential

Fishing demand at Shasta and Trinity Lakes, inland coldwater lakes (i e. Iron Canyon, Lewiston, McCloud) and inland coldwater streams(i e Upper McCloud and Prt River) will increase at developed recreation facilities High mountain lakes will receive an increase in dispersed angler pressure

Fishing diversity will be enhanced on the Upper Sacramento Rver as the wild trout population rebounds from the disastrous chemical spill of July, 1991 Even as the Forest Service takes posltive steps toward better watershed ecosystem and riverine habitat management, external influences or disturbances may negate the recovery of declining salmon and steelhead stocks. It is anticipated that winter-run steelhead population declines will rebound allowing for more angler fishing diversity wlthin the Trinity River and select tributaries. Summer steelhead and spring-run chinook stocks will probably remain low, but they will improve as long-term recovery measures are implemented

Finally, *efforts* to improve anadromous fish habitat, red-band trout habrtat, inland coldwater trout habltat in major perennials, and inland warmwater fish habrtat will be increased Natural recovery, coupled with habitat improvement efforts will result in. (1) achieving and maintaining healthy and robust fish populations and their habitats, (2) providing better fishing opportunities, and (3) increasing the diversty of fish species being sought by anglers However, these *efforts* will probably fall short of meeting potential fishing demands on the Shasta-Trinrty National Forests The combination of past natural and human disturbances may be of such great magnitude that long-term recovery of potentially fishable stocks may be several decades away

Roads and Facilities Management

One of the primary factors that has the potential to impact anadromous or inland fish streams is sediment loading Salmon and steelhead declines are generally associated with agriculture, urbanization, damming, timber harvesting, and road building as well as commercial and recreational over harvest of stocks Loss of highly productive watershed ecosystems and nverine habitat may be the single most consistent contributor to salmonid populations that are listed as "at risk of extinction" Road building can be a contributor of downstream sediment-loading This results in riverine habitat damage on and *off* National Forest lands

Protection will be increased in key watersheds to facilitate the recovery of anadromous fish Further road obliteration and road closure opportunities, especially in the South Fork Trinty Rver basin, will be analyzed and implemented to prevent or reduce potential sediment loading to fish-bearing streams New road construction will decrease signficantly Road reconstruction, which takes into consideration riparian and fish habitat needs, will remain fairly constant over the 50-year period The number of miles of road maintenance will increase over the same time period

The consequences of this action will be (1) curtailing the loss of stream and river habrtat complexty: and (2) establishing ecologically healthy watersheds throughout the Forests. These watersheds will be capable of sustaining diverse and abundant riparian habitats, assuring good

water quality and quantity as well as the harmony associated with resilient and productive ecosystems

Vegetation Management

Potential impacts resulting from vegetation management practices will have a signrficantly reduced nsk of impacting anadromous or inland coldwater fish streams when compared to a decade ago Most of the existing land base on the Forests has been allocated to Wilderness. National Wild and Scenic Rivers, Late-successional Reserves, wide Riparian Reserve corridors, and/or identified as Key Watersheds, or other constraining designations Anadromous and inland coldwater streams will benefrt from the increased emphasis on ripanan habrtat protection

Under all alternatives, potential impacts to the fisheries resource, from sediment loading, will be greatly reduced This is due to the reduction in timber harvest levels and associated road building and the significant increase in set-aside lands Risk of sediment loading on the 500,000 acres still subject to vegetative modification activrties such as timber harvest, wildlife habitat improvement and road construction will remain but will be mitigated by the riparian standards and guidelines in the Forest Plan

Even with the decrease in timber harvesting. it is still necessary to prevent the impairment of a functional ecosystem by eliminating the introduction of undesirable sediments into streamcourses or negating irretrievable damage to ripanan habrtats Land allocation Rparian Reserves identifies the nine objectives of the Aquatic Conservation Strategy which includes as a key component the protection of riparian reserve areas Functional standards and guidelines have been established for timber, roads and facilities. range, recreation. minerals. fire/fuels as well as for lands and hydropower developments and watershed and habrtat restoration to ensure the integrity and protection of these riparian habitats

There is a potential for more sediments to exist with an increase in the number of acres treated for timber harvest and related road construction The application of Rparian Reserve corridors should reduce nsks of potential impacts

Livestock Management

Livestock can adversely affect ripanan vegetation through trampling and grazing, they may also affect aquatic habrtats or water quallty Management standards and guidelines, including mtigation measures, will be implemented as necessary to protect ripanan habitats from existing and/or future adverse impacts

Livestock use on existing National Forest allotments is expected to remain constant over a 50-year period No new allotments will be added to the Forests' base Impacts to nparian habrtats are expected to be localized Where conflicts occur, they can be resolved Conflicts will occur more to inland coldwater streams than anadromous fish streams

Implementation of better range improvement efforts such as water guzzlers, fencing, or rest rotations should be analyzed where livestock/riparian conflicts are identified

Fire/Fuels Management

Prescribed fire for fuels management and habrtat wildlife improvement have the potential to damage nparian areas and streamcourses if not properly controlled. This risk is minimal, however, since only treatments that maintain or enhance attainment of the Aquatic Conservation Strategy are permitted

Habitat Improvement

Through the application and management of key watersheds, Forest personnel will place an increased reliance on the natural long-term recovery of non-sensitive (fall-run chinook salmon and winter-run steelhead) and sensitive (spring-run chinook salmon and summer steelhead) anadromous fish habitat in the Trinlty hver basin This is not intended to eliminate the fish habitat restoration or watershed rehabilrtation program, but rather to compliment it

Habrtat improvement opportunrties will be identified and implemented to the benefit of anadromous, inland coldwater, and inland warmwater fish populations Implementation of the program varies according to emphasis and time frames Outputs are displayed only to the program's prescribed goals

Successful accomplishment of the fish habitat improvement program, wrth its projected increases in fish production, is dependent upon (1) ecosystem strategy planning. (2) capability of fish habrtats to respond to applied treatments, (3) adequate fish numbers to seed improved habitats, and (4) success in the mitigation of potential impacts to streams, watersheds, and riparian areas from land use and development activities

Consequences Specific to An Alternative

Alternative PRF (Preferred Alternative)

Habitat Improvement

This alternative will treat 1,500 acres for nonstructural habitat improvement and install 3,200 structures for anadromous fish over the 50-year period For inland coldwater fish habitat (streams and lakes), 700 acres of nonstructural habitat improvement will be undertaken and 2,000 structures installed Similarly, 1,000 acres of non-structural habitat will be treated and 2,500 structures installed to benefit warmwater fish species

Habitat improvement for non-sensrtive anadromous fish species (fall-run chinook salmon and winter-run steelhead) will be increased on selected stream systems within the Trinity Rver basin Habitat improvement for sensitive anadromous fish species (spring-run chinook salmon and summer steelhead) will be evaluated and implemented on a limited basis Low population numbers, coupled with under-utilization of stream habitats, will determine the need, desirablity, and feasibility of a habrtat improvement program for these sensitive fish species

Habitat improvement for warmwater fish species will be increased at Shasta and Trinity lakes Fish habitat improvement will increase on mqor perennial inland fish streams. Surveys will be undertaken to analyze the need to implement habitat improvement on minor perennial inland fish streams

Watershed rehabilitation projects will occur on strategic ephemeral and intermrttent streams to protect and maintain rainbow trout and winter-run steelhead habitat in downstream perennial stream areas Direct fish habitat improvements for rainbow trout and winter-run steelhead will occur in major and perhaps some minor perennial streams to accommodate a greater portion of major consumptive sportfishing

Implementation of this alternative will result in the improvement of recreational sportfishing opportunities on the Forests above that of current levels

Alternative RPA (1990 RPA Program Emphasis)

Habitat Improvement

This alternative will treat 1,500 acres for nonstructural habitat improvement and install 6,000 structures for anadromous fish over the 50-year period For inland coldwater fish habitat (streams and lakes), 1,750 acres of nonstructural habitat improvement will be undertaken and 2,500 structures installed Similarly, 2,250 acres of non-structural habitat will be treated and 3,750 structures installed to benefit warmwater fish species

Habrtat improvement for non-sensitive anadromous fish species (fall-run chinook salmon and winter-run steelhead) will be increased on selected stream systems within the Trinity River basin and implemented for the first time in the Beegum Creek drainage Habrtat improvement for sensitive anadromous fish species (spring-run chinook salmon and summer steelhead) will be evaluated and implemented on a limited basis Low population numbers, coupled with under-utilization of stream habitats, will determine the need, desirablity, and feasibility of a habitat improvement program for these sensitive fish species

Habitat improvement for warmwater fish species will be significantly increased at Shasta and Trinity Lakes Habitat improvement will be increased on minor and major perennial inland fish streams

Watershed rehabilitation projects will be extended beyond strategic ephemeral and intermittent streams to significantly protect, maintain. and enhance rainbow trout and winter-run steelhead habitat in downstream perennial stream areas Direct fish habitat improvements for rainbow trout and winter-run steelhead will occur in major and minor perennial streams to accommodate a significant portion of major consumptive sportfishing

Implementation of this alternative will result in the significant improvement of recreational sportfishing opportunities on the Forests above that of current levels.

Alternative CUR (No Action/No Change)

Habitat Improvement

This alternative will treat 1,000 acres for nonstructural habitat improvement and install 3,520 structures for anadromous fish over the 50-year period For inland coldwater fish habitat (streams and lakes), 200 acres of nonstructural habitat improvement will be undertaken and 1,000 structures installed Similarly, 650 acres of non-structural habitat will be treated and 1,600 structures installed to benefit warmwater fish species

Habitat improvement for non-sensitive anadromous fish species (fall-run chinook salmon and winter-run steelhead) will continue at a low to moderate emphasis level within the Trinity River basin predominantly within tributaries of

the South Fork Trinity River Habitat improvement for sensitive anadromous fish species (spring-run chinook salmon and summer steelhead) will be evaluated and implemented on a limrted basis Low population numbers, coupled with under-utilization of stream habrtats. will determine the need, desirablity, and feasibility of a habitat improvement program for these sensitive fish species

Habtat improvement for warmwater fish species will continue at a low to a moderate emphasis level at Shasta and Trinity Lakes Treatment of reservoir habitats will depend heavily on establishing working partnerships with local and regional groups Partners will contribute 80 percent or more of the improvement costs Very limrted fish habrtat improvement will occur on a few major perennial inland fish streams No fish habitat improvement will occur on minor perennial inland fish streams

Watershed rehabilitation projects will occur on strategic ephemeral and intermittent streams to protect and maintain rainbow trout and winter-run steelhead habrtat in downstream perennial stream areas Direct fish habitat improvements will occur first for steelhead trout, second for largemouth bass, third for redband trout, and finally, for rainbow trout in a few major perennial streams to accommodate consumptive sportfishing

Implementation of this alternative will result in the improvement of recreational sportfishing opportunities predominantly for anadromous fish It will also reflect an increasing management desire to emphasize warmwater fishenes at Shasta and Trinity Lakes and redband trout management at Trout Creek

Alternative CBF (Citizens for Better Forestry)

Habitat Improvement

This altemative will treat 1,500 acres for nonstructural habitat improvement and install 3,200 structures for anadromous fish over the 50-year period For inland coldwater fish habrtat (streams and lakes), 700 acres of nonstructural habitat improvement will be undertaken and 2,000 structures installed Similarly, 1,250 acres of nonstructural habtat will be treated and 2,100 structures installed to benefrt warmwater fish species

Habitat improvement for non-sensitive anadromous fish species (fall-run chinook salmon and winter-run steelhead) will be increased on selected stream systems within the Trinity River basin Habitat improvement for sensitive anadromous fish species (spring-run chinook salmon and summer steelhead) will be evaluated and implemented on a limited basis Low population numbers, coupled with under-utilization of stream habrtats, will determine the need, desirablity, and feasibility of a habltat improvement program for these sensitive fish species.

Habitat improvement for warmwater fish species will be increased at Shasta and Tnnity Lakes Fish habrtat improvement will increase on major perennial inland fish streams Surveys will be undertaken to analyze the need to implement habitat improvement on minor perennial inland fish streams

Watershed rehabilrtation projects will occur on strategic ephemeral and intermrttent streams to protect and maintain rainbow trout and winter-run steelhead habitat in downstream perennial stream areas Direct fish habitat improvements for rainbow trout and winter-run steelhead will occur in major and perhaps some minor perennial streams to accommodate a greater portion of major consumptive sportfishing

Implementation of this alternative will result in the improvement of recreational sportfishing opportunities on the Forests above those of current levels

Threatened, Endangered, and Sensitive Species

Consequences Common *to* All Alternatives

All future sites of Federally-listed threatened or endangered (T&E) species will be fully protected and managed according to Prescription VII (Threatened. Endangered, and Selected Sensitive Species) All alternatives will meet the intent of the respective recovery plan for each designated species

Threatened. At present, there are no known Federally-listed threatened fish species on the Forests

Endangered. At present, there are no known Federally-listed endangered fish species on the Forests

Sensitive. All known or future sites necessary to provide for viable populations of sensitive fish species will be fully managed and/or protected as necessary Overall. the amount *of* Prescription VII habitat will fluctuate by no more than five percent among each of the four alternatives

Forest-wide and management prescription standards and guidelines, Best Management Practices (BMPs), npanan management zones (RMZs), and supplemental manage-

ment area direction will be implemented to protect and maintain T&E and sensitive fish habitat to ensure the viability of fish stocks among all alternatives.

The spring-run (summer) steelhead is the only fish species listed as sensitive by the Shasta-Tnnty National Forests The spring-run chinook is recognized as a sensitive fish species in the Klamath River system but not within the Trinity River Basin. Summer steelhead habitat will be managed initially for species preservation, especially in the South Fork Tnnty River. Key tributaries containing summer steelhead populations will remain closed to fishing until the California Department of Fish and Game (DFG) determines the closure's efficacy Summer steelhead will not be managed for major consumptive sportfishing unless an increase in population numbers car be projected by DFG to sustain such a fishery. This will result in a loss of fishing diversity on the Forests for the immediate future

Salmon, steelhead, and trout populations may benefit from reduced management activities, such as timber harvest, road building, and prescribed burning in riparian areas The increased emphasis on key watersheds, highly restrictive riparian management standards and guidelines, the establishment of late-successional reserves, and the development of Wild and Scenic Rver Management Plans will also benefit these fish species These actions will result not only in the maintenance and protection of known summer steelhead habitat, but also in the strengthening and diversifying of populations over time

8. Forest Pests

Consequences Common to All Alternatives

All alternatives will continue to follow an integrated pest management (IPM) approach This will allow use of strategies most appropnate to the situation and the theme of the alternative Because Alternative CBF prohibits the use of pesticides there will be limits in controlling some pests Not all insect, disease, and animal injury is undesirable in the forest ecosystem, but for the purpose of this section damage will refer to that which adversely affects management goals and objectives

Maintaining and improving forest health is a goal which may be defined differently for each alternative The health of a forest is partly defined by the human desires associated with each area If adverse impacts of pests on a resource increases or threatens to increase to a level that interferes with management objectives, the options available to control this damage will be evaluated and the selected option will be integrated into project activities Biological effectiveness, environmental safety, and compatibility with other resources and concerns will be considered when selecting a pest management option

Implementation of any of the alternatives will involve different levels of pest management opportunities and will likely result in varying severities of pest-related injury on the Forests Indicaton of pest-related injury include tree mortality, reduced growth, top-killing, and reduced quantity and quality of seed production Damage can result in sawtimber defect, understocking, failure and delay of regeneration, reduced site productivity, degradation or closure of recreation sites. increased incidences of hazardous trees, and undesirable vegetation changes The latter changes can affect numerous resources, including visual quality, wildlife and fisheries habitat, and wilderness quality

Vegetation management provides the best opportunities to prevent or reduce the amount and impact of pest-related damage, although direct actions against pests may be necessary in specific situations In order to compare the consequences of each alternative on forest pests, the intensity of vegetation management is used as a proxy to indicate the opportunity to prevent and reduce damage With greater opportunity to manage vegetation, less damage will be anticipated

Areas where the vegetation is managed intensively will present the greatest opportunity to reduce or prevent pest losses Other areas where condition of the vegetation is important, such as developed recreation sites, will also present significant pest management opportunities. Areas such as wilderness and semi-primitive recreation, on the other hand, will present minimal opportunities to control pests Areas managed non-intensively will have moderate pest management opportunities

The differences between alternatives in forest pest activity will be a result of the management objectives and prescriptions implemented in each alternative The percent of the total Forests' land base, categorized as having "maximum", "moderate". "limited", or "minimal" opportunity to prevent or reduce pest-related damage by vegetation management, is displayed by alternative in **Figure IV-I**

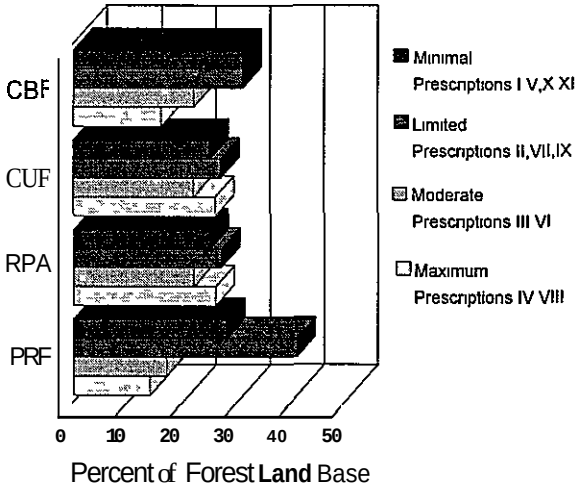
A discussion of silvicultural systems and their relationship to forest pest activity and control is found in Appendix J

Consequences Specific to an Alternative

Alternative PRF (Preferred Alternative). This alternative will have an intermediate level of opportunity for minimizing pest activity The lower acreage of moderately to intensively managed lands compared to Alternatives RPA and CUR will reduce the intensity of stand management activities and increase damage from forest pests Areas where vegetation is managed intensively should have low levels of pest activity

Alternatives RPA *(1990* RPA Program Emphasis) and CUR (No Action/No Change). These two alternatives will have the greatest opportunities for minimizing pest activity

Figure IV-I
Opportunities for Minimizing Forest Pest Activity



They will also have the greatest need if timber outputs are to be attained Pests of mature forests, e.g. decays and wood borers, will become less important, while pests of youngertrees, especially in plantations, will become more significant Pest damage should be the lowest of all alternatives

Alternative CBF (Citizens for Better Forestry). Pest management opportunities will be the least of all alternatives Because herbicides will not be used and there will be restrictions on the use of pesticides, including biologicals, opportunrties for IPM will be limited This is especially true of defoliators in some areas, this may affect visual quality Plague occurrences may increase in developed recreation areas because of the lack of pesticide use This may conflict with existing agreements wrth other public agencies, such as county health departments and the Animal and Plant Health Inspection Service (APHIS). No pest suppression in wildernesses may result in increased damage and increased costs of suppression to surrounding areas outside of wilderness. This may also conflict with other agencies' responsibilities, specifically the eradication of exotic organisms The emphasis on lower intensity timber management will increase the level of pest activity and injury.

9. Geology

Consequences Common to All Alternatives

No alternative will affect the physical presence of minerals Therefore, geology, as it relates to mineral deposits, is common to all alternatives

Volcanic and seismic hazards will be constant and unchanged for all alternatives However, the hazard of initiating slope instability and resulting impacts to water qualty will differ by alternative Although slope stability investigations are performed for nearly every land disturbing project, slope failures can occur as a result of unforeseen circumstances or a function of an intensive storm event which exceeds design standards To minimize slope failures, highly unstable areas have been identded and a Forest standard and guideline has been developed that prohibits management activities on these lands

Compared to a decade ago, vegetation treatments are occurnng on fewer acres Clearcutting has been significantly reduced Road construction has also been reduced These facton contribute to less potential impacts to landsliding Standards and guidelines offer resource protection for soil qualrty, including compaction, erosion and productivity, and for ripanan areas Therefore, the nsk ofwater qualty degradation through management related mass wasting is not signrficant

Consequences Specific to An Alternative

Each alternative will have a different nsk of initiating slope instability due to the amount of road construction, number of stream crossings, and intensty of timber harvesting

As the level of roading and harvesting increases, the nsk of initiating slope failures will likely increase Therefore, in this analysis, acres oftimber harvest and acres of new road construction will be used as indicators of the relative nsk of initiating slope instabilty for each of the altematives **Table IV-5** lists these acres

The alternatives were ranked in terms of relative nsk, which was based on the number of acres of timber harvested New road construction is limited for all alternatives (See **Table IV-5)** Therefore, new road construction will not be included in this evaluation The ranking of alternatives, which resulted from the application of these criteria, (from the least to the greatest risk) was as follows PRF, CBF, RPA, and CUR The following discussion expands on the reasons for this relative ranking All altematives are compared to current direction. Altemative CUR

Alternative PRF (Preferred Alternative). This alternative will have about 33 percent fewer acres of timber harvest than Alternative CUR Therefore, this alternative has the second lowest potential for slope instability

Altemative RPA (1990 RPA Program Emphasis). Compared to Alternative CUR the implementation of this alternative will have a slightly lower potential for initiating slope instability There will be an 8 percent decrease in timber harvested acres compared to Alternative CUR

Alternative CUR (No Action/No Change). Implementation of this altemative will result in harvesting timber on an average of 9,660 acres This is the greatest of all the alternatives Slope failures related to management activities have been observed during extreme storm events However, these landslides occurred on only a small portion of the managed land base, and at the same time that landslides occurred on unmanaged lands This trend will likely continue if this altemative is implemented

Alternative CBF (Citizens for Better Forestry). Implementation ofthis alternative will result in a 39 percent decrease in timber harvested acres This alternative has about the same nsk as Altemative PRF but less than all the other alternatives considered

Tabl V-5
Timber Harvest Acres and-Road Construction by Alternative
(Average Annual Acres for the-First Decade

Alternative		Timber Harvest (acres)	Road Construction (acres)
PRF	(Preferred Altemative)	6,430	5
RPA	(1990 RPA Program Emphasis)	8,890	40
CUR	(No Action/No Change)	9,660	40
CBF	(Citizens for Better Forestry)	5,880	28

10. Heritage Resources

Consequences Common To All Alternatives

One of the issues identified during the early public involvement period concerned the disturbance or destruction of cultural resources that has occurred, or is thought to have occurred, as a result of Forest Service activities (Public Issue #1) In order to address this issue in a positive manner, as well as to respond to related management concerns, new direction has been developed in the Forest Plan This direction is embedded in all alternatives under Prescnption XI (Heritage Resource Management), in the Forest standards and guidelines, and in the monitoring plan (contained in the Forest Plan)

Prescnption XI directs that highly significant cultural resources will be protected indefinitely from potentially damaging activities such as timber harvesting and road construction The Forest standards and guidelines provide mechanisms to ensure that cultural resources potentially affected by land management activities will be identified and assessed as to their eligibility for the National Register of Historic Places Eligible properties will be protected or adverse effects to them will be mitigated Cultural resources not assigned to either Prescription XI or the standards and guidelines, will be managed according to the Archaeological Resources Protection Act of 1979 and Shasta-Trinity National Forests' Supplement #6 to Forest Service Manual 2361 The Forest standards and guidelines also ensure Native American access and use of sacred sites and provide for collection and/or use of traditional resources in all alternatives

The monitonng plan in the Forest Plan includes periodic inspection of activities to assess whether or not the above management direction is being met This will be accomplished through an annual program which samples projects that included active protection of cultural resources The intensity of sampling will be adjusted annually if the results of monitoring depart from established criteria

The effects to cultural resources associated with Prescription XI will be the same for all alternatives, (i e , all sites will be protected regardless of the alternative) For the remainder of sites on the Forests, there will be instances where potential adverse *effects* will need to be mitigated In all such cases, the required interagency consultations (i.e , (36 Code of Federal Regulations [CFR] 800) will be undertaken The specific number of sites that might be affected is difficult to quantify precisely, since that number will result from a case-by-case analysis of costs (mitigation funds needed) and benefits (e g , timber outputs gained).

It is unknown how the alternatives will contnbute to or detract from the State Historic Plan The existing State Plan does not specify any particular preservation targets for types of cultural resources, nor any goals for regions in California However, the State Plan is being updated and revised It is likely that many of the cultural resources associated with Prescription XI will contribute in some measure to the goals of the new State Plan

The short-term versus long-term effects on cultural resources associated with Prescription XI will be the same The short- and long-term *effects* to sites receiving other management direction (i e , properties associated with Forest standards and guidelines and those sites not eligible for the National Register of Historic Places) will be more difficult to measure. Over the short-term (e g , 10 years), the number of sites that will be lost (with or without mitigation) will be few in number In the case of timber, the threat will occur for each site only once during the timber harvesting cycle

Over the long-term, it is possible that some sites not associated with Prescription XI will be lost, particularly those located on suitable timber lands Specific cultural resources are generally considered non-renewable However, since less than one-fourth of the Forests has been intensively inventoried during the last 15 years, perhaps as many sites remain to be found as have already been located The potential of losing sites, however, is greatly reduced from past levels due to the greatly reduced timber programs and the large amounts of set-aside acres in all alternatives

Two important benefits relating to cultural resources can be associated, to varying degrees, with all alternatives (1) the development of specfic management direction that varies according to the value of a cultural resource should lead to more cost-effective management, as well as the preservation of highly significant sites, and (2) all alternatives continue resource management activities (particularly timber) that have, in the past, been indirectly responsible for most of the inventory, recording, and evaluation of cultural resources throughout the Forests Regardless of the alternative selected, Forest personnel will continue to consult with other agencies such as the State Historic Preservation Office, the Keeper of the National Register of Historic Places, the Advisory Council on Historic Preservation, etc , as required by the National Historic Preservation Act, and other legislation

The application of Forest Standards and Guidelines, as well as Prescnption XI, will pose some constraints on the management of other resources. The constraints may be one of two kinds a financial cost or a land use limitation For example, construction of a road through an archaeological site, where it is infeasible to avoid the site, may require funds for mitigation In the case of timber management, some areas might not be harvested because of the presence of significant cultural resources The specific constraints are developed when a project is actually designed

Consequences Specific To An Alternative

As stated above, sites assigned to Prescription XI will be protected by all alternatives The remaining sites (the majority) will be managed according to Forest standards and guidelines In trying to estimate the effects of specific alternatives on cultural resources, it was concluded that using prescnptions with high to moderate ground disturbance, particularly activties associated with timber harvesting, will best approximate the risk to cultural resources These include Prescriptions III (Roaded Recreation), IV (Roaded, High Densrty Recreation), VI (Wildlife Habitat Management), and VIII (Commercial Wood Products Emphasis/Timber Management) It must be realized, however, that simply because cultural resources are located in areas assigned to these prescriptions it does not mean that the sites will be adversely affected

During the last decade, the vast majority of cultural resources located in such areas (e g , timber sales) have been protected This pattern will not change markedly Most site damage in the past has been inadvertent New direction in the Forest Plan shall significantly eliminate such unintentional. adverse occurrences Therefore, the following discussions are not intended to predict quantitatively any actual number of cultural resources to be disturbed. but rather, the potential of each alternative to cause effects that will need to be mtigated in some manner

Alternative PRF (Preferred Alternative). Several measures were used to compare the alternatives One involved summing all the acres assigned to the most land disturbing prescriptions for the four alternatives This involved summing Prescnptions III (Roaded Recreation), IV (Roaded, High Densrty Recreation), VI (Wildlife Habrtat Management), and VIII (Commercial Wood Products Emphasis/Timber Management) Another measure was the number of suitable timber acres for each alternative, while another was the annual timber harvest for each alternative Using these measures, Alternative PRF is estimated to have only a moderate potential to adversely affect cultural resources Timber outputs, acres of surtable timber land, etc , are all relatively low

Alternative RPA *(1990* RPA Program Emphasis). This alternative is similar to Alternative CUR in its potential to affect cultural resources Timber outputs, reforestation outputs, etc , are the highest of all alternatives It ranks highest among all alternatives for its potential to affect cultural resources

Alternative CUR (No Action/No Change). This alternative has the highest number of acres assigned to prescriptions involving ground disturbance It is second to Alternative RPA in the number of sultable timber acres and proposed timber outputs **(Tables IV-II** and **IV-21)** Specific, potential risks to cultural resources include timber harvesting, reforestation, timber stand improvement, recreation, and road construction and reconstruction, etc

RIternative CBF (Citizens for Better Forestry). This alternative has some of the lowest figures for timber and reforestation outputs, miles of road to be constructed and reconstructed, etc Of all the alternatives, Alternative CBF will probably have the least potential to damage or adversely affect cultural resources

II. lands

Consequences Common to All Alternatives

Included under this subject heading are discussions of the environmental consequences common to all alternatives on' (1) landownership adjustments, including land purchase programs, (2) interagency exchange, (3) non-recreational special-use management, (4) land withdrawals, and (5) property line-related encroachment.

landownership Adjustment. The ownership pattern within the Shasta-Trinity National Forests provides considerable opportunities for landownership adjustments through land exchanges, donations, and purchases Adjustments will provide consolidated ownership patterns in areas of intermingled landholdings so that lands can be managed more effectively The resulting compact ownerships make possible lower maintenance, supervision, and improvement costs Examples of land exchange benefits (consequences) are

1 Shorter boundaiy lines, easier to mark and maintain,

2 Fewer trespass problems, claims, and lawsuits,

3 Lower costs for road construction and maintenance due to more compact ownership,

4 Increased flexibility to develop lands in ways not otherwise possible or practicable, and

5 Reduced need for rights-of-way over private land

Also, exchange or purchase often makes valuable lands avalable for public use Additional examples of public benefts that can result from proper acquisitions are

1 Better control of erosion in mountain watersheds which supply water to downstream users or communities.

2 Acquisition of important recreation lands, or other lands such as critical wildlife habitat,

3 Protection of the wilderness environment, and

4 Isolated timber lands can be made economically accessible for easier forest management

The intent, regardless of alternative, will be to continue favorable land exchanges with private landowners, such as Sierra Pacific Industries, John Hancock Insurance Company (successor to Champion International Corporation), and Roseburg Lumber Co Forest personnel are evaluating opportunities for additional exchanges with these companies

Some of the private lands to be acquired under future exchanges are located within existing Wildernesses Exchanges involving these lands will continue until the goal of acquiring high priority classified lands and adding them to the National Forest system is achieved The trade-off, therefore, will be between the amenity values on the offered private lands versus the timber volumes being foregone to private ownership from the selected National Forest lands

L d p rch a programs are financed principally through l d and Water Conservation Fund money authorized by Congress However, partnerships v h Tr for lic a and the Nature C an y, s ell a the endo it fi h are an d to acquir ng lands High priorities for funding are for acquisition of private lands within existing or proposed Wildernesses, National Recreation Areas (NRAs) a d/c approved tic composites T purchase program is based on a willing seller/willing buyer a rangement

Rega dl of tl alt tive, tl presence of cultural properties, sensit v e plant sites, threatened and n-dangered species habitats, and other s, which must be protected under statutes, can cause modifications in landownership adjustment activities F > ca p l N: tional F lands with t features identified for disposal und a land exchange car be deleted fi a prop t on ly, N Forest lands th these ur i tu can be identified for addition to tl National Forest stem in order t me t the objectives of the legislation

The impact of these features on the Shasta-Trinity's land exchange p wil t vary b alternatives ecause the ilt mate goals a d v e for landownership adjustment through exchange will be common t ll alternatives. With s p t t land chase, tl larger the acquisition program the more l tl above considerations will have to be taken nto account

Non-Recreational Special Uses. The Forests' ownership pattern necessitates that some occupancy and use of National Forest land be permitted so private or other public lands can be appropriately used. None of the alternatives considered are expected to impact this pro-

gram Special-use permits are issued, when proper, upon compliance with reasonable condltions for the protection and administration of the National Forests

Land use activities are generated from sources outside the Forest Service Demands for special-use permits are expected to be the same for all alternatives with similar impacts on the Forests' resources Some anticipated resource consequences are the loss of land for other Forest uses, erosion or other resource damage from inadequate maintenance of private roads, and restrictions on some forest management activities in the vicintty of private uses

Withdrawals. Lands may be wlthdrawn from mineral entry, at an agency level, for roadside zones, administrative, recreation, and power sttes To protect the integrity of some campgrounds, Section 507 of the Federal Land Policy Management Act of October 21, 1976, "Right-of-Way Reservation", may be requested Some lands are also withdrawn by Congress for Wilderness and Wild and Scenic Riven, and at the Department level for Research Natural Areas

In compliance with Public Law 94-579 (Section 204), each agency level withdrawal will be reviewed in conjunction with the Secretary of the Interior to determine whether it should continue and for how long This review has been completed.

Land Surveys and Occupancy Encroachment. The Forests' landline location program has increased significantly during the past five years Consequently, the discovery of occupancy encroachment has also increased These encroachments.{applicable, can be handled by the Small Tracts Act

Landline location needs will not vary substantially by alternative Therefore, there will be little or no difference in relative impacts of the descnbed alternatives on encroachment cases related to property lines

The consequences of not surveying landlines can be simply explained by the fact that landownen or land managers, either private or Federal, cannot manage land if they do not know where it is It is important to have the precise landlines when the land values are higher, and when the land is more intensely managed

Transportation and Utility Corridors. Corridors have not been designated in any alternative because there is inadequate information to prejudge the future needs for rights-of-way access across the National Forests Forest-wide directions provide for establishment of future corridors, if needed Therefore, there will be little or no dfierence in relative impacts of the described alternatives Proliferation of rights-of-way outside existing corridors will be minimized

Rights-of-way for the Forests' Transportation System. Rights-of-way over about 100 miles of roads and 45 miles of trails are still needed These roads and trails are part of the Forests' transportation system The consequences of not acquiring these rights-of-way are

1 Road or trail segments can be closed by the landowners (either general or selective closures),

2 Some projects, such as timber sales, will be deferred, and

3 Additional costs will be incurred to reroute those private road segments where it is physically and economically feasible

Hydroelectric Power. Existing hydroelectric power facilities will be allowed to continue under all alternatives New hydroelectnc projects will also be allowed, subject to environmental analysis and impact mitigation requirements on an individual project basis These projects will be subject to prohibitions or restrictions imposed by designation of areas (Wild and Scenic Riven and Wildernesses) and/or the application of management prescnptions The Wilderness Act prohibits development of hydroelectric facillties in existing wildernesses (except in rare cases) The Wild and Scenic Rvers Act precludes hydroelectric development in designated or proposed Wild and Scenic Rven A rare exception, however, is a project in a "recreational" designated segment that does not affect the river values There are 498,776 acres designated as Wilderness and 33,728 acres in Wild and Scenic Rivers. for a total of 532,504 acres, on which hydroelectric development will be prohibited

The development of hydroelectnc power is a process that is initiated by agencies, companies or individuals outside the Forest Service The Federal Energy Regulatory Commission (FERC), upon consultation with the Forest Service, is responsible for determining whether proposals for hydroelectric development are (1) compatible with purposes for which the National Forests were created, and (2) consistent with the Nation's need for energy in light of the other public needs for the land proposed for development The Forest Service is responsible for determining what conditions are necessary to protect National Forest resources in a license for a hydroelectric project. Should a project be exempted from licensing by FERC, the Forest

Service is responsible for permitting and determining the terms and conditions of any such permit Exempted projects are subject to requirements by local agencies such as the California Department of Fish and Game (DFG)

Hydroelectnc development will be controlled and impacts mitigated by the development of site specific environmental analysis and documentation of effects for each proposal before a decision is made to permrt the project

Consequences Specific to An Alternative

Approximately 320 acres of land will be purchased per year under Alternatives PRF, CUR, and RPA Approximately 480 acres will be acquired by purchase under Alternative CBF.

There will be no specific consequences resulting from implementation of any of the alternatives on non-recreational special uses, withdrawals, interagency exchange, land surveys and occupancy encroachment, transportation and utility corndon, and nghts-of-way for the Forests' transportation system

The alternatives considered in the Forest Plan will affect the development of hydroelectric power because of the number of acres allocated to Wilderness, Wild and Scenic Rivers, and Prescription I (Unroaded Non-Motorized Recreation) Prescription I will severely restnct access and the ability to economically transmrt power The Wild portion of Wild and Scenic Rivers will be managed under Prescnption I Designation as Wilderness or Wild and Scenic Fivers will be prohibdive to development and allocation to Prescnption I severely restrictive The restrictions placed on hydroelectnc development by altemative are shown in **Table IV-6**

Alternative CBF most severely restricts hydroelectric development Altemative CUR is least severely restrictive with Alternatives RPA and PRF in the middleground. These alternatives will be most applicable to small-scale development Overall, Alternative CBF has the greatest impact on hydroelectric development, Alternative CUR has the least

Table IV-6
Acres by Alternative Affecting Hydroelectric Development

	PRF	RPA	CUR	CBF
Prohibitive				
(1) Wildemess	—	"-	--	7,720
(2) Wild and Scenic				
(a) Wild	13,440	--	--	18,176
(b) Scenic	5,336	--	--	8,032
(c) Recreation	4.448	--	--	11,104
Total	23224	--	--	**45.032**
Severely Restrictive				
Prescription I *(net)*	65,048	*22,092*	5,027	120,630
Total	65,048	*22,092*	**5,027**	120,630
GRAND TOTAL	*08,272*	22,092	5,027	165,662

* Wild portions of Wild and Scenic Rivers have been subtracted *to* avoid duplication.

12. law Enforcement

Consequences Common to All Alternatives

In comparing the existing law enforcement problems associated with any of the alternatives, the consequences will be similar The law enforcement problems will be more a function of social morality and economics, rather than a given alternative intent or emphasis

The cannabis issue is probably the most visible law enforcement situation However, in recent yean substantial progress has been made in reducing violations Adramatic increase in the problem can be expected f there is a significant reduction in areas available for timber harvest A reduced timber harvest holds the potential for a two-fold impact The economic incentive to produce marijuana, as an alternative income, will occur simultaneously with a reduced deterrence created by the reduction of management activty and legitimate presence in large tracts of land suitable for cannabis cultivation Another potential consequence of significantly reduced timber harvest, in addrtion to outright theft of timber, is wildland arson An alternative source of income for idle timber harvest equipment is rental to the agency responsible for tire suppression activities A second financial incentive for arson is the perception that burned timberland will potentially be offered for salvage logging operations

Additionally, to the extent that land use allocations or resource management activities differ from established public use patterns or expectations, conflicts can be expected to occur Road closures for resource protection purposes, campground closures due to budget reductions, and restrictions on traditional use for the protection of endangered species are expected to result in increased trespass and vandalisim

13. Minerals

Consequences Common to All Alternatives

Most environmental consequences resulting from mineral activities are similar in all alternatives For example, the protection of cultural resources may require the incorporation of special stipulations in plans of operation and mineral leases in order to mitigate advene impacts *Also,* this may be true for other features or resources for which protection is required by statute, such as threatened and endangered species habltat and sensltive plants Such measures may be used under any alternative Since the protection of some resources is dictated by laws and regulations, the impacts on the management of the mineral resources are simllar in all alternatives When any mineral resource is utilized, its depletion as a natural resource is irreversible, but the commodity has entered the market

Locatable Minerals. Any person proposing to conduct mineral operations, such as prospecting, exploration, development, extraction, or reclamation, which might cause surface disturbance must submit a Notice of Intention to Operate wlth the local District Ranger If the District Ranger determines that the operations will likely cause signlficant disturbance of surface resources, the operator must submit a Plan of Operations as directed in 36 CFR 228 Through approval of mutually acceptable plans of operation, operations are conducted so as to minimize adverse environmental impacts

Mining activities may vary from simple projects involving little surface disturbance to complex, high-density programs that disturb all of the surface land area These complex programs may involve detailed rehabilitation planning Depending on the size of operation, short-term effects may have considerable impact on surface resources while the long-term effects may be moderated through reclamation In a large-scale operation, reclamation planning takes into account the reality of the situation It takes into account the benefits derived from a surface configuration much differently than prior to the mining operation

leasable Minerals. A number of geothermal and oil and gas lease applications covering the Shasta-Trinity National Forests has been received by the Bureau of Land Management Leases are issued only after the Forest Service submits recommendations regarding each application The recommendations are based on an environmental analysis and the consequences resulting from the foreseeable development of the resource. The leases contain standard stipulations/conditions which protect the environment. Additional stipulations/conditions are added to place emphasis on site-specific needs

The stipulations/conditions are structured so that they can be applied on a site specific basis which will protect the environmental attributes of the area. Further restrictions can be used to mitigate surface disturbance of special resources such as cultural resource sites Adverse environmental effects will be mltigated by the application of standard and site specific lease stipulations

Discovery during exploration may lead to long term development In this event appropriate environmental analysis will take place prior to developing the resource The development will provide road access to other forest resources and disperse land uses Long-term development will eventually result in the depletion of the resource At the same time, the mineral commodity will be entered into the market place for consumption

Mineral Materials. These materials include common varieties of sand, gravel, rock, cinders, etc They are quarried or excavated under authority of a mineral materials permit The permit contains standard terms and conditions which are adequate to protect the environment A reclamation plan is required for operations with significant ground disturbance Long-term advene effects on surface resources are appropriately mitigated

Consequences Specific to An Alternative

Assuming that an environmentally suitable plan of operations is developed, adverse impacts from mineral development are expected to be minimized under all alternatives Outputs are directly related to the amount of land open to mineral entry

Some areas are withdrawn from location under the General Mining Laws in order to restrict activties **A** withdrawal maintains other public values in the area or reserves the area for a particular public purpose or program Withdrawals are made, where needed, to reserve areas such as Research Natural Areas (RNAs), Wildernesses, wild nvers, selected administrative sites, etc

The baseline withdrawal acreage **as** of 1984 is *927,000* acres The potential for additional wlthdrawals varies by alternative Withdrawals will be a direct function of the number of acres commited to RNAs, Wilderness or wild portions of Wild and Scenic Rivers Acres displayed for RNAs are those outside existing withdrawn areas such **as**

wildemess, or areas to be withdrawn by wilderness in the displayed alternative

Alternative PRF (Preferred Alternative). This alternative allocates 23,260 acres for RNAs. none for Wilderness, and 6,432 for wild nvers, for a total of 29,692 acres

Alternative RPA *(1990* RPA Program Emphasis). This alternative has the least number of acres allocated, 13,400 for RNAs, none for Wilderness, and none for wild rivers This altemative has the least potential for withdrawals

Alternative CUR (No Action/No Change). This alternative allocates 21,470 acres for RNAs, none for wildemess, and none for wild nvers

Alternative CBF (Citizens for Better Forestry). This alternative allocates 26,970 acres for RNAs, 7,720 for Wilderness, and 7,808 for wild rivers for a total of 42,498 acres This alternative has the greatest potential for withdrawal acres

14. Range

Consequences Common to All Alternatives

The *necessity* to protect and/or mitigate the *effects* of grazing upon unique resource attnbutes will not vary between alternatives These resource attributes are cultural properties and threatened and endangered species habitats which are protected under statute For example, under any of the alternatives considered in this Final EIS, allotment management plans are required to employ management strategies compatible with other resources Since measures such as these will be common to all alternatives, there will be no differences in the nature of the impact ofthese non-discretionary resources between alternatives.

The **actual** sustained grazing program will be significantly less than potential due to. (1) demand being significantly less than supply, (2) recreation conflicts (i e , concentration of livestock in and around popular camping sites and water sources), and (3) unfavorable benefit-cost ratios for range improvement

Consequences Specific to An Alternative

Each alternative can be evaluated in terms of animal months (AMs), livestock grazing impact, and management intensty needed to protect and/or improve range condition *AMs* as used here should not be considered absolute values but as trends in livestock grazing emphasis With AMs (See **Table IV-7**), the assumption is that if the trend is upward or downward, the number of animals and/or allotments will be increased or decreased, respectively Actual AMs can vary considerably each year due to changes in climate, forage conditions, and availablity

Grazing impact is described in terms of high, moderate and low High impacts assume that essentially all of the available forage (standard of take one-half of current year's growth and leave one-half) will be fully utilized by livestock grazing Moderate impacts assume that 40 to 70 percent of the forage will be utilized Low impact assumes that most of the available forage will not be utilized

Management intensty needed to protect and/or improve range condition is also described in terms of high, moderate and low High intensty includes such things as ripanan corridor fencing, fencing pasture areas, water development, and vegetation planting or seeding. Moderate management intensty may include some fencing and water development, but not as much as high intensty Moderate intensty will also include considerable herding of livestock to control impacts Low management intensty will involve some herding of livestock to control range impacts

Alternative PRF (Preferred Alternative), Alternative CUR (No Action/No Change), and Alternative CBF (Citizens for Better Forestry). Under these alternatives, *AMs* will basically be the same. Grazing impacts will be moderate on primary and secondary ranges and light to moderate elsewhere including nparian areas Management intensity will be moderate to high with increased emphasis of riparian area management Grazing will be phased out of wilderness areas in Alternatives PRF and CBF.

Alternative RPA *(1990* RPA Program Emphasis). Under this alternative the AMs will be increased by about 20 percent over current levels Grazing impacts will be moderate to heavy on primary and secondary ranges and light to moderate on riparian and other remaining areas Management intensity will be high

Table IV-7
Animal Months (AMs)
(Average Annual *AMs*)

Alternative		AMs
PRF	(Preferred Alternative)	8,300
RPA	(1990 RPA Program Emphasis)	10,000
CUR	(No Action/No Change)	8,300
CBF	(Citizens for Better Forestry)	8,300

15. Recreation

Consequences Common to All Alternatives

The current management direction in the Whiskeytown-Shasta-Tnnrty National Recreation Area (NRA) Management Plan will be carned forward in all alternatives The Forest Plan will serve as the document to which the NRA Management Plan will be tiered

Proposed recreation opportunity spectrum (ROS) classes are linked to the management prescriptions assigned to a specfic alternative according to the theme of that alternative Thus, the inventoried ROS has the potential to change from one ROS class to another Under all alternatives, designated Wildernesses will be managed to the pnmitive ROS class (includes all inventoried primitive ROS as well as inventoried semi-primitive non-motorized ROS within the Wilderness boundaries)

The emphasis on developing and maintaining partnenhips will be common to all alternatives

The management and protection of resource features which fall within the purview of minimum management requirements (MMRs), (e g , encompassed by laws and regulations) will be common to all alternatives These features will have a similar effect on the recreation resources regardless of alternative For example, proposed recreation activities and improvements, such as off-highway vehicle (OHV) use, and trail and campground construction, will be limited by the existence of significant cultural resource properties. sensitive plant sttes. and threatened and endangered species habitats needing protection

Consequences Specific to An Alternative

Alternative PRF (Preferred Alternative). Alternative PRF will provide developed recreation opportunities adequate to meet estimated demand for the next 50 yean The conceptual organization of the Shasta-Trinity National Forests recreation potential will be framed into theme areas Twelve geographic recreation theme areas will examine management opportuntties over the next five decades The consequences of this organization will be that unique recreation experiences and activities offered by each theme area will be identified, rather than providing identical activities in all locations Additional recreation opportunities offered by each theme area, but not currently being used, will be identified and promoted in the Ist and 2nd decades

Recreation use will increase approximately 50 percent over the next 50 yean Existing developed sites will be rehabilitated at the rate of 8,750 people-at-onetime (PAOT) per decade New developed sites will be constructed to meet projected demand Dispened use will increase approximately 50 percent by the end of the planning horizon

This alternative will result in no changes from current acreages in the primitive and semi-primitive non-motonzed ROS classes The change in semi-primitive motorized is approximately a 15 percent increase from current There will be a 15 percent decrease in the roaded natural ROS class, and no change from the current acreages in the rural ROS class

OHV opportunities will decrease slightly (from the current 243,020 to 239,175 acres) for areas open and usable during the summer Described another way, Alternative PRF will have 586,609 acres closed, 1,259,688 acres restricted, and 275,250 acres open (includes usable and unusable) to OHV use This will be offset by an increase in designated OHV travelways

As a result of timber management activtties, hydroelectnc projects, and increased use of lake surfaces, there will be a minor decrease in the semi-primitive character of the landscape due to road construction and harvest areas Resource management activrties will be evident but will harmonize wtth the natural environment Increased demand for competing winter sports activities and water-oriented recreation activities will lead to a limited amount of use conflicts

Development of downhill skiing facilities in the Mt Shasta area will be encouraged to accommodate up to 5,000 skiers-at-one-time (SAOT) A site-specific environmental statement has been completed to examine the environmental effects of this proposal

Alternative RPA *(1990* RPA Program Emphasis). This alternative will provide developed recreation opportunities to meet demand levels through the planning horizon The conceptual organization of the Shasta-Trinrty National Forests recreation potential will be framed into theme areas Twelve geographic recreation theme areas will examine management opportunities over the next five decades The consequences of this organization will be that unique recreation experiences and activities offered by each theme area will be identified, rather than providing identical activities in all locations The difference from

Alternative PRF is that addrtional recreation opportunities offered by each theme area, but not currently being used, will be identified and promoted over the next 5 decades Total recreation use by the end of the planning horizon will be approximately 7 3 million recreation visitor days (RVDs)

As in Alternative PRF, this alternative will result in no increases in acreage in the primitive and semi-primitive non-motorized ROS classes The semi-primitive motonzed class will have a slight increase from inventoried acreage, and there will be a slight decrease in the roaded natural ROS class. There will be no change from current acreages in the rural ROS class

OHV opportunities will be slightly greater than the current situation (from 243,020 acres to 256,120) *for* areas open and usable during the summer In addition, designated OHV travelways will be increased Alternative RPA will have 543,959 acres closed, 1,259,908 acres restricted, and 3 17,680 acres (includes usable and unusable) open to OHV use

There will be some decrease in the semi-primitive character in many areas of the landscape as a result of increasing timber outputs Resource management activities will be evident but will harmonize wrth the natural environment

Downhill skiing in the Mt Shasta area will be encouraged to accommodate up to 5,000 SAOT with possible future expansion to 13,000 SAOT based on demand A site-specfic environmental statement has been completed to examine the environmental effects of this proposal

Alternative CUR (No Action/No Change). In Alternative CUR developed recreation opportunities will be adequate to meet demand in the first decades However, in the remaining decades, the supply of developed recreation opportunities will fall short of demand The management organization will not be conceptualized into geographic theme areas Consequences will include a continuation *of* current management which will attempt to meet all opportunity demands in all areas There is the possibility that the development of unique opportunities will be missed Only 20 percent of developed sites will be operated at the standard service level As the demand for developed sites increases, the midweek period will become more heavily used The quality of developed recreation use will decline due to cutbacks in maintenance and services The quality of the recreation experiences will also decline due to the crowded condrtions that will exist

Dispened recreation activrties that are dependent on trail and water use will be emphasized in this alternative due to their more cost-effective nature The quality of the dispersed recreation experience will decline for some users

This alternative will result in no changes to the current ROS class acreages

OHV opportunities will remain as designated in the 1980 Forest OHV Plan, as amended Designated OHV travelways will increase. Alternative CUR will have 533,3 10 acres closed, 1,233,033 acres restncted, and 355,200 acres open (including usable and unusable) to OHV use

As a result of resource management activities requiring road access, there will be some decreases in the semi-primitive character of the landscape Resource utilization activities will be evident but will harmonize with the natural environment

Under this alternative, downhill skiing facilities in the Mt Shasta area will be encouraged to accommodate up to 5,000 SAOT A site-specific environmental statement has been completed to examine the environmental effects *of* this proposal

Alternative CBF (Citizens for Better Forestry). This alternative will provide recreation opportunities adequate to meet estimated demand Existing developed sites will be rehabilitated at the rate of 1,100 PAOT per decade and new developed sites will be constructed at the rate of 1,050 PAOT per decade The management organization will not be conceptualized into geographic theme areas. Consequences will include a continuation of current management which will attempt to meet all opportunrty demands in all areas There is the possibility that the development of unique opportunities will be missed This alternative will result in a slight increase in both the primitive and semi-primitive motorized ROS classes There will be a significant increase over inventoried acres in the semi-primrtive non-motorized ROS class, and a significant decrease in the rural ROS class acres There will be a slight decrease in roaded natural acreages

OHV opportunrties will be less than the current situation for areas open and usable in the summer (existing 243,020 to 220, 195 acres proposed) Described another way, this alternative will have 687,650 acres closed, 1,180, 157 restricted, and 253,740 acres open (including usable and unusable) to OHV use Designated OHV travelways will increase

This alternative has the least amount of changes *of* any altemative in semi-primitive characteristics on a large portion of the landscape

Under Alternative CBF downhill skiing opportunrties will be limrted Downhill skiing facilities on Mt Shasta will be developed to serve a maximum of 1,500 SAOT

16. *Riparian Areas*

Refer to the sections on fisheries and water quality in this chapter for a discussion of environmental consequences associated with npanan areas.

17. Soils

Consequences Common to All Alternatives

Land management practices, such as timber harvesting, reforestation srte preparation, and vegetation type conversion, can affect soil productivity The removal of vegetation from a site, as in timber harvesting. also removes plant nutrients Removing vegetation from a site for reforestation or type conversion exposes the soil to erosion and leaching of nutnents Soil compaction by mechanized equipment can reduce root aeration The direct effect of these site alterations can be the eventual loss of commodity outputs

Research has shown that timber harvesting and site preparation for reforestation, if done following Soil Qualrty Standards (SQS) and Best Management Practices (BMPs), result in no significant loss of soil produdivity in the short term 'The indication is that there is also lttle or no long-term loss in soil productivity, at least in highly productive srtes If there ts a long-term loss of productivrty, it will probably be more apparent in low productivity soils The construction of system roads, however, does remove areas from Droduction

Consequences Specific to An Alternative

The SQS and BMPs that mitigate soil erosion, compadion, nutrient loss, and organic matter loss will protect soil productivity They will be employed for each alternative However, there is still a slight potential that soil productivity can be affected

Each alternative has a different potential effect on soil productivity Indicaton of this variable effect are best displayed and discussed in terms of management activrties that will resutt in soil disturbance The indicators used here are acres of timber harvest and acres of road construction

Compared to a decade ago, fewer acres are being harvested No acres are scheduled to be treated by clearcutting So, clearcutting has been reduced from an average of 5,500 acres to close to 0 acres per year in Altemative PRF In addition, new standards and guidelines have been implemented which offer greater resource protection for soil qualrty, including compaction, erosion and productivity, and for riparian areas

The assumption is that the greater the number of acres harvested, the higher the potential for soil compaction and erosion which will affect soil productivrty *Also,* more miles of road construction result in more acres of soil taken out of production **Table IV-5,** under the Geology Section of this chapter, displays the acres of timber harvest and the acres of road construction by alternative The following discussion considers potential impacts of each alternative in relation to current management, Alternative CUR

Alternative PRF (Preferred Alternative). This alternative will have about 6,430 acres of timber harvest, or about 33 percent fewer acres than Alternative CUR, thus there will be a slightly lower potential for soil productivrty degradation About 5 acres of land will be taken out of production by road construction each year

Alternative RPA (1990 RPA Program Emphasis). This alternative will have less potential for adversely affecting soil productivity from Alternative CUR There will be about 8,890 acres of timber harvest, or about an 8 percent decrease in this alternative over CUR About 40 acres of land will be taken out of production by road construction each year

Alternative CUR (No Action/No Change). This alternative will have the greatest risk of adversely affecting soil productivrty There will be an average of about 9,660 acres of timber harvested per year This timber harvest, and the subsequent reforestation srte preparation adivrties, often expose the soil to potential erosion *Also,* in this alternative, about 40 acres of land will be taken out of production by road construction each year

Alternative CBF (Citizens for Better Forestry). There will be about 5,880 acres of timber harvested, or about 39 percent fewer acres than in Altemative CUR There will be 28 acres of land removed each year from productivrty because of road construction

1 Analysis of Soil and Site Properties in Paired Clearcut and Uncut Douglas-fir Stands on the Galice Formation, Fox Planning Unit, Six Rivers National Forest, Robert F Powers and Charles P Weatherspoon, Pacific Southwest Forest and Range Experiment Station, Redding, CA 96001, January, 1984

18. Special Areas

RESEARCH NATURAL AREAS (RNA)

Consequences Common to All Alternatives

Under all alternatives the established Shasta Mud Flow Research Natural Area (RNA) will be retained The characteristics of young-growth ponderosa pine stands and the geologic values of a volcanic mud flow will be maintained

Under all alternatives areas suitable for RNA purposes, but not yet identified, can be lost due to allocation to management prescriptions and uses which will alter the natural vegetation and landscape This effect will be minimized through early identification of areas which fulfill RNA network requirements Refer to Appendix F for a complete listing of the target ecosystems needed for the Regional network of RNAs

Consequences Specific to An Alternative

The impacts related to RNA establishment can be viewed from two aspects, (1) impacts to the RNA program, that is, opportunities gained or lost in reference to RNA targets, and (2) secondary impacts of RNA establishment on other resources

With reference to the first aspect, areas recommended for RNA establishment vary by alternative See **Table IV-8** for a listing of recommended RNAs

Designation of an area as a RNA will also have an impact on the resources located within that RNA Resource conditions within each RNA are descnbed in Appendix F, **Table F-2**. Some uses will be restricted or prohibited under an RNA designation For example, all motorized, dispersed recreation uses, developed recreation uses, timber harvesting, road construction, mineral development, and other ground-disturbing activities will be prohibited

Non-motorized dispersed recreation will be limited to day use Thus, dispersed camping will be discouraged, if not prohibited Even day use will be carefully controlled and limited, depending upon the purposes of the RNA and the nature of studies to be conducted within the RNA

Conversely, the immediate short-range effect of identifying land for RNA purposes will be to prohibit candidate areas from human disturbance associated with land management activities except where specific projects have been initiated

Alternative PRF (Preferred Alternative). This alternative allocates 23,260 acres of National Forest lands in eight candidate RNAs to Management Prescription X (Special Area Management) Records will be prepared establishing these areas

Stuarts Fork is recommended pending further site evaluation Its allocation may be made later in an amendment to the Forest Plan

Other candidate lands will be evaluated prior to proposing their establishment as RNA's Any decision concerning their allocation to Management Prescription X (Special Areas), as an RNA(s), will be made later in an amendment to the Forest Plan

Final establishment of these areas will meet 8 out of the 34 established RNA targets shown in Appendix F, **Table F-1** These targets are shared by the Klamath, Lassen, Six Rivers, and Shasta-Trinity National Forests

Alternative RPA *(1990* RPA Program Emphasis). This alternative allocates 13,400 acres of National Forest lands in five candidate RNAs to Management Prescription X (Special Area Management). Four of the five areas are within existing Wildernesses Established Records will be prepared after this Plan is issued

Other candidate lands will be evaluated prior to proposing their establishment as RNA's Any decision concerning their allocation to Management Prescription X (Special Areas), as an RNA(s), will be made later in an amendment to the Forest Plan

Final establishment of these areas will meet 5 out of the 34 established RNA targets shown in Appendix F, **Table F-1** These targets are shared by the Klamath, Lassen, Six Rivers, and Shasta-Trinity National Forests

Alternative CUR (No Action/No Change). This alternative allocates 21,470 acres of National Forest lands in eight candidate RNAs to Management Prescription X (Special Area Management) Established Records will be prepared after this Plan is issued

Other candidate lands will be evaluated prior to proposing their establishment as RNAs Any decision concerning

Table IV-8
Allocation of Research Natural Areas - By Alternative
(Net National Forest Acres)**

Name of Area	Acreage	PRF	RPA	CUR	CBF
1.Bald Mountain	800	-	-	-	800
2.Bear Creek	4,500	-			4.500
3.Cascade	2,000	-		-	2,000
4.*Cedar Basin	1,160	1,160	1,160	1,160	1,160
5.*Devils Rock-Hosselkus	5,550	**5,550**	-	4,980	5,550
6.*Manzanita Creek	7,250	7,250	7,250	7,250	-
7.Murphy Glade	1,260	-	-		1,260
8.*Mt. Eddy	890	890	-	890	890
9.*Preacher Meadows	1,850	1,850	1,850	1,850	1,850
10.*Red Butte-Red Fir Ridge	1,640	1,640	1,640	1,640	1,640
11.*Rough Gulch	3,960	3,960	-	2,200	3,960
12.*Smoky Creek	960	960			960
13.South Fork Mountain	1,180	-	-		*900*
14.*Stuart Fork	1,500		1,500	1,500	1,500
TOTAL (Number of Areas)	**34,500** (14)	**23,260** (8)	13,400 (5)	**21,470** (8)	**26,970** (13)

* Recommended for establishment
** These figures do not include the already established Shasta Mud Flow, 3, 115 acres

their allocation to Management Prescnption X (Special Areas), as an RNA(s), will be made later in an amendment to the Forest Plan

Final establishment of these areas will meet 8 out of the 34 established RNA targets shown in Appendix F, **Table F-1** These targets are shared by the Klamath, Lassen, Six Rivers, and Shasta-Trinity National Forests

Alternative CBF (Citizens for Better Forestry). This alternative allocates *26,970* acres of National Forest lands in 13 candidate RNAs to Management Prescnption X (Special Area Management) Established Records will be prepared after this Plan is issued

Other candidate lands will be evaluated prior to proposing their establishment as RNA's Any decision concerning their allocation to Management Prescnption X (Special Areas), as an RNA(s), will be made later in an amendment to the Forest Plan

Final establishment of these areas will meet 13 out of the 34 established RNA targets shown in Appendix F, **Table F-1** These targets are shared by the Klamath, Lassen, Six Rivers, and Shasta-Trinity National Forests

SPECIAL INTEREST AREAS (SIA)

Consequences Common to All Alternatives

A number of SIAs will be recommended for classification in all alternatives (See **Table III-14** in Chapter III and **Table IV-10**) If these areas were not classified, they will be exposed to a variety of resource management activities

which can have the potential to cause disturbance Examples of such activities include salvage logging, road building, mining, and dnlling associated wrth geothermal development

Table IV-9 indicates the relative risks of environmental disturbance that will be involved for each of the areas if they were not classified

Impacts resulting from any future potential mineral developments will be mitigated through classlfication of the areas, followed by mineral withdrawal

Consequences Specific to An Alternative

Alternative PRF (Preferred Alternative). A total of 19 SIAs will be recommended under this alternative. These areas are (1) Bigelow Meadow, (2) Black Butte, (3) China Mountain, (4) Cory Peak, (5) Deadfall Basin. (6) Deep Crater, (7) Giant Crater Lava Tube System, (8) Grizzly Peak, (9), Kangaroo Ridge, (10) Lrttle Glass Mountain, (11) Natural Bridge, (12) Paint Pot Crater, (13) Pumice Stone Mountain, (14) Samwel Cave, (15) Scott Mountain, (16) Spatter Cones, (17) Tedoc Mountain, (18) Toad Lake, and (19) Western Azalea

Recommendation of these areas (6,981 acres total) will cause insignlficant impacts on the environment from both a short-term and long-term aspect There will be an insignificant amount of timber resource outputs and mineral values foregone

In addition. *22* other areas, which may qualify as SIAs, will be further analyzed for possible classlfication Management direction will be provided to evaluate each potential area

Alternative RPA (1990 RPA Program Emphasis) Thirteen areas, involving 5,458 acres, will be recommended for classification as SIAs under this alternative Six addrtional areas will be analyzed for possible classification

Alternative CUR (No Action/No Change). Nine of the SIAs recommended in Alternative PRF will be recommended for classlfication under this alternative (See **Table IV-10)** However, no additional areas will be analyzed for classification as SIAs

Alternative CBF (Citizens for Better Forestry). This alternative will recommend 15 areas for SIA establishment (1) Blake Mountain, (2) Cable Creek, (3) Deep Crater, (4) Giant Crater Lava Tube System, (5) Lrttle Glass Mountain, (6) Lower McCloud River Wild Trout Area, (7) Mt. Shasta Scenic Area, (8) Natural Bridge, *(9)* Paint Pot Crater, (10) Pumice Stone Mountain, (11) Samwel Cave, (12) Spatter Cones, (13) Tedoc Mountain, (14) Trout Creek Redband Trout Area, and (15) Western Azalea

Areas not recommended for SIA classification will be available for all other uses Management activrties that may have major impacts to SIAs eliminated from consideration might include

Grazing. Sensitive biotic communities can be severely disturbed and degraded when they are overstocked with livestock A lack of management direction in these areas can result in a significant loss of the target habrtat

Timber Harvest and/or Other Special Forest Products Removal of the vegetation by harvesting can result in disturbance to unique vegetative species or associations typical of some SIAs

Road Construction. Construction of roads can adversely affect proposed areas Roading can disturb unique geological areas.

Mining and Geothermal Development. Exploration for and development of mines or geothermal areas can adversely affect all of the areas Exploratory dnlling operations, surface or underground mining excavations, settling ponds, leaching ponds and waste disposal srtes will remove vegetation, possibly affect both surface and subsurface drainage, and disturb land surface features

Off-Highway Vehicle (OHV) Use. OHV use causes soil erosion and compaction and displacement along the vehicle track Dust on plants can contribute to reduced plant growth Fragile botanical communities can be damaged by such use

MT. SHASTA

Consequences Common to All Alternatives

Management direction is already implied for all alternatives in Mt Shasta's designation as a Wilderness, a National Natural Historic Landmark (NNHL), and a Recreation Area (under the Secretary of Agriculture's 1926 Land Order) In addition, the management direction for Management Areas 3 (Mt Shasta) and *5* (Forest Wildernesses-Mt Shasta Wilderness) will be followed in all alternatives

Table IV-9
Risk of Disturbance to Special Interest Areas
(if they are not classified)

	Area Name	Risk	
1	Bigelow Meadow*	G, OHV	++
2	Big Sand Flat	G, OW	++
3	Black Butte*	M, OHV	+
4	Blake Mountain	G, L, OHV	++
5	Burnt Lava Flow	L, M, OW	+++
6	Cable Creek	G, L	++
7	China Mountain*	G, L, M, OW	++
8	Cory Peak*	G, L, M, OHV	++
9	Deadfall Basin*	G, L, M, OHV	++
10	Deep Crater"	M, OW	+++
11	Del Loma Cave	M, OHV	+++
12	Dobkins/Durney Basin	G, M, OHV	++
13	Dubakella Mountain	M, L, OHV	++
14	Giant Crater Lava Tube System*	L, M, OW	+++
15	Grizzly Peak*	M, OHV	+
16	Hall City Cave	L, M, OW	+++
17	Hirz Mountain	M	+
18	Kangaroo Ridge*	G, L, M, OHV	++
19	Little Glass Mountain*	M, OW	++
20	Lower McCloud Rver	G, OW	++
21	McCloud Falls	G, L, OW	++
22	McGinnis Springs/Wagon Camp	G, L, OW	++
23	Mt Shasta Scenic Area	G, L, OW	+++
24	Natural Bridge*	L, OW	+
25	New Rver	G, L, OHV	++
26	Paint Pot Crater*	M, OHV	+++
27	Fapoose Hill	M, OW	+
28	Potem Falls	L, OW	+
29	Potter Creek Cave	M	+++
30	Pumice Stone Mountain*	M, OW	+++
31	Samwel Cave*	M	+++
32	Scott Mountain*	G, L, OHV	++
33	Spatter Cones*	L, OW	+++
34	Tedoc Mountain*	G, L, M	++
35	Tilted Rock Lava Flow	L, M, OHV	+
36	Toad Lake*	G, OW	++
37	Tombstone Peak Caves and Fossil Locality	M, OW	+
38	Trout Creek	G, L, OHV	++
39	Twin Lakes Basin	G, L, OW	+
40	Wells Creek Falls	OW	+
41	Western Azalea*	L, OW	++

* Recommended for establishment as Special Interest Areas

Key G = Grazing/Pack Animals, L = Logging Activities, M = Mining/Geothermal Activities, OHV = Off Highway Vehicles, + = Low Risk, ++ = Moderate Risk; +++ = High Risk

Consequences Specific to an Alternative

The consequences associated with Mt Shasta will vary depending on the degree of management emphasis placed upon Mt Shasta and the surrounding area As noted above, some emphasis has already been provided through a mixture of administrative and legislative designations

Alternative PRF (Preferred Alternative). Under this alternative, the Mt. Shasta Management Area (Management Area 3) will be informally designated a Special Manage-

Table IV-10
Special Interest Areas 'Recommended' for Establishment
Comparison of LMP Alternatives

Area Name	PRF	RPA	CUR	CBF
1. Bigelow Meadow	136	136		-
2 Black Butte	560	560		-
3 Blake Mountan				155[1]
4 Cable Creek				Unspecified[1,2]
5 China Mountain	680	-	-	-
6 Cory Peak	280			-
7 Deadfall Basin	460	460		-
8 Deep Crater	333	333	333	333
9 Giant Crater Lava Tube System	179	179	179	179
10 Grizzly Peak	220		-	-
11 Kangaroo Ridge	190		-	-
12 Little Glass Mountain	1,440	1,440	1,440	1,440
13 Lower McCloud River Wild Trout Area			-	Unspecified[1,2]
14 Mt. Shasta Scenic Area				Unspecified[1,2]
15 Natura Bridge	64	64	64	64
16 Paint Pot Crater	444	444	444	444
17. Pumice Stone Mountain	107	107	107	107
18 Samwel Cave	20	20	20	20
19. Scott Mountain	128			-
20 Spatter Cones	5	5	5	5
21 Tedoc Mountan	1,060	1,060	1,060	1,060
22. Toad Lake	650	650		-
23 Trout Creek Redband Trout Area	-		-	Unspecified[1,2]
24 Western Azalea	25			5
Total Acres	6,981	5.458	3.652	3,812 (+)
Number of SIAs	19	13	9	15

1 These five areas are being 'recommended' in Alternative CBF only Therefore, they are shown as 'potential' SIA in Table III-16, which reflects Alternative PRF only

2 Boundaries have not been set

ment Area in recognition of its unique values This Management Area will be a single, coordinated unit to focus attention on the Mt Shasta area as a whole This informal designation will recognize the many uses and values which abound in the Mt Shasta area

Based on this concept, there will be few apparent changes in the outputs of goods and services over the current management situation However, there will be slightly higher management costs than represented by Alternative CUR This will be brought about by such things as more intensive signing, additional visitor information services,

and multiple resource coordination, tied to a goal which emphasizes Mt Shasta.

Alternatives RPA (1990 RPA Program Emphasis) and CUR (No Action/No Change). Under these alternatives no changes will be made over the current management emphasis Therefore, no addtional environmental consequences are anticipated

Alternative CBF (Citizens for Better Forestry). Underthis alternative the Mt Shasta Management Area (Management Area 3) will be designated as a SIA and named the Mt Shasta Scenic Area In effect, the area will be recognized specfically for its unique scenic and recreational values Other unique features will be recognized but not necessarily emphasized There will be no changes in the management of the areas contiguous to the proposed scenic area boundaries No environmental consequences will be anticipated for these areas as a result of SIA classification

19. Timber

The consequences of implementing the alternatives are closely related to the public issues The consequences focus on three basic questions (1) what lands will be used for timber production?, (2) to what intensity will timber management be practiced on these lands?, and (3) what timber management practices will be applied to these lands? To assess and predict the consequences of each alternative on the timber resource, the following items are addressed

- suitable timber land base,
- management intensity on the suitable timber lands;
- silvicultural and harvest practices,
- allowable sale quantity (ASQ), long-term sustained yield and growth, and
- management requirements and mitigation measures

The conceptual background for these items is given in the next section That section also describes consequences that are common to all alternatives Consequences that are specific to an alternative are shown in **Table IV-11** and discussed in the subsequent sections

Consequences Common to All Alternatives

Suitable Timber Land Base. The production of timber is largely dependent upon the quantity and quality of lands allocated to that use Using the timber suitability process directed by the National Forest Management Act (NFMA), Shasta-Trinity National Forests personnel have identified about 1,077,800 acres as capable, available, and tentatively suitable for timber production This represents about 51 percent of the Forests' land base This is the base from which the suitable timber lands are selected for each alternative

During the formulation of each alternative, some of the lands originally identified as tentatively suitable were determined to be unavailable or not appropriate for timber production in order to meet the objectives of the alternative This occurred if the land was (1) assigned to other resource uses that precluded timber management (e g wilderness and research natural areas), (2) assigned to other resource uses that limited timber management activities so severely that timber management requirements can not be met (e g unroaded non-motorized recreation areas and riparian management zones), or (3) determined not to be cost efficient in meeting timber management objectives over the planning horizon (e g. non-stocked brushfields) These lands are classified as not suitable or available for timber production under the alternative, and the amount of land in this category varies by alternative

Late-Successional Reserves have the most significant effect on the reduction of the suitable timber land base in all alternatives

Non-stocked lands on tentatively suitable timber land are not included in the suitable timber land base in any of the alternatives

Removing land that is tentatively suitable from the suitable land base in an alternative reduces the potential allowable timber harvest level The magnitude of this reduction depends not only on the amount of land removed but also on its relative productivity Reductions can be mitigated by increasing the intensity of timber management on the remaining suitable acres The following section discusses this concept

Timber Management Intensity on Suitable Timber Lands. Timber management intensity on suitable timber lands, for all alternatives, is categorized as regular or marginal

Regular management is characterized by high to moderate timber yields (70-100 percent of potential) using the appropriate mix of silvicultural practices and intensities to obtain these yields Reduced yields are due to limitations on silvicultural practices or intensities in order to meet other resource objectives Marginal management is characterized by minor yields (20 percent of potential), primarily from sanitation/salvage cutting, due to site limitations or resource objectives which severely restrict timber management

Timber management intensity is determined by the management prescriptions in an alternative The standards and guidelines in the management prescriptions determine the intensity at which the timber can be managed within those prescription areas The amount of land allocated to each of the two intensity levels varies between alternatives

Timber intensities affect the rate at which timber stands can be managed Cubic foot volume growth of managed stands, with no intermediate thinning yields, culminates at 50 to 80 years of age Timber stands which exceed this

Table IV-II
Timber Consequences of Each Alternative

	Unit of Measure	ALTERNATIVE PRF	RPA	CUR	CBF
Suitable Timber Land	M Acres*	530 0	638 1	635 8	495 4
Suitable Land by Intensity Class	M Acres				
Intensive/Modified		434 6	537 7	502 8	327 7
Minimal		95 4	100 4	1330	122 7
Tentatively Suitable Land - Not Suitable Under the Alternative	M Acres	547 8	439 7	442 0	582 4
Silvicultural Practices					
Regeneration Cutting-Decade 1	M Acres				
Clearcut		0 0	38 1	31 6	0 0
Green Tree Retention		20 0	9.3	17.8	26 9
Selection		15 0	0 0	3 0	14 0
Reforestation	M Acres				
Total - Decade 1		35 0	47.0	52 0	41 0
Total - Decade 5		35 0	47.0	52 0	41 0
Percent of Forest Reforested After 5 Decades	Percent	8	11	12	10
limber Stand Improvement					
Total - Decade 1		53 0	71 0	78 0	62 0
Total - Decade 5		53 0	71 0	78 0	62 0
Allowable Sale Quantity	MMBF**				
Average Annual - Decade 1		82 0	112 4	1059	65 3
Average Annual - Decade 5		90 4	123 9	1166	68 1
long-Term Sustained Yield (LTSY)	MMBF	103 3	1367	1274	75 3
Growth	MMBF				
Average Annual - Decade 5		1560	172 8	1905	101 4
BF/Acre/Year - Decade 5***		285	271	300	205

* M Acres - Thousand Acres
** MMBF = Million Board Feet
*** Board Feet per Acre per year

age will not be growing at optimal rates and should be regenerated wtth a new stand in order to maintain maximum productivrty of the site

Most of the existing timber stands on the Forests are beyond the age of culmination of growth The rate at which these stands are regenerated and converted to young, faster growing managed stands has a signficant effect on harvest levels This "conversion penod" for existing stands will vary between alternatives, due primarily to the mitigating requirements and objectives of the alternative

Alternatives with pnmary emphasis on timber management will have relatively shorter conversion periods than alternatives which will emphasize wildlfe, recreation and aesthetic values An indication of this is reflected in the number of acres in the younger (0-50 years) age classes

The rate at which replacement or regenerated stands are allowed to be harvested is another important factor which affects harvest levels This cutting rate is referred to as the rotation length or age Replacement stands under timber management prescriptions will be allowed to cycle on varying rotation lengths, depending on the theme and objectives of the alternatives Rotation lengths for replacement stands usually correspond closely to the conversion periods for existing stands

In all of the alternatives, the average size of the trees harvested in the future will generally be smaller than the trees harvested today This is because most of the trees

harvested in the future will be younger than the trees currently being harvested

Silvicultural and Harvest Practices

Silvicultural Systems (Cutting Practices) - The silvicultural systems selected to manage any particular area will be determined through site-specific analysis by an interdisciplinary team The final prescription will depend on factors such as management objectives, current stand and site conditions, environmental considerations, cost effectiveness, and the desired future condition of the vegetative cover This standard will apply to all alternatives

Both even-aged and uneven-aged systems will be used in all alternatives, although the amount of acres managed under each system will vary considerably See Appendix J for a discussion of the major silvicultural systems and their application

Regeneration cutting in understocked and poorly-growing stands will be emphasized in all alternatives Even-aged systems, using clearcutting, green tree retention (GTR), and shelterwood cutting, will be the primary practices used in areas to be managed intensively for timber production, where timber growth and yield is an important consideration Even-aged systems will normally be appropriate on these areas due to low sensitivity to other resource issues, single-storied stand structures, presence of little or no manageable understory, high incidence of insects and/or diseases, speaes that are relatively intolerant to shade, steep slopes, and minor risk of regeneration failures

Where forest timber growth and yield is unregulated, e g Late-Successional Reserves, timber harvest will be incidental to providing for other resource values Silvicultural treatments such as thinning and biomass removal, salvage, sanitation, and regeneration can be permitted to meet specific nontimber resource objectives

The amount of clearcutting varies considerably between alternatives For assessing consequences, projected clearcutting acres for each alternative can be compared against the 1990 Resources Planning Act (RPA) target The RPA target for the Forests is to reduce the amount of clearcutting by at least 14 percent from the base year in the 1st decade of the Forest Plan For the base year (1984-1990) an average of about 8,700 acres per year was clearcut All alternatives meet this target

GTR will be employed in all alternatives GTR will normally retain 15 percent of the harvested stand in patches and individual trees which are larger than the mean diameter of the stand These trees will be retained for multiple rotations of the stand This practice will result in a yield reduction of about 15-30 percent compared to pure clearcutting due to the loss of volume in the green trees retained and the shading effect of the reserve trees on the newly regenerated stand

Uneven-aged systems, using selection cutting, will be employed in all alternatives where other resource objectives are emphasized and a continuous tree cover is desired Average per acre timber yields from regenerated stands under uneven-aged systems are projected to be about 10 to 20 percent less than under even-aged systems, due to the effect of shading and competition from surrounding trees Management costs per acre are also predicted to be 10 to 20 percent higher under an uneven-aged system due to smaller openings

Overstory removal cutting in two-storied stands, with scattered overstory and a fully stocked understory, will be a silvicultural option in all alternatives

Intermediate commercial thinnings in overstocked stands will be practiced in all alternatives Stand maintenance (sanitation/salvage cutting) will be the primary practice used in areas where marginal management is specified

All cutting practices, including clearcutting, will be considered on about 85 percent of the tentatively sutable timber land base Cutting practices on the remaining 15 percent will be limited to methods other than clearcutting due to artificial regeneration limitations These areas include high elevation red fir, soils with low site productivty, soils with high rock content, and soils with poor water holding capacity

From a growth and yield standpoint, clearcutting and shelterwood cutting produce the highest timber outputs Therefore, alternatives with a larger proportion of acres in these practices will produce the highest ASQ

The major environmental consequences related to silvicultural systems are biological (i e , productivity, species diversity, etc) and managerial (i e , costs, scenic quality, watershed and soils, etc) These are discussed in detail in Appendix J, Major Silvicultural Systems and Their Application

Reforestation - Most of the reforestation activities in all alternatives will occur as a result of regeneration cutting of timber stands Regeneration cutting by clearcutting, GTR, shelterwood cutting and selection cutting will be needed

to optimize progress toward a regulated forest Regeneration cutting is necessary to increase the long-term productivity of the land by replacing older, slow-growing stands with young, fast-growing stands Reforestation activities will include ste preparation and planting in all alternatives

Successful reforestation depends on a number of facton, including but not limited to the following (a) adequate and timely site preparation, (b) good planting stock, (c) proper stock handling, (d) good planting job, and (e) seedling protection after planting The risk of failure will be greatest under those alternatives requiring the most reforestation

Regenerated stands will vary in size in all alternatives Clearcut, GTR, and shelterwood openings will generally be 2 to 20 acres in size Selection cutting openings will be less than *two* acres

Existing stand structures (proportion of species, tree sizes, and ages) will be altered under all alternatives where regeneration cutting occurs

Existing tree species will be maintained in all alternatives Diversity of tree species, indigenous to an area, will be assured by application ot the following standards in all alternatives (a) an appropriate mix of tree species will be planted in areas to be artificially regenerated, (b) the regeneration of both shade tolerant and intolerant tree species will be encouraged in areas to be naturally regenerated, and (c) manageable, salvable, advanced reproduction will be left in areas planned for regeneration cutting

The planting of a mix of species native to the area, plus the addition of natural regeneration of species common to the area, will ensure against a monoculture situation Planting of Douglas-fir, white and red fin, cedars sugar pine, and ponderosa and Jeffrey pines will continue under all alternatives The more shade-intolerant species. such as ponderosa pine and Douglas-fir, will be the primary species planted

Replacement of the more shade-tolerant species. such as whte and red firs, and cedars will rely more on natural regeneration, since these species can regenerate and survive in the shade of the other tolerant species and brush Maintaining a mix of native tree species is consistent with current reforestation practices No major changes will be anticipated in any of the alternatives

Opportunties to reforest suitable timber lands which are non-stocked with conifers (e g brushfields) will be considered, but not emphasized, under any of the alternatives Minor acreages of non-stocked lands may be converted to confers under any of the alternatives.

The amount of reforestation varies by altemative For assessing consequences, projected reforestation (planting) acres can be compared against the historical level of reforestation activty over the last nine years, and the percent of the Forests' acres that will be reforested over the next five decades.

The actual reforestation acres accomplished over the previous decade averaged about *9,500* acres per year on the Forests

Timber Stand Improvement (TSI) - Substantial TSI work, including release from competing vegetation and precommercial thinning, will be practiced under all alternatives The amount of acres treated will vary between alternatives.

Most of the TSI activities will occur within areas which have been reforested (plantations) TSI is often necessary to assure plantation establishment and to maintain growth and vigor of regenerated stands Maintaining trees in a healthy, vigorous condtion is also the best defense against insect and disease damage The control of competing vegetation and proper stocking through release and thinning will foster these conditions under all alternatives

4 full range of vegetation management methods must be made available to successfully treat competing vegetation These methods include manual, mechanical, prescribed fire, biological, and chemical (herbicide) methods as well as grazing Herbicides will be avalable for use in all alternatives, except Alternative CBF Herbicide use will be limited to those stuations where it is essential to achieve the desired land management objectives

The effects on timber yields and costs due to restrictions on herbicide use are discussed in Chapter II If herbicide use is restricted, yields will be less and costs will be more

The consequences of the alternatives on TSI work can be assessed by comparing the projected acres of TSI with the historical level of TSI activty over the past five yean The actual TSI acres accomplished from over the previous decade averaged about 8,000 acres per year on the Forests

Allowable Sale Quantity and long-Term Sustained Yield and Growth

Allowable Sale Quantity (ASQ). The ASQ is the maximum amount of timber that may be scheduled for sale from the suitable land base Although it is expressed as an average annual quantity, ASQ actually applies on a decade basis, because the amount of timber sold each year may vary The ASQ is determined by the amount of suitable land, the management intensty applied to those lands, and the silvicultural practices applied

The pnnciple of non-declining yield applies in **all** alternatives This requires that the ASQ for any decade must be equal to or greater than that of the previous decade

Yields from hardwoods are not included in the ASQ in any of the alternatives Hardwoods will not be managed for commercial timber purposes (sawlogs) However; utilization of hardwoods which are by-products of commercial conifer sales will be permitted under all alternatives

One of the measures used to assess the consequences of an altemative on the ASQ is to compare the proposed ASQ with the actual volume sold under the old Timber Management Plan The actual volume sold from 1975 through 1992 averaged about 200 MMBF per year

Another measure used to assess the consequences of an alternative on the ASQ is to compare the proposed ASQ with the timber targets (timber offered) from RPA The RPA timber target is 195 MMBF per year in the first decade of the Plan

The 1990 RPA targets for timber offered in the first decade will not be attained under any of the alternatives This is because the target was based on projected plans prior to the listing of the northern spotted owl **as** a threatened species

The wildfires of 1987 had a negligible effect on ASQ, since most of the inventory on suitable lands was salvaged and most of these burned-over areas were reforested in a timely manner

Finally, timber yields from the remaining suitable timber land base are often reduced due to other resource requirements, such **as** wildlife habitat, visual objectives, and riparian areas, in response to minimum management requirements (MMRs) and forest issues

The attainment of the 1990 RPA timber target will require a significant increase in the suitable timber land available for timber production, and/or a relaxation or elimination of requirements which limit timber yields from suitable lands

long-Term Sustained Yield (LTSY) - The LTSY is the highest wood yield that may possibly be sustained from lands managed for timber production It is a function of the amount of suitable timberland, the productive capacity of that land, and the management intensity applied thereon Like the ASQ, LTSY will normally be higher for alternatives with more land managed under intensive timber management The ASQ approaches, but does not reach, the LTSY dunng the 160 year planning horizon in any of the alternatives

Growth - Due to a relatively large existing timber inventor/ on the Forests, it is possible to harvest more timber than is grown for quite a few decades. However, growth exceeds harvest in all decades in all alternatives. This is due to numerous constraints on the amount of timber that can be harvested (e g green tree retention requirements) Growth must equal or exceed the amount harvested in all alternatives in order to maintain timber yields over time. Future growth can be improved by regenerating existing understocked or poorly-growing stands

One of the measures of growth is to compare the average total growth per year in the fifth decade on the suitable timber lands in each altemative Alternatives with higher annual growth will produce higher, sustainable timber volumes over time

Another measure of growth is the average annual growth per acre in the 5th decade Alternatives with higher growth per acre have higher quality timber land (i e more productive land) in their timber land base.

Management Requirements and Mitigation Measures

The Pacific Southwest Region's (Region **5)** minimum management requirements (MMRs), minimum implementation requirements (MIRs), and timber policy requirements, as well as the Forests' management requirements which are common to all alternatives, constitute the mitigation measures which will be applied under ill of the alternatives considered Refer to Chapter II and Appendix **B** in this Final EIS for a detailed description of these requirements These basic mtigation requirements will affect the allocation and schedulirig of timber lands with

resulting impacts on timber resources, outputs, and costs in all the alternatives

About 40 percent of the tentatively suitable timber land base will be removed from the timber base and classified as unsutable for timber production in all alternatives due to these minimum requirements

Additionally, mitigation measures will be reflected in the management emphasis on resources such as riparian management zones, wildlrfe habtats. and visually senstive areas on suitable timber lands The effect of these requirements on the timber resource will vary between alternatives based on the theme of each alternative

Consequences Specific to An Alternative

Each alternative has its own unique timber land allocation and timber harvest schedule, establishing the amount, sequence, and rate at which stands will be harvested The alternative harvest schedules are choices in balancing current wants and demands between competing uses, in response to public issues

Alternative PRF (Preferred Alternative). This alternative will produce moderately high timber outputs compared to the other alternatives It will have an ASQ of 82 MMBF per year This is the third highest harvest level of all the alternatives This ASQ will be 59 percent less than the average annual volume sold over the last 18 years

In this alternative, the tentatively sutable timber land base is about 530,000 acres Addtional lands are removed and classified as unsutable for timber production due to allocations to prescriptions with no scheduled timber outputs The primary prescriptions affecting this reduction in the timber base are (1) unroaded non-motorized recreation, (2) ripanan reserves along streams, lakes and wetlands and (3) senstive wildlrfe species

About 50 percent of the suttable timber land under this alternative will be managed wth a commercial wood products emphasis in the context of ecosystem management The primary factors causing reductions from past levels are (1) maintenance of visual quality along senstive roads and recreation areas, and (2) maintenance and enhancement of wildlife habitat for game species

Regeneration cutting will occur on about 6 6 percent of the sultable timber land in the 1st decade Clearcutting is a permitted cutting practice but is expected to be used on a small percentage of the total acres harvested in the 1st decade

The average annual acres to be reforested in the 1st decade will be about 63 percent less than the average annual acres reforested on the Forests over the last nine yean In 50 years about 8 percent of the forest will consist of stands which are less than 50 years of age

This alternative has the third highest LTSY capacity of all the alternatives, exceeded by Alternatives RPA and CUR

Average annual growth in the 5th decade will be moderate, exceeded by Alternatives RPA and CUR

Alternative RPA (1990 RPA Program Emphasis). This alternative will produce the highest timber outputs of all the alternatives It will have an ASQ of 1 1 2 4 MMBF per year This will be about 44 percent lower than the average annual volume sold over the last 18 years

This alternative will not meet the 1990 RPA timber target However, twill come closer to meeting this target than any of the other alternatives

In this alternative, the tentatively suitable timber land base is about 638,000 acres Addtional lands are removed and classified as unsuitable for timber production due to allocations to prescriptions with no scheduled timber outputs The primary prescriptions affecting this reduction in the timber base are (1) research natural areas, (2) dispersed recreation sltes. and (3) bitterbrush areas for wildlife

This alternative has the most acreage allocated to commercial wood products emphasis of all the alternatives About 75 percent of the sutable timber land under this alternative will be managed with a commercial wood products emphasis in the context of ecosystem management About 25 percent of the sutable timber land will be managed wth resource emphasis other than commercial wood products This is the least amount of any of the alternatives The primary factors causing this reduction are (1) maintenance of visual qualrty along senstive roads and recreation areas, and (2) maintenance and enhancement of wildlife habitat for game species

Regeneration cutting will occur on about 7 4 percent of the sutable timber land in the 1st decade Clearcutting will be the primary cutting practice used on about 43 percent of the acres harvested in the 1st decade This is about 6 percent lower than current practices, and the highest of all the alternatives

The average annual acres to be reforested in the 1st decade will be about 51 percent less than the average annual acres reforested over the last nine years In 50 years about 11 percent of the Forests will consist of stands which are less than 50 years of age

This alternative has the highest LTSY capacity of all the alternatives

Average annual growth in the 5th decade will be relatively high, exceeded only by Alternative CUR

Alternative CUR (No Action/No Change). This alternative will produce moderately high timber outputs compared to the other alternatives It will have an ASQ of 105 8 MMBF per year This is the second highest harvest level of all the alternatives, and will be about 47 percent less than the average annual volume sold over the last 18 years

In this alternative, the tentatively suitable timber land base is about 636,000 acres Additional lands are removed and classified as unsuitable for timber production due to allocations to prescriptions with no scheduled timber outputs The primary prescriptions affecting this reduction in the timber base are (1) research natural areas, (2) brtterbrush areas for wildlife, and (3) dispersed recreation areas

About 63 percent of the suitable timber land under this alternative will be managed with a commercial wood products emphasis in the context of ecosystem management The primary factors causing this reduction are (1) maintenance of visual quallty along sensitive roads and recreation areas, (2) maintenance and enhancement of wildlife habitat for game species, and (3) protection of riparian management zones along perennial and intermittent streams

Regeneration cutting will occur on about 8 2 percent of the suitable timber land in the 1st decade Clearcutting will be the primary cutting practice used on about 33 percent of the acres harvested in the 1st decade This is about 16 percent lower than current practices

The average annual acres to be reforested in the 1st decade will be about 45 percent lower than the average annual acres reforested on the Forests over the last nine years This is the highest of all the alternatives In 50 years about 12 percent of the Forests will consist of stands which are less than 50 years of age

This alternative has the second highest LTSY of all the alternatives

Average annual growth in the 5th decade under this alternative will be the highest of all the alternatives.

Alternative CBF (Citizens for Better Forestry). This alternative will produce moderately low timber outputs compared to the other alternatives It will have an ASQ of 65 3 MMBF per year This will be about 68 percent less than the average annual volume sold over the last 18 years

In this alternative, the tentatively suitable timber land base is about 495,000 acres Additional lands are removed and classified as unsuitable for timber production due to allocations to prescriptions with no scheduled timber outputs The primary prescriptions affecting this reduction are (1) unroaded non-motorized recreation allocated to many former roadless areas, (2) retention of old-growth habitat for wildlife, and (3) riparian management zones along perennial and intermittent streams

This alternative has the least acreage allocated to commercial wood products emphasis of all the alternatives

About 53 percent of the suitable timber land under this alternative will be managed with a commercial wood products emphasis in the context of ecosystem management The primary facton causing this reduction are (1) maintenance of visual quallty along senstive roads and recreation areas, and (2) maintenance and enhancement of wildlife habrtat for game species

Restrictions on the use of clearcutting and the non-use of herbicides will also reduce timber outputs Regeneration cutting will occur on about 8 3 percent of the surtable timber land in the 1st decade Clearcutting will not be practiced in this alternative

The average annual acres to be reforested in the 1st decade will be about 57 percent less than the average annual acres reforested over the last nine yean In 50 years about 10 percent of the Forests will consist of stands which are less than 50 years of age

This alternative has the lowest LTSY of all the alternatives

Average annual growth in the 5th decade will be the lowest of all the alternatives

20. Visual Quality

Consequences Common to All Alternatives

In all alternatives, the most highly used areas of the Forests will be managed for scenic qualrty Examples include the Shasta and Trinity Units of the Whiskeytown-Shasta-Tnntty National Recreation Area (NRA), candidate state scenic highways, riparian zones, developed recreation sites, townsites, and highly used dispersed recreation areas

Visual Objectives in the National Recreation Area. The two units of the NRA will be managed to conserve the scenic values contributing to public enjoyment Management activities such as road construction, development of recreational facilities, timber harvest, etc , are either not scheduled or will be accomplished in a manner which will conserve the scenic nature of the area

Riparian Areas. Riparian areas near major water features, such as lakes and perennial streams, will retain a near natural appearance

Visual Corridors. The foreground and middleground of several candidate state scenic highways will be managed for scenic qualrty These highways include all of US Highway 97, State Highway 3, State Highway 89, and portions of State Highway 36 and Interstate 5 In addition, State Highway 299 and the remaining portions of State Highway 36 and Interstate 5 will be managed for scenic quality in the foreground in all alternatives Management of the middleground, along these addtional roads, will differ significantly between alternatives All alternatives, except Alternative RPA will also provide visual resource protection in the foreground of roads

Developed Recreation Areas. Most developed recreation areas will be managed to maintain a natural or near-natural appearance in the foreground

Wildernesses. Wildernesses will be managed to maintain as near a natural landscape appearance as possible Minimal management activities, such as trail building and maintenance, will occur inside wilderness boundaries

Wild and Scenic Rivers. The foreground of wild and scenic rivers will be managed to maintain a natural or near natural appearance

Special Areas. Research Natural Areas, Special Interest Areas, special wildlife habitats and significant cultural resource areas will be managed to maintain a natural appearance

Visual Appearances Outside Heavily Used Recreation Areas, Wilderness and Special Areas. Timber harvesting, road construction, and other resource management activties will occur on a small portion of the land base when compared with historic levels These activities will be moderately visible from low sensitivity travel routes The contrast between soil color and vegetation will be very apparent where heavy vegetative manipulation occurred Smaller openings will lessen this effect Vegetative patterns will become more mosaic and vegetative sizes will appear more diverse than at present In some areas, site preparation activrties and roads can create continuous unnatural linear patterns on the landscape

In other large, contiguous areas where soil productivrty is low, management activities will generally be limited to occasional road construction, timber salvage, and vegetative manipulation for wildlife purposes In most cases, these activties will not dominate the landscape

The direct environmental effects on the visual resource include some change in visual appearance of the landscape in some areas of the Forests outside the Wildernesses These changes will be created by managed activities implemented to different visual quality levels The rate of implementation, quantity, and visual quality objectives (VQOs) applied will create different long-term and short-term impacts

Consequences Specific to An Alternative

Visual Quality Objectives (VQOs) As a whole, the degree of natural appearance of the Forests will vary between alternatives The distribution of adopted VQOs between alternatives is shown in **Figure IV-2**

The geographic distribution of VQOs dictates the visual appearance that different types of visitors will observe VQO acreages shown in the figures and tables are estimates

Impacts on Distinctive Landscapes. Distinctive landscapes (Variety Class A) will be affected differently under each alternative It is estimated that distinctive landscapes will be managed to the visual quality levels shown in **Figure IV-3**

Visual Condition and Visual Quality Indices. The existing visual condtion of the Forests is a benchmark from which

Figure IV-2
Adopted Visual Quality Objectives (VQOs)

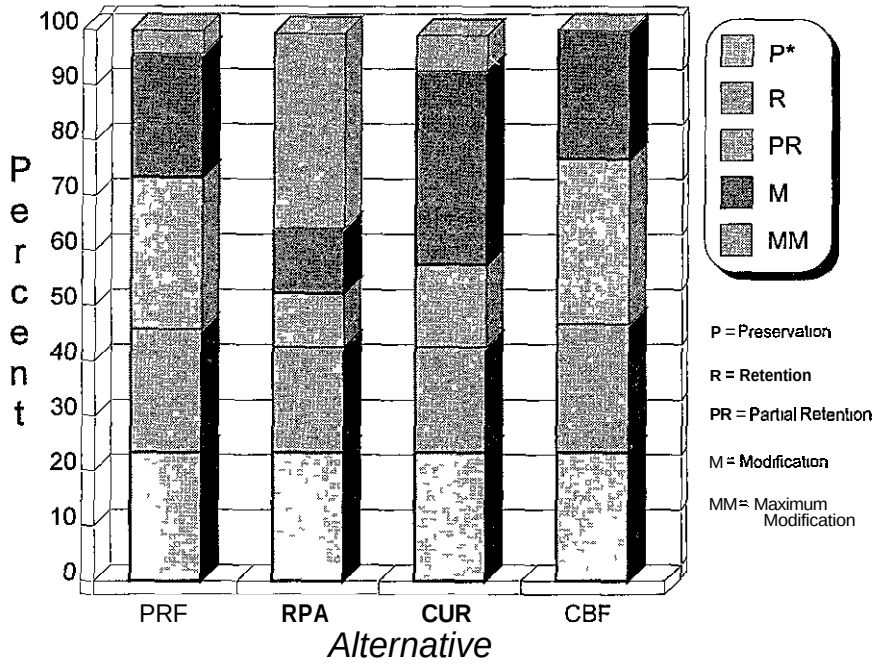
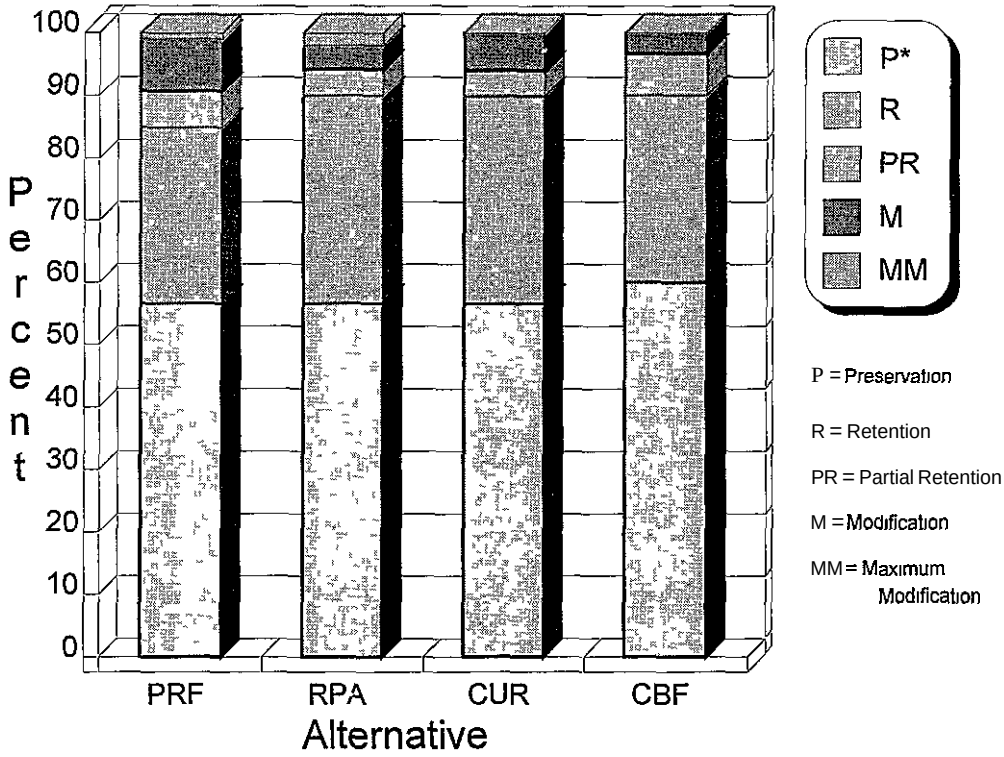


Figure IV-3
Estimated VQOs of Class "A" Landscapes



an estimate can be made ofthe effects on, and the rate of change to the landscape

The Visual Quality Index (VQI) is one measure used to compare the impacts of the alternatives on visual resources in relation to existing visual condition Ratings were assigned according to research-based assumptions of public preferences for certain categones of landscapes Refer to the Glossary for details Also refer to Chapter II for a discussion ofthe comparative impacts ofthe altematives on visual quality using VQI as a parameter

It is estimated that the overall visual quality of the Forests will increase from the existing visual condrtions in all alternatives

Visual Rehabilitation. The existing visual condtions of some areas on the Forests will not meet the visual condition level proposed for those areas in the altematives As a result, visual rehabilrtationwill be requiredto bringthose areas into conformance with proposed visual quallty levels Visual rehabilitation can take the form of natural vegetative growth or it can require active measures to correct a problem

Direct and Indirect Effects. On areas to be conserved in a near-natural appearance, management expenses will increase due to reduced harvest untt size, increased inrtial roading and fuel management costs More protection will be given to the visual quallty and maintaining recreation settings in a near natural state

Indirect effects of areas managed to visual standards of Modification (M) and Maximum Modification (MM) will include a change from near natural to one where management activities are evident but appear natural

Alternative PRF (Preferred Alternative). The VQI will increase 3 percent from its present level (as measured from existing level of 127 3 to the maximum level of 131 5)

This alternative will protect fewer miles of road in the foreground and middlegroundthan Alternative CBF Visual transrtions between the candidate state scenic highway travel corridors and the more remote areas ofthe Forests will be gradual Transttions between the foreground of most other travel corridors and the more remote areas will be more abrupt Interstate 5 will be managed for a near natural appearance in the foreground In the middleground, management activities will dominate the landscape.

More miles ofwild and scenic nven will be protectedthan in Alternatives CUR or RPA This alternative provides for more semi-primrtive landscape settings than Alternatives CUR or RPA Less of the landscape will be subject to MM visual standards than in Alternatives CUR and RPA

Overall, this alternative provides more protection for the visual resource than any other alternative **Table IV-12** summarizes some of the signficant information about this alternative

Alternative RPA *(1990* RPA Program Emphasis). The VQI will increase 1 percent from its present level (as measured from the existing level of 127 3 to the maximum of 128 1)

Visual transitions between the candidate state scenic highway travel corridors and the more remote areas of the Forests will be gradual Transitions between the foreground of most other travel corridors and the more remote areas will be more abrupt

This alternative will protect fewer miles of wild and scenic rivers, fewer acres of semi-pnmttive landscape setting, and will produce more acres of MM VQOs than any other alternative

Overall, the landscape quality for this alternative and Alternative CUR will increase at the lowest rate of all alternatives. **Table IV-13** summarizes some of the important visual quality information about this alternative

Alternative CUR (No Action/No Change). The VQI will increase 2 percent from its present level (as measured from the existing level of 127 3 to the maximum level of 128 1)

Visual transitions between the candidate state scenic highway travel corndon and the more remote areas of the Forests will be gradual This altemative will provide for more protection in the foreground of travel corndon than Alternatives PRF and RPA

Fewer miles of wild and scenic nvers will be protected in this alternative than in Alternative PRF. A less semi-primrtive landscape setting will occur in this alternative than in Alternatives PRF and CBF

Overall, this altemative and Alternative RPA provide the lowest increase in protection for the visual resource **Table IV-14** summarizes some of the important information about this altemative

Alternative CBF (Citizens for Better Forestry). The VQI will increase 1 percent from its present level (as measured from the existing level of 127 3 to the maximum of 128 1).

Visual transitions between the candidate state scenic highway travel corridon and the more remote areas of the Forests will be gradual. Transitions between the foreground of most other travel corridors and the more remote areas will also be gradual.

More miles of wild and scenic riven will be protected than in any other altemative. This alternative provides more semi-primitive landscape settings than any other alternative Natural appearing landscape settings will be wider in npanan areas than in any other alternative. None of the landscape will be subject to MM visual quality standards

Overall, this alternative provides slightly less protection for the visual resource than Alternative PRF **Table IV-15** summarizes some of the significant information about this alternative

Table IV-12
Visuat Resource-Summary
-Alternative PRF-
(Preferred Alternative)
(M Acres)

Visual Condition Class	Existing Visual Condition	Future Visual Condition
I	909 1	498 7
II	1,006 6	467 1
III	125 4	356 2
IV	61.1	679 6
V	19 3	119 9
VI	0 0	0 0

Existing Visual Quality Index 127 3
Future Visual Quality Index 131 5
Visual Rehabilitation (M Acres) 116 5

Table IV-13
Visual Resource Summary
-Alternative RPA-
(M Acres)

Visual Condition Class	Existing Visual Condition	Future Visual Condition
I	909. 1	498 7
II	1,006 6	400.3
III	125 4	200 3
IV	61 1	251 1
V	19 3	771 1
VI	0 0	0 0

Existing Visual Quality Index 127 3
Future-Visual Quality Index 128 1
Visual Rehabilitation (M Acres) 123 3

Table IV-14
Visual Resource Summary
-Alternative CUR-
(M Acres)

Visual Condition Class	Existing Visual Condition	Future Visual Condition
I	909 1	498 7
II	1,006 6	405 4
III	1254	328 8
IV	61.1	742 8
V	19 3	145.9
VI	0 0	0 0

Existing Visual Quality Index 127 3
Future Visual Quality Index 129 8
Visual Rehabilitation (M Acres) 111 8

Table IV-15
Visual Resource Summary
-Alternative CBF-
(M Acres)

Visual Condition Class	Existing Visual Condition	Future Visual Condition
I	909 1	506 4
II	1,006 6	492 6
III	1254	638 0
IV	61 1	484 5
V	19 3	0.0
VI	0 0	0 0

Existing Visual Quality Index 127 3
Future Visual Quality Index 128 1
Visual Rehabilitation (M Acres) 149 4

21. Water

WATER QUALITY

The indicators used to describe the effects of the alternatives on water quality are the extent of ground disturbing activities, impacts to watershed condition, and soil and water resource improvement. Assumptions are (1) the lower the level of ground disturbing activities, the lower the risk of degrading water quality, (2) the lower the level of cumulative impacts within a watershed, the lower the effect on watershed condrtion, and (3) the greater the number of acres of soil and water resource improvement, the greater the level of water quality improvement

Consequences Common to All Alternatives

Riparian Area and Streamcourse Protection. On the Shasta-Trinity National Forests, riparian areas are an extremely important, yet limited, portion of the land base They are used by many species of resident and transient wildlife. Rparian areas are desirable for developed and dispersed recreation, they are highly productive forage and timber areas, and they represent the most diverse vegetative conditions on the Forests Forest standards and guidelines, land allocation constraints (e g Riparian Reserves), Best Management Practices (BMPs), and supplemental management area direction assures that each of the alternatives will protect the riparian areas and streamcourses on the Forests

Soil and Water Resource Improvement. By the most recent estimates there are approximately 11,800 acres of degraded watersheds, as a result of past disturbance, that can be effectively treated on the Forests The 1990 RPA targets for watershed improvement on the Forests are to restore 700 acres per year during the 1st decade, 710 acres per year during the 2nd decade, and 450 acres per year during the 3rd decade Implementing the target rate on the watershed improvement needs identrfied to date will result in complete watershed restoration sometime during the 2nd decade Actual rates of implementing identified improvements will occur commensurate with funding regardless of the alternative chosen. A more extensive and complete inventory is needed, however, to identify all areas within deteriorated watersheds that are in need of improvement

Restoration of degraded watershed areas will have several direct effects on the environment (1) erosion will be reduced and, therefore, productivity stabilized, (2) commodity production potentials will be increased, (3) State Water Resource Control Board Management Agency Agreement commitments will be met, (4) visual quallty will be enhanced, and (5) inland and anadromous fish habrtat will be stabilized or improved by reduced sedimentation

Consequences Specific to An Alternative

Ground Disturbing Activities.

In order to disclose the potential effects of each alternative on water quality, the following indicators will be used

- Acres of fuel treatment for timber planting site preparation and wildlife habitat improvement In using this indicator, the assumption is made that as the acres of fuel treatment increase, the potential for riparian area and streamcourse damage also increases Broadcast burning within riparian management zones (RMZs) is not allowed in any alternative which further protects riparian areas and streamcourses (See **Table IV-16**)
- Miles of new road construction This indicator is expressed as the average miles of new road constructed

Table IV-16
Average Annual Fuel Treatment and Wildfire Acres
(First Decade [in acres])

Alternative		Treatment	Wildfire	Total
PRF	(Preferred Alternative)	**30,000**	11,000	41.000
RPA	*(1990 RPA Emphasis)*	6.580	11,000	17,580
CUR	(No Action / No Change)	7,080	15,000	*22,080*
CBF	(Citizens for Better Forestry)	5,880	11,000	**16,880**

per year (averaged over a 5 decade planning period) for each of the alternatives The assumption used is that as more roads are built there will be a greater risk to water qualty degradation Risks are minimized, however, by excluding any road construction wrthin RMZs and by using a full range of road construction strategies related to BMPs

- Timber harvested area This indicator combines four types of harvesting methods and places an adjustment weight on each The weights are used to compensate for the relative amount of ground disturbing activity associated wlth the method Clearcut acres are given a weight of 1 0, greentree retention acres on slopes over 40 percent are given a weight of 0 8, green tree retention acres on slopes less than 40 percent have a weight of 0 4, and group selection harvesting also has a weight of 0 4 All methods were totalled for the purposes of alternative comparison

Alternative PRF (Preferred Alternative). This alternative will have a lower potential for adverse effects to water quality than Alternative CUR While total fuel treatment will average 30,000 acres per year, much of this will be accomplished through removal of biomass and thinning rather than burning In addtion, this alternative provides for the greatest protection along streams, lakes and wetlands of any of the alternatives New road construction will average 3 miles per year, while CUR will average 23 miles Total weighted harvest activity planned for this alternative is 2,892 This amount is 28 percent less than the weighted harvest activity planned for CUR

Alternative RPA *(1990* RPA Program Emphasis). This alternative will have the next to highest potential for degradation of water qualrty It is lower than Alternative CUR because of the change in emphasis in more recent RPA plans, wth less emphasis on commodity production Total fuel treatment averages will amount to 6,580 acres, 7 percent less than the amount planned for CUR (7,080 acres) New road construction will actually be the same for this alternative as for CUR, averaging 23 miles per year. This alternative plans for a total weighted harvest activity of 3,812, 6 percent less than the activity planned for CUR

Alternative CUR (No Action/No Change). Wth the implementation of this alternative's management practices, an annual average of about 7,080 acres of National Forest land will be treated or burned These activities will pose a risk of water qualty degradation that will have to be mttigated Possible effects can be temporary accelerated erosion wlth delivery of sediment to water courses Other potential effects of burning can be loss of aquatic and wildlie cover, loss of streamside temperature control shade, and degradation of aquatic habitat

Alternative CBF (Citizens for Better Forestry). This alternative represents the least nsk of all alternatives to potential water quality degradation Under this alternative the average annual acreage of tota fuel treatment will be 5,880 acres This amount is 17 percent less than the amount planned under Alternative CUR (7,080 acres) Yearly road construction for this alternative is planned at 15 miles per year, averaged over a 50 year planning period This represents 29 percent fewer roads than CUR Total harvested area, as determined by the weighting methodology is only 1,607, or 60 percent less than CUR

WATERSHED CONDITION

For each alternative the status of watershed condition classes was determined through evaluation of cumulative watershed effects Refer to procedures discussed in Appendix H Watershed acres in each watershed condttion class were calculated and plotted for decades I and 5

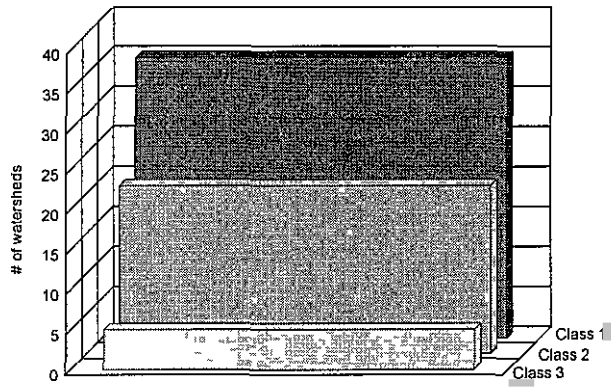
Tabl IV-17
Watershed Condition lasses by Alternative
(Number of /atersheds)

Alternative		Class	Decade I			Decade 5		
			I	2	3	I	2	3
PRF	(Preferred Alternative)		41	19	I	59	I	I
RPA	(1990 RPA Emphasis)		36	23	2	59	I	I
CUR	(No Action / No Change)		39	21	I	60	I	0
CBF	(Citizens for Better Forestry)		37	22	2	57	3	I

Figure IV-4
Watershed Condition Class by Alternative

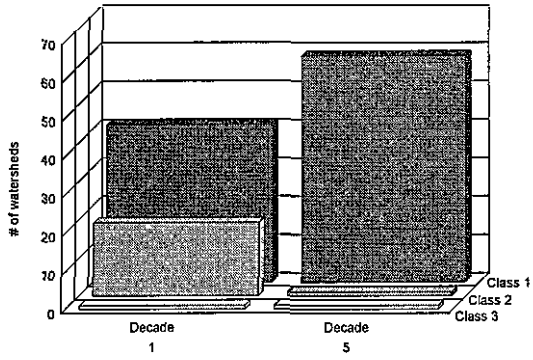
Present Situation

1993



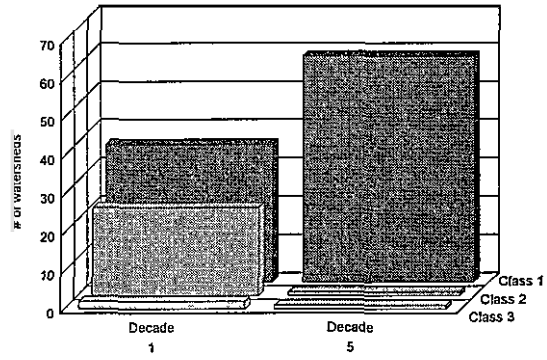
Alternative

PRF



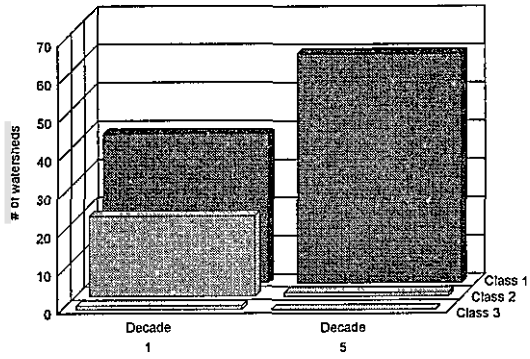
Alternative

RPA



Alternative

CUR



Alternative

CBF

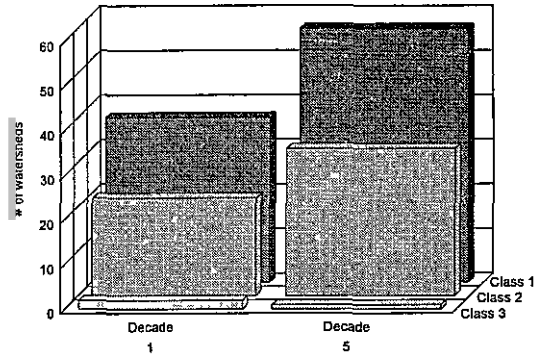


Figure IV-4 includes five separate bar charts which illustrate these trends for each of the alternatives

By using Alternative CUR as a reference of the existing stuation at decades 1 and 5, each of the akematives can be compared to one another Addrtionally, **Table IV-17** lists the number of watersheds in each watershed condition class for decades 1 and 5

For each akemative, the status of watershed condrtion classes will change over time Some watersheds in class 1 condrtion (generally good to excellent) will change to class 2 (generally fair to good). In two altematives, some watersheds will change to class 3 (generally fair to poor) Expenence indicates that as more watersheds decline to watershed condrtion class 2, the greater the potential for watershed degradation wrthin some subwatersheds Additionally, watersheds which decline to watershed condition class 3 have a greater potential for degradation However, because the extent and intensrty of ground disturbance is decreasing greatly compared to histonc levels, watersheds are recovering in each alternative analyzed Implementation of any of the altematives will result in an improvement in watershed condition. beginning in the 1st decade

Cumulative Watershed Effects. Over the short term, all watersheds on the Forests, except for the Rattlesnake Creek watershed. are projected to be well under the threshold of concem (TOC) Special management emphasis on cumulative watershed effects will be given to this watershed in addition to other watersheds which were degraded by the 1987 **fires** Due to this management emphasis, in conjunction wrth watershed improvement projects which are ongoing, there should be no irreversible impacts No signrficant adverse impacts will occur

To insure watershed condtion and protection against water qualrty degradation from cumulative effects, BMPs will be implemented **A** standardized cumulative effects analysis methodology will also be applied to subwatersheds at the project level This will aid in preventing subwatersheds from exceeding their individual TOC

If impacts remain below threshold in these subwatersheds, they will also remain below threshold in the larger fifth-order watershed, and the consequences of cumulative *effects* will be avoided

Direct effects, such as the degradation of stream channels, fish habrtat, npanan vegetation, reduced reservoir life, damage to hydroelectnc facilties, and the destruction of stream crossings and facillties adjacent to or within flood plains, should be minimal Addrtionally, indirect effects to recreation opportunities, fishenes, beneficial uses and upslope instability should also be minimal

Another aspect of watershed condtion is the potential for cumulative watershed effects resulting from uncoordinated land management activrties on public and pnvate lands Because of the potential problems which can result, Forest personnel have adopted a 'Yair share" policy In effect, this means that the forests will constrain management levels on National forest lands to equivalent roaded acre (ERA) levels which will be proportional to the percentage of National Forest land in a watershed

There are 14 watersheds within the Shasta-Trinity National Forests which contain between 35 to 68 percent privately owned lands Wthout cooperative planning there is a risk that uncoordinated management activities can contnbute to cumulative watershed effects Some subwatersheds can be impacted from combined management activities on both private and National Forest lands This will be especially true for the larger contiguous land holdings as well **as** in the "checkerboard" ownership areas

Therefore, the 'Yair share" policy may not always be possible to apply, since it might lead to adverse effects Because of this, management opportunities on National Forest lands may be limrted for a penod of time to allow for watershed recovery A second option will be the implementation of special mrtigation measures, such as road surface stabilization or wider npanan management zones to help minimize the risk of additional cumulative impacts Ideally, through mutual application of BMPs and cooperative planning and scheduling, National Forest managers can work with private landowners to protect these watersheds from undergoing cumulative impacts

Table IV-18
Average Annual Water Yield by Alternative
(50 year average in thousand acre feet)

Alternative	Water Yield
PRF	5.436
RPA	5,460
CUR	5,455
CBF	5,436

WATER YIELD

Consequences Common to All Alternatives

Water yield increases are directly related to the extent and amount of vegetation treatment In this regard, water yield increases in each altemative will be induced ("spin off') outputs resulting principally from timber harvesting activrties in each altemative. As the volume of timber harvested (or land base altered) increases, water yields will increase; and as the harvested land base decreases, water yields decrease

Harvest acres and volumes are displayed and discussed in the Timber Section of this chapter The indicator used here to descnbe the effects of each alternative on water yield is the expected average annual yield in thousands of acre-feet averaged over a 50 year period These yields are displayed in **Table IV-18.**

Consequences Specific to an Alternative

Alternative PRF (Preferred Alternative). This alternative will produce, on the average, 19,000 acre-feet of water less per year than Alternative CUR This will be a decrease of about 0 4 percent

Alternative RPA *(1990* RPA Program Emphasis). In this altemative the average annual water yield will increase 5,000 acre-feet compared to Alternative CUR This will be an increase of about 0 *09* percent

Alternative CUR (No Action/No Change). Alternative CUR will produce the average yield of water that is currently being produced from National Forest land (5,455 M acre feet) Consequently, water available for use on the Shasta-Trinity National Forests and downstream will remain the same, fluctuating from year to year depending on the annual changes in precipitation

Alternative CBF (Citizens for Better Forestry). The average annual water yield for this alternative will be 19,000 acre-feet less than Alternative CUR This will be a decrease of about 0 4 percent

22. Wild and Scenic Rivers

Consequences Common to All Alternatives

The existing Wild and Scenic Rven System. consisting of about 106 4 miles of the Trinity Rver system, remains the same under all alternatives Because these designations already exist, there are no environmental consequences associated with the existing Wild and Scenic Riven System

In managing the three classrfications of rivers (Wild, Scenic, and Recreation), three distinct management prescriptions are proposed within the one-quarter mile corridon For wild river segments Prescription I (Unroaded Non-Motorized Recreation) is applied (except in wilderness), for scenic river segments Prescription II (Limited Roaded Motorized Recreation) is applied, and for recreation river segments Prescription III (Roaded Recreation) is applied Restrictions on management activities and uses are most severe along wild river segments and least severe along recreation segments

The above prescriptions will also apply to additional river segments being proposed for designation in each of the alternatives Therefore, the major differences between alternatives are the number of miles of wild, scenic, and recreation riven that are proposed for designation

Generally speaking, the larger the number of miles. the greater the advene effect will be on potential water diversion for energy and agriculture and potential mineral development opportunities On the other hand, the greater the number of miles, the greater the positive effect on the watershed, riparian areas, fisheries, and water qualrty Refer to Appendix E for detailed discussions of wild and scenic rivers

Consequences Specific to an Alternative

Table IV-19 indicates the recommended wild and scenic rivers' classifications on National Forest streams for each of the alternatives

Alternative PRF (Preferred Alternative). Under this alternative the existing 106 4 miles of wild and scenic nven will be supplemented by about 79 7 miles of National Forest streams being proposed for Congressional designation

Gf the 79 7 miles of National Forest land involved, 48 5 miles are recommended for Wild River, 17 3 miles for Scenic River and 13 9 miles for Recreation Rver

The McCloud Rver and Squaw Valley Creek are not recommended for wild and scenic nver classification However, the charactenstics which made the McCloud River eligible for classrfication will be retained through a Coordinated Resource Management Plan with the private landownen along the river

Within the one-quarter-mile corridor along the 48 5 miles of Wild Rver the environmental consequences will be as follows

- No impoundments or diversions will be allowed,
- No mineral entry will be allowed, other than existing valid rights,
- No scheduled timber harvesting will occur,
- Access will be limited to trails, no road access will be allowed,
- River corridors, including npanan **areas,** will be semi-primitive in nature

Within the one-quarter-mile corridor along the 17 3 miles of Scenic River the consequences will be

- No impoundments or diversions will be allowed,
- Mineral exploration and extraction will be allowed consistent with the law,
- Only minimal timber harvesting, primarily salvage, can occur on suitable timber lands,
- Road access will be limited,

Within the one-quarter-mile corridor along the 13 9 miles of Recreation River segments restrictions will be less, resulting in relatively few consequences Impoundments will still not be permitted Modified timber harvesting will be allowed on sultable timber lands and road access can occur in more places.

Overall, there will be relatively minor effects on timber harvests and allowable sale quantlties within the river

Table IV-19
Recommended Wild and Scenic Rivers
(National Forest Miles)

NAME	ALTERNATIVE PRF	RPA	CUR	CBF
Beegum Creek				
Wild Rver	25	-		2.5
Canyon Creek				
Wild Rver	65	-	-	65
Recreation hver	110	-	-	11.0
Hayfork Creek				
Wild River		-		10.0
Scene Rver	115	-		10
Recreation hver		-		.5
McCloud River (Lower)				
Wild Rver				43
Scenic Rver				18
McCloud River (Upper)				
Recreation River				14.7
Scenic River				
North Fork Trinity River				
Wild Rver	117			117
South Fork Trinity River				
Wild Rver	161			16.1
Scenic Rver	58			58
Recreation Rver	29			29
Sacramento River				
Recreation River				61
Squaw Valley Creek				
Wild Rver				40
Scenic River				60
Virgin Creek				
Wild Rver	117			117
Total - Wild	485			568
Total - Scenic	173			251
Total - Recreation	139			34.7
Total Miles	**797**			**1166**

* An extension of BLM designation north of the forest boundanes, which is segment #2 of the main fork

corridon Most of the proposed river corndon are on lands classified as unsurtable for timber management or on lands which will be assigned prescnptions where no chargeable volumes are scheduled (e g , Prescription IX - kparian Management) Dispened recreation will be affected because of limted access

Alternatives RPA *(1990* RPA Program Emphasis), and CUR (No Action/No Change). These alternatives do not propose any addtions to the existing 106 4 miles of Wild and Scenic Riven System. Not having the addrtional river corndors will, however, eliminate the additional protection to the watershed and fishenes

Alternative CBF (Citizens for Better Forestry). This alternative recommends the same additions to the Wild and Scenic kvers System as Alternative PRF In addition, Alternative CBF recommends Canyon Creek, Upper and Lower McCloud kver, Sacramento kver, and Squaw Valley Creek These sections of river contain an addtional 54 4 miles of proposed rivers

Of the 1 16 6 miles of National Forest land involved, 56 8 miles are recommended for Wild River, 25 1 miles for Scenic River, and 34 7 miles for Recreation River The consequences on those recommended segments will be the same as descnbed for Altemative PRF

23. Wilderness and Roadless Areas

This assessment encompasses the probable environmental consequences on wilderness and roadless areas resulting from adoption of any one of the four alternatives described in detail in this Final EIS

The analysis focuses on the primitive recreation opportunrties that will be retained or foregone regardless of whether these areas will be recommended for additions to the National Wilderness Preservation System

Consequences Common to All Alternatives

There are five Wildernesses on the Shasta-Trinity National Forests totaling 498,776 acres There is one further planning area, Mt Eddy, which totals 7,720 acres At issue is whether the Mt Eddy area should be recommended for wilderness designation Wilderness designation of Mt Eddy will preclude some management activities such as timber harvesting and downhill ski development Conversely, development of Mt Eddy may permanently impair potential wilderness values

Wilderness attributes used in this analysis to determine the quality of a specific undeveloped area are identical to the elements used in the previous Roadless Area Review and Evaluation (RARE II) study The definition of the Wilderness Attributes Rating System can be found in the glossary

This section focuses on the general nature or type of impact of management practices and activities on wilderness attnbutes Viewed in this generic context, management practices and activities do not vary from one alternative to another. However, it is obvious that there are identifiable differences between alternatives The major variations between alternatives are due to the mix of management prescriptions under each alternative

Table IV-20 summarizes the effect of management prescriptions on each of the above wilderness attributes The table indicates the degree to which the attribute is retained from its current inventoried condrtion Both short-term (10 years) and long-term (50 years) effects are considered

The table indicates that Prescriptions I (Unroaded Non-Motorized Recreation), II (Limited Roaded Motorized Recreation), V (Wilderness Management), VII (Threatened, Endangered, and Selected Sensitive Species), and X (Special Area Management) will generally retain and slightly enhance inventoried intrinsic wilderness attributes Prescriptions III (Roaded Recreation), IV (Roaded, High Density Recreation), VI (Wildlife Habitat Management), VIII (Commercial Wood Products Emphasis/Timber Management) and IX (Riparian Management) may effect these wilderness attributes By comparing **Table IV-20** descriptions of the effects of each prescription on wilderness attributes wlth the maps of each alternative the effects of each alternative within and adjacent to the area can be assessed

The Mt Eddy area, the only further planning area to be analyzed for wilderness consideration under this round of Forest planning, is assigned to several prescriptions depending on the alternative themes and objectives (See **Table C-I** in Appendix C). Therefore, the overall quality of this area for wilderness is the product of the combined effects of each of the prescriptions used within that area

For example, if only 10 percent of the Mt Eddy area were distributed to development-oriented prescriptions (e g , Prescriptions III [Roaded Recreation], VI [Wildlife Habitat Management], and/or VIII [Commercial Wood Products Emphasis/Timber Management]) and 90 percent were distributed to a non-development prescription, the overall wilderness attributes for the entire Mt Eddy area will not be substantially impaired Also, if the 10 percent that was distnbuted to development-oriented prescriptions were separated from the Mt Eddy area boundary, the remaining *90* percent will be totally unimpaired

The important consideration is the amount of area allocated by prescription and the location and distribution of those prescriptions Since the varies by alternative, the impacts on wilderness attributes are discussed in the sections which follow

Under the 1984 California Wilderness **Ad,** all areas not designated by Congress for Wilderness or further planning were "released' for multiple-use resource management, exclusive of wilderness use Twenty-nine areas on the Shasta-Trinty National Forests, totalling about 306,000 acres (net) fell under this category These areas will be subject to review for possible wilderness classification when the Forest Plan is revised in 10 to 15 yean. Therefore, the amount of primitive recreation opportunities that are retained or foregone in the meantime is an important consideration

Figure IV-5 summarizes the future disposition of the 29 "released" roadless and undeveloped areas on the Shasta-Trinty The figure indicates that the amount of land subject to development (i e , activrties which will impact the primitive recreation characteristics of these areas) varies from *29* percent of the approximately 306,000 acres under

Alternative RPA to 12 percent under Alternative CBF Further analysis of the released areas also appears in Appendix C

Consequences Specific to An Alternative

Alternative PRF (Preferred Alternative). Wilderness attnbutes will be retained on about *90* percent of the Mt Eddy area through allocations to Unroaded Non-Motorized Recreation (Prescription I) and Research Natural Area (Prescription X) About 81 percent of the *29* released roadless area's acreage will remain undeveloped

Alternative RPA *(1990* RPA Program Emphasis). This alternative will eventually diminish most of the inventoried wilderness attributes in the Mt Eddy area This is due to emphasis on resource management activties which require roaded access and vegetation modification, and will result in higher densities of people About 71 percent of the *29* released roadless area's acreage will remain undeveloped

Alternative CUR (No Action/No Change). Wilderness attributes will be retained on about 70 percent of the Mt Eddy area through allocations to Limited Roaded Motonzed Recreation (Prescription II) About *72* percent of the *29* released roadless area's acreage will remain undeveloped

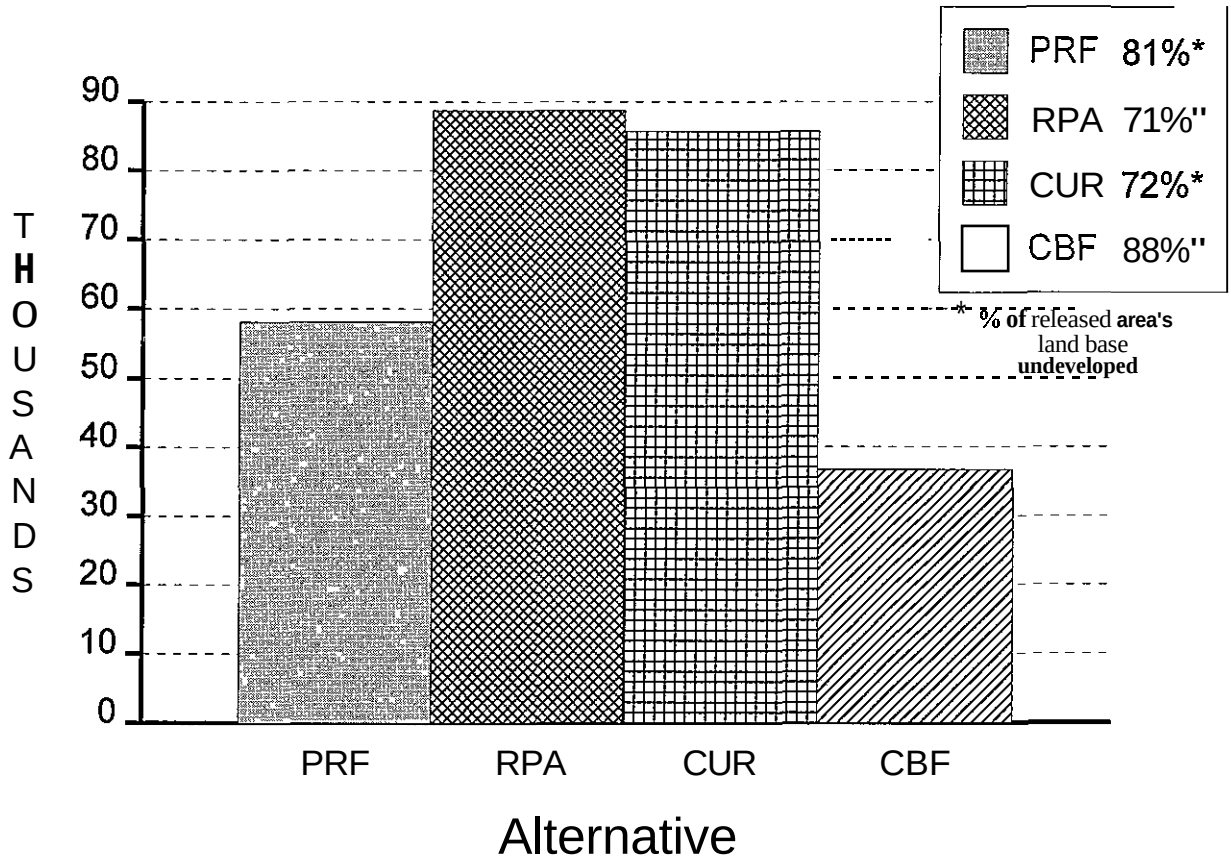
Alternative CBF (Citizens for Better Forestry). This alternative will recommend the entire Mt Eddy further planning area for wilderness designation About 88 percent *of* the *29* released roadless area's acreage will remain undeveloped

Table IV-20
Effects of Management Prescriptions on Inventoried Wilderness Attributes

	Degree to Which Inventoried Attribute is Retained (Short and long-term)				
Management Prescription	Natural Integrity	Apparent Naturalness	Solitude Opportunity	Primitive Recreation Opportunity	Supplementary Attributes
I Unroaded Non-motorized Recreabon	Retained	Retained	Retained	Retained	Retained
II Limited Roaded Motonzed Recreabon	Retained	Retained	Reduced	Reduced	Retained
III Roaded Recreation	Reduced	Reduced	Reduced	Reduced	Reduced
IV Roaded. High Density Recreabon	Eliminated	Eliminated	Eliminated	Eliminated	Reduced
V Wilderness Management	Retained	Retained	Retained	Retained	Retained
VI Wildlife Habitat Management	Reduced	Reduced	Reduced	Reduced	Reduced
VII Threatened, Endangered and Selected Sensitive Species	Retained	Retained	Retained	Retained	Retained
VIII Commercial Wood Products Emphasis/ Timber Management	Eliminated	Eliminated	Eliminated	Eliminated	Eliminated
IX Riparian Management	Reduced	Reduced	Reduced	Reduced	Reduced
X Special Area Management	Retained	Retained	Retained	Retained	Retained
XI Heritage Resource Management	Reduced	Reduced	Reduced	Reduced	Reduced

Figure IV-5
Future Disposition of Released Roadless Areas to be Managed for Non-wilderness Uses Under the 1984 California Wilderness Act (acre [thousands])

Total Acres: 306,060
Net Acres Subject to Development



24. Wildlife (General)

Overview of Analysis. Land management activities and natural events can affect wildlife populations by altering the food, water, cover, or spatial components of habitat Some of these activities and events are beneficial, while others are adverse or neutral depending on species life history requirements and management prescriptions A project that benefits one species may adversely affect another For example, when late seral stage forests are converted to early sera stage openings, there can be adverse effects to northern spotted owl and golden-crowned kinglet There can be beneficial effects to the California quail and white-crowned sparrow, but there will be little or no effect to yellow warbler and acorn woodpecker

The management indicator approach is used, along with Standards and Guidelines, to insure that all species on the Forests will be maintained at viable levels Management indicators are categorized into wildlife assemblages or groups of wildlife

Wildlife Assemblages as Management Indicators

1 Late Seral Stage

2 Openings and Early Seral Stage

3 Multi-habitat

4 Snag and Down Log

5 Rpanan

6 Aquatic

7 Hardwood

8 Chaparral

9 Cliffs, Caves, Talus and Rock Outcrop

See Chapter III, Wildlife for more wildlife assemblage information

Wildlife assemblages *are* influenced by the overall acreage in each management prescription because the objectives and emphasis varies Management prescnption acreage differs by alternative (see **Table IV-21** and management prescnption descriptions in Chapter 4 of the Forest Plan) Therefore, alternatives are compared to the historical situation and among each other by analyzing prescnption acreage, along with contrasting timber harvest method and quantities

Consequences Common to All Alternatives

Compared to the historical and existing situation, wildlife habitats will continue to have direct enhancement and rehabilitation activities varying by each alternative's emphasis or quantity of Prescription VI (Wildlife Habtat Management) land Water, forage, cover, and spatial weds for featured, hunted species will occur (deer, bear, elk, turkey) along with other wildlife such as neotropical migratoty birds A wildlife viewing program will continue to increase people's awareness and appreciation of the Forest and its wildlife resource

Table IV-21
Degree of Habitat Manipulation Resulting from Application of Management Prescriptions by Alternative (M Acres* and % of Land Base)

Management Prescription (and Degree of Habitat Manipulation	ALTERNATIVE							
	PRF		RPA		OLR		CBF	
IV, VIII (High)	291	(14%)	543	(26%)	551	(26%)	348	(16%)
III, VI (Moderate)	372	(17%)	473	*122%)*	473	(22%)	450	(22%)
II, VII, IX (Minimal)	865	(41%)	569	(27%)	572	(27%)	661	(31%)
I, V, X, XI (Insignificant)	593	(28%)	533	(25%)	525	(25%)	662	(31%)

* M Acres = thousand acres

Partnerships and programs for emphasis areas will continue to grow Elk Country, A Million Bucks, Taking Wing, Answer the Call, Eyes on Wildlife, Partners in Flight, and Animal Inn

The historical timber harvest level had a much higher effect upon wildlife assemblages compared to the existing situation and the alternatives considered Timber harvest volume was more than twice the amount than is currently proposed in any of the alternatives Historically, standards were less protective, resulting in greater habitat manipulation Adverse impacts occurred for the following assemblages. Late Seral Stage, Snag and Down Log, Riparian, Hardwood, and Aquatic The larger timber harvest level benefited Multi-habitat, Openings and Early Seral Stage, and Chaparral wildlife assemblages The number of acres of late seral stage assemblages increases in all alternatives, historically they had been decreasing

For the alternatives being analyzed, Prescription VIII (Commercial Wood Products Emphasis/Timber Management) will have the highest degree of indirect habitat manipulation Prescriptions III (Roaded Recreation) and VI (Wildlife Habitat Management) have a lesser degree of indirect habrtat manipulation These prescriptions affect about 25 percent of the Forests' land base These three prescriptions allow timber harvest and road construction which can modify seral stage progression, species composition, and increased access However, these affects are mitigated by Standards and Guidelines such as seral stage requirements, down log and snag requirements, and the ripanan standards Assemblages that may benefit within these prescnption areas are the Openings and Early Seral Stage, Multi-Habrtat, and Chaparral Assemblages that may be adversely effected are the Late Seral Stage, Snag and Down Log, and Hardwoods Across the Forest, chaparral will remain fairly constant at about 149,300 acres The amount of hardwoods will remain moderately constant at about 189,000 acres Seral stages within chaparral and hardwood lands will vary by alternative

The remainder of the prescriptions (about 75 percent of the land base) has a minimal degree of indirect habitat manipulation which is beneficial to Late Seral Stage, Multi-habitat, Snag and Down Log, Rparian. Aquatic, and Hardwood assemblages. The Cliffs, Caves, Talus and Rock Outcrop assemblage will not be affected by any of the prescriptions or alternatives

Prescriptions I (Unroaded Non-Motorized Recreation), IV (Roaded, High Density Recreation), V (Wilderness Management), VII (Threatened, Endangered, and Selected Sensitive Species), X (Special Area Management), and XI (Heritage Resource Management) do not allow for timber management activities

For all alternatives, diversity of wildlife habitat will be sufficient to meet population viability for wildlife by implementing and monitoring management requirements and standards and guidelines

The following <u>short-term</u> consequences of timber management activities can occur on lands under all alternatives

beneficial effects:

- openings provide forage, edges and patches provide local diversity
- green tree retention sites provide vertical/structural diversity to early seral stages, trees provide substrate for nests, cover, roosts, and snags and down logs, forage is provided

adverse effects:

- alteration of forested habrtat diversity such as conversion of successional stages, decreased snag and down log size and density, decreased large hardwoods, fragmentation, and loss of interior forest conditions,
- temporary disturbance, decreased thermal protection, displacement of animals and decreased reproductive success
- mortality of animals during implementation of projects due to crushing, site preparation and burning

Compared to histoncal level condltions, the following <u>long-term or cumulative</u> environmental consequences may occur under all alternatives

beneficial effects:

- late seral stage forests acreage will increase, interior forest areas will increase, thermal cover will increase
- increased wildlife associated with late seral stage forests and riparian areas, associated or dependent TE&S species populations will stabilize or increase:
- vertical diversity within forest stands will increase

adverse effects:

- openings and early seral stage forests will decrease, less open forage areas,
- small change as compared to histoncal levels in the amount of public access and human disturbance as a result of access management,
- small loss when compared wlth historical levels of habltat associated wlth surface area occupied by permanent roads and facilities,
- a decrease in wildlife dependent on early successional vegetation

Consequences Specific to An Alternative

Environmental impacts, as well as opportunlties to improve wildlrfe habitats, will vary by alternative These differences were assessed in the following ways

- Effects of management prescriptions (specifically commercial wood products prescriptions) on wildlife habitats.
- Effects of alternatives on habitats for wildlife assemblages, differences are primarily a function of the number of acres in each prescription or harvest goals by alternative,
- Amount of direct wildlife habitat enhancement and restoration

Late **Seral Stage Wildlife Assemblage.** The amount *of* late seral forests (seral stage 4b, 4c, and greater) is expected to increase from the historical levels and the current stuation in all alternatives by the end of the 5th decade This is a result of less timber harvested Minimally disturbed forested areas are beneficial for those species which are dependent on or associated wlth older, complex forests

Alternative PRF (Preferred Alternative). This alternative provides a high degree of maintenance of habitat for the late seral stage wildlrfe assemblage Alternative PRF places the second highest amount of land into Prescriptions I (Unroaded Non-Motorized Recreation), IV (Roaded. High Density Recreation), V (Wilderness Management), VII (Threatened, Endangered, and Selected Sensitive Species), X (Special Area Management), and XI (Heritage Resource Management) These prescriptions allow 54 percent of the land base to cycle naturally After 5 decades, 6 18,000 acres of late seral stage forest will exist This will give the second largest increase at 73,000 acres more than current levels

Alternative RPA *(1990* RPA Program Emphasis). Alternative RPA provides a high degree of maintenance of habitat late seral wildlrfe species Species dependent on mature forest areas will receive reduced benefts from this alternative. compared to Alternatives CBF and PRF Alternative RPA places the second lowest amount of land into Prescriptions I, IV, V, VII, X, and XI These prescriptions will allow 50 percent of the land base to cycle naturally After 5 decades, 6 10,000 acres will exist in late seral stage forest This will be the lowest increase at 65,000 acres more than current levels

RIternative CUR (No Action/No Change). This alternative provides a high degree of maintenance of habltat for these 'ate sera wildlife species Alternative CUR places the least mount of land into Prescnptions I, IV, V, VII, X, and XI These prescriptions will allow 50 percent of the land base :o cycle naturally After 5 decades, 6 14,000 acres of late seral stage forest will exist This will be the second largest ncrease at 69,000 acres more than present levels

Alternative CBF (Citizens for Better Forestry). Alternative CBF provides a high degree of maintenance of habitat for wildlife species dependent or associated with late seral stages Alternative CBF places the highest amount of land nto Prescriptions I, IV, V, VII, X, and XI These prescrip:ions will allow 61 percent of the land base to cycle iaturally After 5 decades, 62 ,000 acres of late seral stage forest will exist This will provide the greatest inrrease at 76,000 acres more than present levels

Dpenings and Early Seral Stage Wildlife Assemblage. There are about 10,600 acres of naturally occurring grasslands and meadows on the Forests Openings created through timber management activlties are transi:ional, but they greatly contribute habitat to the early seral stage wildlrfe Compared to historical levels, there will be ess openings created wlth each alternative There will be ess regeneration harvesting and less acres and harvest volume by all methods

With the Alternatives, Prescription VIII will have a high degree of habltat manipulation because commercial wood products development is emphasized Minimal and uneven-aged timber management is also a permrtted prac:ice Prescriptions III and VI have a moderate degree of habitat manipulation Prescriptions VIII, III, and VI reduce the existing amount of middle to late seral stage forest

stands, hardwoods, and dead-down material They also increase the potential for wildlife disturbances associated with increased access and fragmentation

This wildlfe assemblage will beneft by the increase in open habitat, such as plantations Some benefits will be moderated because of increased road density and its increased disturbance The amount of early seral habitat is expected to increase from the current situation in all alternatives by the end of the 5th decade

Alternative PRF (Preferred Alternative). Alternative PRF places 13 percent of the land base (lowest) into Prescnption VIII. PRF will have almost no acreage scheduled for the clearcut timber harvest method After 5 decades, 177,000 acres of seral stages 1 and 2 will be present This is the second lowest at 71,000 acres more than current levels

Alternative RPA *(1990* RPA Program Emphasis). Alternative RPA places 26 percent of the land base (highest amount) into Prescription VIII RPA will schedule the highest acreage of clearcut timber harvest methods After 5 decades, 185,000 acres of seral stages 1 and 2 will be present. which is the most at 79.000 acres more than current levels This alternative will be the most beneficial to wildlfe of the early seral stage assemblage

Alternative CUR (No Action/No Change). Alternative CUR places 26 percent of the land base (second highest) into Prescription VIII. CUR will schedule the second highest acreage to clearcut harvest methods After 5 decades, 181,000 acres of seral stages 1 and 2 will be present This is the second highest at 75,000 acres more than current levels.

Alternative CBF (Citizens for Better Forestry). Alternative CBF places 16 percent of the land base (second lowest) into Prescription VIII CBF will have no clearcut timber harvest After 5 decades, 173,000 acres of seral stages 1 and 2 will be present This is the lowest at 57,000 acres more than current levels This alternative is likely to be the least beneficial to wildlife of the early seral stage assemblage

Multi-Habitat Wildlife Assemblage. Both open habitats (e g Chaparral or Openings and Early Seral Stage) and cover habitats (e g Hardwood or Late Seral Stage) are important for bear, elk, turkey and deer Therefore, these species benefit from landscape diversity and mosaic patchwork of openings and cover Acreage of chaparral will remain fairly constant at about 149,300 acres Acreage of hardwoods will remain moderately constant at about 189,000 acres Seral stages will vary for chaparral and hardwoods will vary by Alternative and direct habitat manipulation

Alternative PRF (Preferred Alternative). Alternative PRF, after 5 decades, will provide for the lowest amount of created openings and the second highest amount of late seral stage forests.

Alternative RPA (1990 RPA Program Emphasis). Alternative RPA, after 5 decades, will provide for the highest amount of created openings and the lowest amount of late seral stage forests RPA will have a higher intensity of direct open habitat manipulation to maintain or increase deer populations

Alternative CUR (No Action/No Change). Alternative CUR, after 5 decades, will provide for the second highest amount of created openings and the second lowest amount of late seral stage forests

Alternative CBF (Citizens for Better Forestry). Alternative CBF, after 5 decades, will provide for the least amount of created openings and the highest amount of late seral stage forests

Snag and Down log Wildlife Assemblage. Compared to historic levels, all alternatives will retain a higher density of dead-down material for these wildlife species Timber management will be much less than historical levels, thus more acres will retain natural levels of snag and log densities For each alternative, standards and guidelines for retaining snags and down logs will remain constant There can be varying densities between alternatives because timber management treatments (such as regeneration cutting) and acreage will vary, however, compliance with standards and guidelines should provide for acceptable levels of snags and log densities Green tree retention treatments will moderate adverse impacts to this wildlife group because the large green trees will become future snags and down logs

Alternative PRF (Preferred Alternative). Under Alternative PRF 3,500 acres will be scheduled for regeneration harvest as compared to historic levels This alternative will have the second lowest amount of timber harvest acreage Alternative PRF, therefore, will be the second most beneficial to wildlife requiring snags and down logs

Alternative RPA (1990 RPA Program Emphasis). Alternative RPA will have the highest amount of acreage scheduled for the regeneration harvest method, but it will still be below historic levels This alternative will have the second highest amount of timber harvest acreage Alter-

natives RPA and CUR will be the least beneficial to the Snag and Down Log Wildlife Assemblage

Alternative CUR (No Action/No Change). Alternative CUR will schedule the second highest acreage to regeneration harvesting, but it will still be below historic levels Alternative CUR will have the highest acreage predicted for stand maintenance (salvage) treatment This alternative will have the highest amount of timber harvest acreage Alternatives RPA and CUR will be the least beneficial to this assemblage

Alternative CBF (Citizens for Better Forestry). Alternative CBF will also have a relatively low amount of regeneration harvesting when compared to historic levels Alternative CBF will have the lowest amount of timber harvest acreage This alternative will be the most beneficial to this assemblage

The Hardwood Wildlife Assemblage will be less adversely impacted compared to the historical situation, because timber harvest acres and volume will be much less In all alternatives approximately 75 aercent of the Forests will not be subject to any harvest that will impact hardwoods The standards and guidelines for the hardwood community will be the same for all alternatives Specific levels will be managed for to meet desired future conditions developed during watershed (landscape) analysis Alternatives with higher acreages of Prescription VIII will have more adverse impacts to wildlife that require hardwood for habitat needs This will apply only on those acres available for timber harvest

Alternative PRF (Preferred Alternative). Alternative PRF will have the least acres assigned to Prescription VIII It will also have the least adverse impact on wildlife requiring hardwoods

Alternative RPA (1990 RPA Program Emphasis). Alternative RPA will have the second most acre5 assigned to Prescription VIII It will also have the second most adverse impact on wildlife requiring hardwoods

Alternative CUR (No Action/No Change). Alternative CUR will have the most acres assigned to Prescription VIII It will have the most adverse impact on wildlife requiring hardwoods

Alternative CBF (Citizens for Better Forestry). Alternative CBF will have the second least acres assigned to Prescription VIII It will have the second least adverse impact on wildlife requiring hardwoods

The Chaparral Wildlife Assemblage will benefit from timber harvest activities that will create a mosaic of age classes and plant species Wildlife associated with the chaparral community will also benefit from direct habitat enhancement that will create a mosaic of age classes and plant species The standard and guidelines for the chaparral community will be the same for any alternative But timber management regimes vary by alternative This will create more open, transitory shrub-like areas (e g plantations), Therefore, alternatives that have more acres assigned to Prescription VIII and regeneration timber harvest methods, will benefit chapanal wildlife because of more openings being created

Alternative PRF (Preferred Alternative). Alternative PRF will place 13 percent of the land base (lowest) into Prescription VIII PRF will have almost no acreage scheduled for the clearcut timber harvest method Alternative PRF will be second least beneficial to chaparral wildlife, because it will create a small amount of openings and some direct chaparral treatments will occur PRF will be more beneficial than CBF to chaparral wildlife because of the higher ASQ

Alternative RPA (1990 RPA Program Emphasis). Alternative RPA will place 26 percent of the land base (second highest) into Prescription VIII This alternative will schedule the high acreage of clearcut timber harvest methods Alternative RPA will have a higher intensity of direct open habitat manipulation (e g prescribed fire in chaparral to maintain or increase deer populations Alternative RPA will be the most beneficial for chaparral wildlife because of the combined effect of direct and indirect management

Alternative CUR (No Action/No Change). Alternative CUR will place 26 percent of the land base (highest amount) into Prescription VIII Alternative CUR will have the most acreage scheduled for timber harvest, but the second most acres scheduled for the clearcut harvest method There will be minor direct habitat treatment

Alternative CBF (Citizens for Better Forestry). Alternative CBF will place 16 percent of the land base (second lowest) into Prescription VIII Alternative CBF will have no clearcut timber harvest This alternative will be the least beneficial to chaparral wildlife. because it will create the lowest amount of openings Some direct chaparral treatments will occur

Riparian and Aquatic Wildlife Assemblages will have better conditions compared to the historical situation because of protective standards and guidelines. Best Management Practices, land allocations, and supplemental

ManagementArea direction Aquatic wildlife will be cared for through application of fish management standards and guidelines. kparian Management Zones (RMZs) are the same for most alternatives. PRF has generally wider corridors along npanan areas than the other alternatives No timber harvest will be allowed along Class I and 2 RMZs and limited harvest activity will be allowed along Class 3 and 4 RMZs (see Management Prescnption IX) Ripanan and aquatic wildlife will not be adversely affected in perennial stream RMZs (class I and 2 streams) RMZs are smaller at lakes, wetlands, springs, ephemeral streams and intermrttentstreams Habtat components, such as future down logs and microclimate, can be modfied, but only if riparian values will be protected Thus, wildlife requiring these areas will be provided for

The nparian standards and guidelines adequately provide for nparian values at the same level in all alternatives except in PRF where intermittents and ephemerals are treated the same as perennial streams

WILDLIFE (Threatened, Endangered, and Sensitive Species)

Consequences Common to All Alternatives

All known or future srtes of Federally listed threatened or endangered (T&E) species will be fully protected by the Shasta-Trinity National Forests and managed according to Prescription VII All alternatives will meet the intent of the respective recovery plans for these species

Threatened At present, there are two known Federally listed threatened wildlife species on the Forests northern spotted owl and marbled murrelet

Endangered At present, there are two known Federally listed endangered wildlife species on the Forests bald eagle and peregrine falcon

Sensitive: All known or future sites necessary to provide for viable populations of sensitive wildlife species will be fully managed and/or protected as necessary Overall, the amount of Prescription VII habitat will fluctuate by not more than five percent between all the alternatives

Threatened

Spotted Owls. All alternatives except PRF will be managed according to the Final Northem Spotted Owl EIS, Interagency Scientific Commrttee (ISC) Report and the Final Fish and Wildlife Service Recovery Plan. PRF will be managed by providing Late-Successional Reserves, Riparian Reserves and standards and guidelines specific to late seral stage habitat and species

Marbled Murrelet. There are no known occurrences or nesting of this species on the Forests

Endangered

Bald Eagle. All alternatives will exceed the recovery target of 20 pairs of bald eagles Habrtat exists for continued Expansion of this species on the Forests

Peregrine Falcon. All alternatives will exceed the recovery target of 6 pairs of peregrine falcons Habitat exists for the continued expansion of this species on the Forests

Consequences Specific to an Alternative

Sensitive

There is a difference between alternatives for furbearers Alternative CBF will have more lands in Prescription VII specifically for fisher and marten when compared to the other alternatives Alternative PRF provides for furbears through the system of Late-Successional Reserves and wide Riparian Reserve corridors and specfic standards and guidelines related to late seral stage habrtat and species

Fisher and Pine Marten. Prescriptions that allow no scheduled timber harvest and streamside corridors will provide sufficient mature and older over-mature habitats of appropriate size and pattern to maintain viability of fisher and pine marten in all alternatives

Goshawk. All alternatives except PRF will provide a minimum of 150 habitat areas for goshawks in a matnx system of 18 square mile block per pair of goshawks Each alternative except PRF will provide for at least 150 acres of suitable habitat within each territory at any one point in time The above criteria will maintain the viability of goshawks in those alternatives Goshawks are provided for in PRF though the system of Late-Successional Reserves, Rparian Reserves and protection of sites and birds During project implementation All alternatives will consider goshawks during development of watershed analysis (landscape analysis)

Willow Flycatcher. Application of the special riparian management zone standards will provide for maintaining viability in all alternatives

E Means to Mitigate Adverse Impacts

Forest Standards and Guidelines were developed by the interdisciplinary team to provide guidance and direction to the land manager and to provide a system by which adverse impacts can be mtigated Specific direction is included in these standards and guidelines to assure that long-term productivity is not impaired by the application of short-term management practices

As noted earlier, standards and guidelines. along with laws, regulations, policies, and Pacfic Southwest Region Minimum Management Requirements and Minimum Implementation Requirements apply to all alternatives

The list of standards and guidelines which serve as mitigation measures is lengthy A summary of the management direction for the Shasta-Trinity National Forests is described in Chapter II A description of Forest Standards and Guidelines is contained in Chapter 4 of the Forest Plan

F Adverse Environmental Effects Which Cannot Be Avoided

Implementation of the action or any of the alternatives will result in some adverse environmental effects that cannot be avoided The application of the standards and guidelines is intended to limt the extent and duration of these effects

However, some adverse effects that cannot be avoided are included in the action and alternatives to it These effects include

- Short term increases in erosion and sedimentation resulting from soil disturbing vegetative management activities will occur despte application of erosion and water quality control measures and avoidance of highly erosive and/or unstable land areas In all alternatives road construction will result in increased erosion and permanent loss of productive land

- Short-term adverse effects will take place on scenic quality because of vegetation management and road construction

- Timber volumes will be foregone because of the inaccessibility and inoperability of steep landforms and by prescribing management prescriptions that do not allow harvesting

- Short-term reduction in air qualty will occur because of dust, smoke, and automobile emissions resulting from increased recreation use and vegetative management practices

Mitigation measures are included in the standards and guidelines and in the management prescriptions in the Forest Plan They are intended to mitigate the adverse effects that cannot be avoided

G Relationship Between Short-Term Uses and long-Term Productivity

The National Environmental Policy Act of 1969 (NEPA) requires consideration of short-term uses and long-term productivity in environmental analyses, but it does not define the terms The relationship between the two is very complex Forest management of public lands is a long-term venture, but one that must serve the year-to-year needs of society The thrust of consideration appears to be toward maintenance of productivty over the very long term Short-term uses might be considered as annual activities such as recreation. timber harvest or grazing, but these occur on a continuing basis and are probably acceptable so long as productivity is not significantly impaired

The inherent ability for long-term productivity is lost if soil productivity and hydrologic characteristics are impaired permanently by short-term uses Such things as compaction, soil erosion, and nutrient losses can result in a gradual decrease in timber and range productivity thus adversely affecting sustained yields for future generations

The Multiple-Use Act defines sustained yield as the "achievement and maintenance in perpetuity of high annual or periodic output of the various renewable resources of the National Forests without impairment of the productivity of the land"

While short-term uses can adversely affect long-term productivity, they can also enhance long-term productivty as in the case of a managed forest Short-term activities such as timber harvest, when applied properly, can increase growth and, therefore, increase long-term productivity over that of an unmanaged forest condition In fact, an unmanaged forest will, over time, decline in growth and, therefore, lower long-term productivity

Much of the specific direction and mtigation requirements of management standards and guidelines is directed toward maintaining long-term productivity The interdisciplinary team developed management standards and guidelines for two basic purposes: first, to ensure or

protect long-term productivrty: and, secondly, and equally important, to assure coordination and/or mitigation between resource uses and activities The intent. ultimately, is that long-term productivity and values of all resources be maintained at acceptable levels These standards and guidelines have the potential to maintain long-term productivity

The National Forest Management Act of 1976 (NFMA) Planning Regulations require that the Forest Plan specify monrtoring and evaluation requirements The purpose is twofold On the one hand, monitoring is *to* assure that the goals and objectives of the Forest Plan are, in fact, being met On the other hand, monitoring is instituted in order to determine that long-term productivity is maintained Monitoring requirements are displayed in the accompanying Forest Plan The requirements will be similar for all alternatives More intensive and costly monitoring activities and frequencies will be expected under high production Alternatives CUR (No Action/No Change), and RPA (1990 RPA Program Emphasis) Slight relaxations will be anticipated under Alternatives PRF (Preferred Alternative) and CBF (Citizens for Better Forestry)

In summary, through policy implementation, improvement *of* practices, and monitoring it is expected that long-term productivrty of the Forests can be maintained while still receiving the benefits of short-term uses

H Irreversible or Irretrievable Commitment of Resources

Irreversible commitment of resources refers to resources that are renewable only over a long period of time, such as soil productivrty, or to nonrenewable resources, such as cultural resources or minerals Alternatives were formulated with the understanding that maintenance *of* future options was an important consideration Measures to protect those resources that can be irreversibly affected by other resource uses were incorporated in the Forest standards and guidelines

The construction of arterial and collector roads to provide future access to the Forests is considered an irreversible action because of the time needed for a road to revert back to natural condrtions Also, the extraction of gravel and rock used for road construction and reconstruction is an irreversible action Mining and dam construction are also examples of activities that represent irreversible commitment of resources Alternatives RPA and CUR, with the highest resource output levels, have the greatest irreversible commitment of resources based on associated construction of roads Alternatives PRF and CBF have the fewest irreversible actions and protect future options the most All alternatives are at levels below historical averages, however.

Site-specific environmental analyses will further explore the impacts of any dam construction proposed on the National Forests relative to the irreversible commitment of resources This Final EIS and the Forest Plan do not include decisions on major dam construction projects (e g proposed enlargement of Shasta Dam, etc) They lie outside the scope of forest planning

Irretrievable commitment of resources is the production or use of renewable resources that are lost because of allocation decisions made This represents opportunities foregone for the period *of* time that the resource cannot be used Timber on steep slopes, that is not economically accessible, may represent an irretrievable commitment of resources since mortality is not salvageable The commitment is irretrievable rather than irreversible because future technological advances can make harvest of these areas possible and feasible Another example of irretrievable commitment of resources is wilderness designation

The difference between alternative-output levels and the higher levels that can be produced also represents an irretrievable commitment of resources For example, a low level of forage use for domestic livestock grazing or a low level of water yield can be increased in the future based on the application of different management prescriptions, but the outputs between now and then will be "lost" or not available for use Therefore, the maintenance of future options and the current utilization of the resources to the fullest extent possible tend to conflict with one another The purpose of Forest planning is to provide a mix of uses now and for future time periods that balance the needs of both the current population and future generations

I Possible Conflicts with Federal, Regional, State, and local land-Use Plans

There are no known conflicts with plans of cooperating or affected agencies Early in the Forests' planning process (1980), interested and affected Federal, State, and local agencies and jurisdictions enumerated their concerns relative to the management of the Shasta-Tnnrty National Forests Information provided by the various agencies helped the interdisciplinary team establish the issues to be addressed in the Forest Plan and the Final EIS Coordination with these agencies has continued throughout this planning process and is expected to continue into the future This Final EIS and the Forest Plan provide a vehicle to resolve any problems with other public agencies should

a conflict result from any of the direction contained in the various alternatives including the Forest Plan

To avoid future conflicts, close coordination and cooperation will need to continue between affected agencies in implementing the selected alternative These agencies include

U.S. Department of Interior-Bureau of land Management (BLM). The areas within which continued cooperation is expected are development of joint chaparral management plans, off-highway vehicle management, range administrahon. cadastral survey programs, and minerals management Active coordination in the above programs will mitigate any future conflicts between the two agencies

U.S. Fish and Wildlife Service (USFWS). The Shasta-Trinity National Forests will continue to coordinate their efforts in the management of the bald eagle, peregrine falcon, northern spotted owl, marbled murrelet, and other T&E territories through the USFWS consultation process Coordination will continue with the Calrfornia Department of Fish and Game (DFG), and Recovery Plans

California Department of Fish and Game (DFG). Because of the divergent missions of the National Forests and the DFG. there will always be some dfierence of opinion on how certain areas of land should be managed The planning objectives of the DFG provide a good perspective and position on the resolution of land use conflicts involving fish and wildlife management Close coordination of planning *efforts* in the development and implementation of the vanous State game herd and special fishery plans and the implementation of the eventual alternative selected in this Final EIS will need to continue This effort, along with a coordinated monitoring action plan, will mitigate differences that arise between the agencies

State Water Agencies. Water qualty standards will continue to be met using Best Management Practices (BMPs) Critical watersheds will be maintained as part of project management implementation These measures will minimize future conflicts in watershed management between the Shasta-Tnnity National forests and State water agencies

California State Parks. Some potential visual resource conflicts, due to timber management activties. are possible with the California State Park agency in the area surrounding Castle Crags State Park It is evident that the viewshed from Castle Crags is sensitive enough that these values should be considered in the design of area projects

State Energy Agencies. Possible conflicts may arise from both direct impacts on the land and indirect impacts because of regional energy needs

As the growing population of California scrambles for relatively cheaper sources of dependable energy from inside and outside the State, there will be an ever-increasing need to develop new facilities and upgrade existing power inter-ties This emphasis will result in new needs for power transmission corridors across the Forests Again, the State Energy Commission is at the forefront of this renewed emphasis

County Governments. Continued close cooperation with County Boards of Supervisors and Planning Departments will need to take place dunng the implementation of the selected alternatives to avoid future conflicts This cooperation is particularily important in the areas of land uses and road development and use

Energy Requirements and Conservation Potentials of Alternatives

Energy Consumption. Estimates of energy consumption by alternative include energy used for administration, road construction/reconstruction, timber harvest. recreation, fire management, watershed management, and grazing These estimates were measured in terms of gallons of gasoline and diesel fuel used and converted to British thermal units (BTUs) Worksheets used in these calculations are included in the planning records available at the Forest Supervisor's Office, 2400 Washington Avenue, Redding, Calrfornia

Energy consumption related to timber management activities accounts for about 80 percent of the average annual use under each alternative The calculation for timber energy consumption was based on the amount of petroleum products used in timber harvesting operations and associated road building activities

Energy Produced. Estimates of energy produced by alternative used the same categories shown above for energy consumption Water yield accounted for *94* percent of the total energy produced on the Shasta-Trinity National Forests

Energy Requirements. The following conclusions can be made on the effect of alternatives on the energy resources of the Shasta-Tnnity National Forests

- The inclusion of energy produced by water yields is misleading and tends to skew the overall energy ef-

ficiency of the alternatives The presence of the Central Valley Project involving the Sacramento and Trinity River Basins, plus the Shasta Dam, further exaggerates this situation,

- By excluding water yields (most of which are beyond the administrative control of the National Forests), it is obvious that, as one intensifies commodrty outputs, less efficient use of energy occurs However, differences between alternatives are predictable;

- Differences between alternatives from the standpoint of net energy requirements (budget) are insignificant, and

- The increased energy consumption in the high-output alternatives indicated by this analysis is balanced by the increased opportunties for addtional biomass utilization Some of this can be converted to energy production as technology and economic conditions permit

Chapter V

List of Preparers

CHAPTER V
List of Preparers

Primary responsibility for the preparation of the Forest Plan and Final EIS was held by the Land Management Planning Group and Interdisciplinary (ID) Team In addition, the Forests' Line Officers, consisting of the Forest Supervisor, Deputy Forest Supervisor, and the District Rangers, provided additional input to the planning process from a managerial viewpoint

Throughout the preparation of these documents, many individuals assisted in a variety of ways Without their expertise, ideas, and opinions, the writing of these documents would not have been possible

land Management Planning Group

Core Team Members

Steven Clauson — Land Management Planner

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Education: B S Forestry

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Education: College coursework

Ken DeCamp — Illustrator

Experience: Illustrator Shasta-Trinity N F 12 years Teaching, Botany, Mycology, Art, 10 years, Design and Illustration (private studio), 7 years: Fine Arts, 23 years, Forest Service 13 years

Education B A Geography. M A Geography and Education, Equivalent A A , English, Certificate, Graphics and Mapping

Gail Tanaka Editonal Assistant

Experience Computer Specialist, Planning Forester, Forestry Technician - Timber, Fuels Shasta-Tnnity N F 15 yean, USFS 15 yean

Education B S Entomology, College coursework in forestry

Gary Chase Hydrologic Technician

Experience Forestry Technician, Hydrologic Technician, Desktop publishing, Computer graphics, Spreadsheet and data base, Shasta-Trinity N F. 19 yean, USFS 20 yean

Education A A in Forestry

Scott Vaughn Fire Planner

Experience Fire Planner, Assistant Fire Management Officer, Fire/Fuels Forester, Shasta-Trinity N F 10 years, USFS 17 yean

Education B S Forest Resource Management

Jeff Paulo Silviculturist

Experience District Silviculturist, Reforestation/TSI Forester, Shasta-Trinity N F 13 years, USFS 19 years

Education B S Forest Management

Line Officers

Steve Fitch Forest Supervisor

Experience Forest Supervisor, Shasta-Tnnity N F, Forest Supervisor, National Forests in Florida, Deputy Forest Supervisor, North Carolina, Chief's Planning Staff, Washington, D C , Assistant to U S Senator, Washington, D C , Distrid Ranger, Shasta-Trinity N F, Recreatior Staff Officer. Inyo N F Forest Service 3C years

Education B S Forest Management Science

Robert Tyrrel Forest Supervisor - retired 1992

Expenence Forest Supervisor (3 National Forests), District Ranger (2 National Forests), Staff Officer - Public Affairs, Fire, Soils & Water, Staff Director Program, Planning and Budgeting (PP&B) Shasta-Trinity N F 8 yean, Forest Service 35 years (retired)

Education B S Forest Management

William Carpenter Deputy Forest Supervisor

Experience Deputy Forest Supervisor, Program officer, District Ranger, Timber Management Assistant Shasta-Trinity N F 10 years, Forest Service 33 yean (retired)

Education B S Forest Management

Charley Fitch District Ranger, Big Bar Ranger District

Experience Distnct Ranger, Distnct Resource officer, Forest Management, Silviculturist Shasta-Trinity N F 15 yean, Forest Service 28 years

Education B S Forest Management

Karyn Wood District Ranger, Hayfork Ranger District

Experience Distnct Ranger, Distnct Fire Management Officer, Recreation Staff Assistant, Assistant Fire Management Officer, Fuels Forester, Timber Sale Administrator, Sale Preparation Officer Shasta-Trinity N F 3 years, Forest Service 19 years

Education B S Forest Management

Robert Hammond District Ranger, McCloud Ranger Distnct

Experience District Ranger (2 National Forests). Resource Officer, Timber Management Officer, Administration Forester Shasta-Trinity N F 2 years, Forest Service 27 yean

Education B S Forest Management

Kathy Hammond District Ranger, Mt Shasta Ranger Distnct

Expenence District Ranger (2 National Forests); Public Affairs Officer, Resource Officer; LMP ID Team Leader, Dispersed Recreation/Wilderness Area Manager Shasta-Trinity NF· 2 years, Forest Service. 17 years; BLM. 3 years

Education B S. Natural Resource Management

Shawne Mohoric District Ranger, Shasta Lake Ranger District

Experience District Ranger, Wildlife Biologist, 3 districts, Multi-disciplinary Resource Officer, 2 districts Shasta-Tnnity NF 2 years, Forest Service. 15 years

Education B S Biology, B S Wildlife Science

Irl Everest Distnct Ranger, Weaverville Ranger District

Expenence District Ranger (2 National Forests), Resource Officer, Lands and Resource Officer, Forester Rights-of-way and Timber Management Shasta-Trinity NF 9 years, Forest Service 28 years

Education B S Entomology, B S Forest Management

Robert Ramirez District Ranger, Yolla Bolla Ranger Distnd

Experience District Ranger, Planning Forester; District Silviculturist, Forester, Silvicultural Assistant Shasta-Trinity NF 5 years, Forest Service 20 years

Education B S Forest Management

Supervisor's Office Staff

Jerry Brogan Timber Management

Experience Timber Management Officer (TMO), District Ranger, Deputy TMO, District TMO Shasta-Tnnity NF 9 years, Forest Service 33 years

Education B S Forestry

Ken Coop Range, Ecology, Wildlife, Fisheries, Botany

Expenence Biological Sciences Staff Officer, Fish/Wildlife Staff Officer, Botany Range, Ecology Staff Officer. Shasta-Trinity N.F: 12 years, 9 years, respectively Regional Area Game Management Biologist, Montana Fish & Game Department 6 yean, Dixie & Fishlake National Forests Zone Wildlife Biologist, 2 yean; Klamath National Forest Wildlife Biologist, 2 years Shasta-Trinity NF 14 years; Forest Service 18 years

Education AS Science/Biology, B.S Wildlife Conservation & Ecology, M S. Fishenes & Wildlife Management

Duane Lyon Rural Development, Bio Region Coordinator, Cultural Resources, and Tribal Government Liaison ***of-*** ficer

Expenence Forest Recreation Officer, Forest Land Management Planning Officer, Recreation Planning at Regional Level, Recreation and Visual Resource Managementat Forest, Regional, and Washington Office levels Shasta-Trinity NF 14 years, Forest Service. 28 years

Education B S Landscape Architecture

Royal Mannion Public Information

Experience Public Affairs Officer, Distnd Ranger, Timber Sale Planning, Resource Officer, Recreation Officer, Forester Shasta-Tnnity NF 13 years, Forest Service 30 years (retired)

Education B S Forest Management

Frank Packwood Special Agent

Experience Supervisory Criminal Investigator, Shasta-Trinity NF 11 years, Forest Service 29 years

Education Federal Law Enforcement Training Center-Criminal Investigator School, College coursework

Jim Stoll Forest Engineer

Expenence Assistant Forest engineer, Shasta-Trinity National Forest, 4 years, Forest Engineer, 2 years, Forest Service: 16 years

Education B S Civil Engineering

Kenneth Showalter Recreation/Lands

Experience Forest Recreation/Lands Staff Officer, District Ranger, Timber Management Officer. Recreation Officer. Program Planning and Budget Ofticer, Land Management Planning Team Shasta-Trinity N F 17 years, Forest Service 30 years

Education B S Forest Management

Other Specialists

Paula Crumpton Wildlfe Biologist

Expenence Wildlfe Biologist, Shasta-Tnnky National Forests 5 years, Wildlife Biologist, Gifford Pinchot N F 6 years, Wildlife Biologist, Cibola N F· 3 years, Seasonal Biologist, Six Rivers N.F 1 year Forest Service 15 years

Educabon B S Wildlife Management

Gregg DeNitto Pest Management

Experience Plant Pathologist Northern Callfomia Forest Pest Management Service Area Shasta-Trinity N F 6 years, Forest Service 15 years

Education Ph D Forest Pathology

Don Haskins Geology

Experience Forest Geologist, Geologist-Watershed Management Shasta-Tnnky N F 14 years, Forest Service 18 years

Education B S Geology. M A Geology

Winfield Henn Cultural Resources

Experience Forest Archaeologist. City Planning Commissioner, City General Planning Committee Shasta-Tnnity N F 18 years, Forest Service 18 years

Education B A Anthropology, M S Anthropology, Ph D Anthropology

Kristy Hern Recreation

Expenence Assistant Recreation and Lands Staff Officer Shasta-Trinity N F 4 years Distnct Special Uses Specialist. 6 years, Recreation Supervisor. 4 years Forest Service. 17 years

Education B A. Outdoor Recreation

Nancy Hutchins Wildlfe Management

Experience Distnct Wildlrfe Biologist, Shasta-Tnnity N F 10 years, Ochoco N F 3 years Forest Service 13 years

Education B S Forestry and Wildlfe Management

Richard Irizarry Fisheries

Experience Fishenes Biologist, Research Biologist, Fish Culturist Shasta-Tnnty N F 13 years; Forest Service 17 years

Education B S Fisheries Management, Graduate coursework

Patrick Kennedy Recreation-Visual Management

Expenence Forest Landscape Archtect, Recreabon-Visual Management/Planning Supervisory Forest Landscape Archtect (3 National Forests) Shasta-Trinity N F 20 years, Forest Service 32 years

Education B A Landscape Architecture

Sheila logan Ecology

Expenence Zone 3 Ecologist, Ecological Classification and Ecological Unit Inventory, Shasta-Trinity and Mendocino N F 6 years, Forest Service 16 years

Education B S. Plant Ecology, M S Forest Ecology

V i a n Long Botany

Experience Botanist, Shasta-Trinity N F, 2 years, Seasonal Sensitive Plant Technician, 2 years

Education B S Biology with emphasis in Botany

Julie Nelson Botany

Expenence Forest Botanist. Shasta-Tnnty N F 6 years, Forest Service 6 years. Berry Botanic Garden Conservation Director, 6 years, Consulting Botanist, 4 years

Education B S Botany, M.S. Biology

Darrel Ranken Soils and Water

Experience Forest Hydrologist; Water Quality Management, Watershed and BMP Monitoring; Watershed Restoration; Water Resource Inventory, Fluvial Processes and Channel Dynamics. Shasta-Trinity N F 17 years, Forest Service. 20 years

Education B S. Forest Management: M S Forest Hydrology

Kenneth Lanspa Soils

Experience Forest Soils Scientist, Soil Quality Management, Soil Quality Standard Monitoring, Watershed Restoration, Soil Resource Inventory Shasta-Trinity N.F 19 years, Forest Service. 33 years

Education B.S Geology, M.S Soils Reg Geologists 838

David Schultz Pest Management

Experience Entomologist. Forest Pest Management Northern California Shared Service Area Shasta-Trinity N F. 7 years, Forest Service I8 years

EducationB S Forestry, Ph D. Forest Entomology

JimTurner Program Analysis Officer

Experience Financial Planning, economics, operations research Shasta-Trinity N F 15 years, Forest Service 25 yean

Education B.S Colorado State University, Economics, Physical Sciences, M.S Colorado State University, Economics, Operations Research

Chapter V

Distribution List

CHAPTER VI
Distribution List

Copies of the Final Environmental Impact Statement (FEIS) and Forest Plan were distributed to all the agencies, organizations and individuals on the Shasta-Trinity NF mailing list The mailing list has been maintained for over 10 years and was *most* recently updated to include any agency, organization, or member of the public who submrtted comments on the 1993 Draft EIS The list printed in this chapter is not inclusive The complete mailing list is on file at the Forest Supervisor's Office, 2400 Washington Avenue, Redding, California Refer to Appendix K for responses to comments received on the Draft EIS

Elected Officials

Federal

Congressman Dan Hamburg
Congressman Wally Herger
Congressman Vic Fazio
Senator Barbara Boxer
Senator Dianne Feinstein

State

Assemblyman Stan Statham
Senator K Maurice Johannessen
Senator Tim Leslie
Senator Mike Thompson
Attorney General Dan Lungren

Federal Agencies

Advisory Council on Historic Preservation
Deleware River Basins Commissions
Environmental Protection Agency
  Region IX
  Environmental Review Branch
Federal Railroad Administration
Federal Agency Liaison Division
Federal Energy Regulatory Commission
Federal Highway Administration
General Services Administration
Interstate Commerce Commission
USDA Aphis ADC

USDA Forest Service
  Director of Environmental Coordination
  Pacrfic NW Regional Office
  Pacific SW Regional Office
    Land Management Planning
Pacrfic SW Experiment Station
Washington Office
  Land Management Planning
  Office of Environmental Coordination
  Office of the Chief
  Public Affair Department
USDA Office of Equal Opportunty
USDA office of General Council
USDA Soil Conservation Service
USDA Rural Electrification Administration
USDC Office of General Council
USDI Bureau of Indian Affairs
USDI Bureau of Land Management
USDI Bureau of Reclamation
USDI fish and Wildlife Service
USDI National Park Service
USDT Federal Highway Administration
US Army Corp of Engineers
US Coast Guard
US Department of Commerce
Habitat Conservation Division
NOAA Ecology & Conservation Division
US Deparment of Defense
Chief of Naval Operation
Deputy Assistant Secretary *of* Defense
Deputy Assistant Secretary of the Air Force
US Department of Energy
US Department of Health and Human Services
US Department of Housing and Urban Development
US Department of Labor

State Agencies

Air Resources Board
California State Board of Forestry
Callfornia Department *of* Boating and Waterways
California Department of Fish and Game
Califomia Department of Forestry and Fire Protection
Califomia Department of Justice
California Department of Parks and Recreation
California Department of Transportation Districts 1 & 2
California Farm Bureau FB-12
California Highway Patrol
California Regional Water Quality Control Board

  Central Valley Region
  North Coast Region
Callfornia Resources Agency
California State Clearing House
California State Lands Commission
California Water Resources Control Board

local Agencies

Cities

City of Anderson
Crty of Coming
City of Dunsmuir
Crty of Mt Shasta
City of Red Bluff
City of Redding
City of Weed
Crty of Shasta Lake

Counties

Humboldt
  Board of Supervisors
Modoc
  Administrative Officer
  Board of Supervisors
Shasta
  Board of Supervisors
  Planning Commission
  Planning Director
  Public Works Director
  Superintendent of Schools
Siskiyou
  Board of Supervisors
  Farm Bureau
  Planning Commission
  Planning Director
  Public Works Director
  Superintendent of Schools
Tehama
  Board of Supervisors
  Planning Commission
  Planning Director
  Public Works Director
  Superintendent of Schools
Tnnrty
  Board of Supervisors
  Planning Commission
  Planning Director
  Public Works Director
  Resource Distnct
  Superintendent of Schools
  Transportation Planning

libraries

Chico State Universrty
College of the Siskiyous
Colorado State University
Dunsmuir Branch Library
Humboldt State Universrty
Klamath-Trinity Library
Shasta College
Shasta County (main branch)
Shasta County (Anderson)
Shasta County (Burney)
Siskiyou County
Tehama County (Red Bluff)
Trinrty County (Hayfork)
Tnnrty County (Trinity Center)
Trinty County (Weaverville)
University of California (Berkeley)

Educational

Chico State University
College of the Siskiyous
Hayfork High School
Humboldt State Universrty
John Muir Institute
Mt Shasta High School
Shasta College
University of California at Berkeley
Universrty of Pennsylvania
Universrty of Southern Alabama
University of Wyoming

Interest Croups

American Motorcycle Association
American Fisheries Society
American Forest & Paper Association
Audubon Society
  Los Angeles
  Mt Diablo
  Mt Shasta
  Napa-Solano
Backcountry Horsemen of California
Bollibokka Land Company
California Association of 4WD Clubs
California OHV Association
Calriornia Trout
California Forestry Association
California Wilderness Coalition
California Native Plant Society
Calriornia Coalition for Alternatives to Pesticides
Caribbean Sea Turtle Conservation Network
Citizen's Commrttee to Save Our Public Lands
Crtizens for Better Forestry

Citizens Groups

Coalition for Health of Calrfornia Fishenes
California Off Road Vehicle Association, Inc
Far West Motorcycle Club
Federation of Fly Fishers

Friends of Chinquapin
Friends of the River
Graduates for Old-Growth
Hayfork Mining District
Klamath Alliance for Resources & Environment
Klamath Forest Alliance
McCloud River Preserve
McCloud River CRMP
Mendocino Environmental Center
Minerals Exploration Coalition
Mt Shasta Snowmobile Club
Mt Shasta Tomorrow
National Resources Defense Council
National Speleological Society, Diablo Grotto
Nor-Cal Broncos
Northern Calrfornia AFSEEE
Northcoast Environmental Center
Off-Highway Motor Vehicle Rec
California Water Resources Control Board
Paclfic Coast Federation of Fishermen's Associations
Preservation Conference Inc
Safe Alternative for our Forest Environment
Save Mt Shasta
Shasta Alliance for Resources & Environment
Shasta Lake Boaters Association
Shasta Miners & Prospectors
Shasta-Tnnrty Bioregional Council
Sierra Club
  Mother Lode Chapter
  Redwood Chapter
  San Francisco Bay Chapter
  Santa Lucia Chapter
Sierra Club Legal Defense Fund Inc
Ski Mt Shasta

Southern California Ancient Forest Advocates
South Fork Mtn Defense Committee
South Fork Trinrty Up-River Friends
Tehama Alliance
The American Alpine Club
The Fund For Animals
United 4-Wheel Association
Unitarian Universalist Church
Wilderness Society

Businesses

Bar 7 I 7 Ranch Inc
Burney Forest Products
Cascade World
Cedar Gulch Ranch
Environmental Consulting, Planning Design
Evans Environmental Consultants
Hearst Corportation
High Ridge Lumber Co
Insurance Journal
Interdisciplanary Researches
Laughing Heart Adventures
Lost coast 4X4's
Mt Shasta Herald
PG&E
Pacific Therapy Center
Pacific Wood Fuels Co.
Pacificorp
Polar Equipment Co
Redding Oil Co
Roseburg Forest Products
Ross Recreation Equipment
Running Wild
The Gold Rush
Wildland Fire Educational Services
WRC Environmental
Yolo Environmental Resources Center

American Indian Tribes And Nations

Big Bend Rancheria
Burnt Ranch Indian Assn
Calrfornia Council of Tribal Governments
Local Indians for Education
Montgomery Creek Rancheria
Northern California Indian Development Council
Pit River Tribal Council
Pit Rver & Karuk Tribes of Northern California
Roaring Creek Rancheria
Shasta Nation, The
Winimen Wintu Camp Organization
Wintu Education and Cultural Council
Tsungwe Council & Elders
Yurok Indian Tnbe

Individuals

Adams. Edward
Aldinger, Sally
Alexander, John & Debra
Allen, Bob
Allan, Michael & Linda
Allison, Dave
American Forest & Paper
Anderson, Ken
Anderson, Richard
Aramayo, Robert
Arcieri, Virginia
Arden, Alma
Armstrong, Cheryl
Auerbach, Elise

Baer, Lynn & Connie Bailey, Mark & Melinda
Baker, Carol
Balcom, Mark & Jan

Baldwin, Herb
Baldwin, Kenneth
Ballew, *Lany*
Baltic, Tony
Barnette, Karen L
Barbour, Sandra
Barron, Frank
Bartlett, Donald
Bartson, Andy
Battaglia. Phillip
Baumgartner, william
Baxter, David
Beamer, Lesa
Beatty, Kenneth
Belli. Vince J
Benjamin, Nathan
Berditschevsky, M
Berg, Bill
Bernhart. Ursula A
Biery, Ed
Bish. David
Blackburn, Wanda
Blackstone, Mary
Bloom, kchard
Blomstrom, Greg
Blum, Frank B ,Jr
Blumberg, Lewis
Bolton, June
Boone, Sandra
Borba, Carl
Borg, Lennea
Bottini, Franchesca
Boyd, Mimi
Bower, Joseph& Susan
Bowker, Lee - Dean
Bradfield
Bradford, Carlton & Joy
Bralver, Peter
Branch, Thomas & Pamela
Brannon, Melissa
Brennen. Jude
Broshears, James
Brown, Charlie
Browning. Dennis A
Buckley, John
Bucknavage. Jasmine
Bunnell. Lee
Burdette, Emily
Burke, Christopher H
Busby, Frank
Byron. Lewis

Cain, Tim
Calomiris, John, PE
Camp, Larry
Cantore, Dons
Capo, Phillip
Carlson, Bertha
Carnemolla, Anathony M
Casasjian, Carol
Cascade Cove Resort
Cassidy, Tom
Cedar Stock Resort
Chapman, Robin
Chamber of Commerce, Redding
Chamber of Commerce, Anderson
Chamber of Commerce, McCloud
Champion Timberlands
Chatham, R A
Christoph, Marguerite
Christopher, Richard
Cimino, Richard
Clemens, Jeffrey
Cline, Obie Jean
Coe. David
Coenen, Tim
Coffman, Ernie
Cole, Marianne
Coleman, Charles
Colson, Chris
Comartin, Andrea
Combes, Harold H
Conway, Bill
Cook, Walter
Cooksley, Jack
Cooper, Paul
Cooperrider, Allen
Corp, Dennis
Coules, Dennis
Cowardin, R M
Cox Family
Cramsey, David
Cross, Diane L
Curry, Charles

Danel. Russell
Danks, Cecilia
Daniels. James
David. Lawler
De Jager, William R
Dederian, Rich
Degmetich, Charles
De Jong, Aart C & Margaret Mitchell
Delaney, Bill
Depree JamesW
Dern, Carolyn
Dickins, Jennifer
Dodson, Jake
Dominquez. Mannie
Douglas, Claude

Downer, Craig C.
Dufort, Robert
Duncan &Associates
Dunnaez, Garnet
Echlin, Edward
Economou, Constantina
Edwards, Jeffrey
Edwards-Sayer, Peter
Eisenberger, Arthur & Roma
Eissler, Fred
Elgin, Russell
Elsea, Rollie
Ely, George
Emmons, Staci
Eng, Helge
Englebrecht, Mary Elizabeth
Engstrom, Tom
Erosion Control Inc
Evans, Steve
Evans, Willis A
Everett, Yvonne

Farrar, Wm R Jr.
Felts, Alexis
Ferara, Robert
Ferris, Howard
Fischer, Meade
Fitzwater, Michael
Flanigan, Celeste Kay
Floeter, Conrad
Floyd, Lora
Floyd, Phillip
Ford, David Ralph
Francheski, Shawna
Franklin, Robert
Frase, Dave
Freeman, Dennis
French, William
Fries, John
Fritz, John
Frost, Martha
Funocchi, Mart Ann

Garrett, Lawrence
Gaylor, Henry III
Geddie, John
Gerstley, Mrs James
Gerstung, Eric
Gilless, Keith
Gilmer, Don
Gitlin-Emmer, Susan
Glick, Ron
Gluck, David
Goldi, Virginia
Gomez, Terry
Goodrich, Lucile
Goodrich, Roberta
Graham, Dr & Mrs John
Gramrosa, Neil A
Graves, Edward
Green, Randy
Grosser, Paul
Guildman, Thomas
Gunn, Lynn

Haas, Michael
Hallenbeck, Bea
Hamilton, E
Hammons, Mananne Handler, Leslie
Hansell, Margaret
Hansen, Doug
Hanson, Norma
Harkin, Don
Harms, Bobbie
Haroun, Lee
Hamington, Ann & Larry
Harris, Manlyn
Harris, Ronald
Hart, John
Harter, Jane
Harvey, Alison
Head, Dale
Hecter, Susan
Hembling, Bnan
Henell, Elizabeth
Henn, Winfield
Hercsuth, Emil Albert
Hesseldenz, Tom
Higbie, Wesley
High Ridge Lumber Company
Hills, Leighton
Hinman, Bill
Hodgehead, David
Hoekstra, Bud & Maurie
Holdon, Matthew
Hollister, Aletta
Holquist, Robert C
Holzer, Tim
Honemann, Patricia
Holquist, Robert C
Hopkins, Karen
Horowitz, Richard
Horton, Barbara & Melvin
Howard, Roni
Howard & Rullman, Marge & TA
Hrubes, Robert
Hull, Eugenia
Hunt, Buel B
Hurlbut, Dr Stephen

Ibison, Jodie
Ingram, Paul

Jackson, Michael
Jacobowitz, Ila
James, Karen
Janosik, Steve
Janson, Delmar
Jedkins, Jeremy
Jensen, Gregory P
Johns, William
Johnson, Alec
Johnson, Darrow
Johnson, David E
Jones, Jennifer
Jungwith, Lynn

Kapple, Kathi
Katzen, Joanne
Kemp. Mrs Richard
Kimball, Don
Kinyon, Carey G
Kitt, Jeffrey
Klemenchch. Jack
Kloefkorn, Walter
Koths, Kristen
Kottinger, Jim
Kramer, Kenneth
Krol. Robert
Krueger, David S
KSYC
Kusek. Joan

Lacey, Henry B
Lacy, Robin
Lackey, Dale
La Pre, Lawrence F
Lake, Larry
Landeiro, Clara
Lannge, Evelyn & Nils
Larkin, Sean
Lasko, Carol
La Varete, John
La Zier, Cathie
Leimert, Walter
Light, Lillian
Lilinik. Lynda
Lincke, Susan
Logan, Barbara
Lorentzen. Bob
Lowell, Larry

Mackay, Steve
Maertz, Bernice C
Maggiora, Maureen
Malkin, Deborah
Mannion, Denise
Marks, Martha A
Marr, Tom
Marskell, Greg
Martin, Carl
Martin, Donald
Martin, Dan
Martin, Frances
Mason, Peter
Mason, Tad
McAllister, Bard
McCall, Linds, Sherrod, S Cameron & Megan
McCann, Catherine
McDowell, Richard
McKinley, Mary Anna
McKinney, Lisa
McKinney, Marilyn
McLaughland, Robert
McMahon, Marion & John
McMaster, Ken
McNicholas, Thomas & Stephanie
McOlin, Beacon L
Mecchi, Donald E
Meier, Alan
Meigs, Theodore & Ruth
Melo, Louis
Messenger, Lee
Metzger, Harry
Meyer, Bill & Dianne
Middleton, Jim
Miles, Matthew
Miller, Carla
Miller, Charles esq
Miller, Sally
Miller, Ronald W
Millers-Younger, Sandra
Mitchel, Juanita
Mitchel, Marie
Miyoshi, Mark
Modine, Ralph
Moore, Claudia
Moore, Don
Moore, Patrick
Morel, Barbara
Moretti, Julie
Moms, Don
Moms, Gloria
Moses, Robert E
Mountjoy, Daniel
Mueller, Emil J
Mueller, Mrs P
Munroe, Dean
Murphy, Edward C

NACLO
Nardi, Michael
Nelson, Irl
Nelson, Dennis
Nelson, Echo
Newbold, P
Newby, Theresa
Newby, Michael
Newton, Phil
Niswauder, Ruth
Nowacki, Anne & Doug

O'Reilly, Matthew
Olley, John
Olsen, Bruce
Orre, Ed
Owens, Jim

Pace, Felice
Pacfic Gas & Electric
Page, Jim
Painter, Robert
Palmer, Neil
Papini, B
Pardy, LInda Louise
Parton, Glen
Parton, Lona
Patterson, Nellie
Peckham, Kathleen
Peckham & Leonard, KE&KM
Pella-Donnelly, Mary Anne
Perlstein, Joel
Perske, Douglass
Peterson, Elizabeth
Peterson, Howard
Prtton, Helen
Pomeroy, Elizabeth
Ponting, Gordon
Power Engeneers
Pulliam, Dorothy & Hershel S

Quilaca, Phil
Quinlan, Erin

Rafacz, Bernard
Raleigh, Dr D
Ramp, Rudy
Rapf, Marni & John
Rathman, Pat
Ravizza, Thomas J
Reagan, Kelly
Rechin, Julie
Reinhart, Robin
Refkin, Mike
Reiser, Bruce
Renouf, Rich
Ribera, Manco
Riccomini, George
Richard, Christopher
Richards, Ed
Richardson, Aaron & Ione
Riesso, Jessica
Riggs, Katherine
Rippi, George
Rival, William
Rivera, Joe Jr
Robbins, Peter
Robley, Katie
Rocky, J
Rogalin, Kim
Rogers, Ron
Rogers, I
Rogers, Eric
Roper, Deborah
Rosa, Nicholas
Rose, David
Rose, Menko
Roser, Kurt B
Roseburg Resources Co
Roth, Barry Ph D
Rothenberg, Rebecca
Rourke, Mike
Rowland, Greg

Sanders, Dee W
Sanders, Charles
Sanderson, Terry & Winke
Santa Cruz, Andrew
Santa Cruz, Susan
Sattler, Ronald J
Saufley, Frost
Sawyer, John
Sawyers, James
Scales, Todd & Anna
Scenic Resource Management
Schaeffer, Mark
Scheck, Dennis, Stephanie, Diana, Stephen
Scheidegger, Kirk
Schimps, Erich F
Schiraga, Lori
Schlosser, John
Schmidt, Fred C
Scholbe, Arthur
Scholfield, Michelle
Schroeder, Arthur
Schubin, Tom
Schwartzenberg, Carl
Scott, Sally
Scratch, Vema
Self, Steven
Sertovich, Barbara
Sharpenter, Robert
Shaw, Robert H

Shirk, Onalee
Sickal, Kenneth
Sierra Pacific Industries
Silver, Dan
Simmen, Eric
Sims. Don
Slater, Jerry
Smegal, Tom
Smekar, Frank
Smith, Kenneth
Smith, Megan
Smith. Michael
Smith, Mike
Smith, Susan
Sochet, Marty
Soderlund, A
Speake, Constance
Steffenson, Frank
Steffenson, John
Steffenson, Mary Lee
Steger, Eric D
Steinberg, Dr & Mrs Daniel
Steger, Eric D
Stokes, Jim
Storey, Dr Keith
Storm, Donald
Strachan, A
Strand, Bonnie
Streamfellow, Dwight
Stymus, John
Suk, Tomas
Sundstedt, David
Swanson, John

Taff, Mike
Taylor, Nancy
Thomas, Leonard
Thomas Lynn R
Todd, Joyce
Toler, Irvin E
Towle, Phil
Trinity Journal
Tromba, Sal & Family
Truman, Patrick
Tuan, Linda
Tuck, Gene
Tupin, Mr & Mrs Joe
Tustin, Wayne & Shirley

Ulrich. Larry & Donna

Van Epps, Charles P
Van Steenbergh. Mary
Vanness, Richard
Vanoli, Mike, Merrill, Wayne

Vinyard, Lucille
Volker, Steven
Von Hein, Robert
Voss, Michael
Vulcan Power Company

Wagner, Steve
Wale, Tom
Walker, Paula Jean
Walsh, S J MD
Wasieleweski, Jeff
Webb, David
Weidenkeller, Roland
Weidert, Carl &Stanley
Weildich, Mary Lou
Wells, Mark
Welsch, William
Weseloh. Tom
Western Timber Service
Weston, Scott
Wetherby, Barret H
Wheeler, Wilma & Bryce
Wheetley, Mark
Whitaker, H
Whitehouse, George
Willard, Dwight
Williams, Mike
Williason, William
Willison, Darla
Willison, John
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Chapter VII

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Chapter VIII

Glossary

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Glossary

Abbreviations

Listed below are abbreviations and acronyms used in the Final EIS and Forest Plan An asterisk means it is further defined in this glossary (see Definitions).

AMS	Analysis of the Management Situation*
AQRV	Air Quality Related Values
ASQ	Allowable Sale Quantity*
AM	Animal Month*
AMA	Adaptive Management Area*
AWA	Administratively Withdrawn Area*
BLM	Bureau of Land Management
BMPs	Best Management Practices*
BSS	Base Sale Schedule*
CALTRANS	California Department of Transportation
CDF	California Department of Forestry & Fire Protection
CFS	Cubic Foot per Second*
CHA	Critical Habitat Area*
CHU	Critical Habitat Unit*
CMAI	Culmination of Mean Annual Increment*
CRA	Congressionally Reserved Area*
DBH	Diameter at Breast Height*
DCA	Designated Capability Area*
DFC	Desired Future Condition*
DFG	California Department of Fish and Game
EA	Environmental Assessment*
EPA	Environmental Protection Agency
ERA	Equivalent Road Acre*
EUI	Ecological Unit Inventories*
FEMAT	Forest Ecosystem Management Assessment Team
FUD	Fish User Day*
FWIP	Forest Watershed Improvement Program
GIS	Geographic Information System*
GRI	Geologic Resource Inventory
GTR	Green Tree Retention*
HCA	Habitat Conservation Area*
IAP	Interim Artificial Propagation*
IPM	Integrated Pest Management*
KGRA	Known Geothermal Resource Area
LAC	Limits of Acceptable Change'
LSR	Late-Successional Reserve*
LTSY	Long Term Sustained Yield*
MBF	Thousand Board Feet
MIRs	Minimum Implementation Requirements*
MIS	Management Indicator Species* or Management Indicator Assemblages*
MMBF	Million Board Feet
MMRs	Minimum Management Requirements*
NASA	National Aeronautical & Space Administration
NEPA	National Environmental Policy Ads
NFMA	National Forest Management Act*
NPBs	Net Public Benefits*
NTMB	Neotropical Migratory Birds*
OHV	Off-highway Vehicle*
PAOT	People-at-one-time*
PNV	Present Net Value*
RAMPREP	Resource Allocation Model Preparation*
RARE	Roadless Area Review and Evaluation

RIM	Recreation Information Management
RMZ	Riparian Management Zone
RN	Roaded Natural (see Recreation Opportunity Spectrum [ROS])*
RNA	Research Natural Area**
RPA	Forest and Rangeland Renewable Resources Planning Act of 1974*
ROD	Record of Decision*
ROS	Recreation Opportunity Spectrum*
RR	Riparian Reserve*
RVD	Recreation Visitor Day*
SAOT	Skien-at-one-time*
SIA	Special Interest Area*
SPM	Semi-primitive Motonzed (see ROS)*
SPNM	Semi-primitive Non-motorized (see ROS)*
SRI	Soils Resource Inventory
TE&S	Threatened Endangered and Sensitive Species**
TOC	Threshold of Concern*
TSI	Timber Stand Improvement*
USC	United States Code
USGS	U.S Geological Survey
VAC	Visual Absorption Capability*
VQI	Visual Qualtty Index*
VQO	Visual Quality Objective**
WARS	Wilderness Attribute Rating System*
WHR	Wildlife Habitat Relationship*
WRC	Water Resource Council, U S
WUD	Wildlife User Day*

Definitions

This glossary gives definitions of terms in the Final EIS and Forest Plan

A

"aa" (pronounced ah ah) type lava flow

A Hawaiian term for basaltic lava flows typified by a rough, jagged, spinose, clinkery surface (Dictionary of Geological Terms, Doubleday 1976)

acre-foot

The volume of water or sediment equal to the amount that would cover one acre to a depth of one foot (43,560 cubic feet, 326,000 gallons)

adaptive management

A continuing process of action-based planning, monitoring, researching, evaluating, and adjusting with the objective of improving implementation and achieving the goals of the selected alternative

adaptive management areas (AMA)

Landscape units designated for development and testing of technical and social approaches to achieving desired ecological, economic, and other social objectives

adfluvial

Refen to lake-dwelling fish that ascend streams *to* spawn, like kokanee

Administratively Withdrawn Areas (AWA)

Areas removed from the suitable timber base through agency direction and land management plans

adopted visual quality objective

The level of visual qualtty to which the landscape will actually be managed (see visual quality objective [VQO])

allocation

The assignment of sets of management practices (prescriptions) to particular land areas to achieve the goals and objectives of the alternative

allowable sale quantrty (ASQ)

The quanttty of timber that may be sold from the area of suitable timber land in an alternative This quanttty is usually expressed on an annual basis as the "average annual allowable sale quanttty" ASQ is normally expressed in board feet or cubic feet

Alquist-Priolo Special Fault Study Zones

The Alquist-Priolo Special Studies Zones Act was enacted in 1976 by the Callfornia Legislature with the purpose *of* providing maps of specfic seismic hazards, or earthquake potential These maps are used to regulate development near active faults in order to mitigate the hazard of surface fautt-rupture Regulation within

the zones is carried out mainly by the crties and counties that issue development permits

alternative

Inforest planning, agiven combination of resource uses and a mix of management practices that achieve a desired management direction, goal, or emphasis.

ambient air qualty

Air qualtty environment

amenity (amenity value)

Typically used in land management planning to describe those resources for which market values (or proxy values) are not or cannot be established

anadromous fish

Those species offish that live in saltwater most of their lives, after migrating from their fresh water beginnings As adults, they migrate back into fresh water streams to spawn Examples are salmon, steelhead and shad

analysis area

An analysis area is an aggregate of capability areas that responds in a uniform way to a given management prescription

analysis of the management srtuation (AMS)

A step in forest planning in which the forests' ability to supply goods and services in response to society's demand for those goods and services is determined

animal month (AM)

The quantity of forage required by one mature cow for one month (For land management planning purposes, the Pacfic Southwest Region uses 1,000 pounds/month or 30 pounds/day)

area of influence

A delineated geographic area within which the present or proposed actions of a forest unit exert an important influence on residents and visitors

arterial (road)

See "road"

aspect

The compass direction that the slope of a land surface faces (e g , north, northwest, south)

assessment

The renewable resources assessment required by the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA)

assigned value

A monetary value that represents the price consumers would be willing to pay for the Forests' outputs, whether or not such prices are actually paid to the Federal Government In forest planning the term "assigned value" refers to both market and non-market outputs, because it is National policy to provide most of the forests' outputs at either no charge to consumers or at a price less than the willingness to pay

B

background

View beginning 3 to 5 miles from the observer and as far into the distance as the eye can detect the presence of objects Skylines or ndge lines against other land surfaces are the strongest visual elements of the "background "

background level (background, natural background level)

The environmental conditions that exist prior to active management taking place

backlog

Work which needs to be completed by the Forest Service, such as reforestation, timber stand improvement, slash disposal, and land line location

basal area

The cross-sectional area of a stand of trees measured at 4 5 feet above the ground, expressed in square feet

base sale schedule (BSS)

A timber sale schedule formulated on the basis that the quantity of timber planned for sale and harvest for any future decade is equal to or greater than the planned sale and harvest for the preceding decade This planned sale and harvest for any decade is not greater than the long-term sustained yield capacity

benchmark

An analysis of the supply potential of a particular resource, or of a set of resources subject to specific management objectives or constraints Benchmarks define the limits wrthin which alternatives can be formulated

benefit

The total value of an output or other outcome (Negative or non-beneficial outputs or effects should be included in total benefts)

benefit-cost analysis

An analytical approach to making choices on the basis of receiving the greatest benefit for a given cost or producing the required level of benefits at the lowest cost The same analytical process has also been referred to as cost effectiveness analysis when the benefits cannot be quantified in terms of dollars

benefit-cost ratio

Measure of economic efficiency, computed by dividing total benefits by total costs Usually both benefits and costs are discounted to present values

best management practices (BMPs)

A practice or a combination of practices that have been determined to be the most effective, practicable means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals These practices have been certified by the State of California Water Resources Control Board and approved by the Environmental Protection Agency as the best means to control nonpoint pollution

biolink

See "Trinity Divide Biolink"

biological growth potential

The average net growth attainable in a fully stocked natural forest stand (or land)

biomass

The total mass (e g ,weight. volume) of living organisms in a biological system (Odum, 1971) For purposes of this document, biomass is the above-ground portions of shrubs and trees, excluding material that meets commercial sawlog specifications

biological diversity, or biodiversity

Species diversity - i e , number of different species occurring in a location or under the same condition It also refers to the variety of habitats and conditions in an area

board foot

Lumber or timber measurement term The amount of wood contained in an unfinished board 1 inch thick, 12 inches long, and 12 inches wide

bone-dried (tons)

A measurement of biomass, wood dried to a constant weight with a standard moisture content of 10% (oven dried)

broadcast burning

A technique of applying fire to target fuels which ignites all burnable materials over the entire unit being treated

browse

Leaf and twig growth of shrubs, woody vines Also shrubs and/or trees favorable and available for animal consumption

burning prescription

Written direction stipulating fire environment conditions, techniques, and administrative constraints necessary to achieve specified resource management objectives by use of fire on a given area of land

buy-out

Federal Timber Contract Payment Modification Act (98 STAT 2213, 16 U S C 618) Allows timber companies to buy out of timber sale contracts at a reduced amount in lieu of the original contract price

C

canopy

The more or less continuous cover of leaves and branches collectively formed by the crowns of adjacent trees in a stand or forest Canopy cover varies by the number of trees in an area

capability

The potential of an area of land to produce resources. supply goods and services, and allow resource uses under an assumed set of management practices and at a given level of management intensity Capability depends upon site conditions such as climate, slope, landform, soils. and geology, as well as the application of management practices, such as silviculture or protection from fire, insects, and disease

capability area

The smallest unit of land or water used in forest planning A discrete and recognizable unit, classified primarily according to physical (soil), administrative, and biological factors All land within a capability area is homogeneous in ability to produce resource outputs and in production limitations

carrying capacity

The number of individuals in a given species that can survive in, and not cause deterioration to, an ecosystem through the least favorable environmental conditions that occur within a given interval of time

chain

A measure of distance equivalent to 66 feet

chaparral

Avegetation community that consists primarily of shrub species such as chamise and ceanothus.

chargeable volume

All volume that is included in the growth and yield projections for the selected management prescnptions used to arrive at the allowable sale quantity, based on Regional utilization standards Consistent with the definition of timber production, planned production of firewood is not included in the allowable sale quantity and therefore is non-chargeable

class (with regard to visual quality)

For visual condrtion classes, see Visual condition"

class I area

An area designated for the most stringent degree of protection from future degradation of air qualtty The Clean Air Act designates as Mandatory Class I areas each National Park over 6,000 acres and each national wilderness over 5,000 acres, that was designated with the passage of the 1964 Wilderness Act

Clean Water Act

Law enacted by the United States Congress in 1972, as amended in 1977 and 1980, whose objective is to restore and maintain the chemical, physical and biological integrity of the Nation's water

clearcutting

Removal of all the merchantable trees in a stand in one cutting operation to help establish a new even-aged stand Clearcutting does not necessarily mean that all unmerchantable trees are removed

climax

The culminating stage in plant succession for a given site where the vegetation has reached a highly stable condition See "Succession"

coldwater fishery

Stream and lake waters which support predominantly coldwater species of fish These fish have maximum sustained water temperature tolerances of about 70 degrees Fahrenhert. Salmon and trout are examples

collector road

See "road".

commercial species

Tree species, such as Douglas-fir and ponderosa pine, suitable for industrial wood products

commodity

A transportable resource product with commercial value

community cohesion

The degree of unity and cooperation within a community in achieving its goals

community stability

The capacity of a community to absorb and/or cope with change without major hardships to groups or institutions within the community

compatible uses

Land uses which can exist together so that no one use improves or detracts from the quality of another In practice this definition is usually relaxed to include uses which can coexist and conflict only slightly

conflicting uses

Land uses by which the quality of each individual use is harmed by the other's uses when they occur together in the same area. This is due either to competition for limlted resources or from by-products which damage alternative uses

Congressionally Reserved Areas (CRA)

Areas that require Congressional enactment for their establishment, such as National Parks, National Monuments and Wilderness These are also referred to as Congressional Reserves

constraint

Limrtations, actions which cannot, or must be taken

consumer surplus

The difference between the total cost to consumers for a good or service and the amount each individual would be willing to pay rather than do without it

ronsumptive use

Use of a resource that reduces the supply

ronsumptive wildlife

Animal species that are hunted ortrapped such as deer, qual, or beaver

cool burn prescriptions

Prescriptions that result in low intense flames

cord

A stack of wood measuring 4 feet high, 4 feet deep, and 8 feet long In wood volume, two cords equal roughly 1,000 board feet

comdor

A linear strip of land identified for the present or future location of transportation or utility nghts-of-way wthin its boundaries *An* area that provides connectivity or migration routes for wildlife to travel between habtats Streamside areas are an example

cost

The price paid or what is given up in order to acquire, produce, accomplish, or maintain anything

cost, administrative

Costs of required general administration which are prorated over fixed, variable, and investment costs

cost, economic

Total fixed and variable costs for inputs, including costs incurred by other public and private parties, and opportunity costs Economic costs include adjustment for cost savings, and opportunity costs, if any

cost-effective analysis

A beneft-cost analysis process utilized when all benefits of the alternatives cannot be quantlfied in terms of dollars (US General Account Office, 1969) Cost effectiveness analysis compares alternatives in terms of their contribution to a goal by using costs and other effectiveness criteria

cost, fixed

Costs of the minimal level of activities committed for the planning penod

costs, maintenance level

Costs of activities needed to meet legal requirements (other than contractual) and costs needed to protect and maintain assets in the absence of controllable use

cost, variable

Costs of program activties above the maintenance level

cover type

Refen to actual stands of any vegetation type, whether dominated by tree, shrub, or grass species

critical habtat area (CHA)

Critical habitat area (CHA) and crtical habitat unrt (CHU) have been used interchangeably and for all intent and purpose, are one in the same CHNCHU is the specific area wthin a geographic area occupied by a species on which are found those physical and biological features (I) essential to the conservation of the species, and (2) that may require special management considerations or protection A CHNCHU normally would refer to a specific (U)nit or (A)area of cntical habitat and designated by a specific number, i e , CHU34

critical habitat unt (CHU)

Critical habitat unit (CHU) and critical habtat area (CHA) have been used interchangeably and for all intent and purpose, are one in the same CHU/CHA is the specific area within a geographic area occupied by a species on which are found those physical and biological features (I) essential to the conservation of the species. and (2) that may require special management considerations or protection A CHU/CHA normally would refer to a specific (U)nit or (A)rea of critical habtat and designated by a speclfic number, i e , CHU34

crown

The upper part of a tree or other woody plant carrying the main branch system and foliage above a more or less clean stem(s)

cubic foot per second (CFS)

Unt of measure of streamflow or discharge, equivalent to *449* gallons per minute. or about 2 acre-feet per day

culmination of mean annual increment (CMAI)

The point where the average annual growth of a stand of timber no longer increases

cultural resources

Tangible and intangible aspects of cultural systems, living and dead, that are valued by a given culture or contain information about the culture Cultural resources include, but are not limited to stes, structures, buildings, districts, and objects associated wth or representative of people, cultures, and human activities and events

cumulative watershed impacts

All impacts on beneficial uses of water and soil located outside of primary land use srtes They are the additive or synergistic effects of multiple actions within a watershed Cumulative effects occur as a result of more than one action and the changes may ether enhance or degrade water qualtty

D

demand analysis

A study of the factors affecting the quantity and pnce of a good and/or service that would be used as purchased by consumers if made available

demand schedule

The relationship between price and quantity demanded The demand schedule expresses how

much of the good or service would be bought or consumed at various pnces at a particular point in time

departure

A level of timber production that allows the planned sale and harvest to drop in a future decade (as opposed to non-declining yield) See "non-declining yield"

designated capability area (DCA)

A contiguous area of habltat to be managed and consewed for spotted owls

designated wildllfe areas

In reference to wildlife, specifically refers to lands presently identfied (or those which may be identified) as displaying the proper habitat attributes necessary for or capable of helping to support a viable population of a given species Field investigation, manual map overlays, and computer searches of the forests' land base may all assist in designating these areas Key designated areas include important winter range, fawning areas transition range, and roost sites

desired future condition (DFC)

The desired condition of the landscape expressed in terms of the biotic and abiotic components of the ecosystem and includes the social, economic and cultural elements

developed recreation

A recreation development site outside of the National Wilderness Preservation System with suitable characteristics for accommodation of intensive recreation activities Development sites can be either potential or existing

diameter at breast high (DBH)

Diameter of a tree measured 4 feet 6 inches from the ground

direct effect (pnmary effect)

A condition caused by an action or inaction without an intermediary causal agent, an effect characterized by a close causal relationship

discounting

Discounting reduces future costs and benefts to reflect the decreased future value and enables comparisons to be made of benefits and costs occurring at different points in time

discount rate

An interest rate that reflects the cost or time value of money It is used in discounting future costs and benefts

discretionary resources

Resources considered in the Forest Plan where the choices of allocation are not limited by laws and/or regulations, or by unique, site-specific sets of physical-environmental requirements Timber, recreation, and wildlfe are examples of discretionary allocations

dispersed recreation

Outdoor recreation that occurs outside planned and maintained recreational facilities (e g , scenic driving, hunting, backpacking, and camping in undeveloped areas)

distance zones

Areas of landscapes denoted by specified distances from the observer Used as a frame of reference in which to discuss landscape characteristics or activities of man

disturbed

See 'Visual condition"

diversity

Variety of different plant and animal communities and speaes within the area

drastic disturbance

See 'Visual condition"

E

ecological unit inventory (EUI)

The mapping of ecological units in a coordinated, interdisciplinary manner Ecological unit inventories include ecological types of both terrestrial and aquatic ecosystems National direction for ecological classification and inventory is contained in FSM 2060 and FSH *2090* I I

ecological type

A category of land having a unique combination of potential natural vegetation. soil, geomorphic process, landform, lithology, climate, and differing from other ecological types in its ability to produce vegetation and respond to management Riparian areas and wetlands are included in terrestrial ecological types

economic efficiency analysis

A comparison of the values of resource inputs (costs) required for a possible course of action with the values of resource outputs (benefts) resulting from such action In this analysis, incremental market and non-market benefits are compared with investment and physical resource inputs

ecosystem management

The use of an ecological approach in land management to sustain diverse, healthy, and productive ecosystems Ecosystem management is applied at various scales to blend long term societal and environmental values in a dynamic manner that may be adapted as more knowledge is gained through research and experience

ecotone

A transition zone between two or more vegetation communities It may have considerable linear length and is narrower than the adjoining community areas themselves The ecotonal communrty commonly contains many of the organisms of each of the overlapping communrties and, in addrtion, organisms which are characteristic of and often restricted to the ecotone Often, the number of species in the ecotone is greater than in the communrties flanking it Organisms which occur primarily or most abundantly or spend the greatest amount of time in junctional communrties are often called "edge species"

endangered species

Any species listed as such in the Federal Register which is in danger of extinction throughout all or a significant portion of its range

endemic organism

Species whose natural range is confined to a certain region and whose distribution is relatively limrted

environmental assessment (EA)

An analysis of alternative actions and their predictable short and/or long term environmental effects, which include physical, biological, economic, social, and environmental design factors and their interactions An Environmental Assessment is the concise public document required by the regulations for implementing the procedural requirements of National Environmental Policy Act (NEPA)

ephemeral

Lasting or existing briefly, temporary

ephemeral stream

A stream or reach of a stream that flows bnefly only in direct response to storm run off or seasonal snowmelt and whose channel is at all times above the watertable

equivalent road acre (ERA)

A unit of measure used in cumulative watershed impact analyses which represents the equivalent disturbance of one acre of roaded area Disturbances primanly include soil exposure and compaction

erosion gully

The removal of soil by the formation of relatively large channels or gullies cut into the soil by concentrated surface runoff

erosion, soil

The detachment and movement of soil from the land surface by wind and water

erosion, surface

Erosion which removes materials from the surface of the land as distinguished from gully or channel erosion The two main types of surface erosion are sheet erosion and rill erosion

esthetics

Evaluations and considerations concerned with the sensory qualrty of resources (sight, sound, smell, taste, and touch) and especially wtth respect to judgment about their pleasurable qualrties

ethnographic

The study of contemporary cultural groups

eutrophication

The natural process of maturing of a lake In general, and within limits, productivrty increases as a lake ages An eutrophic lake may characteristically be shallow in depth and rich in nutrients Littoral (shoreline) vegetation may be more abundant and plankton populations denser Because of heavy organic content, summer stagnation may be severe enough to exclude coldwater fishes, however, a lake is probably suttable for perch, pike, bass, and other warmwater fishes (Shasta Lake is a lake experiencing eutrophication unlike Trinity Lake which is referred to as an oligotrophic lake which means nutnent poor)

evapotranspiration

The conversion of water, whether open or as soil moisture or within plants, into water vapor that is released to the atmosphere

even-aged stand

A forest stand composed of trees having no, or relatively small, differences in age

even-aged timber management

The combination of actions that results in the creation of stands in which trees of essentially the same age grow together Managed even-aged forests are characterized by a distribution of the stands of varying ages (and therefore tree sizes) throughout the forest area The difference in age between trees forming the main canopy level of a stand usually does not exceed 20

percent of the age of the stand at harvest rotation age Regeneration in a particular stand is obtained during a short period at or near the time that a stand has reached the desired age or size for regeneration and is harvested Clearcut, shelterwood, or seed tree cutting methods produce even-aged stands

extirpated

To wipe out or make extinct - some species have been extirpated from areas

F

fine sediments

Small particles in the mixture of stream bottom (spawning) gravels that are less than 6 4 millimeters in size

fire break

A natural or artificial barrier usually created by the removal of vegetation and used to prevent or retard the spread of tire

fish habitat

The aquatic environment and the surrounding terrestrial environment that, combined, afford the necessary physical and biological support systems required by fish species during various life history stages

fish user day (FUD)

Twelve hours of recreation use oriented to fish

forage

All plants available for grazing or browsing by wildlife or harvested for feeding livestock

forb

Any herbaceous plant other than those in the Gramineae (true grasses), Cyperaceae (sedges), and Juncaceae (rushes) families, e g , wildflowers A broad-leaved flowering herb whose stem above ground does not become woody and persistent

foreground

The portions of a view between the observer and up to 1/4 to 1/2 mile distant The surface patterns on objects and visual elements are important in the "foreground" portions of views Observers are able to relate themselves to the size of individual visual elements (such as a tree) and are able to begin to sense their scale relationship to the landscape Aerial perspective is absent or insignificant in the "foreground," and the intensity and lightness or darkness colors are seen in maximum contrast Wind motion in trees or on grass can be seen in this close-in area but seldom beyond

Forest and Rangeland Renewable Resource Planning Act of 1974 (RPA)

An act of Congress that responded to the need for coordinated, long-range planning of resource uses within the National Forests

forest cover type

A classification of forest land referring to a group of timber stands of similar development and species composition. Examples in California include Douglas-fir, mixed conifer, and the true fir types

forest leadership team

Comprised of the Forest Supervisor, Deputy Forest Supervisor, principal staff members from the Forest Supervisor's Office, and District Rangers

FORPLAN

A linear computer programming model used to assure that land allocations and output schedules for alternatives and benchmark are made in a way that meets all constraints in the most cost-efficient manner possible In addition to being used to formulate alternatives and benchmark that are both feasible and cost efficient, FORPLAN is also used to perform detailed accounting work and to generate summary reports of information needed to construct the display tables in the Final EIS

fuel break

A wide strip of land strategically placed for fighting fires, where hazardous fuels have been replaced with less burnable fuels Fuelbreak divide fire-prone areas into smaller parcels for easier fire control and provide access for tire fighting

fuel loading

The quantity of fuel per acre in a given area, expressed in tons per acre Unless otherwise noted, this refers only to material which is dead or down on the forest floor

fuels

Any material capable of sustaining or carrying a forest fire, usually natural material both live and dead. Downed logs and branches are examples

G

geographic information system (GIS)

A computerized mapping system that enters, stores, updates, displays, analyzes, models and reports on information that is tied to known geographic locations

goal

A concise statement that describes a desired condition to be achieved sometime in the future It is normally expressed in broad, general terms and istimeless in that it has no specific date for completion Goal statements form the principal basis from which objectives are developed

goods and services

The various outputs, including on-ste uses, produced from forest and rangeland resources

grazing

Consumption of meadow or pasture vegetation by livestock and wildlife such as elk

green tree retention (GTR)

The practice of retaining live, growing trees on a site during timber regeneration harvests as afuture source oftreesandsnagsforwildlife Anaverageofsixtotwelve trees per acre that exceed the average stand diameter are normally retained

The definrtion is similar to the term "legacy retention" used by the Six Riven National Forest, and the term "regeneration with reserves" used by the Klamath National Forest

guideline

See standard and guideline

H

habitat

A place where a plant or animal naturally or normally lives or grows For wildllfe, habitat is made up of four components food, water, cover, and space

habtat conservation area (HCA)

An area established for the conservation of northern spotted owl populations

habitat element

A component of wildlie habitat Snags and hardwoods are examples

habitat matnx

A tabular valuation of wildlife habrtat for all wildlife species

hatchery

Any premises upon which breeding, hatching or fish-rearing facilities are situated when such premises are required to have a license by the state fish and game code, including ponds for commercial use

herbicide

A substance used to inhibit or destroy plant growth If its effectiveness is restncted to a specific plant or type of plant, it is known as a selective herbicide If its effectiveness covers a broad range of plants, it is considered to be non-selective herbicide

incompatible uses

Land uses which cannot exist together by reason of ether competition for limrted resources or use by-products which prevent the alternative use For example, timber harvesting and wilderness preservation are incompatible uses for one piece of land

indicator species

A particular species of plant or animal whose presence in a certain situation or location is a fairly certain sign or symptom that particular environmental condrtions are also present (management indicator species)

indirect effect (secondary effect)

A condtion caused by an action or inaction through intermediary causal agents An effect for which the causal linkages to the action or inaction are not readily apparent Indirect effect contrasts with direct effect This is not a measure of importance. but merely a classlfication by causal linkages Direct effects are usually easier to detect and measure wth certainty, but they may be ether more or less important than indirect effects

induced fish and wildlife outputs

Measurements of work accomplished by other resource functions to the benefit of fish and wildlife

inner gorge

A stream reach bounded by steep valley walls which terminate up a more gentle topography Common in areas of rapid stream dow or uplift, such as Northern Califomia and Southwest Oregon Walls must be 65 percent slope or greater

input-output analysis (interindustry analysrs, Leontief analysis)

A quantitative study of the interdependence of a group of activities based on the relationship between inputs and outputs of the activities The basic tool of analysis is a square input-output table, interaction model, for a given period that shows simultaneously for each activity the value of inputs and outputs, as well as the value of transactions within each activity itself It has been especially applied to the economy and the industries into which the economy can be divided

inputs

Land, labor, and capital required to produce outputs Inputs are generally represented by activity costs

integrated pest management (IPM)

A process for selecting strategies to regulate forest pests in which all aspects of a pest-host system are studied and weighed The information considered in selecting appropriate strategies includes the impact of the unregulated pest population on vanous resource values, alternative regulatory tactics and strategies, and benefit/cost estimates for these alternative strategies Regulatory strategies are based on sound silvicultural practices and ecology of the pest-host system and consist of a combination of tactics such as timber stand improvement plus selective use of pesticides A basic principle in the choice of strategy is that it be ecologically compatible or acceptable

interdisciplinary (ID) team

A group of individuals with different skills and training assembled as a team to solve a problem or perform a task (assembled out of recognition that no one scientific discipline is sufficiently broad to adequately solve a problem) Members of the team proceed to a solution with frequent interaction so that each discipline may provide insights to any stage of the problem and disciplines may combine to provide new solutions Thus it differs from a multi-disciplinary team where each specialist is assigned a portion of the problem and their partial solutions are linked together to provide the final solution

interim artificial propagation (IAP)

Augmentation of existing fish stocks on mainstem watercourses and/or their tributaries using aquacultural methods on a well-defined time-limited basis emphasizing use of natural and/or wild stock fish IAP is an element of bioenhancement Natural stock progeny of natural self-reproducing anadromous salmonids regardless of ancestry Wild stock, natural self-reproducing stocks that have not been supplemented or augmented with artificially produced fish

intermittent stream

A stream or reach of a stream that flows above ground only at certain times of the year, as when it receives water from springs or from some surface source A stream which, in general, flows only during wet periods and is dry during dry periods.

irreversible/irretrievable effects

Any effect of an action or inaction which (due to physical, biological, or socioeconomic constraints) cannot be recovered (by returning the object of the effect to its previous condition) within a reasonable length of time

issue

A matter that is in dispute between two or more parties, a point of debate or controversy

K

Key Watershed

As defined by National Forest and Bureau cf Land Management District biologists, a watershed containing (1) habitat for potentially threatened species or stocks of anadromous salmonids or other potentially threatened fish, or (2) greater than 6 square miles with high-quality water and fish habitat

L

Land and Water Conservation Fund Act (78 Stat 897, as amended, 16 U S C 4601-4 to 4601-11, 23 U S C 120 (Note))

Provides funds for the Federal acquisition and development of outdoor recreation resources

andform

Term used to describe many types of land surfaces which exist as a result of geological activity, such as a plateau, plain, basin, mountain, etc

andscape

A heterogeneous land area with interacting ecosystems that are repeated in similar form throughout

.ate-Successional Reserves (LSR)

A forest in its mature and/or old-growth stages that has been reserved under each option in the FEMAT report

imits of acceptable change (LAC)

A planning process that consists of the following four main components (1) the specification of acceptable and achievable resource and social conditions, defined by a series of measurable indicaton, (2) an analysis of

the relationship between existing conditions and those judged acceptable, (3) identification of management actions necessary to achieve these conditions, and (4) a program of monitoring and evaluation of management effectiveness

linear programming

A mathematical method used to determine the most effective allocation of limited resources between competing demands when both the objective (e g , profit or cost) and the restrictions on its attainment are expressible as a system of linear equalities or inequalities (e g , $y=a+bx$)

local road

See "road

long-term sustained yield (LTSY)

The highest uniform wood yield from lands being managed for timber production that may be sustained under a specified management intensty consistent with multiple-use objectives

M

macroinvertebrates

These are components of the aquatic environment that provide a connecting link in the food chain between multicelled periphyton. detritus from terrestrial sources and the fish population They are essential as a food source because of their strict habitat requirements and are very useful as indicators of changes in aquatic habitat The number, size and species of aquatic invertebrates are important to fish habrtat as they are the primary food source for many trout and young salmon Aquatic invertebrates include insects such as mayflies and stoneflies, crustaceans such as crayfish and shrimp. molluscs such as snails and clams, and fresh water earthworms Terrestrial invertebrates are also an important food source

major disturbance

See "visual condition"

Managed Late-Successional areas

Selected harvest areas and managed pair areas

management area

A contiguous area of land used in planning. usually consisting of differing analysis areas, to which one or more prescriptions are applied Management areas do not vary between alternatives, however, the prescriptions applied to them do vary

management direction

A statement of goals and objectives and the associated management prescriptions and standards and guidelines for attaining them

management indicator assemblages

Groups of wildlife associated with vegetative communities or key habitat components that are used to monitor effects of management activities

management indicator species (MIS)

See "indicator species"

management intensty

The level of output or use to be obtained on a given land area

management practice

A specific activrty, measure, course of action or treatment

management prescnption

Management practices and intensity selected and scheduled for application on a specific area to attain goals and objectives

Market

The processes of exchanging a good or service for money or other goods or services according to a customary procedure **A** market need not be an established institution located ai a specific place

market area

The area from which a market draws or to which it distnbutes its goods or services, and for which the same general prices and pnce influences prevail

mass wasting

A general term for the dislodgement and downslope transport of soil and rock material under the direct application of gravity Mass wasting includes slow displacement such as creep, and rapid displacement such as rockfalls, landslides and debns torrents

mast

Nuts, acorns, and similar products of hardwood species. which are consumed by animals

matrix

Federal lands outside of reserves, withdrawn areas, managed late-successional areas, and adaptive management areas

maximum modification

See "visual quality objective (VQO)"

middleground (middle distance)

The portions of a view between 1/4 or 1/2 mile and three to five miles from the observer The "middleground" portions of a view are especially critical because they tend to dominate the view It is in this distance range that the emergence of shapes and patterns on the landscape can be clearly seen Consequently, the "middleground" portions *of* a view often best show whether manmade changes rest easily or uneasily on the landscape

millennia

A period of 1,000 yean

mineral entry, withdrawals

The exclusion of mining locations and mineral development work on areas required for administrative sites by the Forest Service and other areas highly valued by the public

minimal timber management

See timber management intensities

minimum implementation requirements (MIRs)

Requirements which are within agency control but at the forest level there is little discretionary control regarding the application of them on the ground They are needed to ensure that alternatives are minimally acceptable and implementable on the ground

minimum management requirements (MMRs)

Requirements which are outside of Forest Service authorrty to change (i e , statutes and regulations in contrast to manual direction or agency policy)

minor disturbance

See "visual condition"

modification

See "visual quality objective (VQO)"

monoculture

The cultivation *of* a single timber species excluding others

multi-disciplinary team

A joint effort by two or more people having different scientific training and/or backgrounds and assigned responsibilities in the same activrty or effort Each specialist is assigned a portion of the problem and their individual solutions are combined to provide the complete solution

multiple use

The management of all the various renewable surface resources of the National Forest so that they are utilized in the combination that will best meet the needs of all

mustelid

A family of small active carnivorous mammals including many important furbearers and predators such as the mink and fisher

N

National Environmental Policy Act of 1969 (NEPA)

An A d of Congress which declared a National policy to encourage productive and enjoyable harmony and protection *of* the environment

National Forest Management Act of 1976 (NFMA)

Act of Congress that amended the Forest and Rangeland Renewable Resources Planning Act of 1974, to require and direct, among other things, the preparation of forest plans

National Forest System

The National Forest System consists of units of Federally owned forest, range, and related lands throughout the United States and its territories, united into a nationally significant system dedicated to the long-term benefit for present and future generations The National Forest system includes all National Forest system lands reserved or withdrawn from the public domain of the United States, all National Forest system lands acquired through purchase, exchange, donation, or other means, the National Grasslands and land utilization projects administered under Title III of the Bankhead-Jones Farm Tenant Act (50 Stat 525, 7 U S C 1010-1012), and other lands, waters, or interests therein which are administered by the Forest Service or are designated for administration through the Forest Service as a part of the system

iatural diversity data base

The State's data base of recorded locations for important plant and animal species

iatural openings

A natural (non-human-caused or induced) break in forest canopy with an understory predominately made up of herbaceous cover (grasses/forbs)

net public benefits (NPBs)

An expression used to signify the overall long-term value to the nation of all outputs and positive effects (benefits) less all associated inputs and negative effects

(costs) whether they can be quantitatively valued or not NPBs are measured by both quantitative and qualrtative critena rather than a single measure or index The maximization of NPBs to be derived from management of units of the National Forest System is consistent with the principles of multiple use and sustained yield

neotropical migratory birds (NTMB)

Birds that breed in North America and migrate to Central or South America during fall and winter Population levels of these birds are of international concern

nepheld metric

Measure of suspended sediments in a water column (Fisheries term)

non-chargeable volume

All volume that is not included in the growth and yield projections for the selected management prescriptions used to arrive at the allowable sale quantrty

non-consumptive species

Wildlife species not 'taken" for food, pelts, or sport, but normally, observed, studied, photographed, etc (as opposed to harvest or consumptive species)

non-declining yield

Timber scheduled for harvest so that any given decade's production does not fall below the previous decade's production

non-discretionary resources

Resources considered in the Forest Plan where the choices of allocation are limited by law and/or regulation, or by unique, site-specfic sets of physical - environmental requirements Wilderness, Research Natural Areas, and Wild and Scenic Rivers are examples of non-discretionary allocations

non-market outputs

Forest outputs not normally exchanged in markets In the Forest Service. the following are classified as non-market outputs dispersed recreation. fish and wildlife user days, and water Although not normally exchanged in markets, the Forest Service assigns proxy values for analysis purposes

non-point source

Source is general rather than specfic in location

O

objective

A concise time-specific statement of measurable planned results that respond to pre-established goals It forms the basis for further planning to define the precise steps to be taken and resources to be used in achieving identfied goals

obliterate (roads)

Obliterate means to block a road's use as a transportation facilrty remove any drainage structures, and return the land it occupies to full production

off-highway vehicle (OHV)

Off-road vehicle, examples include 4-wheel drives. jeeps. motorcycles

older over-mature habrtat

Multi-layered large older over-mature tree stage generally with an average age of the dominant trees of over IE0 years These stands display obvious signs of decadence and contain at least three trees per acre (standing or down) (on the average) over 36 inches dbh Referred to as old-growth habrtat, or late seral-stage forests

old-growth

See "older over-mature habrtat"

opportunity cost

The value of benefits foregone or given up due to the effect of choosing another management alternative that either impacts existing outputs or shifts resources away from other activities so that they are no longer produced and their benefits are lost

output

Goods, products, or services that are purchased, consumed, or utilized by people

output, maintenance level

The amount of an output which will occur regardless of management activity

overstory

That portion of the trees in a forest, with more than one roughly horizontal layer of foliage, which forms the upper or uppermost layer

overstory removal

A timber cutting method applied to stands with two distinct age or size classes, the older (or larger) of which is merchantable and is removed The removal should leave an adequately stocked stand of understory trees

P

partial retention

See "visual qualrty objective (VQO)"

perennial stream

A stream or reach of a stream that flows continuously throughout the year and whose upper surface generally stands lower than the watertable in the region adjoining the stream

people-at-one-time (PAOT)

A public recreational usage measurement term The number of people in an area or using a facilrty at the same time Generally used as "maximum PAOT" to indicate capacity of an area or facilrty to support peak usage loads.

pest

An organism, plant or animal, which interferes with the attainment of the Forests' goals and objectives

pesticide

Any material, synthetic or natural, used to control populations of pests

pH

A measure of hydrogen-ion activrty in solution expressed on a scale 0 (highly acid) to 14 (highly basic), 7 0 pH is a neutral solution, nether acid nor basic (Fetgh, 1973)

planned ignition

A fire started by deliberate management action

planning area

The area of the National Forest System covered by a Forest Plan

planning horizon

The overall time period considered in the planning process that spans all activities covered in the analysis or plan and all future conditions and effects of proposed actions which would influence the planning decisions (end of 16th decade/160 yean from current)

policy

A specrfic decision or set of decisions together with related actions designed for implementation

porosrty

Porous, capable of absorbing moisture

prescribed burn

Intentional application of fire to wildland fuels in either their natural or modified state, under such conditions of weather, fuel moisture, soil moisture, etc as allow the fire to be confined to a predetermined area and at the same time to produce the intensity of heat and rate of spread required to further ascertain planned objectives of silviculture, wildlife habitat, grazing, fire-hazard reduction, etc It seeks to employ fire scientifically so as to realize maximum net benefits wth minimum damage at acceptable costs

present net value (PNV)

The difference between the discounted value (benefts) of all outputs to which monetary values or established market prices are assigned and the total discounted costs of managing the planning area

preservation

See "visual quallty objective (VQO)"

price-quantity relationship

A schedule of prices that would prevail in a market for various quantities of the good or service exchanged

primrtive recreation

See "recreation opportunlty spectrum (ROS)"

program

The renewable resources program required by the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA)

project

A work schedule prescribed for a project area to accomplish management prescriptions, investments, maintenance, or protection

project planning (operation planning)

Types of planning concerned wrth physical undertakings (such as a dam) Project planning incorporates a greater range of specific elements than functional planning, and thus, deals with more numerous and diverse parts

proxy value

A value assigned to a good or service for evaluation purposes when the good or service is not bought or sold and an established monetary price does not exist

public issue

A subject or question of widespread public interest relating to management of the National Forest system

public participation activities

Meetings. conferences, seminars, workshops, tours, written comments, survey questionnaires, and similar activities designed or held to obtain comments from the general public and specific publics about National Forest system land management planning

pyroclastic

A clastic rock material formed by volcanic explosion or aerial expulsion from a volcanic vent

R

range allotment

An area designated for the use of a prescnbed number and kind of livestock

range, primary

Areas which livestock prefer to graze and overuse will occur before livestock select a secondary range

range, secondary

Range which is lightly used or unused by livestock and will ordinarily not be significantly used until overuse of the primary range

range, transrtory

Land temporanly sultable for grazing For example, grass may cover the area before being replaced by growth not surtable for forage, such **as** forested vegetation

rate-of-return

Rate of interest at which the net discounted benefts equal the net discounted costs (Internal rate-of-return is a similar measure appropriate to private firms)

real dollar value

A monetary value which compensates the effects of inflation

receipt shares

The portion of receipts derived from Forest Service resource management activrties distributed to State and County governments, such as the Forest Service 25 percent fund payments

recreation opportunity spectrum (ROS)

A means of classifying and managing recreation opportunities based on physical setting, social setting, and managerial setting Criteria results in five different ROS Classes briefly described below

Primrtive (P) - An area 3 miles or more from roads and trails wrth motorized use, generally 5,000 acres or greater in size in essentially an unmodrfied natural environmental setting

Semi-Primitive Non-Motorized (SPNM) - An area 1/2 mile from roads and trails with motorized use Generally 2,500 to 5,000 acres unless contiguous to primrtive areas or wildemesses wrth subtle modifications to an otherwise natural setting.

Semi-Primitive Motorized (SPM) **An** area 1/2 mile from roads and trails with motorized use and generally 2,500 to 5,000 acres in size May have moderately dominant alterations to an essentially natural setting wrth motorized use of roads and trails

Roaded Natural (RN) - **An** area 1/2 mile or less from roads and trails and open to motorized use Resource modrfications and utilization practices are evident but harmonize wrth the natural environment

Rural (R) - The natural environment is substantially modified to the point that developments are dominant to the sensitive travel route observer Structures are readily evident and may range from scattered to small dominant clusters Pedestrian or other slow moving observers are constantly within view of culturally changed landscapes Visitor contact is moderate to high Controls and regulations are obvious and law enforcement is visible Typical activrties or facilrties include but are not limited to camping, fishing, information centers, convenience stores, resorts, marinas, and downhill ski areas

recreation theme area

A conceptual organization of the recreation potential into geographic areas to provide a framework for examining recreational management opportunrties A list of recreation opportunrties for each of the 12 theme areas appears in the Final EIS, Chapter III, "Recreation" section

The 12 recreation theme areas are

1 Rural Community Interface

2 Trinity Divide and Castle Crags

3 Mt Shasta Recreation Area and Wilderness

4 McCloud River (upper, reservoir, lower)

5 Medicine Lake Highlands

6 Main Fork Trinity River

7 Trinty Alps Wilderness

8 Yolla Bolly and Chanchelulla Wildernesses/Tedoc Mountam

9 South Fork Trinlty River/Chinquapin

10 Shasta Unit of the National Recreation Area (NM)

11 Trinlty Unrt of the N M

12 Scenic Byways

recreation visitor day (RVD)

Defined **as** one person on srte for a 12 hour penod or any combination of people - i e , 3 people on srte for four hours each)

recreational nver area

Wild and Scenic Riven Act usage Those rivers or sections of rivers that are readily accessible by road or railroads, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past

record of decision (ROD)

As used in these documents, ROD commonly refers to the ROD "for Amendments to Forest Service and Bureau for Land Management Planning Documents Within the Range of the Northern Spotted Owl"

reforestation backlog

Suitable timber land which is currently not stocked with commercial trees species Lands occupied mainly with hardwoods, brush, or grasses scheduled for conversion to commercial conifers through reforestation

regeneration cutting

Applies generally to the logging stands of rotation age or greater, and of stands below rotation age which cannot economically be held any longer because of poor stocking, health, thrift, quality, or composition These cuttings are intended to replace the existing stands with a new stand

Research Natural Area (RNA)

An area established specifically to preserve a representative sample of an ecological community, primarily for scientrfic and educational purposes

reserve tree

Any tree or group of trees left unfelled in a harvest area that is being regenerated and kept as part of the new stand.

Resource Allocation Model Preparation (RAMPREP)

Pacrfic Southwest Region (Region 5) computer program for projecting timber growth and yields from existing and regenerated stands

Resource Amenity Emphasis Category

Individuals in this social category typically value natural resources more for their amenity and symbolic values than their economic conversion values For example, these individuals would prefer that local natural resource commodity items, such as timber, not be harvested but be retained for future generations See the Forest Plan, Chapter 3, for more information on this category

Resources Planning Act (RPA)

See Forest and Rangeland Renewable Resources Planning Act

Resource Utilization Emphasis Category

Individuals in this social category typically are directly or indirectly associated with the utilization/marketing of the natural resources in the impact area **An** example is those individuals whose occupations and/or political activities are associated with the wood products industry See the Forest Plan, Chapter 3, for more information on this category

responsible line officer

The Forest Service employee who has the authority to select and/or carry out a specific planning action

retention

See "visual quality objective (VQO)"

riparian area

Areas consisting of ripanan ecosystems, aquatic ecosystems, or wetlands Referring to the land bordering a stream, lake, marsh, or wet meadow

Riparian Reserves (RR)

Designated riparian areas found outside late-successional reserves

rip-rap

Wall or foundation of stones placed together, e g for stream bank protection

rip-rap composition

Using large rock;, boulders, concrete chunks or similar non-erosive objects as an armoring device for soil stability

risk cutting

Cutting to remove trees that are likely to die before the next periodic cut

road

Transportation route for motorized vehicles wider than 40 inches The three types of National Forest roads are arterial, collector, and local

Forest arterial road Serves large areas and usually connects with public highways or other Forest arterial roads to form an integrated network of primary travel routes Usually paved or chip sealed Travel speed 25 mph or greater Developed and operated for long-term management purposes and constant service

Forest collector road Serves smaller areas than arterial roads Collects traffic from Forest local roads and/or terminal facilities and is usually connected to a Forest arterial or public highway *Typically* has an aggregate, aggregate and oil, or chip seal surface. Travel speed 15-25 mph Road length. 5-15 miles. Operated for

constant or intermittent service depending on management objectives for the area

Forest local road Connects terminal facilities with Forest collector, artenal roads, or public highways Road may or may not have an aggregate surface Travel speed 5 mph Road length less than 5 miles, developed and operated for long or short term service, may be closed

road maintenance levels

The distinction between maintenance levels is not always sharply defined Some criteria may overlap two or more different maintenance levels Assignment at specfic maintenance levels should be based on the critena that best fits the management objectives for the road Some road management objectives, such as for interior campground road, may not be compatible with some of the following criteria In these situations, the desired level of user comfort and convenience should be used as the overriding criteria to determine the maintenance level

Level I Intermittent service roads dunng the time management direction requires that the road be closed or blocked to traffic Basic custodial maintenance is performed to protect the road investment and to keep damage to adjacent resources to an acceptable level Drainage facilities and runoff patterns are maintained

Level 2 This level is assigned where management direction requires that the road be open for limited passage of traffic Traffic is normally minor, usually consisting of one, or a combination of administrative, permitted, dispened recreation, or other specialized uses Log haul may occur at this level Roads in this maintenance level are normally characterized as single lane, primitive type facilities intended for use by high clearance vehicles Passenger car traffic is excluded

Level 3 This level is assigned where management direction requires the road to be open and maintamed for safe travel by a prudent dnver in a passenger car Traffic volumes are minor to moderate Roads are normally characterized as low speed, single lane with turnouts and spot surfacing Some roads may be fully surfaced with either native or processed matend The functional classification of these roads is normally local or minor collector

Level 4 This level is assigned where management direction requires the road to provide a moderate degree of user comfort and convenience at moderate travel speeds Traffic volumes are normally sufficient to require a double lane aggregate surfaced road Some roads may be single lane and some may be paved and/or dust abated The functional classification of these roads is normally collector or minor artenal

Level 5 This level is assigned where management direction requires the road to provide a high degree of user comfort and convenience These roads are normally double line, paved facilities. Some may be aggregate surfaced and dust abated Functional classfication of these roads is normally artenal

roaded natural recreation

See "recreation opportunty spectrum (ROS)"

rotation

The penod of time between the initial timber stand establishment and the time when it is considered ready for cutting and regeneration

rural recreation

See "recreation opportunty spectrum (ROS)"

---

salvage cutting

Cutting pnmanly to utilize dead and downed matend and scattered trees considered non-merchantable if left in the stand until the next scheduled cut

sanitation cutting

The removal of dead, diseased, infested, damaged, or susceptible trees essentially to prevent the spread of pests or pathogens and so promote forest hygiene

scenario

An outline or synopsis of a fixed sequence of future events in a defined environment

scenic nver

Wild and Scenic Rivers Act usage Those nvers or sections of nven that are free of impoundments, with shorelines or watersheds still largely pnmitive and shorelines largely undeveloped, but accessible in places by roads

selection logging (selection cutting)

Cutting method in which individual trees or small groups of trees are removed to create a stand with different sizes and age classes on the same site This results in an uneven-aged stand

semi-primitive motonzed recreation (SPM)

See "recreation opportunty spectrum (ROS)"

semi-pnmrtive non-motonzed recreation (SPNM)

See "recreation opportunty spectrum (ROS)"

senstive species

Species which have appeared in the Federal Register as proposed additions to the endangered or threatened species list, those which are on an official state list or are recognized by the Regional Forester to need special management in order to prevent them from becoming endangered or threatened

sensitivity level

A particular degree or measure of viewer interest in the scenic qualities of the landscape

seral

A biotic community which is a developmental, transtory stage in an ecologic succession.

seral stage

A stage or category that represents an ecologic successional time penod For example, an old-growth forest is a late seral stage

shelterwood system

Even-aged Silvicultural systems in which (in order to provide a source of seed and/or protection for regeneration) the old crop is removed in two or more successive "shelterwood cuttings," the first of which is ordinarily the seed tree cutting and the last is the final overstory removal cutting

silviculture

Generally, the science and art of cultivating (i e ,growing and tending) forest crops

silvicultural system

Establishing, growing and tending of forests Systems are classified as even or uneven-aged according to the method of carrying out harvesting (extraction of timber)

site index

A numerical evaluation of the quality of land for plant productivity, especially used in forest land where it is determined by the rate of growth in height on one or more of the tree species

skiers-at-one-time (SAOT)

A public recreational usage measurement term The number of skiers in an area or using a facility at the same time. Generally used as "maximum SAOT" to indicate capacity of an area or facility to support peak usage loads

slope gradient

Amount of elevation change per 100 feet, usually expressed as a percentage

snag

A standing dead tree from which the leaves and most of the branches have fallen Snags are important for wildlife, especially for cavtty nesters such as woodpecken and wood ducks.

social categories

Individuals and groups of individuals are affected differently by Forest management activties pnmanly because of different social linkages to the Forest Social categories have been formed based on histoncal and projected trends of user groups, public heanngs, informal interviews of Forest personnel and users, and other govemment studies and documents, use surveys and census data In the Forest Plan, Chapter 3, social categories are used to describe the various linkages and effects of management activties These categones are (1) recreationists, (2) Native Americans, (3) resource amentty emphasis, and (4) resource utilization emphasis Resource amenity emphasis and resource utilization emphasis categories are further defined in this glossary

special interest area (SIA)

Areas established and managed for their unique special feature They include geological, historical, archaeological, botanical, and other memorable features

species assemblages

A collection of species sharing a common habttat or srtuation

spotted owl habttat area (SOHA)

Refer to habtat conservation area (HCA)

stand

A communtty of trees occupying a specfic area sufficiently uniform in composition, age arrangement and condition distinguishable as a silvicultural or management unt Typically, stand sizes vary from about 5 to over 30 acres on National Forest System lands

stand maintenance

A management practice which includes individual tree harvest by salvage and high-risk sanitation for the removal of fire-killed, insect infested, and dead trees, although other live trees may be cut in the process

standard and guideline

A principle requiring a specfic level of attainment, a rule to measure against It provides basic direction for implementation of management activities

standard service level

Management of recreation facilrties which provides for vegetation management, full maintenance of facilrties, appropnate toilet cleaning and garbage pick up, and information and interpretive services for the recreabon user

stocking level

In a forest, a more or less subjective indication of the number of existing trees as compared to the desirable number for best results - e g , maximum productivity of wood

strategy

A consideration of altemative means to reach an objective

sub-climax plant communty

A successional stage of a vegetative type that is pnor to the final stage

succession

The process of replacement of one plant community (age, composition, height and densty) over time by another until the final (climax) or stable biotic community is reached

successional climax

See "succession"

successional stage

See "succession"

sutable forest land

Land that is to be managed for timber production on a regulated basis in an alternative

sump

A depression at the lowest level to receive water and form a pool, allowing particulate matter to settle

sustained yield

A continuous supply or yield over time

synergistic

Cooperative or combined action between people or agencies so that the total effect is greater than the sum of the parts

T

target

A statement used to express planned results to be reached wrthin a stated time period

terracing

A treatment used to prepare steep slopes (20 to 60 percent) for reforestation Tractors are used to cut terraces (benches) along the contour of the slope to remove competing vegetation and/or expose mineral soil Terraces are normally 8 to 12 feet wide with an undisturbed area left between *the* terraces One to two rows of trees, spaced 6 to IO feet apart, are then planted on each terrace

theoretical maximum capacity (TMC)

Formula used for planning purposes that captures a percentage of the design capacity* of a recreation facility

TMC = PAOT x managed season days x 2 x 40%

Where PAOT = people-at-one-time

Managed season days = number of days that a facility is open for use

2 = two 12 hour recreation visrtor days/use days

40% = estimated percent of time the site is utilized by a visitor in a 24 hour period

* Design capacty The number of PAOT which the space or facility can safely and conveniently support, consistent with the level of recreation experience (degree of ste development) the site is intended to provide.

thermal cover

Trees of sufficient densty that provide shelter from adverse temperature conditions for wildllfe

thinning

Cutting made in an immature crop or stand in order primarily to maintain or accelerate the diameter increment (annual growth) of the residual trees but also, by surtable selection. to improve the average form of the trees that remain. without permanently breaking the canopy

threatened, endangered, and sensttive species (TE&S)

See separate listing

threatened species

Any species which is likely to become an endangered species within the foreseeable future and which has been designated as threatened in the Federal Register

threshold of concern (TOC)

The point which a physiological or psychological effect begins

threshold level

The minimum concentration or amount of a giver substance or condition necessary to produce a measurable physiological or psychological effect

timber harvest schedule

The quantity of timber planned for sale and harvest, by time period, from the area of land covered by a Forest Plan The first period, usually a decade, of the selected harvest schedule provides the allowable sale quantity Future periods are shown to establish that sustained yield will be achieved and maintained

timber management intensities

intensive

A category of timber management intensity characterized by optimum timber yields (80-100 percent of potential) using the full range of silvicultural practices and intensities to obtain these yields Average rotation lengths vary from 100 to 110 years. Other non-timber objectives do not substantially constrain timber outputs Examples of land included in this category are Commercial Wood Products Emphasis/Timber Management (Prescription VIII)

minimal

A category of timber management intensity characterized by minor yields (20 percent of potential), primarily from sanitation/salvage cutting, due to site limitations or resource objectives which severely restrict timber management Average rotation length is 200 years

modified

A category of timber management intensity characterized by reduced yields (70 to 80 percent of potential) due to limitations on silvicultural practices or intensities in order to meet other resource objectives Average rotation length is 125 years Examples of land included in this category are Wildlife Habitat Management (Prescription VI) and visual partial retention areas of Roaded Recreation (Prescription III)

timber production

The purposeful growing, tending, harvesting, and regeneration of regulated crops of trees to be cut into logs, bolts or other round sections for industrial or consumer use The term does not include firewood.

timber stand improvement (TSI)

The use of pre-commercial thinning, cleaning, weeding and intermediate cuttings to eliminate or suppress less desirable vegetation and improve composition, condition, structure, or growth of a stand

timber suitability

Suitable Forest land that is to be managed for timber production on a regulated basis in an alternative

Tentatively Suitable. Forest land that (1) is producing or is capable of producing crops of industrial wood, (2) has not been withdrawn by Congress, the Secretary of Agriculture, or the Chief of the Forest Service, (3) has existing technology and knowledge to ensure timber production without irreversible damage to soils, productivity, or watershed conditions, (4) has existing technology to ensure adequate restocking can be attained within 5 years after final harvest, and (5) has adequate information available to project responses to timber management activities

Unsuitable (Not Suited) Forest land that is not managed for timber production because (1) the land has been withdrawn by Congress, the Secretary of Agriculture, or the Chief of the Forest Service, (2) the land is not producing or capable of producing crops of industrial wood, (3) technology is not available to prevent irreversible damage to soils, productivity, or watershed conditions, (4) there is no reasonable assurance that lands can be adequately restocked within 5 years after final harvest, based on existing technology and knowledge, as reflected in current research and experience, (5) there is at present a lack of adequate information in response to timber management activities, or (6) timber management is inconsistent with or not cost efficient in meeting the management requirements and multiple-use objectives specfied in the Forest Plan

:radeoff

The impact on an output or cost produced by changing another output or cost

:ransportation network

The transportation network includes all existing and planned roads, trails, bridges, airfields, and other transport facilities wholly or partly within or adjacent to and serving the planning area

:ravel influence zone

Areas comprising existing or anticipated significant public outdoor recreational occupancy use along existing and planned overland routes of travel, areas in and around existing or planned developed recreation sites These are areas in which beauty of the landscape and other aesthetic values are key management considerations

Trinity Divide Biolink

A link for biologic elements (animals, plants and people) joining the Klamath and South Cascade physiographic provinces

type conversion

The conversion of one type of vegetation cover to another, e g , the conversion of brush or forest covered lands to grass as for grazing purposes

U

unacceptable modtication

Activities that contrast excessively in form, line, color or texture from the charactenstic landscape

underburning

The prescnbed use of fire beneath a forest canopy

understory

The lower layer of trees and shrubs under the forest canopy

uneven-aged timber management

A timber management practice in which the application of a combination of actions needed to maintain continuous high-forest cover, recurring regeneration of desirable species, and the growth and development of trees through a range of diameter or age classes, provides a sustained yield of forest products Cutting is usually regulated by specifying the number or proportion of trees of particular sizes to retain wrthin each area, thereby maintaining a planned distribution of sizes classes Cutting methods that develop and maintain uneven-aged stands are single-tree selection and group selection See also Appendix L in the Forest Plan for definrtion

unnoticed

See "visual condrtion"

unplanned ignition

A fire started at random by ether natural or human causes, or a deliberate incendiary fire

untouched

See "visual condrtion"

V

values-at-risk

Any resources that are at risk of being damaged/destroyed as a resutt of fire

values, market

Values for market goods and services in terms of what people *are* willing-to-pay as evidenced by market transactions - measured in real dollars

values, non-market

Values for non-market goods and services that must be imputed from other economic information

vanety dass

A classtication system wrth three landscape categones

Distinctive (Class A) Unusual and/or outstanding landscape vanety that stands out from the common features in the landscape

Common (Class B) Prevalent, usual, or widespread landscape vanety wrthin a character type It also refers to ordinary or undistinguished visual vanety

Minimal (Class C) Little or no visual variety in the landscape, monotonous or below average compared to the common features in the character type

vegetative pattern

A vegetative arrangement of parts, elements. or details that suggests a design of somewhat orderly distribution

viewshed

Landscape seen or potentially seen from all or a logical part of a travel route, use area, or water body The purpose of corndor viewshed planning is to provide the management direction for retaining or creating the desired forest character in an attractive sequential arrangement over time and space.

visual absorption capabilty (VAC)

Capacty of a landscape to absorb proposed development or management activrties and still maintain its inherent visual character and qualty Two of the most important factors affecting the absorption capabilty of a landscape are (1) the degree of visual penetration, i e , the distance into the landscape you can see from a vantage point, and (2) the complexty of the landscape

visual character

The overall impression created by a landscape's unique combination of visual features (such as land, vegetation, water, structures, etc)

visual condition

The degree of physical alteration to the landscape Visual condition is referred to as existing visual condrtion (EVC) or future visual condrtion (FVC) Visual condrtion of activrties is measured by size, shape, and contrast in vegetative densty For example, an irregularly shaped management activity located in a densely canopied confer stand which has removed most vegetation in a one to five acre area would be classified as visual condition class II

This method of measurement is used to characterize the present quantity and degree of physical alteration, future quantity and degree of physical alteration, and the rate of change in those conditions that will occur over time in any alternative form of management

Visual Condition Classes are as follows

Class I - Untouched Areas that appear to have no physical alteration

Class II - Unnoticed Areas can be any size with low contrast or very small (0-5 acres) with high contrast

Class III - Minor disturbances Areas over 40 acres with moderate contrast to very small areas (0-5 acres) with very high contrast

Class IV - Disturbed. Very large areas (40+ acres) of high contrast to small areas (5-10 acres) of very high contrast

Class V - Major disturbance Very large areas of very high contrast to large (20-40 acres) areas of high contrast

Class VI - Drastic disturbance Areas greater than 300 acres of high contrast

visual quality index (VQI)

A numerical rating of scenic quality, an indicator of the relative overall visual quality of the forests Each acre of land is assigned a point value (ranking) based upon the visual quality level and the landscape variety class Rankings range from a high of ten points for an acre of land managed to a preservation standard on variety class A lands, to no points for unacceptable modification on variety class C lands Specific methodology for determining VQIs can be found in the Forest Planning Records

visual quality objective (VQO)

A set of measurable maximum levels of apparent naturalness of an area based on physical and sociological characteristics Refers to degree of acceptable alteration of a characteristic landscape

Preservation Ecological change only

Retention Human activities are not evident to the casual forest visitor

Partial Retention Human activity may be evident but must remain subordinate to the characteristic landscape

Modification Human activity may dominate the characteristic landscape but must. at the same time, follow naturally established form, line, color, and texture It should appear as a natural occurrence when viewed in foreground or middleground

Maximum Modification Human activity may dominate the characteristic landscape but should appear as a natural occurrence when viewed as background

W

warmwater fishery

Stream and lake waters which support fish with a maximum summer water temperature tolerance of about 80 degrees Fahrenheit Bluegills, perch, and largemouth bass are examples

matchable wildlife

Wildlife that people enjoy viewing such as deer and bald eagles

waterform

The shape or visual structure of a body of water

water influence zone

Areas oriented to outdoor water recreation

Watershed condition class

A description of the health of a watershed, or portion of the watershed, in terms of the factors which affect the quality, quantity and discharge characteristics of surface and groundwater resources, and the capacity of a soil for producing a plant community or sequence of communities under a specified system of management See Appendix H for detailed descriptions of Class 1, 2, and 3 watersheds Briefly, they are

Class 1 Watersheds which are generally in good to excellent condition

Class 2 Watersheds which are generally in fair to good condition

Class 3 Watersheds which are generally in poor to good condition

watershed order *(first,* second, third, fourth, or fifth)

Location of a watershed relative to its tributaries, corresponding to stream order

Wetlands

An area at least periodically wet or flooded, where the water table stands at or above the land surface (wet meadows and marshes)

wilderness attribute rating system (WAFS)

An index of wilderness quality used in the second Roadless Area Review and Evaluation (RARE II) of 1977

The rating consists of four requisite attributes 1) natural integrity, 2) apparent naturalness, 3) outstanding opportunities for solitude, and 4) primitive recreation opportunities In addition, the system provides for rating supplemental wilderness attributes outstanding ecological, geological, scenic, and historical features

wildlife user day (WUD)

A WUD represents a person being involved in the pursuit, taking or enjoyment of wildlife for a period of 12 hours

wildlife habitat relationship (WHR)

A system of organizing information about wildlife, their habitats, and relationships between them, the land and resource management It is used to set standards and guidelines, to evaluate species and habitat diversity, and to identify special habitat needs, etc

wild river

Wild and Scenic River Act usage Those rivers or sections of rivers that are free of impoundments, with shorelines essentially primitive, generally inaccessible except by trail, and with unpolluted water

X

xeric

Habitat characterized by dry conditions rather than mesic (moderate) or hygric (wet) conditions Chaparral is an example

Chapter IX

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Appendix A

ssues, Concerns, and Opportunities

APPENDIX A
Issues, Concerns, and Opportunities

Identification Process

Scoping Process (Identifying Public Issues)

In October *1979,* the Forest Supervisor of the Shasta-Trinity National Forests initiated a public participation plan for the Forests' long-range planning process Public participation for the Proposed Forest Land and Resource Management Plan (proposed Forest Plan) began with the publication of a Notice of Intent in the Federal Register on October 25, *1979*

On November 1, 1979, County Boards of Supervisors, the State Clearing House, and tribal leaden of local Native Americans were notified by letter about the Forests' planning process and the schedule of anticipated planning actions At the same time, a news release was sent to newspapers and radio and television stations within the Forests' zone of influence

A contact plan, identifying government officials and Native American tribal leaders affected by the Shasta-Trinty National Forests' planning process, was also prepared In the contact plan, District Rangers and interdisciplinary team members were assigned responsibilities to brief their designated contacts, on a one-to-one basis, and to encourage their participation in the planning process This contact plan is included in the planning records at the Forest Supervisor's Office, 2400 Washington Avenue, Redding, CA

A preliminary mailing list was developed from previous public involvement efforts This list, computerized for easy updating, contained the names and addresses of individuals, organizations, govemment agencies and Native American tribal leaders It now contains about *700* names

An initial planning newsletter, describing the planning process and inviting public participation in the identification of issues, was sent to everyone on the mailing list in December, *1979* In addtion, posters (with return postcards), encouraging public participation, were placed in offices and stores throughout the Forests' zone of influence.

Paid advertisements appeared in four local newspapers during November, 1979, announcing public workshops in Burney, Mt Shasta, Redding, and Weaverville The workshop in Burney was co-hosted by the Lassen National Forest, and the Weaverville Ranger District workshop was co-hosted wth the Mendocino National Forest On November 20, 1979, a news release was circulated to the news media invting the public to attend the November/December workshops

As a result of the Forests' initial public participation effort, 330 written responses, containing some 2,000 comments. were received

Screening of Suggested Issues

The first step in analyzing the public responses was to sort and classify the comments In this step, comments of a general nature were separated from "public issues" By definition, a public issue is a subject or question of widespread public interest relating to the management of National Forest lands

Many of the public's general comments pertained to the Forest Service's land management process and various day-to-day operational matters, rather than controversies about speck resource and management plans

The next step was to screen the public issues by applying the four criteria descnbed below This screening was necessary to ensure that the proposed Forest Plan focuses directly on major public issues which will determine future uses of Shasta-Trinity National Forests' land and resources (It should be noted that the proposed Forest Plan does not focus on broad national economic or social concerns, day-to-day operational decisions, or on matters beyond the scope, responsibility, and authority of the Forest Supervisor) Each proposed issue was screened against four cnterion If a "yes" could be answered to all the cnterion-questions, it became a major public issue If the answer to any one criterion was no, the issue was screened "out" and did not become a major public issue

Screening Criterion No. I: LONG-RANGE versus SHORT-RANGE Does the proposed issue involve major, long-range, land-use planning decisions ("strategic"

decisions), as distinguished from short-range "operational" activties and decisions?

Screening Criterion No. 2 PLANNING LEVEL Can the proposed issue be addressed at the Forest "level" within the planning process prescribed in the Planning Regulations and Federal legislation such as the National Environmental Policy Act (NEPA) and the Forest and Rangeland Renewable Resources Planning Act of 1980 (RPA)?

Screening Criterion No. 3 AUTHORITY Is the proposed issue wrthin the Forests' scope of direct responsibilities and authorities?

Screening Criterion No. 4 PUBLIC INTEREST Is the proposed public issue a subject or matter of widespread public interest. relating to the management of National Forest lands, identfied through public participation?

Of the 111 issues which were screened, 25 met all of the criteria Subsequently, they were addressed as "major public issues" in the 1986 Forest planning documents

Screening of Management Concerns

National Forest Management Act (NFMA) regulations require that the Forest Supervisor determine the management concerns that are to be addressed in the planning process Proposed management concerns were derived from the following sources

1 References spread throughout the NFMA regulations which relate to specfic resources, activities, and concerns

2 Management concerns recommended by Forest personnel Similar to the analysis of public issues, these items were sorted by applying the regulations' definition "A management concern (is) an issue, problem, or condition which constrains management practices identified by the Forest Service in the Planning process" Following this sort, the proposed management concerns were screened against three criteria given in the Forest Service Manual (FSM 1920)

   a Those that do not involve long-range planning and that are usually addressed at the project level (this corresponds to Screening Criterion # 1 for major public issues)

   b Those that cannot appropriately be addressed at the National Forest level (corresponds to Criterion #2 for major public issues)

   c Those that do not involve the Forest Service (corresponds to Criterion #3 for major public issues)

Those items which were screened "in" were placed under the appropriate RPA program element to accompany major public issues as "related management concerns"

Public Issues/Management Concerns Document

In a letter dated May 23, 1980, everyone on the Forests' planning mailing list was notified which public issues were selected to be addressed in the proposed Forest Plan The letter also referred to a detailed report of the issue/identification process that was available for review Copies of this document are in the official planning records at the Forest Supervisor's Office, 2400 Washington Avenue, Redding, Calfomia

The letter also announced that open houses would be held in June in Hayfork, Mt Shasta, Redding, and Weaverville to answer questions about the proposed Forest Plan and the disposition of public comments Very few people attended these open houses

Information meetings were also held in Mt Shasta, Redding, and Weaverville dunng December, 1980

In 1983 an extensive public involvement effort was undertaken wth regard to roadless areas This process focused specifically on the roadless areas recommended for wilderness, non-wilderness, and further planning in the 1979 Roadless Area Review and Evaluation (RARE II) Environmental Impact Statement (EIS) A detailed description of this effort is on file in the official planning records at the headquarten of the Shasta-Trinrty in Redding

Since the Forest planning process began, a coordinated planning approach has taken place with local, State, and Federal agencies. National Forests in Northern California and Southern Oregon and the Regional Office in San Francisco

A progress report on the status of the proposed Forest Plan has been displayed regularly in the semi-annual (April and November publication of the forest Environment Assessment [EA] Status Report) About 150 of these publications are sent to elected officials, government agencies, organizations and individuals

Land Management Planning Documents (1986)

In August, 1986, the Shasta-Trinrty National Forests issued two land management planning documents for public review and comment Nearly 1,000 copies of the Proposed Forest Land and Resource Management Plan (proposed Forest Plan) and the Draft Environmental Impact Statement (DEIS) were sent to interested publics along with a transmrttal letter Another 400 documents were mailed upon request during the public review period In addition, a news release was sent to the news media within the Shasta-Trinrty National Forests' zone of influence outlining the public review process and encouraging public participation

The initial 90-day public review period began with the issuance of the proposed Forest Plan and Draft EIS on August 17, 1986 Public briefings were held between August 25th and September 4th in Burney, Hayfork, McCloud, Mt Shasta, Red Bluff, Redding, and Weaverville

Reaction to the documents was mixed Some wanted the documents to be withdrawn and others asked that the public comment period be extended Because of the implications of some of the concerns raised, Regional Forester Zane G Smith announced on September 26, 1986, that the draft documents were being recalled and would be re-issued at a later date However, he encouraged public comments by emphasizing that they would be extremely helpful in rewriting the proposed Forest Plan and Draft EIS Shortly after Smith's announcement, the public review date was extended to January 17, 1987

During December, 1987, eight (afternoon and evening) formal hearings were held at Redding (12/8), Hayfork (12/9), Weaverville (12/10), and Mt Shasta (12/11) A total of 163 people gave statements at the hearings

By the close of the public review period, the Shasta-Trinity National Forests had received more than 1,300 pieces of correspondence containing a wide variety of valuable information Comments came in the form of postcards, letters, form letters, petitions, resolutions, and 100 page documents as in the case of a Citizen's for Better Forestry Alternative and a Wilderness Society Critique Transcripts from the public hearings were analyzed the same as the other correspondence received

4 summary of the content analysis process (the method used to analyze the public comments received) was made available to the public in May, 1987

Comments received dunng the 1986/87 public review period were used to update and revise the public issues for the 1990 phase of Forest planning Management concerns were either dropped or elevated to public issues Thirty major public issues were addressed in Chapter I of the 1990 Draft EIS For a detailed list and description of those issues refer to that document

Revision Of Land Management Planning Documents (1987-1990)

From the close of the public comment period (January, 1987) through the re-issuance of the revised planning documents, emphasis was placed on providing the public with a better understanding of some of the major areas of controversy This was done primanly through a series of public seminars

4 March, 1987, seminar covered the content and capability of the new planning data base for the Forest Also presented was information on the revised planning schedule and an overview of the public comments received on the Draft EIS and proposed Forest Plan A seminar held in May, 1987, addressed the various silvicultural systems, including alternatives to clearcutting **A** preliminary analysis of the amount of timber that could be produced by adopting any on the silvicultural systems was also presented

At the July, 1987 seminar, spotted owls and some options for managing their habitat was discussed A September, 1987 seminar covered how the management of the natural resources, employment, revenues, and Forest Service budgets fit together in the development of a Forest plan An early Fall, 1988 seminar focused on the formation of alternative Forest plans

Throughout the planning period, Forest Service personnel worked closely with individuals and groups to give them a better understanding of the forest planning process Some of the groups included The Audubon Society, Sierra Club, SHARE (Shasta Alliance for Resources and Environment), CBF (Citizens for Better Forestry), California Native Plant Society and The Wilderness Society

The Citizens for Better Forestry developed and proposed an alternative Forest Plan in December of 1986. Repre-

The Crtizens for Better Forestry developed and proposed an alternative Forest Plan in December of 1986 Representatives from CBF worked closely wrth Forest Service planners to refine their proposal so it could be evaluated along with other alternatives in the Draft EIS The CBF proposal was displayed as Alternative CBF

In addition. the Tnnrty County Board of Supervisor; submitted comprehensive suggestions that applied to portions of Tnnity County Although those suggestions were not treated as a separate, new alternative, many of them were analyzed in detail and brought forward into one or more of the alternatives

A few "round table" sessions, sponsored by the Universrty of Calfornia Cooperative Extension Forester, were held in Mt Shasta and Weaverville The purposes of those sessions were to provide a public forum to share ideas and gain a better understanding of the Forests' planning process

Since the decision was made to revise and re-issue the documents, informational programs were also presented to vanous groups such as Shasta County School Administrators. Rotary Clubs, American Society of Civil Engineers, Miner's Committee. California Registered Professional Foresters and The Shasta Fly Fishers

Iand Management Planning Documents *(1990 - 1993)*

On February 27, 1990, the Shasta-Trinity National Forests issued a Draft EIS and proposed Forest Plan for a 120-day period of public review and comment At that same time, a news release was distributed to the news media within the Shasta-Trinrty National Forests' zone of influence outlining the public review process and encouraging public participation

Public briefings on the contents of the two documents were held in Redding, Weaverville and Mt Shasta during April of 1990

Formal Public Hearings on the two documents were held in June of 1990 in Redding, Weaverville and Mt Shasta

On June 22, 1990, during the public review period. the U S Fish and Wildllfe Service listed the northern spotted owl as a threatened species under the Endangered Species Act That action significantly changed the range of management opportunrties displayed in the Draft EIS and proposed Forest Plan The Forest Supervisor subsequently announced that revised documents would be issued The revised documents would provide the public wrth an opportunrty to review and comment on the full disclosure of the effects of the listing of the spotted owl Public comments were encouraged and continued to be received until the comment penod closed on July 7, 1990

By the end of the public comment period, 1,656 responses were received and their contents analyzed Subsequently, the 30 public issues addressed in the Draft EIS were re-evaluated Some of the public issues did not warrant further consideration. they were either dropped or combined wrth other issues The list was narrowed down to 21 public issues that are addressed in the Draft EIS and the accompanying proposed Forest Plan

A January 22, 1991, Notice of Intent was published in the Federal Register announcing that the Forest Service would issue a revised Draft EIS and proposed Forest Plan dunng the Winter, 1991-92

On January 28, 1991, a letter was sent to everyone on the planning mailing list updating them on the status of the proposed Forest Plan

Another Notice of Intent was published in the December 4, 1992, Federal Reeister changing the date for issuing the revised documents to Spnng. 1993

In October of 1993 the DEIS and proposed Forest Plan were issued Over 400 responses were received Based on public response the number of issues to be addressed in the FEIS was increased to 22

Review of Other Agency/Native American Tribal Plans

U.S. Department of Interior-Bureau of Iand Management (BLM)

Resource Management Plan - Redding Resource Area

Forest personnel participated in the review of the resource srtuation analysis involved in the preparation of the above plan This provided the Shasta-Tnnrty wrth an opportunrty to ensure that the management directions prescribed on adjacent National Forest lands in the Draft

U.S. Department of Interior-Bureau of Indian Affairs (BIA)

Klamath River Basin Fisheries Resource Plan

This plan was used in the development of the analysis of the management situation for the fishery resource This plan was used to establish management opportunrties for habitat improvement, to gather histories of past anadromous fish runs, to determine current and projected estimates of angler demands and use patterns, and to describe current habitat condrtions

U.S. Department of Interior-Bureau of Reclamation

Proposed Trinity River Basin Fish and Wildlife Management Program (October, 1980)

This plan was used to develop background information and histones of past fish runs for the analysis of the management situation for the fishery resource

U.S. Department of Interior-Fish and Wildlife Service

Final Environmental Impact Statement (Final EIS) - Proposed Trinity River Basin Fish and Wildlife Management Program

This Final EIS was used to establish fishery habltat improvement opportunrties and feasible production goals for the Trinity River Basin fishery

U.S. Department of Interior-National Park Service

Whiskeytown-Shasta-Trinity National Recreation Area (NRA) - Whiskeytown Unit Master Plan

This Plan was used to coordinate recreation management between the Forest Service and the National Park Service units of the NRA The resulting management direction was incorporated into the supplemental management direction for the Management Areas compnsing the Shasta and Tnnrty Units of the NRA Refer to Chapter 4 of the Forest Plan

State of California - Department of Fish and Game (DFG).

Hayfork Deer Herd Management Plan
McCloud Flats Deer Herd Management Plan
Weaverville Deer Herd Management Plan
Yolla Bolla Deer Herd Management Plan

These plans were used to incorporate some of the wildlife goals and objectives in the proposed Forest Plan They were used to establish projected levels of hunting use, and to evaluate and describe current and projected population conditions for game species for the analysis of the management srtuation

Shasta, Tehama, Siskiyou, and Trinity Counties

General Plan(s)

These plans were used to ensure maximum compatibility of direction on Shasta-Trinrty National Forests lands with adjacent private landownen Close review of the Shasta County General Plan was made with respect to private land uses allowed wrthin the Shasta Unrt of the NRA and recreational subdivisions adjacent to National Forest lands elsewhere on the Forests These plans had broad implications on land ownership direction shown as supplemental direction under each of the 22 Management Areas identified in the Forest Plan

Appendix B

The Modeling and Analysis Process

APPENDIX B
The Modeling and Analysis Process

I. Introduction

The purpose of this Appendix is to present a technical discussion of the analysis process and models used in Forest planning Basic assumptions, model components and inputs, modeling rules and methods, and modeling constraints imposed, along with their rationale and impacts, are described in this Appendix Information presented here supplements the broader and less technical descriptions that are included elsewhere in this Final Environmental Impact Statement (FEIS) See Chapter II for a description of the overall process, the results of the benchmark analysis, additional discussion of the alternatives, and a discussion of opportunity costs associated with Forest constraints

FORPLAN, a linear programming model, is the primary modeling tool used to assure that land allocations and output schedules are made in a way that meets all constraints in the most cost-efficient manner possible In addition to being used to formulate alternatives and benchmark, FORPLAN is used to perform detailed accounting work and to generate summary reports of information needed to construct the display tables in this FEIS

Four additional models were used to generate input data for use in FORPLAN, to interpret output data from FORPLAN, and to assist in the spatial allocation of FORPLAN to meet various alternative themes

- A Forest Plan Data Base was developed to define land units (i e analysis areas) and acres of suitable prescriptions by alternative
- A Geographic Information System (GIS) used the Forest Plan Data Base to visually display timber suitability which, in turn, was used in the mapping and development of the Forests' alternatives
- A Wildlife and Fish Habitat Relationship system (WFHR) was used to model and analyze the alternative's effects on forest habitats
- The Effective Alteration (EFFALT) modeling employed perspective plot computer simulations to correlate levels of timber harvesting with visual quality objectives (VQOs) More detailed descriptions of these models appear in Section III of this Appendix.

II. The Forest Planning Model

A. Overview

FORPLAN is a specialized matrix generator and report writer for a standard linear programming algorithm, the Functional Mathematical Programming System (FMPS) This is the linear programming code used with PC FORPLAN Linear programming is a standard mathematical technique for solving simultaneous linear equations subject to a certain set of constraints and a particular objective function In its simplest form, this is expressed mathematically as

Maximize $z = c_1x_1 + c_2x_2 + \quad c_nx_n$
(Objective function)

Subject to $a_{11}x_1 + a_{12}x_2 + \quad a_{1n}x_n \le b_1$

$a_{21}x_1 + a_{22}x_2 + \quad a_{2n}x_n \ge b_2$ (Constraint set)

$a_{m1}x_1 + a_{m2}x_2 + \quad a_{mn}x_n \le b_m$

$x_j \ge 0$

These mathematical expressions can also be seen in **Table B-1**

In the FORPLAN formulation, the linear equations (rows) represent resource production functions, costs, and acreage or other types of constraints For example, row 1 might represent timber production, row 2 might represent total cost, row 3 might represent acres burned by wildfire The columns $j = 1,n$ represent the different activities (prescriptions) which can occur over time on specific units of land called analysis areas (represented by x_j) The a_{ij} coefficients in the Matrix are the production, cost, or resource coefficients associated with each prescription/analysis area combination The b_i's are the right-hand side constraints representing exact amounts (=) or upper () or lower () constraint levels that must be

Table B-1
Matrix

	Column j=1	Column j=2	Column j=3	Column j=n	Constraint Type	Right Hand Side Constraint
Objective Function	c_1x_1	c_2x_2	c_3x_3	c_nx_n	Maximize	
Row i=1 (limber)	$a_{11}x_1$	$a_{12}x_2$	$a_{13}x_3$	$a_{1n}x_n$	≥	b_1
Row i=2 *(Cost)*	$a_{21}x_1$	$a_{22}x_2$	$a_{23}x_3$	$a_{2n}x_n$	c	b_2
Row i=m	$a_{m1}x_1$	$a_{m2}x_2$	$a_{m3}x_3$	$a_{mn}x_n$	=	b_m
				x_j	≥	0
				i=1, m j=1, n		

met In the example above, if row I represented timber production, the interpretation of the constraint

$$a_{11}x_1+a_{12}x_2+a_{13}x_3 \quad +a_{1n}x_n>b_1$$

would be the total amount of timber produced from all prescriptions and analysis areas must be greater than or equal to the amount of b_1

In the Forest planning model, with few exceptions, the objective function is to maximize present net value (PNV) for 10 decades for each prescription/analysis area combination PNV, expressed in dollars, is a total of all benefits and costs, discounted to the present time

The FORPLAN model was built by representing the production functions. costs, values, and resource supplies for the Forests in the mathematical format descnbed above For the Shasta-Trintty National Forests the resulting model contained approximately 7,400 columns and 1,500 rows Once the model was formulated, several test runs were made to check the model for reasonableness and to make addrtional calibrations Land allocations, activtty and output schedules, costs, benefits, and PNV were developed by altering the prescriptions' intenstty The objective function and constmnts were then set tc meet the theme of each alternative and benchmark

Unique constraint sets were developed to represent minimum management requirements (MMRs), minimum implementation requirements (MIRs), Forest managemen requirements (FMRs) common to all altematives, anc speclfic land allocations and output schedules needed foi individual alternatives

An tterative process was used to formulate these constraint sets pnor to making final FORPLAN runs for the alternatives and benchmarks (see the Benchmarks and Alternatives Sections [M and N], respectively, of this Appendix)

FORPLAN was used to determine the most cost-efficient mix of goods and services that could be produced from the Forests based on the objectives and constraints of each alternative The tradeoffs made among alternatives were examined, and the costs and benefts associated wrth each objective or constraint were measured This analysis provided a way of indirectly evaluating the nonpriced benefits by measunngthe amount of PNV foregone The final criterion used to evaluate alternatives was net public benefits (NPBs), the PNV plus consideration of non-quantifiable Forest resource benefts

Yanagement activities modeled in FORPLAN were determined by the Forests' interdisciplinary team This pre-FORPLAN analysis included identifying

- The activities that could be applied to National Forest system land,
- those activtties that could be modeled in FORPLAN.
- the bnds of land to which each activity could be applied.
- the costs, outputs, and benefts which would result from the application of each activtty to a speclfic type of land. and
- the compatibilty of activities when applied to the same land area

This provided the basis for a matrix of all possible management activities which could be modeled, along with their associated costs, outputs, and benefits

B. Iand Units

Capability areas are the smallest units of land (or water) for which data is collected in forest planning They are discrete and recognizable units classified according to physical (soil), biological (vegetation), and administrative factors All land within a capability area is homogeneous in its ability to produce resource outputs and in its production limitations The capability **areas** are homogeneous with respect to land status, forest type, condrtion class, and National Forest group (i e Shasta National Forest and Trinity National Forest)

Additional information was also needed for each capability area to assess resource opportunities and public issues A few of the important items assessed included Ranger Distnct boundary, compartment boundary, slope, aspect, timber productivity class, timber surtability for regeneration, length of perennial, inner gorge, and intermittent streams, spotted owl habitat conservation areas (HCAs), and roadless areas. (For more detailed information see the LMP90 Data Dictionary for Land Management Planning, June, 1992)

Because there are over 67,000 capability areas wrthin the Forests, they could not all be used in FORPLAN Use of such a large number of land units would be cumbersome and expensive and would have exceeded the matrix size limits that can be used in FORPLAN Analysis areas were created to handle this problem Conceptually, an analysis area is an aggregate of capability areas that responds to a given management prescription in a uniform way

The delineation of the analysis areas involved aggregation of the capability areas into approximately *90* analysis areas, based on physical, biological, and administrative attributes Major considerations in attribute selection were timber yield capability and cost The selection of which attributes to include in FORPLAN was guided by factors such **as** forest type, condttion class, site class, slope, and accessibility, these factors are the largest determinants of yield and cost

Next, the analysis areas were defined using each attribute **as** a level of stratification or level identifier in FORPLAN Because of model size limitations, the number of attributes selected initially exceeded the number that could be used This necessitated the selection of the most cntical attributes necessary to address the planning problems and to consider the reliability of the data for making yield and cost estimates. The attnbutes selected and the categories within each attribute were defined **as** follows

National Forest Group
Shasta National Forest
Trinrty National Forest

Habitat Conservation Area/Late-Successional Reserves
Inside HCA/LSR
Outside HCA/LSR

Quarter township: 50-II-40
(Applies to all Alternatives except PRF)
Quarter township meets 50-II-40
Quarter township does not meet 50-I 1-40

Timber Suitability
Lands potentially suttable for all timber intensrties
Lands potentially suitable for all timber intensrties, except thinning.
Lands unsuttable for regulated timber harvest

Forest Type
Douglas-fir (DF)
Grass (GR)
Hardwoods (HW)
Knobcone Pine (KP)
Lodgepole Pine (LP)
Mixed Conifer (MC)
Ponderosa Pine (PP)
Red Fir (RF)

Condition Class
SM Regeneration growing under GTR
P1 Plantations 0-10 years
P2 Plantations 11-20 years
P3 Plantations 2 1-35 years
2G saplings and poles 40 percent crown closure
2P saplings and poles 40 percent crown closure
3G small and medium sawtimber 40 percent crown closure
3P small and medium sawtimber 40 percent crown closure
4G large sawtimber 40 percent crown closure
HW Hardwood on Conifer site
XX All size and density classes

The **National Forest group** identlfier was used to determine how FORPLAN treats timber regulation between the two Forests Although the entire Shasta-Trinity National Forests was modeled as a whole, the Shasta and Trinity Forests present distinctive and contrasting differen-

ces with respect to standing timber inventory, growing stock, and growth conditions Unique timber yield tables were developed by Forest

The **Habitat Conservation Area (HCA)/Late Successional Reserve (LSR)** identifier was used to separate analysis areas by HCA-LSR/non-HCA-LSR as required for analysis of 50-11-40 except for PRF Land inside HCA/LSR boundaries is withdrawn from the quarter township 50-11-40 analysis

The **Quarter township: 50-11-40** identfier was used to separate quarter townships that meet 50-11-40 from those that don't in all alternatives except PRF According to the Interagency Scientific Committee's report, "Conservation Strategy for the Northern Spotted Owl" (April 1990) no regeneration harvesting may occur in a quarter township unless more than 50% of the acres have trees with an average dbh of 11 inches and 40% crown cover (on those acres capable of meeting the requirement)

The **timber suitability level** identfier was used to determine the range of timber intensties could be applied to each analysis area based on suitability for regeneration

The **forest type and condition class** identifiers were structured in accordance with the RAMPREP yield tables used in FORPLAN A unique set of cost/financial tables was also used with various combinations of these identifiers

C. Management Areas

National Forest land within the Shasta-Trinity National Forests has been divided into 22 management areas Each area has distinct management direction in response to local issues and intrinsic resource opportunties However, these areas were not identfied as management areas in FORPLAN They will be used as a means of disaggregating FORPLAN outputs from the Preferred Alternative to the Ranger District level.

D. Prescriptions

A prescription consists of a set of management practices and the schedule for application to achieve desired objectives on a specfic area For a given analysis area, the range of prescriptions describes what could be done (i e , the possibilities) on that area FORPLAN is used to determine what should be done based on the constraints and objective function of an altemative

Prescnptions used in Forest modeling were denved from management prescnptions developed by the Forests' interdisciplinary team Management prescnptions are a mix of compatible management pradices The interdisciplinary team quantfied the outputs, costs, and benefits that would occur when a prescnption is applied to a given analysis area or unt of land This quantification process produced the outputs. costs, and benefit coefficients that were used in the FORPIAN yield and economic tables

I. Management Prescriptions It is important to distinguish between FORPLAN prescriptions and management prescriptions FORPLAN prescriptions are sets of activities which could occur on the analysis areas, they can be modeled in FORPLAN They are "generic" activities in that they are written without impostion of standards and guidelines needed to f t activities to site specific condtions Management prescnptions, on the other hand, are written as a result of allocating FORPLAN prescriptions to specfic land areas and imposing certain standards and guidelines A management prescription includes the FORPLAN prescription as one of its parts, but it also includes additional practices needed to meet standards and guidelines at specfic stes

FORPLAN prescriptions are developed to allow for a full range of management activities on an analysis area In that way a choice can be made between an intensive management practice or a non-intensive management practice Limiting the number of prescriptions to choose from is a type of "built-in" constraint The choice of prescriptions identfied for each analysis area was constrained only by technical feasibility The FORPLAN prescnptions which were analyzed are described below Additional information, as well as the prescriptions and the prescription development process, is included in Chapter II

2. FORPLAN Prescriptions The prescriptions listed below consist of two levels Management Emphasis (ME) and Management Intensity (MI) ME levels are generally equivalent to prescnptions, while MI levels are analogous to management practices or options related to the prescnption itself

The descriptions below summarize the ME/MI combinations shown in detail in **Table B-2** This table shows the relationship between FORPLAN prescriptions and management prescnptions Some of the FORPLAN prescriptions are applied to more than one management prescription or to certain types of analysis areas (e g , unsuitable timber land analysis areas)

a The following are timber management related FORPLAN prescnptions

Table B-2
Management Prescnption FORPIAN Prescription Linkage
Timber Management Related Prescriptions

Management Prescription		FORPLAN Prescription	
		Management Emphasis'	Management Intensity
I	Unmaded Non-Motorized Recreation	TM-UNS	Unsuttable
II	limited Roaded Motorized Recreation	TM-MRG	Stand Maintenance
III	Roaded Recreation		
	Partial Retention	TM-REG	Clearcut Green Tree Retention Shelterwood Selection Stand Maintenance Commercial Thinning
	Retentron	TM-MRG	Stand Maintenance
	Shasta Lake NRA	TM-UNS	Unsuttable
IV	Roaded, High Density Recreation	TM-UNS	Unsuitable
V	Wilderness Management	TM-UNS	Unsuitable
VI	Wildlife Habitat Management	TM-REG	Clearcut Green Tree Retentron Shelterwood Selection Stand Maintenance Commercial Thinning
VII	Threatened, Endangered, & Selected Sensitive Species		
	Bald Eagles	TM-UNS	Unsuitable
	Peregnne Falcons	TM-UNS	Unsuitable
	Goshawks	TM-UNS	Unsuttable
	Sensitive Plants	TM-UNS	Unsuttable
	Spotted Owls	TM-UNS	Unsuttable
		TM-MRG	Stand Maintenance
VIII	Commercial Wood Products Emphasis/Timber Management	TM-REG	Clearcut Green Tree Retentron Shelterwood Selection Stand Maintenance Commercial Thinning
IX	Riparian Management		
	Perennial Streams/Inner Gorge	TM-MRG	Stand Maintenance
	Intermittent/Ephemeral Streams	TM-UNS	Unsuttable
		TM-UNS	Unsuttable
		TM-REG	Clearcut Green Tree Retention Shelterwood Selection Commercial Thinning Stand Maintenance
X	Special Area Management	TM-UNS	Unsuttable
XI	Heritage Resource Management	TM-UNS	Unsuttable
Non-capable, Unavailable, and Unsuitable Land Within Above Management Prescriptions		TM-UNS	Unsuitable
Developed Recreation		DEVREC	Low Standard Standard Rehabilitation New Construction

Table B-2
(Continued)
Timber Management Related Prescript

Management Prescription	FORPLAN Prescription: Management Emphasis*	FORPLAN Prescription: Management Intensity
Dispersed Recreation	DSPREC	Low Standard Standard Rehabilitation New Construction
Fire Management	FIRE	NFMAS Program -25% Program

* TM-MRG Timber Mangement-Marginal Yield Objectives
TM-REG Timber Management
TM-UNS Timber Management-Unsuitable Lands

(1) Timber Management-Unsuitable Lands (TM-UNS) This prescnption applies to all lands from which no chargeable timber volume is planned Management objectives ether preclude timber production or are so restrictive that silvicultural objectives cannot be met Examples are non-capable, unavailable, and unsuitable lands, proposed wildernesses and research natural areas (RNAs), cultural and developed recreation stes, and threatened and endangered species (T&E) habttats

(2) Timber Management-Marginal Yield Objectives (TM-MRG) This prescription includes sutable timber lands where management objectives are such that some minor timber yields are scheduled Another name for this prescnption is Minimal Timber Average rotation age is 200 yean Timber outputs are regulated as a separate, noninterchangeable component of the allowable sale quantity (ASQ) Stand maintenance and salvage are included in this prescription. Examples of areas where this prescnption applies are in visual retention areas and semi-primtive motorized recreation areas

(3) Timber Management-Reduced Yield Objectives (TM-REG) Includes surtable timber lands where management objectives allow for even-aged and uneven-aged systems Rotations vary from 90 to 160 years with the average rotation being 120 yean

b Prescnptions were also made for developed recreation, dispened recreation, and fire management Alternative program levels were analyzed for each alternative These resource program related prescnptions were defined as follows

(1) Developed Recreation-Low Standard (DNREC-LOWSTD) Existing facilties would be open at a level such that the user's willingness to pay is less than at the standard level

(2) Developed Recreation-Standard (DEVREC-STNDRD) Existing facilties would be open wth all improvements and operation at standard levels

(3) Developed Recreation-Rehabilrtation (DEVREC-REHABST) Facilties at low standard condrtion are rehabilrtated to the standard level resulting in outputs at the standard level

(4) Developed Recreation-New Construction (DEV-REC-NCONST) Facilties can be built on certain lands to standard level

(5) Dispersed Recreation-Low Standard (DSPREC-LOWSTD) Existing roads and trails would be open at a level such that the user's willingness to pay is less than at the standard level

(6) Dispersed Recreation-Standard (DSPREC-STNDRD) Existing trails would be open and maintained at standard levels

(7) Dispersed Recreation-Rehabilitation (DSPREC-REHBST) - Existing roads and trails at low standard are rehabilrtated to the standard level resulting in outputs at the standard level

(8) Dispersed Recreation-New Construction (DSPREC-NCONST) Pl[illegible] built to standard levels

(9) Fire Manaeement Proeram (FIRE) - Consists of vaned mixes of manpower, engines, prevention, detection, and aircraft resources, along wrth fuels management. The most efficient program was

detection, and aircraft resources, along with fuels management. The most efficient program was selected and then reduced 25 percent to respond to budget issues.

3. Assignment of Timber Management Intensities by Analysis Area Based on the technical suitability of the land, certain intensities are applied. These intensities vary from analysis areas that are less than 40 percent slope, and forest types and condition classes of MC3G, DF3G, RRN, and MC2G where all intensities are considered; to analysis areas that are unsuitable for regulated harvest where only Unsuitable is applied

Unsuitable is applied as an option on all lands For any of the analysis areas doing nothing and allocating the land to **Unsuitable** is always an option

Stand Maintenance is applied to all suitable timber land Since this intensity removes so little timber volume during any entry, it can be applied on areas where regeneration is very difficult (i e low site)

Selection is limited to land that is **less** than 40 percent slope and forest types and condition classes of RF2N, DF3G, MC2G, MC3G, and PP3P exist Because of the difficulty of using cable logging systems with **Selection,** it is not considered feasible on slopes greater than 40 percent Where suitable acres are not open to regeneration harvest, selection cutting is permitted only on high site land Forest types and condition classes that are old and/or poorly stocked are also considered unsuitable for this intensity

Shelterwood can be applied on any suitable high site lands where the following forest types and condition classes exist DF4G, DF3G, MC3G, MC2G, RF3G, RF2N and plantations Shelterwood is not applied on poorly stocked lands because many of these areas do not have 10 to 20 percent good crown, seed/shelter trees, which *are* considered the minimum stocking necessary to apply this intensity Shelterwood is also not applied in low site land where regeneration harvest is not permitted

Green Tree Retention is applied only on lands suitable for regeneration harvest

Thinning to the 50-1 1-40 rule for all alternatives except PRF and an all available land under alternative PRF can be applied to any surtable timber land with any commercial species except lodgepole pine or hardwoods

Clearcutting is applied only on lands *suitable* for intensive even-aged harvest systems The difficulty of obtaining regeneration on other lands precludes this intensity from these analysis **areas.**

From a financial analysis standpoint no timber management intensities were eliminated because of having a low or negative present net value (PNV)

E. Time Periods

To facilitate modeling the scheduling of outputs and activrties on the Forests for the 150 year planning honzon, 10 years (one decade) was the basic reporting penod chosen Consequently, outputs are modeled as totals or averages for 10 year periods, and constraints were applied to outputs or activities on a 10 year basis. In order to reduce the complexity of data displayed in this FEIS five decades are used in all display tables

F. Outputs

Development of Modeling Coefficients Following is a description of the coefficients used for outputs tracked inside and outside of FORPLAN **A** bnef discussion of how each coefficient was developed is also included here **Table *B-3*** shows a listing of all outputs used in the analysis process

a Modeled Inside FORPLAN

Facilties

Road Construction/Reconstruction. When the road network is completed, it is assumed that an average road densrty of 6 miles/square mile will exist on suitable timber land For analysis areas defined as roaded 3 5 miles per square mile are assumed to have already been built and thus 2 5 miles per square mile are needed For roadless areas 6 miles/square mile of new roads will be needed For group selection the average road density is increased to 7 miles/square mile to complete a road network Otherwise, the same assumptions apply as stated above.

Forty percent of the roads are proportional to acres treated by management intensty and 60 percent due to allocation The rates of development vary by FORPLAN prescription. In decade 1, for timber management, 30 percent of the needed roads will be built. For Modified Timber, 45 percent will be built in decade 1

Table B-3
Outputs Used in *Analysis*

Output	Units of Measure	Modeled inside FORPLAN	Modeled Outride FORPLAN
Facilities			
Transportation			
Trail Construction	Miles		X
Road Construction	Miles	X	
Road Reconstruction	Miles	X	
Road System	Miles		X
Dams and Reservoirs	Number		X
Administrative Sites	Number		X
Fire and Fuels			
Fuel Treatment (Timber)	*Acres*	X	
Fuel treatment (Non-timber)	Acres	X	
Expected Acres Burned by Wildfire	Acres		X
Fish			
Resident (Otherthan T&E)	MLbs		X
Anadromous Fish			
Commercial Harvest	MLbs		X
Sport	MLbs		X
Fish User Days -Total	FUDs	X	
Direct Habitat improvement			
Inland Fsh (except T&E)	*Acres*		X
Anadromous Fsh - Sport	Acres		X
Total	Acres		X
Direct Habitat Improvement			
Inland Fish (except T&E)	Acres/# of Structures		X
Anadromous Fish - Commercial	Acres/# of Structures		X
Anadromous Fish - Sport	*Acres*/# of structures		X
Human Resources			
Programs	# of Enrollees		X
lands and Minerals			
Land Acquisition	*Acres*		X
Minerals (Operating Plans)	# of Plans		X
Range			
Grazing	AMs	X	
Recreation			
Developed Public Recreabon	RVDs	X	
Developed Pnvate Recreation	RVDs	X	
Dispersed Recreation	RVDs	X	
Wilderness	RVDs	X	
Area Open to OHV Use	Acres		X
Area Closed to OHV Use	Acres		X
Area Restricted to OHV Use	Acres		X
Area with Seasonal OHV Use	Acres		X
Recreabon Opportunity Spectrum (ROS)	Acres		X
Timber			
Allowable Sale Quantity (ASQ)	MMCF/MMBF	X	
Reforestation	Acres	X	
Timber Stand Improvement	***Acres***	X	
Firewood	MCords		X
Dispersion	Acres	X	
Visual Quality			
visual Quality Index			X
Effective Alteration	Acres	X	
Water	Acre/Feet		
Water Quality	fat standard)		X

Table B-3
(Continued)

Output	Units of Measure	Modeled Inside FORPLAN	Modeled Outside FORPLAN
Water (Continued)			
Increased Water Quantity (Water Yield)	Acre Feet	X	
Watershed Improvement	Acres		X
Watershed Condition/Cumulative Watershed Impacts	ERA Acres	X	
Wildlife			
Threatened & Endangered (T&E) and Sensitive Species:,			
Bald Eagle	Acres-	X	
Goshawk	Acres		X
Peregrine Falcon	Acres	X	
Spotted Owl	Acres	X	
Habitat Capability (Other than T&E)			
BigGame - Deer	Animal #		X
Wildlife User Days - Background	WUDs	X	
Habitat Improvement			
All Species	WUDs		X
Habitat Improvement			
All Species	Acres/# of Structures		X
Seral Stages - Wildlife Habitat Relationships	Acres	X	

Abbreviated Terms and Meanings

AMs	Animal Months
ERA	Equivalent Road Acres
FUDs	Fish User Days
MCords	Thousand Cords
MLbs	Thousand Pounds
MMBF	Million Board Feet
MMCF	Million Cubic Feet
OHV	Off-highway Vehicle
RVDs	Recreation Visitor Days
WUDs	Wildlife User Days

For road reconstruction it is assumed that 325 miles of road will have to be built for every million board feet of timber produced

Fire and Fuels

Fuel Treatment (Timber and Non-Timber) This output is the sum of two kinds of fuel treatments natural and activity fuel. The natura fuel treatment acres were calculated by adding the probable acres to be treated for wildlife habrtat improvement to the acres to be treated under a fuels management program. Acres treated under activity fuels were calculated directly from FORPLAN using acres treated for site preparation These outputs are coincidental to other activities and require no surtable timber land acre constraints

Fishenes

Fish User Days (FUDs) and Direct Habitat Improvement (Acres) Over 90 percent of the FUDs are assumed to occur as background. For all alternatives these are included in FORPLAN, and they increase at 1 5 percent annually Ten percent of the background FUDs are assumed to be produced from anadromous fish and 90 percent from inland fish. The remaining FUDs are produced as a result of direct habrtat improvement Total direct habitat acres are estimated based on the theme of the alternative.

Range

Grazing This output measures actual animal months (AMs) per acre per year This is based on the assumption that 50 AMs will be produced for each MMBF of timber harvested

Table B-4
RAMPREP Yield Tables Used

Existing Strata	Dunning Site Class: Shasta	Dunning Site Class: Trinity
M2G	III	II
M2P	III	III
M3G -High	II	III
M3G - Low	V	V
M3P - High	II	III
M3P - Low	V	V
D3G	N/A	I
D3P	N/A	II
D4G	N/A	I
R2N	V	N/A
R3G	III	N/A
R3P	III	N/A
P3P	IV	N/A
LPX	IV	N/A
Regenerated Stands		
High	II	III
Low	IV	IV

Recreation

Developed Public and Pnvate Recreation A coefficient representing recreation visrtor days (RVDs)/acre/year was developed by determining the annual number of RVDs which are provided by the total acres of existing land for developed srte recreation The source of the data used in development of coefficients was the Recreation Information Management System (RIM) and the National Forest Recreation Survey (NFRS) Alternatives vary by the proportion of demand achieved by low versus standard RVDs No tentatively suitable timber acres are constrained for this purpose

Dispersed Recreation A coefficient representing RVDs/acre/year for dispersed recreation was developed by using RIM data to determine the annual number of RVDs which are provided by the total acres of average surtabilrty land for dispersed recreation Alternatives vary by the proportion of demand achieved by low versus standard RVDs No surtable timber acres are constrained for this purpose

Wilderness Coefficients for wilderness recreation use were developed by dividing the total area in wilderness (as of 1982) by the total RVDs use figures from RIM Alternatives vary by the proportion of demand achieved by low versus standard RVDs

Timber

Allowable Sole Quantity (ASQ) Timber yield coefficients were developed from a Forest timber inventory completed in 1980 and updated in 1990 Data from this inventory was used to develop yield tables using a growth simulation model called RAMPREP Growth and yield modeling was done for each timber stratum/type and site class for both existing and future regenerated stands See Table B-4

Inventory data and RAMPREP yield tables are included in the Forest planning records and are available for review at the Forest Supervisor's Office in Redding, California

Reforestation Reforestation acres were equal to the acres of regenerated timber harvests scheduled by FORPLAN Regenerated harvests included clearcutting, green tree retention, shelterwood cutting, and selection cutting. This allows for a small amount of natural regeneration and some replanting

Timber Stond Improvement (TSI). TSI includes release and precommercial thinning The acres of TSI treatment were based on a percentage of the reforestation acres. Approximately *90* percent of the reforestation acres (including backlog) were assumed to require a release treatment and 60 percent would be precommercially thinned

Dispersion The intent of this output and constraint is to leave manageable units between harvest units which **are** considered openings This requirement applies only to regeneration harvest openings created by even-aged timber management. **An** opening created by even-aged timber management will no longer be considered an opening once the trees have reached 4 5 feet in height

Coefficients were developed to depict the number of regeneration harvest acres that could be cut in any one decade to meet dispersion requirements The actual coefficients used were based on studies done on sample photos and compartments on the Eldorado, Plumas, and Sierra National Forests Coefficients used were developed by the Pacrfic Southwest Region (Region 5) and incorporated into the Forests' FORPLAN analysis

Dispenion is a proxy for the visual qualrty objective (VQO) Maximum Modrification Permissible maximums were defined and applied to the FORPLAN model as a constraint For an Intensive Timber regime not more than 34 percent of the dispersion altered acres and not more than 23 percent of the timber inventory could be

harvested over *two* decades See planning record Dispersion of Timber Harvest for more information

Visual Quality

Effective Alteration (EFFALT) This output is expressed in acres effectively altered by vegetation changes Coefficients were developed to depict the number of regeneration harvest acres that could be cut in any one decade to meet visual resource requirements The actual coefficients used were devised from analysis of perspective modeling done in Region 5. Coefficients used were developed by the Region and incorporated into the Forests' FORPLAN analysis

Permissible maximums of visually altered acres were defined by VQO A table for each VQO class was constructed. Within this table, maximums were also defined for the percent of timber inventory that could be harvested by VQO class These constraints were then linked to FORPLAN prescriptions

Under a Minimal Timber regime (TM-MRG) not more than 5 percent of the timber inventory could be harvested in any decade (Retention VQO) For a Regular Timber regime (TM-REG) not more than I5 percent of the visually altered acres could be harvested over two decades and not more than I5 percent of the timber inventory (Partial Retention VQO)

Tentatively suitable timber acres devoted to TM-MRG, and TM-REG regimes vary according to the theme of the alternative For more information on how TM-MRG. and TM-REG vary by alternative see the Constraints Unique to An Alternative Section in this Appendix.

Water

Increased Quantity (Water Yield) Water yield outputs, derived from calculations using collected (U S Geological Service) water yield data and coefficients, take into account changes due to modification of the water balance caused by vegetative manipulation Present water yield was determined by extrapolating measured flows from 23 Geological Survey gauging stations located within or near the National Forests. From this data a Forest-wide average water yield was calculated

To account for the variability of runoff from vanous Forest types, the 30 identified timber (vegetation) strata for the Forests were combined into five groups having similar runoff characteristics. The Forest-wide average water yield was modified to determine a runoff coefficient reflective of the groups' runoff potential Group I consists of timber strata having high evapotranspiration rates, and thus low runoff rates The Group I runoff coefficient is 2 2 feet/acre/year. Group 5 consists of timber strata having high runoff rates such as rock outcrop and surface water. The Group 5 runoff coefficient is 4 7 feet/acre/year. Groups 2, 3, and 4 have runoff coefficients of 2 5, 2.9, and 3 4 feet/acre/year, respectively

Changes in water yield due to forest management activities were calculated based on temporary type conversion from one stratum to another, such as brush (2 5 feet/acre/year) to grass (3 4 feet/acre/year) When prescnbed management reduces evapotranspiration by reducing vegetation, the water yield increases initially, then decreases to pretreatment back over a period of 20 years Management activities considered included clearcuts, shelterwood cuts, intermediate thinning and brush to grass conversion Changes in water yield were calculated over the life of the plan using this time streaming method Although water yield is affected by forest management practices, it is a coincidental output and requires no constraints on the suitable timber lands

Watershed Condition/Cumulative Watershed Impacts The potential effects to watershed condrtions were evaluated wrthin FORPLAN through the evaluation of cumulative watershed impacts (Appendix H) A model was developed within FORPLAN which calculated Forest-wide Equivalent Road Acres (ERAs) generated from silvicultural activities for each decade. ERAs were calculated, within the model, through the use of disturbance coefficients for each type of harvest activity including clearcutting, selection harvesting, thinning, etc These coefficients took into account site disturbance from either cable or tractor harvest systems and roading levels necessary to access harvest units The resulting ERAS were adjusted over three decades to account for natural recovery due to revegetation A residual 5 percent ERA was not reduced to account for retained system roads

For all benchmarks and alternatives the Forest-wide ERAs ire lower than the Forest-wide threshold of concern TOC) constraints Thus, no constraint was applied in .he FORPIAN model for cumulative watershed impacts. This occurs because the dispersion and effalt constraints are more constraining

The potential effects of proposed management activities on watershed condition were evaluated outside of the 'ORPLAN model by distributing the individual Forest-wide ERAs generated by the FORPLAN model back to he 61 individual watersheds delineated on the Forests see Appendix H) The EPA values for decades I, 5, I0 and I5 were distributed back to the individual watersheds

in a manner proportional to their surtable ttmber acres, minus plantation acres

Each watershed was then grouped into its appropnate watershed condition class These classes are based on the relationship between the watershed's ERA level and the TOC Class I watersheds have ERA levels less than 40 percent of their TOC, Class 2 watersheds are between 40 and 80 percent of their TOC, and Class 3 watersheds have ERA levels greater than 80 percent of their TOC For each ofthe decades evaluated the watershed acres and the number ofwatersheds in each watershed condition class were totaled

This information illustrated the projected trends in watershed condtion for each of the alternatives through the entire planning penod It also sewed as the basis for the analysis of the alternatives in Chapter IV

Wildlife

Threatened and Endangered (T&E) and Sensitive Species.

Bold *Eagle* -- The bald eagle was modeled by delineating a number of acres (approximately 350 acres per terntory) for current and potential bald eagle territories and assigning these acres to a timber unsuitable prescription

Peregrine Falcon -- The peregrine falcon territories include approximately 2,100 acres (350 acres per territory), an insignificant amount of which is classified as suitable timber land

Spotted *Owl Habitat* -- Spotted ow! habitat for all alternatives except PRF was provided for based on the requirements of the Interagency Scientific Committee Report (ISC) and the Fish and Wildlife Service's proposed recovery plan for the spotted owl The actual modeling took two forms (1) acres identlfied in the ISC Report as Category I and II habitat capability areas (HCAs) were made unsuitable for any timber prexnption In addtion, the Fish and Wildlife Service's cntical habtat areas (CHAs) include areas not identified by the ISC, and it is also unsuitable, (2) all land outside of HCAs and CHAs and otherwise sutable for timber management is subject to the ISC 50-11-40 requirement This reauirement means that each quarter townships must have 50 percent of the sultable timber land with 11 inch average diameter trees and 40 percent crown cover

In summary, if the area is part of a HCA or CHA, it is unsuitable for timber management Other areas are only suitable for TM-REG if the quarter township meets the 50-11-40 requirement, and only *those* acres in excess of the 50 percent rule are subject to any form of even-aged management (clearcut, green tree retention, group selection). All areas outside of HCAs and CHAs, that exceed 11-40, can be reduced to the 11-40 requirement, even if the quarter township is deficit, through the appropriate silvicultural prescription (thinning, overstory removal)

Alternative PRF had similar allocations and conditions but they are based on the Late-Successional Reserves (LSR) allocahon identlfied in Chapter 4 of the accompanying Plan The LSR acres were approximately equal to the HCA and DCA acres described above The intent of 50-11-40 is met through a combination of ripanan reserves old growth inclusions and the green tree retention requirement

Wildlife User Days (WUDs) Background Includes consumptive (ie. deer, bear) and non-consumpttve WUDs Consumptive WUDs are assumed to be 282,000 WUDs for decades 1, 2, 3, 4 and 5 Non-consumptive WUDs start at 282,000 WUDs and increase at a 1 5 percent annual rate The background estimates are included in FORPLAN and are the same for every altemabve

Direct Habitat Improvement (WUDs and Acres) and Induced Habitat Improvement (WUDs) WUDs are produced by Forest Service activtties in two ways (1) by management intensties (i e clearcutting, shelterwood, selection) which produce forage and, therefore, induced WUDs, and (2) by burning brush (direct habitat improvement - acres) which produces forage and direct WUDs

The number of acres of direct habitat improvement vanes by alternative First, a goal is selected based on the theme of the alternative Second, a FORPLAN run is made that determines induced WUDs based on the mix of management intensities Third, the induced WUDs are subtracted from the goal and this determines the number of direct WUDs Fourth, direct acres are estimated by multiplying WUDs by 1 33 Acres/WUD Finally, the direct acres are input into FORPLAN to account for the total effect WUDs have on PNV inside the model

Seral Stages - Wildlife Habitat Relationships Seven seral stages were tracked in FORPLAN ranging from seedlings and saplings to older over-mature habitat Each forest type and condttion class was assigned a proportion of each seral stage now and into the future FORPLAN thus tracked the number of acres by seral stage for each decade No suitable timber land acres were constrained to meet seral stage requirements

b Modeled Outside FORPLAN

Facilities

Trail Construction/Reconstruction (Miles). No coefficients were developed This output is based on histonc averages with adjustments made for the theme ofthe alternative.

Road Maintenance (Miles) The number of miles of road maintenance is determined by the current maintenance miles plus new roads constructed for the midpoint of each decade

Dams, Reservoirs and Administrative Sites (No). There were nc coefficients for this output Estimates were made based on the budget and theme of the alternatives for the numbers offacilities that would be required

Fire and Fuels

Expected Acres Burned by Wildfire Wildfire potential acres were calculated using the National Fire Management Analysis System (NFMAS) Fire modelingwas done for specifically Identified Fire Management Analysis Zones using the 1970 decadal fires history records

Data from the Forests' timber, range, wildlife, and wildfire inventories and records developed a vegetation description model which defined the existing situation External calculations were made on vegetation change and resubmitted to the NFMAS to determine future vegetation description models impacts on timber, range, wildlife, watershed, and wildfire potential effects over time

Fisheries

Inland Fish (Thousand [M] Pounds) Poundage estimates were individualized by inland coldwater streams and lakes (rainbow trout) and inland warmwater lakes (largemouth bass) In inland coldwater streams, the assumption was made that all identfied low and moderate quality habitat could be increased to high to establish an initial ceiling potential

With respect to inland coldwater lakes, the assumption was made that identfied lake acreage was of low quality and one-third of it could be improved to moderate habitat quality Also one-third of the identified warmwater lake acreage could be improved from moderate to high quality habitat

The alternative's theme was used to determine production emphasis by inland fish species For all three inland fishery types, a potential resource increase was used to generate annual outputs in M lbs.

Anadromous Fish (M lbs) Numbers of fish and associated poundages were estimated for all alternatives, based on the potential catch of chinook salmon, coho salmon, and steelhead trout from National Forest lands in the Trinity River Basin Escapement potential for these species was determined in concert with Region 1, California Department of Fish and Game (DFG) fisheries personnel (October, 1984) The intent or theme of each alternative was then used to disaggregate total production based on the capability of the alternative to achieve full, high, moderate, or low production emphasis Increased production was measured against the 1989 base level

A potential resource increase ranging between 0 5 and 2 0 percent, depending upon alternative emphasis, was used for the anadromous sport fishery to generate annual outputs in M pounds For the commercial fishery, resource outputs (M pounds) were projected at an evenflow increase (2 percent per year) for the 50-year period until the identified total production was attained

Direct Habitat Improvement- Inland and Anadromous Fish (FUDs and Acres) The number of acres was calculated as the product of the increase in pounds per acre in habitat quality according to the fishery Anadromous fish structures are displayed at an average of 8 structures per acre Inland coldwater streams would receive 10 structures per acre and inland warmwater lakes 1 4 structures per acre Inland coldwater lakes would be improved through lake enrichment techniques (improvement of nutrients levels)

The total number of acres treated for direct habitat improvement for each fish type (inland and anadromous) were multiplied by management emphasis coefficients, disaggregated by habitat quality emphasis (low to moderate, low to high, etc) and multiplied by the expected increase in FUDs per acre to achieve a FUD output for each decade for inland and anadromous fish

Human Resources

Programs (Number of Enrollees) There were no coefficients for ihis output. Numbers were estimated using historical data and expected budget levels by alternative

Lands and Minerals

Land Acquisition (Acres) There were no coefficients developed for this output The acres in an annual purchase program, to more efficiently manage the Forests,

were estimated by alternative. The number of acres varied by the theme of the alternative

Minerals (Operating Plans [Number of Plans]) There was no plans/acre coefficients developed for this output The various outputs represent the estimated number of plans associated with locatable minerals, leasable minerals (i.e, oil, gas, and geothermal), and salable minerals, (i e, sand, gravel, stone, etc) Outputs vary by the number of acres potentially prohibited (withdrawn) or constrained for mineral development by the management prescriptions Plans of operation represent the following

- Work associated with notices of intent or plans of operation filed under 36 Code of Federal Regulations (CFR) 228 Includes preparation of Environment Analyses/Environmental Impact Statements (EA/EIS), and approval and administration of plans of operation
- Work associated with oil/gas or geothermal operations, including cooperation with U S Geological Survey (USGS) and Bureau of Land Management (BLM)
- Work associated with administration, inventorying, and development of common mineral material resources for in-service use Includes geological investigations and preparation of EA/EIS

Recreation

Off-Highway Vehicle (OHV) Use - Areas Open, Closed, Restricted, and Seasonally Closed to OHV Use Acres of National Forest lands open, closed, and restricted to OHV use were determined by totaling the management prescription allocations which correspond to the above categories. Mileage figures by open, closed, and seasonally closed categories were derived similarly (i e, through examining direction and permitted uses under each management prescription by alternative)

Recreation Opportunity Spectrum (ROS) The number of acres of ROS class were based on the existing physical setting, scheduled recreation development, timber harvesting, and road and trail construction Administrative setting was also considered

Timber

Firewood (M Cords) This output was determined by the total number of firewood permits issued based on historic averages No coefficients were developed

Visual Quality

Visual Quality Index (VQI). The VQI was calculated for each alternative using standard Forest Service procedures The VQI is a means of numerically displaying the effects of alternatives on overall visual quality Weights were developed by Variety Class and degree of alteration Those weightings were developed from public preferences for landscape views See **Table B-5** for Visual Quality Index (VQI)

Water

Water Quality (Acre Feet) Water that meets water quantity standards is expressed in thousands of acre-feet units This output was derived by adjusting total induced water yields for the Shasta-Trinity National Forests Yields derived from watersheds needing to be improved were subtracted from the water yield figures reported by FORPLAN All remaining yields were assumed to meet water quality standards

Watershed Improvement (Acres) There were no coefficients for this output It was assumed that watershed improvement acres would be the same for all alternatives as long as funding is available

Wildlife

Goshawk Habitat One-hundred fifty territories were identified in all alternatives, with the acres per territory varying by alternative All acres assigned to goshawk territories

Table B-5
Visual Quality Index (VQI)

Weight	Variety Class A*	Variety Class B*	Variety Class C*
10	P or I		
9	R or II		
8		P or I	
7	M or IV	R or II	
6	MM or V	PR or III	PR or III
5	UM or VI	M or IV	
4		MM or V	M or V
3		UM or VI	
2			P or I, R or II
1			MM or V, UM or VI
0			

* P = Preservation
R = Retention
PR = Partial Retention
M = Modification
MM = Maximum Modification
UM = Unacceptable Modification

are unsuitable for timber management Adjustments were made outside of FORPLAN

Big *Game* Numbers *(Number of Deer)* Estimates of the number of deer were primarily derived from (1) density coefficients of habitat types, *(2)* number of acres in those types, and *(3)* DFG census and harvest information. This analysis indicated an existing estimated base of 65,000 deer Numbers of deer are considered to be pnmarily a result of natural and/or man induced habitat alterations and/or processes over time.

Direct *and* Induced *Habitat* Improvement . *Big Game and* Other *Wildlife* Species *(WUDs and* Acres) The assumption is made that 85 percent of the direct and induced WUDs and acres calculated by the FORPLAN model are big game and 15 percent other species

G. Economics In FORPLAN

I. General The subject of economics is discussed throughout this Final *EIS* In Chapter II economics are covered in the alternative development process discussions, and they are displayed in various tables Chapter III describes the economic environment, the economic consequences are discussed in Chapter IV, and Appendix D outlines how economics are used in this document

Most of the economic efficiency analysis was done with the use of FORPLAN The economic data and assumptions that were incorporated into that model are described below

All dollar values are expressed in *1989* dollars. The following factors, based on the implicit price deflator for the gross national product, were used to adjust values from other years to *1989*

A discount rate of *4.0* percent was used to determine the PNV of future benefits and costs. This rate approximates the long-term cost of capital in the pnvate sector as measured by the return on AAA corporate bonds after adjustment for inflation

Real price trends for timber, range, recreation, wildlife and fish were used in all FORPLAN runs

These pnce trends are projections from an econometnc model of national and regional markets updated for the *1990* Resources Planning Act Final Environmental Impact Statement.

2. Costs All costs used in the analysis are estimates based on accounting records and the experience of project managers. The most recent costs were collected (i e *1992 & 1993)* and adjusted to *1989* dollars The

Year	Factor
1995-89	.82
1994-89	85
1993-89	87
1992-89	*90*
1991-89	*93*
1990-89	*96*
1989-89	1 *00*

following costs were collected and loaded into FORPLAN

Facilities
RD-R - road reconstruction
RD*N - road construction due to allocations
RD-N - road construction due to acres harvested
RD-M - road maintenance, existing
SDNM - new road maintenance
RDBD - roads to bed

Fire and Fuels
BRAC - cost of fighting fires
FFP - nonsuppression costs

Range
WOA - operations and maintenance
RNC - capital investments

Recreation
DVOA - operations and maintenance
DVC - capital investments
3038 -wilderness
DSPC, RH -trail maintenance
DSPC, NC -trail construction

limber
SALE - sale preparation and administration
SALV - salvage preparation and administration
SITE - site preparation including brush disposal
PLNT - reforestation
RPLT - replant
RLSE - release
PCTH - precommercial thinning

Wildlife and Fish
CW80 - wildlife operations and maintenance
CX80 - fisheries operations and maintenance

Other
TTIT - general administration
MNLV - base level operational costs

Base level operational costs include general administration. FA&O maintenance, trail maintenance. minerals management, lands management, fire detection and initial attack, wildlife maintenance, and water maintenance

Of the various costs included in FORPLAN, those which varied most by alternative were capital investment costs associated with construction/reconstruction of roads and recreation facilties Operations and maintenance costs, which vaned signbcantly, were timber sale administration

Costs were checked for reasonableness by comparing the first decade costs for Alternative CUR, developed with the use of FORPLAN, against actual expenditures Costs for the current altemative deviated by less than 5 percent from actual expenditures This deviation was within acceptable standards of reliability for Forest planning

3. Benefits The dollar values for outputs used to calculate PNV are the prices that consumers would be willing to pay for Forest outputs, whether or not such pnces are actually collected by the Federal Government At present, it is national policy to provide most Forest outputs ether at no charge to consumen or at a charge less than the willingness to pay pnce (See **Table B-6**)

Benefits for outputs were computed by multiplying the output by the willingness to pay price Output above the estimated demand was not valued

For outputs used off-site, benefits are based on the value of the outputs as they leave the land or production slte For outputs used on-site, benefts are valued when use takes place However, in cases where it is easier to derive values after the output leaves the production slte. costs incurred and profits earned after the output leaves the site were deducted from the values at later production stages

Grazing values are the average amount that National Forest permittees are willing to pay for grazing on the Forests as estimated from ranch livestock budgets developed by the USDA Economic Research Service

Recreation Visitor Day (RVD) values are the estimated average amount that recreationists are willing to pay to participate in a recreation activity associated wlth a developed slte and/or a dispened recreation opportunty These values are based on a survey of travel cost and contingent value recreation studies conducted by the Forest Service for the Forest and Rangeland Renewable Resources Planning Act (RPA) evaluations for 1990

limber values are average actual timber receipts (including purchaser road credits) divided by harvest volume reported on cut and sold reports for the penod 1988 to 1992 adjusted to 1989 dollars Proration of pnce by forest type is based on recent selling values of the timber

Water values The 1990 RPA recommended water value of $59 per acre-foot was used Essentially all of the water yield from the Shasta National Forest can be diverted for agriculture, hydroelectnc power; or domestic use On the Trinity National Forest, where very little of the water yield can be diverted, a value of *$6* per-acre foot was used This $6 value is a proportion of $59, as determined by the acres of diverted and undiverted water sheds

Wildlife and Fish User Day (WFUD) values are based *on* studies conducted for the Forest Service which were used in the RPA evaluations for 1990

A demand curve was developed for WFUDs This assumes a 1 5 percent annual increase for the next 5 decades None of the projected outputs for any of the alternatives exceeded this level *(See **Table B-7**)*

Values for Outputs that Exceed Demand

Beneft values are applied only where there is a demand forthe output by the Forests' users, Outputs that exceed demand are given a benefit value of zero, while those that are produced at or below the quantity demanded by consumers are assigned the benefit value described in the previous section This is handled wth the use of a demand cut-off A demand cut-off was used for RVDs For this resource output, demand is less than the potential capacity of the Forests Refer to **Table B-7**

See Chapter II for a discussion on how costs and benefts interact to determine the PNV for each altemative and how non-valued benefts have trade-offs and opportunity costs

H. Constraints

Constraints are quantifiable limits placed on the FORPLAN model to assure that only realistic and

Table B-6
Benefit Values Used in Analysis

Priced Output	Unit	Average Actual Cash Receipts per Unit of Output	Average Willingness to Pay Value Used In The Analysis
Timber			
Average All Species	MBF	97.00	221.00
Mixed Conifer Type	MBF	99 88	
Ponderosa Pine Type	MBF	133.15	
Douglas-fir Type	MBF	84 04	
Red-fir Type	MBF	57 28	
Lodgepole Pine Type	MBF	46 10	
Range	AMs	1 86	4 91
Recreation			
Dispersed (standard)	RVD	0.00	27.63
Dispersed (low)	RVD	0.00	5.75
Developed (standard)	RVD	0 57	11.20
Developed (low)	RVD	0 57	5.94
Wilderness (standard)	RVD	0.00	14.07
Wilderness (low)	RVD	0.00	6.71
Wildlife and Fish			
Big Game	WFUD	0.00	33.16
Non-game	WFUD	0 00	33.16
Inland Fish	WFUD	0 00	63.31
Anadromous Fish	WFUD	0 00	63.31
Commercial Harvest	Pounds	0.00	1 84
Water			
Shasta NF	Acre/feet	0.00	59.00
Trinity NF	Acre/feet	0.00	6.00

Abbreviated Terms and Meanings:

AMs Animal Months
MBF Thousand Board Feet
RVD Recreaaon Visitor Day
WFUD Wildlife and Fish User Day

Table B-7
Recreation, Wildlife, and Fish Demand Curves Used in Analysis
(User Days)

Decade	Developed Recreation	Dispersed Recreation.	Wildlife and Fish	Total
1	1,261,000	2,895,000	1,035,000	5,191,000
2	1.453.000	3,360,000	1,201,000	6,014,000
3	1,646,000	3,899,300	1,393,000	6,938,300
4	1,838,000	4,525,200	1,617,000	7,980,200
5	2.031,000	5,251,000	1,877,000	9159,000

- Wilderness is a part of dispersed recreation. The demand curve for wilderness is assumed to be. decade 1 - 140.000: decade 2 - 163.000. decade 3 - 189.000: decade 4 - 219.000: decade 5 - 254.000.

reasonable amounts of resources are used, that outputs are produced, and that prescription allocations are made

In a linear programming analysis. constraints supersede the objective function Thus, where a predetermined level of output, minimum physical condtion, or allocation is entered as a constraint, it is always achieved (or no feasible solution is found) Output levels and other desired effects, entered as constraints. are implicitly assumed to contribute more to public benefits than their cost of production plus the foregone public benefits of any outputs or other effects they replace in the solution For this reason, the interdisciplinary team tned to formulate constraints that met objectives with the lowest cost and least effect on other outputs In most cases, this required the formulation and testing of several alternative sets of constraints to determine the most cost effective set (in terms of PNV that would meet the objectives)

Five different categories of constraints were used

I. Minimum Management Requirements (MMRs) - These are constraints needed to meet MMRs or management standards Procedures for defining the MMRs were specified by Region 5 MMRs are applied to all benchmarks and alternatives. but they are not applied to the unconstrained Maximum PNV assigned wrth Flow and Long-term Sustained Yield constraints (FLW) or the Minimum Level of Management (MLV) FORPLAN runs

The MMRs *are* taken from 36CFR 219 27 and generally represent requirements that are outside of Forest Service authorty to change They are based on statutes and regulations in contrast to manual direction or agency policy

2. Minimum Implementation Requirements (MIRs) - These *are* constraints needed to assure that alternatives are minimally acceptable and implementable on the ground Procedures for defining MIRs were specified by Region 5. They are within agency control, but there is lrttle discretionary control regarding their application at the Forest level MIRs do not apply to benchmarks. but they *are* applied to all alternatives.

3. Timber Policy Constraints - These are needed to ensure that timber harvest meets sustained yield, rotation length, and dispenion requirements These constraints are applied in all benchmarks and alternatives, except for the non-declining yield constraint

4. Forest Management Requirements (FMRs) - These constraints are needed to assure implementabilty at the local level They are based on local (ratherthan Regional) condrtions and issues These constraints are not applied to benchmarks, but are applied to all alternatives except the Constrained Economically Efficient (CEE) FORPLAN Alternative Opportunity costs associated wrth these constraints were depicted in FORPLAN Altemative CEF

5. Forest Constraints That Vary Between Alternatives - These constraints are unique to individual altematives They are applied to meet the theme of individual alternatives Land base constmnts caused most of the difference between the Shasta-Trinity National Forests' alternatives

See the Economic Compansons Section of Chapter II for a discussion of the opportunty costs associated wth each of the above constraints

I. Minimum Management Requirements (MMRs)

Included in the following discussion of the MMRs is the rationale of how they were modeled in FORPLAN All MMRs were modeled ether directly or indirectly. That is, in some cases a constraint was used in the model which was intended to recognize more than one MMR

I. Capable, Available, and Tentatively Suitable Timber Lands - The following criteria were used in identifying tentatively surtable timber lands in the Forests' data base

a The land is forested and is producing or is capable of producing crops of industrial wood This includes land which is at least 10 percent occupied by forest trees and/or land which has the biological growth potential of at least 20 cubic feet per acre per year

b The land has not been withdrawn from timber production by Congress, the Secretary of Agriculture, or the Chief of the Forest Service On the Shasta-Trinity National Forests, the Castle Crags, Chanchelulla, Mt Shasta. Trinty Alps. and Yolla Bolly-Middle Eel Wildernesses, as well as the Shasta Mud Flow Research Natural Area (RNA), have been wrthdrawn from timber production

c Technology and knowledge exists and is available to ensure that timber is produced wrthout irreversible damage to soil productivity, water qualty, or water-

shed condition Lands which are most prone to sediment production through mass wasting, such as inner gorges and recently active landslides, are identified, and classified. as unsuttable.

d Existing technology and knowledge, as reflected in current research and experience, provides reasonable assurance that adequate restocking can be attained within five years after final harvest

e Significant cultural resource sites have been removed from the suitable timber land base

This MMR was modeled in FORPLAN by allocating cultural resource areas (2,000 acres), the Shasta Mud Flow RNA, existing Wilderness areas, non-forest, non-regenerable, non-capable, highly unstable areas, 600 foot corridor along the mqor inner gorge, and 300 foot corridor along the minor inner gorge as unsuitable (TM-UNS) for timber management

2. Threatened and Endangered (T&E) and Sensitive Species - including the following

a Approved or current recovery, territory, and species management plans for population and habrtat requirements were used

b A target population level was assigned **as** follows

Bald eagle (35 pair) and
Peregrine falcon (14 pair)

c Bald Eagle and Peregnne Falcon-.

Population levels have been assigned by Region 5's Fish and Wildlife staff in conjunction with approved recovery plan requirements Major active nesting areas would receive priority in management strategies.

This MMR was modeled in FORPLAN by allocating all currently identified and potential terntones to TM-UNS Most of these acres are within the Shasta Unit of the Whiskeytown-Shasta-Trinity National Recreation Area (NRA)

d Spotted Owl

All acres identified in the ISC report as Category I or II HCAs, plus the F&WS Critical Habitat, are modeled as TM-UNS In addition, the allowable prescriptions on otherwise suitable land must comply with the 50-11-40 rule This MMR is modeled slightly differently in the preferred alternative (PRF) All acres adopted as late successional and riparian reserve in the ROD from the President's Plan are modeled as TM-UNS.

Direction for Sensitive Species

(1) A target population level was assigned as follows

Goshawk (150 pair)

(2) Goshawk

Within its habitat range, goshawk territories would be managed to maintain a density of at least one territory per 18 square miles Distances between terrltones or clumps of terntones should not exceed 12 miles A total of about 150 territories is assumed as the minimum level for the Forests About 75 territories are on lands classified as tentatively suttable for timber.

Each territory would contain a minimum of 100 acres of habitat This provides suitable conditions for the nest stand and an alternate nest stand

A total of about 15,000 acres is assumed to be the minimum acreage to be managed for goshawks on the Forests About 5,000 acres are on suttable timber lands not otherwise constrained by MMRs.

Currently active nest territories **take** preference in delineation of a population network

Timber management activlties would be excluded within occupied nest stands during the nesting period During other penods of time, these activities should be limlted to those activities which meet the criteria outlined in this MMR and the habitat variables associated with sutable habtat in the Forests' goshawk habttat capability model

Direction for Snag-Dependent Species

To the extent possible, within each timber compartment an average of 1 5 snags per acre with the following specifications would be provided, maintained, and managed for

(1) 1 2 snags per acre between 15-24 inches diameter at breast height (d b.h.) and greater than 20 feet high: and

(2) 0 3 snags per acre greater than 24 inches d b h and greaterthan 20 feet high

This MMR was modeled in FORPLAN by foregoing the timber yields from every other thinning in regenerated stands

3. Diversity of Plant and Animal Communities

a Diversity consists of richness, evenness, and pattern, each element of which is considered in the diversity MMR

b Diversity of plant and animal communities is achieved by providing a threshold level of vegetation types and seral stages found within the Shasta-Trinity National Forests

c Plant and animal communities will be managed so that diversity will be similar to that already existing on the Forests Reductions in diversity may be prescribed only when needed to meet the overall multiple-use objectives of an alternative

d The MMR is to provide and maintain a minimum of 5 percent of each timber type/seral stage combination on the Forests as a whole The total existing area in each type in forested lands was used as the base for this calculation

e Both suitable and unsurtable timber lands were used to meet the diversity requirements as long as habrtat charactenstics for management indicator species (MIS) were fully met

f Vegetative types and seral stages (total acres) will be distributed in proportion to their current acres in a given management area

This MMR was modeled in FORPLAN by accounting for seven seral stages ranging from seed/saplings to older over-mature habrtat for each decade All seral stages achieved the 5 percent minimum requirement on a Forest-wide basis without additional constraints

4. Riparian Area Management - Perennial Streams, lakes, and Reservoirs

a No practices or prescriptions that cause detrimental changes to water qualty, aquatic flora and fauna, and hydrophytic vegetation will be applied to perennial npanan areas

b Emphasis will be given to npanan dependent resources Other activities will be allowed to occur when compatible wth dependent resources

This MMR was incorporated in FORPLAN by allocating a 200 foot corridor along all perennial streams to minimal timber (TM-MRG)

5. Soils and Water

a Soil and water resources will be conserved No significant or permanent impairment of the productivity ofthe land will be allowed.

b Existing or potential watershed conditions that will influence soil productivity, water yield, water pollution, or hazardous events. such as landslides and stream channel destabilization, will be evaluated

The amount of land disturbance on sensitive watershed lands will be limited in order to avoid soil loss. activation of mass land failures, and degradation of water quality through sedimentation

This MMR relates to cumulative watershed impacts and was modeled in FORPLAN by estimating ERAs The Forest-wide ERAs are lower than the Forest-wide TOC constraint Thus, no constraint was applied in the FORPLAN model This occurs because dispersion is more constraining than the TOC constraint (See K Timber Policy Constraints - 4 Dispersion)

6. Designated Wild, Scenic, and Recreation Rivers

a These rivers are managed according to guidelines contained wthin the National Wild and Scenic Rivers Act Management direction is focused on the maintenance and enhancement of these nvers for their recreation and scenic values.

b. Lands adjacent to wild segments of the Wild and Scenic Riven System are unavailable for timber production However, timber management activlties can take place along the Scenic and Recreation Rver segments

This MMR was modeled in FORPLAN by allocating 1/R mile corndon along wild nven to TM-UNS, scenic rivers to TM-MRG, and recreation rivers to TM-REG

J. Minimum Implementation Requirements (MIRs)

Following is a listing of the MIRs, including a discussion of how they were modeled in FORPLAN MIRs will be applied in the implementation of all alternatives

1. Sensitive Plant Species

a. Sensitive plants will be managed to ensure that these species do not become threatened or endangered because of management actions

b. Vegetation management practices will be planned to protect or enhance sensitive plant species.

The above can be met without constraining the FORPLAN model

These MIRs were not modeled in FORPIAN They will be met through standards and guidelines in the Forest Plan and through project level design and location considerations

2. Visual Quality

Foregrounds and middlegrounds of the following scenic corridor travel routes will be maintained to partial retention visual objectives officially designated Callfornia State and County scenic highways and California State Scenic Highway system routes (as identified in the 1970 Master Plan)

a The foreground portions (3/4 to 1 mile wide) and middleground portions (areas located from 1/4-1/R to 3-5 miles from the viewer) of the following corridon will be managed to an adopted visual qualrty objective (VQO) of partial retention.

(1) US Highway 97;

(2) State Highway 3;

(3) State Highway 36 (from its junction with State Highway 3 westward to the National Forest boundary),

(4) State Highway 89,

(5) Interstate Highway 5 (between US Highway 97 and State Highway 89)

This MIR was modeled by allocating the foreground and middleground areas to TM-REG

3. Clearcutting

No more than 18 percent of the total sutable acres available for even-aged management can be clearcut in any one time penod This constraint was never binding in any time period in any alternative

K. Timber Policy Constraints

Listed below are the detailed descriptions of the constraints used in the FORPLAN model in response to sustained yield, harvest flow, rotation length, and dispersion requirements

1. Rotation Length and Culmination of Mean Annual Increment Requirements for Timber Harvest Scheduling.

a Mean annual increment was.

(1) Based on regenerated yields;

Table B-8
Minimum-Age to Attain 13 inch, 50 foot Trees

Dunning Site	FORPLAN Period	Age
I & IA	4	35
It	5	45
III	6	'55
IV	7	65
V	a	75
VI+	Generally stands in this site grow less than 20 cubic feet per acre per year Therefore, generally these stands are not suitable for timber production.	

Table B-9
Minimum Rotations

Forest Type	Without Thinning 95% CMAI	with Thinning 95% CMAI
Mixed Confer - Trinity NF	60 years	90 year;
Mixed Confer- Shasta NF	SO years	70 year;
Douglas-fir	50 years	70 year
Red fir	80 years	110 years
Ponderosa Pine	80 years	110 years
Lodgepole Pine	70 years	N/A

(2) Calculated for each applicable FORPLAN prescnption, and

(3) Determined for sawlog products measured in cubic feet

b For benchmarks and alternatives, minimum rotations were based on culmination of mean annual increment (CMAI) in utilized cubic feet of merchantable size trees Regenerated timber stands are regarded as generally culminated in growth at the age that corresponds to 95 percent of the apparent culmination calculated from the managed yield projections used in FORPLAN. Culmination is always later than or equal to the age of merchantability

c On the Forests, the age at CMA is equal to the age of merchantabilty on over 80 percent of the surtable timber lands Therefore, rotation ages based on merchantabillty are the same as rotation ages based on CMA for FORPLAN modeling purposes

Merchantability occurs when the average projected d b h is 13 inches wth an average projected tree height of 50 feet for stands maintained wrthin the range of desired to optimum stocking This is to insure that nearly **all** trees in the projected stand will be minimally merchantable and larger at first harvest

The minimum age for attainment of 13-inch d b h, 50-feet height and *90* percent-BA MAX (for standard even-aged management) is assumed to be shown in **Table 8-8.**

The rotations included in FORPLAN matrices represent the range from culmination to the end of the planning horizon This is for regenerated timber projected for harvest starting in any period that corresponds to a mean stratum age equal to that of culmination for regenerated stands To the extent possible, each regeneration class in the FORPLAN matrix included one timing choice that corresponded to minimum CMAI defined for the class The FORPLAN minimum rotation lengths are shown in **Table *8-9***

Table B-10
Dispersion

Forest Type	Site Class	Minimum Plumber of Trees per Acre
Ponderosa Pine	I	150
	II	125
	III	100
	IV	75
Red & White Fir	All	200
Douglas-fir	All	125
Mixed Connifer	All	1SO

2. Sustained Yield Requirements

FORPIAN Modeling **Rules** To ensure that the Forests can sustain the timber harvest level past the end of the planning horizon, a FORPLAN constraint was applied that states timber harvest cannot exceed 95 percent of the long term sustained yield in decade 15

3. Harvest Flow Requirements

FORPLAN Modeling **Rules** Timber output after the first decade is not allowed to fluctuate more than 15 percent from the previous decade This prevents wide fluctuations from one decade to the next The 15 percent limt is based on the portion of the current timber sale quantity required to support an average sawmill

When non-declining yield was not applied (in benchmarks and sensitivity analyses), a harvest flow constraint of plus or minus 15 percent was applied

4. Dispersion

a The intent of the dispersion rule is to prevent regeneration units, which are still "openings," from being adjacent to each other The intent is also to disperse units in such a way as to leave logical harvest units between openings for future management This requirement applies only to regeneration harvest based on even-aged management An opening created by even-aged timber management will no longer be considered an opening once the number of

trees, (See **Table B-IO),** have reached 4.5 feet in height and are generally free to grow

b *FORPLAN Modeling Rules* The dispersion requirement is modeled in FORPLAN by limrting the number of acres which can be altered in any one decade Separate constraints were used for each Forest and for each of the major forest types w t h signlficant acreages The constraint for managed timber lands (TM-REG) was a harvest limit of not more than 34 percent of the acres in any two consecutive decades for decade I, 32 percent for decade 2; 30 percent for decades 3 and 4, and 28 percent for decades 5-I6 *Also,* a harvest limt of not more than 23 percent of the first decade timber inventory for decades I-4 and 24 percent for decades 5-I6 was imposed See planning record Dispersion of Timber Harvest for more information

L. Additional Forest Direction and Constraints

Personnel of the Shasta-Trinity National Forests have added a minimal number of constraints to the MMRs and MIRs already listed The purposes of these constraints are twofold to supplement, further interpret, and define the generalized direction in Region 5's MMRs, and to more completely respond to local Forest issues

I. Forest Supplementation of Regional MMRs

Additional Forest direction and interpretations of Region 5's MMRs have not been modeled and are not considered additive to the MMRs These supplementary directions are embedded in the Forest-wide standards and guidelines Refer to the proposed Forest Plan

2. Forest Management Requirements (FMRs)

a Whiskeytown-Shasta-Trinity National Recreation Area (NRA) The Shasta and Trinity Units of the NRA are included under all alternatives considered. However, a variety of resource activities are allowed under the NRA regulations as long as they are compatible wrth the recreation purpose of the area

This constraint was applied to all alternatives considered in detail because of the National importance of the area for public outdoor recreation These values have been recognized by Congress through the Whiskeytown-Shasta-Trinity National Recreation Area Act (Public Law 89-336, November 8, I965), and related regulations (36 CFR 25I 4).

This constraint is modeled in FORPLAN by allocating the Shasta Unit to TM-UNS, the foreground viewing area of the Trinity Unrt to TM-MRG; and the middleground of the Trinity Unrt to TM-REG

c. *Visual resource management direction* is also provided for major travel corridon and viewsheds not included as MIRs The foreground portions of three corridors were identified to be managed to a visual partial retention standard (I) State Highway 299, (2) portions of Interstate 5 not identified in the I970 California State Scenic Highway Master Plan for scenic highway designation, and (3) portions of Highway 36

The Interstate 5 corridor south of State Highway 89 and Highway 36 and east of Highway 3, are examples of Forest-level visual constraints not covered by an MIR

This constraint is needed because these three corridors carry the majority of the viewing public which travel through the Forests State Highway 299 is a major east-west travel corridor between Redding and the north coast of California It is also adjacent to an existing Recreation River (main stem Trinity River) in the National Wild and Scenic Riven System

Interstate 5 provides an important and scenically-sensitive link between Redding, the Shasta Unit of the NRA, the Sacramento River corridor, and Mt Shasta

Highway 36 provides important access through the scenically-sensrtive southern part of the Trinity National Forest

This requirement was modeled in FORPLAN by allocating the foreground viewing areas along portions of Interstate 5, Highway 36, and Highway 299 to TM-REG

: *Poorly Stocked Areas* within *Bitterbrush* These areas are included in the modeling to fulfill a need to maintain and/or enhance a key browse species on deer summer range More importantly, setting aside these areas is

in response to the need to enhance production of livestock (in this case, sheep) to meet RPA goals and provide a sufficient forage base to meet deer summer range and sheep allotment needs

This requirement was modeled in FORPLAN by allocating all poorly stocked bitterbrush areas to TM-UNS

d *Maintaining on Average of 30 Square Feet of Hardwoods* on wildlfe and visual areas is necessary to maintain wildlfe species dependent on this habltat (i e gray squirrels) and is compatible with the VQO of partial retention

This requirement was modeled in FORPLAN by applying a IO percent reduction in regenerated yields on the Tnnty National Forest and a 5 percent reduction on the Shasta National Forest to prescriptlon TM-REG

e *Developed Recreation and Administrative Sites* were modeled by allocating FORPLAN prescription TM-UNS for all alternatives

f *Special Interest Areus (SIAs)* Eight geologic areas and one botanical area are proposed for SIA consideration (See **Table III-14** for a listing of these areas) All of these areas involve unsurtable timber lands and/or consist of caves which do not affect surface uses These areas were not identified in FORPLAN **as** being surtable timber lands

g *Research Natural Areus (RNAs)* In addition to the already designated Shasta Mud Flow RNA, four addrtional areas are proposed for RNAs These areas are Cedar Basin, Preacher Meadows, Red Butte-Red Fir Ridge, and Stuart Fork

This requirement was modeled in FORPLAN by allocating the areas to TM-UNS

h *Riparian Areus Along Class I, II, and III Streams* The riparian standards, **as** descnbed under management prescriptlon IX in Chapter 4 of the Forest Plan, dictate how npanan areas will be managed in all alternatives except PRF For modeling purposes the RMZ widths for Class I, 11, and 111 streams were classified **as** unsurtable (TM-UNS) For alternative PRF see the nparian standards in chapter 4 of the final Forest Plan The nparian standards for PRF classify Class I, 11,111, and IV streams **as** TM-UNS

M. Benchmarks

I. FLW - Maximum Preser Ne Value (PNV) with Flow and long-Term Sustained Yield (LTSY) Constraints Benchmark

a Description and Purpose

(I) Used to evaluate the appropriateness of harvest flow constraints

(2) Used to provide the economic efficient level of valued resources wlth fewest constraints

(3) Forms a base run used in evaluating MMRs

b Specifications

(I) Objective Function Maximize PNV for IO periods (decades)

(2) Timber Policies

(a) Minimum rotation Merchantabilty (same **as** the culmination of mean annual increment [CMAI]),

(b) Includes sustained yield requirements,

(c) Includes harvest flow requirements.

(d) N o dispersion was included

(3) Land Base Includes all tentatively sultable lands

(4) Economic Assumptions Used assigned values wtth trends and demand cut-offs for RVDs

2. HZO - Water Yield Maximization Benchmark (for Five Periods [50 Years])

a Descnption and Purpose Used to define maximum capabilty of the Forests to provide water over the RPA planning honzon subject to MMRs

b Specifications

(I) Objective Function Maximize water yield (acre-feet) for five penods (decades)

(2) Timber Policies

(a) Minimum rotation Used the full set of rotation ages greater than or equal to *95* percent of CMAI,

(b) Includes sustained yield requirements,

(c) Includes nondeclining yield requirements:

(d) Includes dispersion.

(3) Land Base. Includes all tentatively suttable land

(4) Economic Assumptions Used assigned values with trends and demand cut-offs for RVDs

(5) All MMRs were applied.

(6) Activity Constraints. Water yield activities provided for·

(a) Type conversion to grass of selected chaparral lands not capable of growing 20 cubic feet *of* timber per acre per year About 42,000 acres were included

(b) Type conversion to grass of selected chaparral lands on suitable timber lands About 25,000 acres were included.

(c) Intensive harvesting of timber lands to provide high levels of water yield.

(d) Vegetative treatments in noncommercial vegetation types

(7) An economic rollover was performed to determine the most economically efficient allocation and schedule which corresponds to the water yield levels (acre-feet) for each of the first five periods as defined in the Maximum Water run

The specfications for this rollover were as follows,

(a) Objective Function, Maximize PNV for 10 periods,

(b) Timber policies were the same as above,

(c) Land base was the same as above,

(d) Economic assumptions were the same as above,

(e) All regionally defined MMRs were applied as above,

(9 Output constraints Meets the water yield outputs (acre-feet) for each *of* the first five periods as defined by the maximum water run,

(g) Activrty constraints were the same as above

3. MKV - Maximum PNV-Market Values Only Benchmark

a Descnption and Purpose

(I) Used to estimate the mix of resource uses and a schedule of outputs and costs which would maximize the PNV of those outputs that have an established market price Dollar values were based on actual or simulated market prices (willingness to pay) for timber, range, commercially used fish, and developed recreation Used the same dollar values as other runs

(2) Outputs were compared to Maximum PNV assigned with the MMR run to provide proportional differences in PNV and outputs. Proportions were used to estimate the differences between assigned and market values in subsequent runs

b Specfications

(I) Same as Maximum PNV assigned with MMR run except used market values only (timber, range, developed recreation, and commercial fish).

(2) The solution was run through the FORPLAN report writer to price out all assigned values The PNV-COST values from the second report were used to make comparisons.

4. MLV - Minimum Level of Management Benchmark

a Description and Purpose Used to estimate outputs and cost of the backgrounds or residuals Minimum level is an accounting analysis to determine the background outputs and fixed costs associated wlth maintaining the Forests. It was used as a base to compare other alternatives It is not stewardship or custodial management

b Specifications

(I) Objective Function Minimize cost for the planning horizon (I6 decades)

(2) Output Constraints

(a) Only background or incidental outputs were allowed,

(b) Timber, range, and developed recreation outputs were set at zero

: Other Assumptions

(I) Vegetation would follow natural succession Habitat capabilrty for MIS requiring late seral stage habitat would increase over time Habitat capabilrty for indicator species requiring early seral stage habttat would decrease over time

(2) Only maintenance of those facilities that are needed to support the basic ownership activlties would be allowed All other facilities would be allowed to detenorate

(a) State and County roads would remain open but most Forest roads would be closed

(b) All public and private sector recreation facilities on National Forest lands would be closed, with no provisions for maintaining such assets

(3) The fire organization would be greatly reduced Forests would assume costs for detection and initial attack (engines) only, no other fire management and/or cooperator resources were considered

(4) Recreation use assumptions - Dispersed recreation use that cannot be discouraged or controlled would occur

5. MMR - Minimum Management Requirements Benchmark

a Description and Purpose

(I) Used to define and evaluate MMRs

(2) Used to show the opportunity cost of MMRs taken collectively

(3) Used to form the basis for evaluating constraints

(4) Used to estimate the mix of resource uses and a schedule of outputs and costs which would maximize the PNV of those outputs that are assigned a monetary value Dollar values were based on actual or simulated market prices (willingness to pay) for timber, recreation, range, water, wildlife, and fish

b Speckations

(I) Objective Function Maximum PNV for I2 periods (decades)

(2) Timber Policies

(a) Minimum rotation Used the full set of rotation ages greater than or equal to 95 percent of CMAI,

(b) Includes sustained yield requirements,

(c) Includes nondeclining yield requirements,

(d) Includes dispersion

(3) Land Base Includes all tentatively surtable land

(4) Economic Assumptions Used assigned values wlth trends and demand cut-offs for RVDs

(5) All MMRs were applied

6. RGN - Range Maximization Benchmark (for F i e Periods [50 years])

a Descnption and Purpose Used to define maximum capability of the Forests to provide commercial livestock glazing over the RPA planning horizon subject to MMRs

b Speclfications

(I) Objective Function Maximum livestock forage for five periods (decades)

(2) Timber Policies

(a) Minimum rotation Used the full set of rotation ages greater than or equal to 95 percent of CMAI,

(b) Includes sustained yield requirements,

(c) Includes nondeclining yield requirements,

(d) Includes dispersion

(3) Land Base Includes all tentatively sultable land

(4) Economic Assumptions Used assigned values wth trends and demand cut-offs for RVDs

(5) All MMRs were applied

(6) Activity Constraints The range activlties provided for

(a) Type conversion to grass of selected chapanal lands not capable of growing 20 cubic feet of timber per acre per year About 42,000 acres were included

(b) Type conversion to grass of selected chaparral lands on surtable timber lands About 25.000 acres were included

(c) Full development of water, fencing, etc , to permit full utilization of available forage

(d) Grazing in wilderness

(e) Intensive harvesting of timber lands to provide high levels of transtory range

(7) *An* economic rollover was performed to determine the most economically efficient allocation

and schedule which corresponded to the forage production levels head months (HMs) for each of the first five periods as defined in the Maximurr RGN tun

The specifications for this rollover were as follows.

(a) Objective Function. Maximum PNV for 10 periods,

(b) Timber policies were the same as above,

(c) Land base was the same as above,

(d) Economic assumptions were the same as above,

(e) All MMRs were applied as above,

(9 Output constraints Meets the forage outputs (AMs) for each of the first five periods as defined by the Maximum RGN (14RGN) run,

(g) Activity constraints were the same as above

7. TBD - Maximize Timber Outputs for One Decade-Departure Benchmark

a Description and Purpose Used to define the maximum timber output possible for the first decade with nondeclining yield policy removed and CMAI and MMRs retained

b Specifications

(1) Same as TBR run below, except for removal of nondeclining yield (NDY)

(2) Land Base Includes all tentatively suitable land

(3) Economic Assumptions Same as TBR

(4) All MMRs were applied

(5) An economic rollover was performed as was the case for TBR Rollover specifications were the same as TBR

8. TBR - Maximize Timber Outputs Benchmark

a Description and Purpose Used to define the maximum timber output possible for the first decade under current policy and MMRs

b. Specifications

(1) Objective Function. Maximum timber for one period (decade)

(2) Timber Policies

(a) Minimum rotation Used the full set of rotation ages greater than or equal to 95 percent of CMAI,

(b) Includes sustained yield requirements,

(c) Includes nondeclining yield requirements,

(d) Includes dispersion

(3) Land Base Includes all tentatively suitable land

(4) Economic Assumptions Used assigned values with trends and demand cut-offs for RVDs

(5) All MMRs were applied.

(6) An economic rollover was performed to determine the most economically efficient allocation and schedule which corresponded to the harvest levels for each of the five periods defined in the maximum timber tun

The specifications for this rollover were the following

(a) Objective Function Maximize PNV for 10 periods,

(b) Timber policies were the same as above,

(c) Land base was the same as above,

(d) Economic assumptions were the same as above,

(e) All MMRs were applied as above,

(9 Output Constraint Meet timber outputs from each of the five periods as defined by the maximum timber run

9. WLN - Maximum Wilderness Benchmark

a Description and Purpose Used to evaluate the impacts of maximum wilderness allocations.

b Specifications

(1) Objective Function Maximize PNV for 10 periods

(2) Timber Policies

(a) Minimum rotation Used the full set of rotation ages greater than or equal to 95 percent of CMAI;

(b) Includes sustained yield requirements,

(c) Includes nondecliningyield requirements,

(d) Includes dispersion

(3) Land Base

(a) Includes all tentatively surtable lands

(b) All roadless areas designated for further planningwere allocatedto wilderness prescription Boundary adjustments were not allowed The Mt Eddy roadless area was included

(4) Economic Assumptions Used assigned values wth trends and demand cut-0% for RVDs

(5) All MMRs were applied

N. Alternatives

This section lists only those constraints that were modeled in FORPLAN, it also describes how they were modeled For a more complete discussion about the displays and results of all the alternatives refer to Chapter II. Chapter II lists all constraints unique to an alternative and Chapter IV discusses how those constraints change the environmental consequences

Alternatives Eliminated From Detailed Study

I. ALTERNATIVE CEE - CONSTRAINED ECONOMICALLY EFFICIENT ALTERNATIVE

a Description and Purpose

(1) Used to portray the most economically efficient mix of allocations and schedules, subject to meeting MMRs and MIRs

(2) Used to specifically define and evaluate MIRs

(3) Used to demonstrate the opportunity cost of the MIRs taken collectively

(4) Used to form a base run used in evaluating the Forests' constraints common to all alternatives

b Specrfications

(1) Objective Function Maximize PNV for 12 periods (decades)

(2) Timber Policies

(a) Minimum rotation Usedthe full set of rotation ages greater than or equal to 95 percent of CMAI:

(b) Includes sustained yield requirements,

(c) Includes non-declining yield requirements,

(d) Includes dispersion

(3) All MMRs and MIRs were applied No addrtional Forest defined constraints were added

(4) Land Base Includes all tentatively sutable land

(5) Economic Assumptions Used assigned values wrth trends and demand cut-0% for RVDs.

2. Alternative CEF - Constrained Economically Efficient Alternative with Forest Constraints

a Description and Purpose

(1) Used to portray the most economically efficient allocation and schedule, subject to meeting MMRs, MIRs, and Forest constraints common to all alternatives

(2) Used to specifically define and evaluate the Forests' constraints common to all alternatives

(3) Used to demonstrate the opportunrty costs of the Forests' constraints common to all alternatives taken collectively

(4) Used to form a base run used in evaluating other constraints and the Forests' alternatives

b Specifications

Same as Alternative CEE except In addtion to the MMRs and MIRs, the Forests' constraints common to all alternatives are included in this alternative

3. Alternative LBU - 25 Percent Budget Reduction

a Descnption and Purpose Used to estimate the *expected* outputs and services that could be provided in the future if the current budget was reduced by 25 percent

b Assumptions

(1) Held as constant for the SO-year planning horizon, a 25 percent reduction in the normalized 1989 budget (see Alternative CUR direction) This 25 percent reduction applied to the total dollars

c Specifications

(1) Objective Function, Maximum PNV for 12 penods (decades).

(2) Timber Policies

(a) Minimum rotation Usedthefullsetofrotation ages greater than or equal to 95 percent of CMAI,

(b) Includes sustained yield requirements,

(c) Includes non-declining yield requirements,

(d) Includes dispersion

(3) Land Base. Includes all tentatively suitable land

(4) Economic Assumptions. Used assigned values with trends and demand *cut-offs* for RVDs

(5) All MMRs and MIRs were applied The Forests' constraints common to all alternatives were also applied

4. Alternative MKT - Market Emphasis

Description and Purpose This alternative emphasizes high output levels of market resources such as timber, range, and minerals with non-market outputs at economically efficient levels

This required alternative is not measurably different than RPA, therefore, it was not run See alternatives considered in detail section, specifically the RPA alternative

5. Alternative PFD - Preferred Alternative/Departure

a Descriptionand Purpose Usedto determinewhether multiple-use objectives could be better met by regulatingtimber harvestvolumesin amannerwhich deviates from the principle of Non-declining Yield (NDY)

b Speclfications Same specifications as Alternative PRF (Preferred Alternative) except for the following

(1) Objective Function Maximize PNV for 12 decades

(2) Non-declining Yield Applied only after the fifth decade

(3) Required to return to the Base Sale Schedule of Alternative PRF by the fifth decade

6. Alternative 12C - Late-Successional Forest Management

a Descriptionand Purpose This alternative emphasizes the protection of Old-growth reserves and watershed/fishery habttats as defined by the Scientific Panel on Late-Successional Forest Ecosystems

b Specifications

(1) All specifications of the Preferred Alternative are applied to Alternative 12C

(2) In addition, old growth reserve categories 1 and 2 and owl addttions are classified unsuitable

(3) The following constraints of the enhanced watershed/fishery habitat emphasis are included

(a) Intermittent streams 50A on each side with no harveston moderateto high instabilitysites

(b) Class 3 streams (no fish bearing) 150-ft

(c) Class 1 & 2 streams (fish bearing) 300-ft on each side dedicated plus major corridors or flood planes 1/8-mi dedicated on each side

(d) Wild and Scenic Rivers 1/4-mi dedicated on each side

(e) On non-HCAs and Old-growth Reserve areas, preserve 6-green trees greater than the average stand diameter for future snags and dead and down

(9 No hot burns on steep areas and no burning in nparian areas

(g) Critical Watersheds are managed under a extended rotation of 180 years on all suitable timber acres

Alternatives Considered in Detail

I. Alternative PRF - Preferred Alternative

a Descriptionand Purpose. Alternative PRF portraysthe Forests as being capable of supporting a sustained yield of commodity outputs, goods, and services Resources are managed within the requirements of multiple-use forest management Alternative PRF emphasizes a mixture of commodity production and amenity benefits that optimizes net public benefits (NPBs) while responding to local Forest issues

b Speckations

(1) All MMRs, MIRs, and Forest constraints common to all alternatives were applied to this altemative

(2) The following timber policies were applied

(a) Sustained yield requirements,

(b) Harvest flow requirements,

(c) Non-declining yield,

(d) Dispersion rules, and

(e) Minimum rotations

(3) The objective function was to maximize PNV for 100 years (10 10-year periods)

(4) Constraints unique to this alternative

(a) Several allocations of land were made under this alternative beyond the MMRs, MIRs, and common Forest constraints in order to respond to local Forest issues

- Allocations of specfied analysis areas to timber unsuitable (TM-UNS) prescriptions, over and above MMRs, MIRs, and forest constraints, include primanly the following areas

(1) portions of 5 roadless areas to semi-pnmrtive non-motorized,

(2) rural recreation on dispersed recreation srtes. existing and potential ski areas, summer homes and special uses,

(3) 6 RNAs, and (4) non-stocked lands (i e brush, hardwoods, and knobcone pine)

- Allocations of specrfied analysis areas to minimal timber (TM-MRG) prescriptions include pnmarily the following areas

(1) foreground viewing area from developed recreation srtes,

(2) foreground viewing area along scenic highways (Interstate 5 and Highways 3, 36, 89, 97, and 299 and the Everitt Memonal Highway.) and

(3) moderately unstable lands

A total of 102,240 acres of tentatively surtable timber lands was allocated

- Allocations of specrfied analysis areas to timber (TM-REG) prescriptions include primarily the following areas all other tentatively unsurtable land

A total of 427,760 acres of tentatively surtable timber lands was allocated

The net effect of all these allocations on the prescriptions in the Alternative PRF land base, when compared to Alternative RPA. was as follows

TM-REG - Decreased by 110,976 acres from RPA

TM-MRG - Increased by 1,860 acres from RPA

Total tentatively surtable acres reduced by 109,116 as compared to RPA

(a) Rotations are at a minimum of 90 years and average 120 years

(b) The budget level for fire would increase by 100 percent above 1989 levels,

(c) Fifty percent of the dispersed, developed, and wildemess visrtor days would be at low standard and 50 percent at high standard,

(d) Some use of herbicides would be allowed

2. Alternative RPA - *1990* RPA Program Emphasis

a Description and Purpose Under Altemative RPA, the primary objective is to schedule and harvest timber and to provide products and services at levels expected to help satisfy current and future demands (as stated in the 1990 Forest and Rangeland Renewable Resources Planning Act [RPA] program) This alternative determines how the Forests' RPA program can best be implemented

b Speckations

(1) All MMRs, MIRs, and Forest constraints common to all alternatives were applied to this alternative

(2) The following timber policies were applied

(a) Sustained yield requirements,

(b) Harvest flow requirements,

(c) Non-declining yield,

(d) Dispenion rules, and

(e) Minimum rotations.

(3) The objective function was to maximize PNV for 100 years (10 10-year penods)

(4) Constraints unique to this alternative. Only a few allocations of land were made under this alternative beyond the MMRs, MIRs, and common Forest constraints'

- Allocations of specified analysis areas to timber unsuitable (TM-UNS) prescriptions, over and above MMRs, MIRs, and Forest constraints, include primanly the following areas

  (1) Rural recreation on dispersed recreation sites,

  (2) one RNA,

  (3) non-stocked lands (i e brush, hardwoods, and knobcone pine)

- Allocations of specified analysis areas to minimal timber (TM-MRG) prescriptions include primarily the following areas

  (1) foreground viewing area from developed recreation srtes,

  (2) foreground viewing area along scenic highways (Interstate 5 and Highways 3, 36, 89, 97, and 299 and the Everitt Memonal Highway.) and

  (3) moderately unstable lands

A total of about 100,380 acres of tentatively sultable timber lands was allocated to this prescription

- Allocations of specified analysis areas to timber (TM-REG) prescriptions include primarily the following areas all other tentatively suitable lands

A total of 538,736 acres of tentatively suitable timber lands was allocated

(a) No regeneration cutting can occur in deficit quarter townships according to the 50- 11-40 rule Thinning is permitted in all quarter townships on every acre meeting 11-40 Rotations are at a minimum of 90 years

(b) The budget level for fire would increase by 100 percent above 1989 levels

(c) Twenty-five percent of the dispersed, 70 percent of the developed, and 40 percent of the wilderness visitor days would be at low standard and the remaining visitor days at high standard

(d) Some use of herbicides would be allowed

3. Alternative CUR - No Action/No Change

a. Description and Purpose, Alternative CUR is the No Action/No Change Alternative required by National Forest Management Act (NFMA) regulations This alternative represents a continuation of the current resource management direction based on Ranger District Multiple-Use Plans

b Specifications

(1) **All** MMRs, MIRs, and Forest constraints common to all alternatives were applied to this alternative

(2) The following timber policies were applied

(a) Sustained yield requirements,

(b) Harvest flow requirements,

(c) Non-declining yield,

(d) Dispenion rules, and

(e) Minimum rotations

(3) The objective function was to maximize PNV for 100 years (10 10-year penods)

(4) Constraints unique to this alternative Several allocations of land were made under this alternative beyond the MMRs, MIRs, and common Forest constraints

- Allocations of specified analysis areas to timber unsuitable (TM-UNS) prescriptions, over and above MMRs, MIRs, and forest constraints, include primarily the following areas

  (1) Rural recreation on dispersed recreation stes, existing ski areas, summer homes and special uses, and

  (2) non-stocked lands (i e brush, hardwoods, and knobcone pine)

- Allocations of specified analysis areas to minimal timber (TM-MRG) prescriptions include primarily the following areas

  (1) foreground viewing area from developed recreation sites.

(2) foreground viewing area along scenic highways (Interstate 5, Highways 3, 36, 89, 97, 299, and 24 Forest roads,) and

(3) moderately unstable lands

A total of 133,011 acres of tentatively suttable timber lands was allocated

- Allocations of specified analysis areas to timber (TM-REG) prescriptions include primarily the following areas all other tentatively sultable lands

A total of 502,788 acres of tentatively sultable timber lands was allocated

The net effect of all these allocations on the prescnptions in the Alternative CUR land base, when compared to Alternative RPA, was as follows

TM-REG - Decreased by 35,948 acres from RPA
TM-MRG - Increased by 32,631 acres from RPA

Total tentatively suitable acres reduced by 2,317 as compared to RPA

(a) No regeneration cutting is allowed in quarter townships not meeting the 50-11-40 rule Thinning is permitted in all quarter townships on all acres meeting 11-40 Rotations are at a minimum of 90 years

(b) The budget level for fe would be at current levels

(c) One-hundred percent of the dispersed, 80 percent of the developed, and 100 percent of the wilderness visitor days would be at low standard and the remaining visitor days at high standard

(d) Some use *of* herbicides would be allowed

5. Alternative CBF -Citizens for Better Forestry

a Description and Purpose Alternative CBF strikes a balance between resource use and resource restoration This alternative emphasizes protection of RMZs, maintaining roadless areas in an undeveloped condition, maintaining older over-mature habltat, and emphasizing harvest systems other than clearcutting

b Specrfications

(1) All MMRs, MIRs, and Forest constraints common to all altematives were applied to this altemative

(2) The following timber policies were applied

(a) Sustained yield requirements,

(b) Harvest flow requirements.

(c) Non-declining yield,

(d) Dispersion rules, and

(e) Minimum rotations

(3) The objective function was to maximize PNV for 120 yean (12 10-year periods)

(4) Constraints unique to this altemative

(a) Several allocations of land were made under this alternative beyond the MMRs, MIRs, and common Forest constraints

- Allocations of specified analysis areas to timber unsuitable (TM-UNS) prescnptions include primarily the following areas

(1) 16 roadless areas to semi-primitive non-motorized,

(2) Mt Eddy roadless area to wildemess,

(3) Mt Shasta Scenic Area (Area A),

(4) rural recreation on dispersed recreation sltes. *ex*-isting ski areas, summer homes and special uses,

(5) 17 RNAs,

(6) total RMZ width between 300 and 1,200 feet depending on slope, erosion hazard, and spotted owl corridors for perennial streams,

(7) Tnnrty Divide Biolink. and

(8) non-stocked lands (ı e brush, hardwoods, and knobcone pine)

- Allocations of specified analysis areas to minimal timber (TM-MRG) prescriptions include primarily the following areas

(1) Foreground viewing area from developed and dispersed recreation sltes.

(2) foreground viewing area along scenic highways (Interstate 5, Highways 97 and 299, Everitt Memonal Highway, and 5 Forest roads,)

(3) moderately unstable lands:

(4) Mt. Shasta Recreation Area,

(5) N lands high site south and west aspect, and

(6) A lands low site poorly stocked.

A total of 122,666 acres of tentatively surtable timber lands was allocated

- Allocations of specified analysis areas to (TM-REG) prescnptions include primarily the following areas all other tentatively surtable lands

A total of 372,750 acres of tentatively surtable timber lands was allocated

The net effect of all these allocations on the prescriptions in the Alternative PRF land base, when compared to Alternative RPA, was as follows

TM-REG - Decreased by 165,986 acres from RPA.
TM-MRG - Increased by 22,286 acres from RPA

Total tentatively sutable acres reduced by 142,700 as compared to RPA

(a) No regeneration cutting in deficit quarter townships according to the 50-11-40 rule Thinning is permitted in all quarter townships on all acres meeting 11-40 Rotations are set at a minimum of 120 years The regeneration system allowed is green tree retention (GTR) No clear-cutting is permitted

(b) The budget level for fire would increase by 100 percent above current levels

(c) Fifty percent of the dispened, developed, and wilderness vistor days would be at low standard and 50 percent at high standard

(d) No use of herbicides would be allowed.

O. Summary of Constraints Modeled in FORPLAN

The major types of constraints that were modeled in FORPLAN are summanzed for each alternative in **Table 6-11.**

III. Other Models

In addition to FORPLAN, several other systematic models were used by the Shasta-Trinity National Forests These are descnbed below.

A. Forest Plan Data Base

A new Forest Plan data base was developed in 1987. Sixty-thousand capabilty areas were defined based on land status, forest type, condition class, and National Forest group Addtional information was coded into each capability area to assess public issues, define analysis areas, and determine acres of suitable prescriptions by alternative This data was loaded into a System 2K data base on a Univac mainframe at Fort Collins, Colorado

In 1988 the Forest Plan Data Base was migrated from the Univac at Fort Collins to the Data General system in the Supervisor's Office. It currently resides in Oracle on the Data General Dunng 1990 the data base was updated to account for harvesting. planting. fires and land exchange as of January 1, 1990 As a result of these edits the data base currently contains 68,000 polygons Additional labels have been created most recently to help analyze issues pertaining to the Northern Spotted Owl and older over-mature habitat

The following attnbutes were coded for each capabilty area

Geographic locators
Yap Number
Capability Area Number (polygon number)
Net National Forest Acres (land status)
Forest
District
Compartment
Quarter township
Slope
Aspect

Cultural Resources
Cultural Sites

FORPLAN Analysis
FORPLAN Analysis Area
Harvest regulation class by alternative

Riparian Areas
Inner Gorge Distance

Table B-II
Constraints Imposed on Alternatives Considered in Detail

Modeling Feature	PRF	RPA	CUR	CBF
Objective Function	MAX PNV	MAX PNV	MAX PNV	MAX PNV
NDY*	Yes	Yes	Yes	Yes
Budget Constraint	No	No	No	No
33% Mortality	Yes	Yes	Yes	Yes
Unsuitable Lands	Yes	Yes	Yes	Yes
Herbicides	Yes	Yes	Yes	No
Riparian Mgt. Zones (minimum total width feet) (allocation)**				
Perennial Streams				
Class 1 Streams	600 TM-UNS	600 TM-UNS	600 TM-UNS	600 TM-UNS
Class 2 Streams	600 TM-UNS	600 TM-UNS	600 TM-UNS	600 TM-UNS
Class 3 Streams	300 TM-UNS	300 TM-UNS	300 TM-UNS	300 TM-UNS
Intermittent Streams				
Class 4 Streams	200 TM-REG	200 TM-REG	200 TM-REG	200 TM-REG
Lakes, Ponds, Reservoirs, and Wetlands				
Greater than One Acre	300 TMS-UNS	300 TMS-UNS	300 TMS-UNS	300 TMS-UNS
Less than One Acre	200 TMS-REG	200 TMS-REG	200 TMS-REG	200 TMS-REG
Goshawks	3000 TMS-UNS	30W TMS-UNS	3000 TMS-UNS	7500 TMS-UNS
Fire Program (percent)				
Budget Level	+100	+100	CURRENT	+100
Recreation Program (percent)				
Dispersed/low standard	50	25	100	50
Dispersed/high standard	S0	75	0	50
Developed/low standard	50	70	80	50
Developed/high standard	50	30	20	50
Wildemerr (percent)				
Low Standard	50	40	100	50
High Standard	50	60	0	50
Management Intensity				
Minimum Rotation Regeneration in Deficit	*90*	90	90	120
Quarter Townships (50-11-40)	No	No	No	No
Thinning on All Acres That meet 1140	Yes	Yes	Yes	Yes
Prescription (Acres)				
TM-MRG	102.240	100,380	133.011	122.666
TM-REG <40%	213,413	234,983	216.274	160,452
TM-REG >40%	259.617	302.753	286.514	212,298

* NDY - Non-declining Yield
** Actual widths of RMZs are determined as specified under the Riparian Management Zone Standards and Guidelines (S&Gs) (See Chapter 4 of the Forest Plan for the complete set of S&Gs)

Inner Gorge Type
Intermittent Stream Distance
Perennial Stream Distance
Perennial Stream Type

Soils
Erosion Hazard
Geologic Stabilrty

Special Areas
Research Natural Areas
Special Areas

Threatened, Endangered, and Sensitive Species
Habtat Conservation Area (HCA)
Designated Conservation Area (DCA)
Critical Habrtat Unrt (CHU)
50-I 1-40
Quarter Township category for 50-I I-40

Vegetation
Timber Productivity Class
Timber Surtability for Regeneration
Timber Strata (forest type and condition class)
Vegetation Type
Vegetation Size
Vegetation Density
Stand Record System number
Year Planted

Visual Quality
Visual Absorption Capabilrty
Visual Distance Zone
Visual Variety Class
Visually Sensitive Features

Wilderness and Roadless Areas
Classfied Areas
Roadless Areas

Wildlife
Big Game Habtat

See the planning record data base dictionary for Land Management Planning, June 1992, for more information about these attributes

B. Geographic Information System (GIS)

The 60,000 capabilrty areas (polygons) were mapped in DWRIS87 (Distnbuted Wildland Resource Information System) a U S Forest Service, Region 5, GIS product This system resides on the Data General computer at the Supervisor's Office. The Forest set of digital maps, organized into the I 19 quarter quads of the Forest, are linked to the Forest Plan Data Base to allow for area calculations and query mapping The GIS was used to make timber surtabilrty maps and calculate management prescription acres It is also used regularly to overlay a variety of wildlife boundaries with the planning base maps to code polygons with new wildlrfe information and recalculate harvest regulation classes for alternatives

C. Wildlife and Fish Habitat Relationships - Habitat Capability Models

The Wildlife and Fish Habitat Relationships System (WFHR) displays needs and/or habitat attributes of all known species which occur wrthin a given geographical area or zone for breeding, feeding. resting and season of use by major habtat types and seral stages of those types This information is shown on a series of matrices The Shasta-Trinity National Forests' WFHR option includes the North Coast-Cascades Zone but does not include information for fish species

From the WFHR system a specific set of habttat capability models was developed for each of the Management Indicator Species (MIS) to display a classfication of habttat attributes for preferred, moderate, and low levels of management These models represent an aggregation of information from several sets of existing species capabilty models

In addrtion to the matrices, the system includes range maps, pertinent life history narratives, scientific names, known habrtat information, and references for information sources. This data base can be used to predict or provide species responses to habtat alteration, similar habitat use by more than one species, and habitat management needs.

D. Effective Alteration (EFFALT) Modeling

The EFFALT cumulative impact thresholds are applied in FORPLAN to limit timber harvesting activities and thereby assure that landscape alterations do not exceed the levels associated wrth desired visual quality objectives

(VQOs) Perspective plot computer simulations were the pnmary tool employed to establish these thresholds in the EFFALT approach These simulations were developed (chiefly on Hewlett-Packard HP9845 hardware) by Forest Service landscape archtects The most cntical and common situations modeled were middleground landscapes with partial retention VQOs Topographic and timber stand data was fed into the computer to simulate current condtions Varying rotation lengths and harvest entry rates were then tested by modeling all units into the perspective plots

The resulting simulations of altered landscapes were then examined visually to determine maximum limits of alteration permissible under the given VQOs. Thus, the actual correlations of harvesting rates and total EFFALT to VQOs were based on the landscape architects' professional judgment For similar stuations. these judgments were highly consistent They were further corroborated by field inspection and aerial photos compared to existing visual condtions (EVC) mapping

References Cited

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3 U.S Department of Agriculture, Forest Service, *An* Assessment of the Forest and Range Land Situation in the Unted States, January 1980, Washington, D C

4 US Department of Agriculture, Forest Service, Pacrfic Southwest Region, Pacrfic Southwest Regional Guide, January 15, 1984, revised

5 Forest Service Manual (FSM) 2472 03, R-5 Supplement N o 232, May 1980

6 US. Department of Commerce, Bureau of Economic Analysis, Industry - Specrfic Gross Output Multipliers for BEA Economics Areas, January 1977

Appendix C

Roadless Area Descriptions and Evaluations

APPENDIX C
Roadless Area Descriptions and Evaluations

The purposes of this appendix are to (1) summarize the findings used in the evaluation of the Mt. Eddy Further Planning Area (RARE II #05229) for wilderness or non-wilderness allocations: and (2) disclose the proposed disposition for 29 roadless areas released by the 1984 California Wilderness Act

1 Findings and Analysis, Mt. Eddy Further Planning Area (RARE II-#05229)

Wilderness Resource Values

A

Description

The Mt Eddy area totals 9,846 acres, 2,126 of which are in private ownership It is located on the Mt Shasta Ranger District about seven miles west of Mt. Shasta City It is located on the main divide between the Sacramento and Trinity River watersheds

The area is Characterized by highly varied terrain ranging from level benches to nearly vertical slopes Elevations range from 6,000 to 9,000 feet

Vegetative types include grassy meadows, riparian zones, mixed conifer sawtimber, brushfields and subalpine tree species The area contains the Sierran Forest Province-Mixed Confer Forest ecosystem (M261 0-5)

A number of alpine lakes are found within the area Dobkins Lake, Durney Lake, Little Crater Lake, and Deadfall Lakes These and other unpolluted water sources are of a high quality

Evidence of past mineral development is present Several prospecting sites for asbestos and chromite development are located within this area

Recreation use (about 9,600 recreation visitor days [RVDs] annually) includes hiking, camping, rock climbing, swimming, fishing, hunting, horsebackriding, and sightseeing Portions of the area have been studied for downhill skiing Preliminary studies indicate that the base facilities may have to be located at lower, generally nonskiable eievations Skiers would then be transported up to the skiing area.

Two mqor range allotments are located partially within the untt the Eddy Creek C&H and Bear Creek C&H allotments

The proposed Mt. Eddy Research Natural Area (RNA), approximately 890 acres in size, is within this area

The following sensttive plants species are found on Mt Eddy

Draba aureola Wats (DRAU)
Epilobium siskiyouense (Munz) Hoch & Raven (EPSI)
Eriogonum umbellatum Torr var *humistratum* Reveal (ERUMH)

Wildlife and cultural resource values are characteristic to this physiographic province

Capability

Wilderness Attributes

Natural integrity is high and apparent naturalness is moderately high The only limtting feature of these attributes is the presence of roads around and partially within the area which provide access for a large number of hunters and fishermen There are several unimproved roads leading to Little Crater Lake, Dobkins Lake, and Deadfall Lakes, and on Mt Eddy itself These intrusions are not separable through a boundary adjustment and would have to be obliterated if the area was designated for wilderness.

Opportunity for solitude is moderately high It would have outstanding solitude except for two limtting factors its small size and the presence of permanent offsite intrusions It is a relatively untouched area completely surrounded by intensive management activities which take place on public and pnvate land.

The opportunity for primitive recreation is moderately high. The diversity of terrain and vegetation, the number

of lakes and streams, and the vanety of wildlife tend to offset its small size when considering primitive recreation opportuntties

Supplemental wilderness attnbutes (ecologic, scenic, etc) include the aforementioned sensttive plants species, which make it a unique area for botanical study As previously mentioned, a portion of the area has also been proposed for RNA establishment

Manageability and Boundaries

Manageability could be enhanced by further adjustment of exterior boundaries Nearly all the boundaries are located on unsurveyed land lines

Also complicating manageability are the 2,126 acres in private ownenhip These private lands contain desirable subalpine terrain and are distributed in such a manner that acquisition would be a key factor in improving manageability

As mentioned previously, the overall small size of the area limits its suitability for wilderness designation Any boundary adjustment which would further decrease size, would further diminish wilderness attributes

Availability

The most significant potential use of this area, which would compete wtth wilderness designation, would be downhill skiing This area has been inventoried for potential development of a downhill skiing facility with conceivably 60 0 thousand RVDs of use

Potential hard rock mineral development also competes with wilderness values Three prospecting sites for asbestos and one site for chromite development are located here

Tmber and forage values are insignificant and are not a factor in consideration for wilderness availability The Mt Eddy area contains an estimated 46 3 million board feet (MMBF) of standing sawtimber volume Potential yields average 0 9 MMBF per year There are about 3,400 acres of tentatively suitable timber lands, most of which exhibit low productivity for timber Range use averages only 75 animal months (AMs) per year

Recreation use consists primarily of dispened camping, hiking, hunting, and fishing Light, but steady, motonzed dispened recreation use occurs within the area The recreation use season is limtted to six months a year because of access problems dunng the wintertime

The large amount of pnvate land limits availability These lands would have to be acquired to best meet wilderness or downhill skiing objectives

The presence of botanic values, as well as the proposal for a RNA, outwardly complements the wilderness values However, the management and protection of these values would limt the availability of the area for wilderness because of the need to control dispersed recreation use

Need

Although a majority of the people who responded during the 1987 Roadless Area Review and Evaluation (RARE II) public involvement analysis were pro-wilderness, a vocal minority was in favor of non-wilderness The latter group was motivated by the then-active proposal for a downhill skiing development

Mt Eddy is the last remaining undeveloped subalpine area along the Eddy Range, othen have been logged and roaded Recreation use has historically been limited to the summer months New patterns of roaded motorized recreation have appeared as more jeep trails approach the perimeter of this area

The potential wilderness opportuntties in this area should be compared against those of its closest neighbor Mt Shasta is immediately across the valley and ten air miles away The unique feature about Mt Eddy, which is not present at Mt Shasta, is the alpine lakes

Alternatives Considered

B

Refer to **Table C-1** for land allocations (prescriptions) by alternative.

Under Alternative PRF (Preferred Alternative), the emphasis is on semi-primitive non-motonzed and semi-primrtive motorized recreation which appean to be in keeping wtth current and predicted recreation use trends Under the Limited Roaded Motorized Recreation prescnption (Prescription II), development of downhill skiing could be allowed if the need arose in the future

Alternative RPA (1990 RPA Program Emphasis) emphasizes roaded natural recreation, with a small portion of the area allocated to timber management.

Alternative CUR (No Action/No Change) favors more semi-primitive motorized recreation than the other alternatives.

Alternative CBF (Citizens for Better Forestry) allocates the entire area to wilderness management and/or RNA establishment Development of downhill skiing would not be considered under this alternative

RNA allocations vary by alternative within this area Under Alternative RPA (1990 RPA Program Emphasis) RNA establishment is not recommended Alternatives PRF (Preferred Alternative), CUR (No Action/No Change), and CBF (Citizens for Better Forestry) have identfied RNA values, and RNA establishment is recommended.

Environmental Consequences

C

Effects Due to Management Prescriptions

1. **Designation** Wilderness
   Prescription: V - Wlderness Management
   Alternative: CBF (Citizens for Better Forestry).

Wilderness designation under this prescription would maintain natural integrity, apparent naturalness, opportuntty for solitude, and primitive recreation opportunity in the short and long run

Wrih respect to the effects on non-wilderness resources and uses, prohibltion of all statutable or non-conforming practices would limit multiple use outputs and uses of this area

Vegetation would be left to cycle naturally overtime. The total mix of wildlife assemblages and seral stages would be left to change primanly through natural processes.

Air quality would be maintained at a nondegradation level

Grazing, where established, would continue on an extensive, rather than intensive basis No fertilization, seeding of nonindigenous grasses, vegetative conversion, and/or water spreading would be allowed.

New mineral developments would be prohibited, assuming subsequent withdrawal of the area from mineral entry.

Recreation uses would be limited to primitive and, in some cases, semi-primitive non-motorized settings. Motonzed dispersed recreation (off-highway vehicle [OHV] uses) would be prohiblted under this management prescription Approximately 60 0 thousand RVDs of downhill skiing use would be foregone

virtual nondisturbance of soils and watersheds would enhance water quality and fishery habitats A slight decrease in water yield would occur in the long run

No timber harvesting or road construction would be allowed.

Visual resources would be enhanced with a visual quality objective (VQO) of preservation

2. **Designation:** Non-Wilderness
   Prescription: I - Unroaded Non-motorized Recreation
   Alternative: PRF (Preferred Alternative)

This prescnption would maintain (not diminish) components of wilderness quality in the short run. Long-term improvements in wilderness quality would take place pending improvements such as trails, number of pnmitive campsites, and trailhead facilities just outside the area

Restriction of vegetative management to nonmechanical methods would cause slightly favorable impacts on older over-mature dependent wildlife habitats Late seral stage habtats would be allowed to cycle naturally overtime wlth some assistance from prescribed burning

Due to access and use of nonmechanical methods, opportunities to improve seral stage distribution, by prescribed burning, would be limited In the long run, habltat values for early and mid-setal stage dependent species would gradually decline

Air qualtty would be maintained at a nondegradation standard

Grazing would continue on an extensive rather than intensive basis and would be coordinated wlth recreation use Range improvement activities would be undertaken wthin the bounds of the adopted VQOs

New and existing mineral developments would be allowed under plans of operation which provide for mitigation of soil and vegetative disturbances.

Recreation uses would be limited to primitive and semi-primitive non-motorized settings. Motorized, dispersed recreation (OHV uses) would be prohibried under this

Table C-1
Mt. Eddy Roadless Area
Land Allocations by Alternative (Percent of Acres)

Management Prescription[1]	Name	ALTERNATIVE[2] PRF	RPA	CUR	CBF
I	Unroaded Non-motorized Recreabon	70	0	0	0
II	Limited Roaded Motonzed Recreation	5	0	45	0
III	Roaded Recreation	15	80	5	0
IV	Roaded, High Density Recreation	0	0	0	0
V	Wilderness Management	0	0	0	100[3]
VI	Wildlife Habrtat Management	0	0	20	0
VII	Late-successional Reserves and TE& Selected Sensitive Species	0	0	0	0
VIII	Commercial Wood Products Emphasis/Timber Management	0	20	20	0
IX[4]	Riparian Management				
X	Special Area Management	10	0	10	0
XI	Hentage Resource Management	0	0	0	0

1 These prescriptions are descnbed in detail in Chapter II.
2 PRF - Preferred Alternative
RPA - 1990 RPA Program Emphasis
CUR - No Action/No Change
CBF - Citizens for Better Forestry
3 Includes 10 percent in research natural areas
4 All riparian areas will be managed according to Prescription IX. Acreages are not displayed because most acres are included in other more restrictive prescriptions.

management prescription Approximately 60.0 thousanc RVDs of downhill skiing use would be foregone

Nondisturbance of soils and watersheds would maintair water quality and fishery habitat. Water yield woulc decrease slightly in the long run

Timber harvesting would be limrted to catastrophic occur rences where salvage of the timber resource can be accomplished without road construction.

Visual resources would be maintamed for a retentior and/or a partial retention VQO.

3. **Designation:** Non-Wilderness
   Prescription: II - Limited Roaded Motonzed Recreation
   Alternatives: PRF (Preferred Alternative) and CUR (No Action/No Change)

This prescnption would maintain most of the components of wilderness qualrty in the short run Construction of primrtive roads and use of mechanized equipment could cause wilderness character to decrease slightly over the long term.

Restrnction on vegetative disturbance to low impact stand maintenance salvage harvesting could facilitate development of older over-mature dependent wildllfe habrtats Late seral stage habrtats would generally be allowed to cycle naturally over time, with some assistance from prescribed burning

Due to limited access, opportunrties to improve seral stage distribution, through prescribed burning, would be reduced In the long run, habrtat values *for* early and mid-seral stage dependent species would gradually decline

Air quality would be maintained at a nondegradation standard.

Grazing would continue on an extensive rather than intensive basis and would be coordinated wrth recreation use Range improvement activrties would be undertaken wrthin the bounds of the adopted VQOs

New and existing mineral developments would be allowed under plans of operation which provide for mitigation of soil and vegetative disturbances.

Recreation uses would be limited to semi-primitive motorized settings. Motonzed, dispersed recreation (OHV uses) would be permitted under highly suitable trails and areas Approximately 60 0 thousand RVDs of downhill skiing could be realized should the demand develop.

Minimal disturbance of soils and watersheds would maintain high water qualrty Water yield would decrease slightly in the long run Fishery habitats would be enhanced

Timber harvesting and associated road construction would be limited Stand maintenance/salvage of dead, dying, or high risk trees would be the primary objective

Visual resources would be maintained to meet retention and/or partial retention VQOs

4. **Designation:** Non-Wilderness
   Prescription: III - Roaded Natural Recreation
   Alternatives: RPA (1990 RPA Program Emphasis), PRF (Preferred Alternative), and CUR (No Action/No Change)

Under this management prescription wilderness qualrty attributes would be moderately diminished The character of the landscape would appear to be visually natural wrth obvious evidence of management including timber harvesting, road construction, and trailhead and other dispersed site construction

Some mitigation on wilderness impacts could be done through intensrty and timing of land management activrties and visually screening developments using topographic and vegetative barriers This area would be most beneficial to the recreationist seeking developed and less primitive opportunities

Vegetative management would be used in support of recreation objectives These practices would favor most wildlife habrtats, as they would bring about a diverse range of seral stage conditions Basically, values for wildlife habitat would be maintained

Air quality would be maintained

Grazing would be managed at intensive levels in key and highly suitable forage resource areas where they do not conflict wrth recreation Grazing would continue on an extensive level elsewhere Mitigation of impacts on wilderness values would be made by adjusting on-off grazing seasons, timing livestock movement between ranges, and minimizing range structures

New and existing mineral developments would be allowed

A full range of motonzed and non-motorized recreation settings would occur Some developed recreation would take place Users would tend to concentrate near npanan areas (lakes, streams) and other natural attractions Large areas, where no use or very light dispersed non-motonzed use takes place, would be evident Development of downhill skiing would occur fthe need arose in the future

Timber harvesting and associated road construction would focus on achieving recreation objectives Timber yields would be less than the biological potential due to longer rotation lengths (120-140 years)

Existing VQOs would be enhanced in pnmary viewsheds and maintained elsewhere

Water qualrty and fishery habitats would be maintamed Water yield would decrease slightly over the long term

5. **Designation:** Non-Wilderness
   Prescription: VI - Wildlife Management
   Alternative: CUR (No Action/No Change)

Under this management prescription wilderness quality attributes would be moderately diminished Forest vegetation would be managed to maintain or enhance wildlfe habitat

Remnants of natural integrity and apparent naturalness could exist However, land management activities would be evident Mltigation of impacts on wilderness values could be accomplished through increasing the time intervals between or intensrty of management activties and/or visually screening developments using topographic and vegetative barriers

Vegetative management would be applied to meet a wide range of seral stage requirements In general, early, mid, and late-seral stage habitats would be maintained No decline in viability for animal species would be anticipated

Air quality would be maintained

Grazing would be managed at intensive levels in key and highly suitable forage resource areas where it does not conflict wth wildllfe browse/forage resources Grazing would continue on an extensive basis.

New and existing mineral development would be allowed

A full range of motonzed and non-motorized recreation settings, including developed recreation, would occur Users would tend to concentrate near facilities (campgrounds, trailheads) which would be used as a base of operations for enjoying a wide variety of roaded natural recreation pursuits There would be large voids where no activities occur or where only primrtive recreation use takes place. Development of a downhill skiing facilrty would not be recommended under this prescnption

Timber harvesting and associated road construction would focus on meeting wildlrfe habtat management objectives This would result in timber yields which are less than the biological potential due to longer rotation lengths (120-140 years)

VQOs would be partial retention and/or modification, depending on wildlrfe needs

Water quality and fishenes habtat would be maintained Water yield would decrease slightly over the long term

6. **Designation:** Non-Wilderness
   Prescription: VIII - Timber Management
   Alternatives: **RPA** (1990 RPA Program Emphasis), and CUR (No Action/No Change)

All wilderness attnbutes would be diminished in areas subject to this prescription Evidence of vegetation management would appear less natural on the landscape Only those portions of the area not sutable for timber management and/or other commodity uses would remain undeveloped However, this area is too small or narrow to appear pnmltive

A full range of vegetative manipulation measures would be available. but they would tend to favor early seral stage dependent wildlife

Air quality would be maintained in the long run There would be bnef, temporary penods of air quality degradation dunng timber harvesting. road construction. and log hauling

Grazing would be managed at intensive levels in key and highly sultable forage resource areas where they do not conflict wth intensive timber management objectives Grazing would continue on an extensive rather than on an intensive level elsewhere in the area

New and existing mineral development would be allowed

A full range of motorized and non-motonzed recreation settings would take place in this area Roaded natural and rural recreation rather than pnmitive and semi-primitive situations would predominate

Timber stands would be managed through stocking control measureswrth rotation lengths rangingfrom70 to I30 yean

Visual resources would meet adopted VQO levels which, in most instances, would be modification Some maximum modification could occur

Assuming intensive application of Best Management Practices (BMPs), water quality and fisheries habitats would be maintained Water yields would increase slightly

7. **Designation:** Non-Wilderness
   Prescription: IX - Riparian Management
   Alternative: All alternatives

This prescription occurs in long, narrow corndon along streams or around bodies of water Therefore, effects on wilderness would be influenced primarily by the prescriptions adjacent to the riparian areas Management within the riparian areas would have little effect on wilderness values

Under this prescription, there would be some latitude to usevegetation managementtomeetwildlife, fisheries, and water quality management objectives Ingeneral, late seral stage dependent wildlife species would be favored at the expense of early seral stage dependent wildlife species

Air quality would be dependent on activities in other prescription areas

Grazing would be managed at intensive levels on highly suitable forage areas where it does not conflict wrth ripanan management objectives

New and existing mineral development would be allowed, based on plans of operation which clearly provide for mitigation of water qualty degradation and soil and watershed disturbances

Awide range of recreation activities and settings would be anticipated Recreation uses would tend to concentrate a' ng nparian areas where major attractions are located

Motorized and non-motorized forms of dispersed and developed recreation use would occur OHV use would be confined to designated roads and trails

Timber harvesting and associated road construction, where allowed, would be directed toward meeting nparian management objectives Timber yields would be much less than full biological potential and not scheduled at all along Class I, Class II, and Class III streams

Existing inventoned VQOs would be maintained

Water qualrty and fishery habitats would be enhanced with lrttle or no effects on water yield over the long run

8. **Designation:** Non-Wilderness
   Prescription: X - Special Areas (Research Natural Areas - [RNAs] and Special Interest Areas -[SIAs])
   Alternative All alternatives except RPA (1990 RPA Program Emphasis)

This prescription would enhance natural integrrty and apparent naturalness Because of the research purposes pnmitive recreation would not be encouraged in RNAs Primitive recreation is encouraged in SIAs

The opportunrty for solrtude would be enhanced Primitive recreation opportunities would be limited by research objectives in RNAs but not in SIAs

Prohibition ofvegetative management would cause short-term favorable impacts on older over-mature dependent wildlife habitats Late seral stage habitats would be allowed to cycle naturally overtime. Conversely, early to mid-seral stage dependent wildlife habitats would decline in value

Air qualrty would be maintained at a nondegradation level

Grazing, where established, would continue on an extensive basis provided that conflicts with research purposes are minimized No intensive grazing practices (e g , fencing, fertilization, seeding, vegetative conversion, water spreading, etc) would be allowed

New mineral development would be prohibited, assuming subsequent withdrawal of the area from mineral entry Established mineral nghts would be managed under plans of operation which would minimize disturbances to the vegetation

Recreation uses would be limlted to pnmttive and semi-primitive non-motonzed settings Motorized dispersed recreation (OHV uses) and downhill skiing would be foregone

The risks of disturbance to soils and watersheds would be decreased wlth decreases in water yield in the long run

No timber harvesting and associated road construction would be allowed Road and/or trail construction would be limited to RNA/SIA needs

Visual resources would be natural in appearance Areas would be managed to meet a VQO of preservation

Synergistic Effects of Alternatives

1 **Alternative PRF (Preferred Alternative).** Impacts of this alternative on wilderness values would be relatively low Eighty-five percent of the area is allocated to Prescriptions I (Unroaded Non-motorized Recreation), II (Limited Roaded Motorized Recreation), or X (Special Area Management) These prescriptions would retain most wilderness attributes

The remaining 15 percent of the area would be allocated to Prescription III (Roaded Recreation) These prescriptions would affect wilderness values in a small portion of the area

2. Alternative RPA (1990 RPA Program Emphasis). Under this alternative, the majority of the area would be allocated to Prescription III (Roaded Recreation) and Prescnption VIII (Timber Management) which would substantially modify the wilderness attnbutes This altemative would allow motorized recreation and timber harvesting Visual resources would be maintained at the present inventoned VQOs on about 80 percent of the area

3. Alternative CUR (No Action/No Change). This alternative would allow resource development, including timber harvesting and wildlife habltat manipulation, on 45 percent of the area The remaining area would generally retain most of its wilderness character under Prescnption II (Limited Roaded Motorized Recreation), and Prescription X (Special Area Management)

***4.* Alternative CBF (Citizens for Better Forestry).** Under this altemative, the entire area would be allocated to Prescriptions V (Wilderness Management) and X (Special Area Management) These prescriptions would maintain the wilderness character.

Motorized recreation and use by OHV users would be prohibited. Visual qualrty objectives would be preservation

II. Iand Management Disposition Proposed for Roadless Areas Managed for Non-wilderness Under the 1984 California Wilderness Act

General Discussion

The 1984 California Wilderness Act allowed for non-wilderness multiple-use management of 29 individual roadless areas (Refer to the wilderness and inventoned roadless areas map in the map packet for the location of these areas)

These roadless areas, totalling 306,060 acres of National Forest land, would be subject to varying degrees of resource development activtties depending on the themes of the four alternatives considered in detail in this Draft EIS and the mix of Management Prescnptions applied to them There *are* 10 Management Prescriptions considered in the land allocation for each of the *29* released roadless areas They are'

- I Unroaded Non-motonzed Recreation
- II Limited Roaded Motorized Recreation
- III Roaded Recreation
- IV Roaded, High Densrty Recreation
- VI Wildlife Management
- VII Threatened, Endangered, and Selected Sensltive Species
- VIII Timber Management
- IX Riparian Management
- X Special Area Management
- XI Cultural Resource Management

These prescnptions are described in Chapter II

Descriptions of the *29* released roadless areas follow

Description of Released Roadless Areas

I. Backbone: 9,916 acres

This area is located immediately adjacent to (and west of) Shasta Lake Over 25 percent of the area is in private ownenhip Elevations range from 1,200 feet along the

shoreline to over 4,500 feet on the ridges adjacent to Schell Mountain. Vegetation consists of predominantly mixed conifer within the southern third of the area. The remainder is a diverse mixture of live and black oak, digger pine, and manzanita One developed recreation site (e g , Gooseneck Cove) receives light to moderate use There is very Ittle dispersed recreation use in the rest of the area (usually fishing) A small portion of the Shasta Unit of the Whiskeytown-Shasta-Trinity National Recreation Area (NRA) is within this area

2. Bell-Quinby (B): 11,707 acres

This area is located approximately six miles north of Burnt Ranch on the west side of the New River drainage It is almost entirely surrounded by roads and is bounded on the north by the Trinity Alps Wilderness The area is extremely rugged and steep with elevations ranging from 1,380 feet along New Rver and Quinby Creek to 5,864 feet at the north end of the unit Vegetation ranges from mixed conifer species on the north slopes to brushfields and hardwoods on the south slopes. Present recreation use centers around hiking along a jeep and foot trail that runs through the unit

3. Bonanza King: 16,306 acres

This area has been substantially roaded since the RARE II roadless inventory A large portion of the area is in private ownership It is located about te miles north of the Trinity Unit of the NRA Elevations range from 2,500 feet along the Tnnrty Rver to 7,000 feet along the Bonanza King divide Terrain is steep and rugged and nine perennial streams originate in the area Vegetation consists of mostly manzanita within the western one-third Mixed conifer and ponderosa stands occur at lower elevations within the rest of the area Existing habitat supports populations of deer and small game Trails follow the East Fork of the Trinity Rver and access Grouse Lake. The area receives moderate recreation use which consists of hunting, fishing, and other non-motonzed dispersed use

4. Castle Crags (B): 1,732 acres

This area is located about 8 miles southwest of Mt Shasta City and 50 miles north of Redding It adjoins the Castle Crags Wilderness Elevations range from 5,600 to 6,600 feet Terrain is mountainous with some sheer rock cliffs Vegetation consists of large brushfields with scattered mixed conifers in the draws Three alpine lakes are present Access into the area is provided by only a few trails. A portion of the Pacific Crest Trail (PCT) is located along the southern boundary Opportunities for primitive recreation are moderately high.

5. Chanchelulla: 3,865 acres

This area is located approximately 10 miles southeast of the community of Hayfork adjacent to the Chanchelulla Wilderness Elevation ranges from 2,700 feet near the East Fork of Hayfork Creek to about 5,000 feet in the southeast corner along the Wilderness boundary Vegetation consists of extensive brush fields on south-facing slopes and mixed conifer on north-facing ones. Significant commercial timber stands are found in the area The area contains deer habitat There are some trails in the area Present dispersed recreation use is very low and occurs primarily as fishing

6. China Springs (B): 707 acres

This area is located approximately 14 miles north of Junction City It is contiguous to the Trinity Alps Wilderness Elevations range from 2,500 feet to 4,000 feet Vegetation consists primanly of mixed conifer forests Chaparral and oak types occupy some of the more exposed, south facing slopes The western boundary of the unrt is formed by a road system that winds its way up the steep ridge leading to China Springs Short sections of spur roads, hiking trails, water developments, and miners cabins sprinkle the landscape at the edges of this area Dispersed recreation use presently occurring within the area consists of a small amount of hiking, fishing, and hunting

7. Chinquapin: 21,520 acres

Older over-mature Douglas-fir forests blanket the rugged steep slopes of ndges and creek drainages in this area Specimen sized chinquapins grow throughout the area Seventy percent slopes and unstable soils are common This area is located about 15 miles southeast of Forest Glen and Highway 36 and is more than a two-hour drive from Redding Major tributaries to the South Fork Trinity Rver are found throughout the area Water quality is high and unpolluted The southwestern portion contains the highest elevations. culminating at 5,900 feet Lack of vegetative diversity and steep terrain limit varied opportunities for primitive recreation Present recreation use is moderate and confined mostly to the South Fork Trinity River water influence zone

8. Cow Creek 23,152 acres

This area is located about 30 miles west of Weaverville north of U S Highway 299 Elevations range from 5,255 feet at Ironside Mountain to 1,500 feet in the Trinity and New Rver canyons Rock bluffs and steep talus slopes are predominant throughout the area Vegetation consists of

mixed confer, oak, chapanal, digger pine, and manzanita Present dispened recreation use is confined along the Tnntty Rver and New River Fishing, rafting, hiking, and hunting occur within this corridor.

9. Devils Rock ***13,896* acres**

This area is located near the Pit Rver Arm of Shasta Lake, approximately 24 miles northeast of Redding The limestone outcroppings are visually pleasing The Shasta salamander, which inhabits the formations, and the sensitive plants within the area are the pnme ecological features Elevations are low, mostly 1,500 to 2,500 feet, with Brock Butte peak at 3,459 Recreation use is light and consists primarily of hunting big game and wild turkey Three trailheads lead up three of the permanent creeks in the area

10. Dog Creek ***5,543* acres**

The area has been substantially roaded since the RARE II roadless inventory Over 15 percent of the area is in private ownership It is located immediately west of the Sacramento Rver and about five miles north of Shasta Lake Elevations range from 1,100 feet in the northeast corner of the area (adjacent to the Sacramento River) to 4,300 feet along the southern boundary Characterized by steep slpes and rugged terrain, the area is heavily dissected by intermittent stream courses Vegetation is predominately mixed confer and pine forest with some areas of Douglas-fir-pine in the upper reaches of Little South Fork of Dog Creek drainage Primitive recreation opportunities are very limited due to the area's small size and rather homogeneous landscape Present and potential recreation use is light and is composed pnmarily of hunting and fishing

11. Eagle: ***6,798* acres**

The area has been substantially roaded since the RARE II roadless inventory It is located approximately six air miles east of Big Bar and eight air miles west of Weaverville south of US Highway 299 Elevations range from 1,700 feet near the north edge of the area near Hocker Flat to approximately 5,700 feet at the top of the ndge (in the vicinity of Squaw Creek) The area is charactenzed by rugged terrain and steep slopes Five perennial streams are present There are several human-made intrusions in this area A timber access road system was constructed and timber was harvested in 1982 and 1983 by the private landowner within the area Since the 1984 California Wilderness Act, addltional timber access roads have been built Hunting constitutes the majority of the current recreation use in the area

12. East Beegum: ***1,963* acres**

This area is located about 3 miles south of the Platina Canyon on Highway 36 and 8 miles north of the Yolla Bolly Middle-Eel Wilderness Land administered by the Bureau of Land Management (BLM) is immediately to the east Elevations range from 1,700 feet on Beegum Creek to 4,900 feet at Little Red Mountain Vegetation changes from brush types, such as chaparral and manzanita at lower elevations, to stands of mixed conifers at the higher elevations The area provides winter range for deer. Recreation use is light and generally confined to the South Fork of Beegum Creek's water influence zone Trailheads are located at two Forest Service developed camp sites, North Fork Beegum and Beegum Gorge Trails run along the North Fork of Beegum Creek, and a few other hiking trails follow the ndge tops

13. East Fork ***5,195* acres**

The northern boundary begins at the Rat Trap Gap Road (FH 35) at an elevation of 3,200 feet It rises on the south side of the area and reaches a high elevation of 7,200 feet at the Yolla Bolly-Middle Eel Wilderness boundary The East Fork of the South Fork of the Trinity Rver runs through the area Primitive recreation is limited by lack of diversified terrain and vegetation Vegetation consists of predominantly older over-mature mixed confers south of the river with brush interspersed Deer are common here

14. East Girard ***21,914* acres**

This area has been substantially roaded since the RARE II roadless inventory Over 30 percent of the area is in private ownership It is located about 15 miles northwest of Montgomery Creek More than 14 buttes and mountains, ranging from 3,900 feet to 5,300 feet in elevation, are present At least six major tributanes to the McCloud River and Squaw Creek originate wthin the area The north and northwest portions of the area are adjacent to the McCloud River Mixed conifer stands cover the majority of the area, including some areas with a large amount of Douglas-fir Live oak, black oak, and manzanita grow in pockets throughout trhe area Opportunties for dispened recreation are limlted due to the absence of lakes, unform topography, and vegetation Recreation use is currently light, consisting mostly offishing and hunting

15. Fisher Gulch **4,412 acres**

The area, whose chiefvalue is wildlife habitat, water quality and scenic value, is located about 8 miles north of Junction City From a topographic standpoint, the area consists of a series of 5 short northeast/southwest running ridges These ridges are components of a major divide between the East Fork of the Trinity River and Canyon Creek watersheds. Elevations range from 2,600 feet to about 4,600 feet The area contains a wide vanety of mixed confer, dner locations contain digger pine and shrub types which are extremely dense and impenetrable Recreation use is hampered because of the dense brush and rugged terrain Moderate use is generally concentrated around roads, trails and trailheads leading into the Trinity Alps Indications of mineral development are exemplified by the mines in the East Fork of the Trinity River watershed located within and/or adjacent to this area Extensive mineral development, yielding many tons of gold ore, occurred between I882 and I904

16. Kettle Mountain: **4,865 acres**

Minor roading has occurred in this area since the RARE II roadless inventory Over 50 percent of the area is in private ownership It is located about 5 miles northwest of Montgomery Creek Elevations range from 1,400 feet along the Pit River to 3,600 feet on Kettle Mountain Moderately steep slopes and very irregular, heavily dissected hillsides characterize the area Vegetation is classified predominately as mixed conifer with areas of live and black oak interspersed on drier sites A peregnne falcon territory has been identified north of the Pit No 6 Reservoir The apparent naturalness of the area is impacted most by road construction, logging, and the presence of the resetvoir and its facilities Dispersed recreation use is currently light, mostly in the form of deer hunting in the fall.

17. Little French Creek **II,227 acres**

This area is adjacent to and bounded on the north by the Trinity Alps Wilderness It is located north of the town of Big Bar and about 2 I air miles from Weaverville. The area is characterized by rugged terrain and steep slopes Vegetation consists of brushfields, hardwoods, and digger pine at lower elevations (I,400 feet) while the higher elevations (approximately 5,900 feet) support mixed confer stands Several major trails traverse the area providing a means of off-highway vehicle (OHV) use This use is confined *to* pnmitive jeep trails along *the tops of north-*south ridges The use, although light, is well established The area is used as an entrance to the southern edges of the Trinity Alps Wilderness area

18. Mt. Shasta (B): **2,958 acres**

The area lies northeast of Mt Shasta City It joins the Mt Shasta Wilderness on the north, west, and south. It is characterized by rugged terrain containing old lava flows Elevations range from 4,400 to about 9,000 feet. Mt Shasta frequently creates its own climate and wind flow which affects the Mt Shasta (B) area. The area receives a high amount of dispersed camping and hiking use Recreation use is concentrated in the Bunny Flat-Sand Flat area, a takeoff point for most hikers who climb Mt Shasta Snow play (nordic skiing and snowmobiling) is popular during the winter

19. Murphy Glade: **1,018 acres**

This area is adjacent to the Yolla Bolly-Middle Eel Wilderness Elevations range from 5,600 to 7,200 feet near the ridges adjacent to the Wilderness boundary Vegetation consists primarily of older over-mature Douglas-fir sawtimber The area is used as a trailhead for access to the Wilderness Present recreation use is extremely light

20. Panther: **11,727 acres**

Minor roading has occurred in this area since the RARE II roadless inventory The area is located about 5 miles west of Big Bar and 22 miles west of Weaverville south of US Highway 299 Elevations range from I,000 feet along the canyon of the main stem of the Trinity River to 5,200 feet at Monument Peak Six perennial streams flow through the area Vegetation consists of mixed conifer communities of Douglas-fir-ponderosa pine to the more typical communities composed of various mixtures of Douglas-fir, incense cedar, sugar pine, and ponderosa pine. Tanoak, digger pine, chaparral, and oak occur on the dner sites *"lost* of the recreation use occurs along the Trinity River in the form of fishing and rafting Some hunting occurs dong the southern edges of the area.

21. Pattison: **28,326 acres**

This area is located I4 miles northwest of the Hayfork Valley It is located equidistant from the Trinrty Alps Wilderness to the north and the Yolla Bolly-Middle Eel Wilderness to the south Elevations range from 1,650 feet along Hayfork Creek to more than 5,I00 feet near Pattison Peak Vegetation consists of large brushfields, mixed confer timber stands, and true fir communities At least one cultural site [an Indian village) is known to exist The area provides habitat for some older over-mature dependent species as well as bear Recreation is comprised mostly of

off-highway vehicle (OHV) use on numerous jeep trails and includes some hunting and fishing

22. Penney Ridge: 4,844 acres

The area joins the Yolla Bolly-Middle Eel Wilderness along one half mile of its eastern boundary Penney lidge is remote and environmentally similar to the adjacent wilderness Elevations range from 3,000 to 5,400 feet with 70 percent slopes In 1988 the Hermit Fire burned a large portion of the area, affecting vegetation conditions substantially Natural regeneration and conifer planting have occurred throughout the fire-affected area Vegetation is characterized by a mosiac of younger and older mixed confer stands on north-facing slopes and oak grass openings and brushfields on south-facing slopes No new roads were constructed during implementation of fire salvage activities Recreation activities are limited to occasional hiking and hunting

23. Salt Gulch: 6,657 acres

The area has been substantially roaded since the RARE II roadless inventory It is located approximately nine miles southeast of the community of Hayfork Elevations range from 2,800 feet near Hayfork Creek to over 4,300 feet The area is generally situated on a large, highly dissected ridge which forms a divide between Salt Creek and Hayfork Creek. Vegetation consists of Douglas-fir-pine-mixed confer forests on moist, north slopes, mixed confer forests on the less moist, north-facing slopes, and woodland-chaparral on the south-facing, dry slopes of the unit The area contains wildlife habitat for deer Timber harvest has occurred in the area in the past Present recreation use is low and consists mainly of fishing

24. Slate Creek 6,616 acres

The area has been substantially roaded since the RARE II roadless inventory It is located about 4 miles west of the Sacramento kver and the town of LaMoine Elevations range from 2,000 feet along Slate Creek near its confluence with the South Fork, to 4,200 feet on the western divide The area is moderately steep, wrth rugged terrain and well dissected hillsides Vegetation consists of mixed conifer-ponderosa pine stands with occasional patches of hardwoods, manzanta, and fir at higher elevations A high degree of forest management, including timber harvest, has occurred in the last five years Recreation use is currently light with the use being equally divided between hunting. fishing, dispersed camping, and OHV use

25. South Fork: 17,261 acres

The area is located about 6 miles south of Hyampom Valley Special features include Marble Caves, located about I mile north of Forest Glen near the extreme southern end of the area, and cultural sites consisting of an old Indian village Approximately 10 5 miles of the South Fork of the Trinity River, located wthin this area, are designated as part of the National Wild and Scenic kven System Much of the area is covered wrth extensive brushfields with some mixed confer timber on north facing slopes Elevations range from 1,600 feet along the river to 4,900 feet at the top of Bear Wallow Mountain The South Fork supports a valuable anadromous fishery and contains valuable spawning habitats The diversrty in this area somewhat offsets the confinements of the steep topography Recreation use is moderate to heavy in the liver corridor Hiking, camping, rafting, prospecting, and dispersed camping all take place, but fishing is the pnmary activity

26 Underwood *3,219* acres

The area is about 27 miles west of Hayfork and lies within the South Fork of the Trinity River watershed The majority of the area is within the Six livers National Forest Underwood Mountain is a prominent topographic feature Elevations range from 1,920 feet to over 4,000 feet. Vegetation consists of large brushfields and mixed confer timber stands Dispersed recreation use is limrted to hunting

27. Wells Mountain: 6,144 acres

The area has been substantially roaded since the RARE II roadless inventory Over 35 percent of the area is in private ownership It is located about 7 miles east of Hayfork Elevation vanes from 2,500 feet in the streams to over 5,000 feet at Wells Mountain In general, the area is very steep and rugged and is charactenzed by mature dissected topography Ten tnbutary streams feed into Carr Creek to the north and to Hayfork Creek on the south and west Vegetation consists of mixed confer species on the north slopes and extensive brushfields and hardwoods on the south slopes Recreation use is extremely light within this area and is composed pnmanly of hunting and fishing

28. *West* Beegum: 5,480 acres

The area is located about 3 miles south of Platina Canyon on Highway 36 and 8 miles north of the Yolla Bolly-Middle Eel Wilderness Beegum Gorge is the outstanding

topographic feature The northern edge of the area is formed by Noble Rdge while Little Red Mountain Ridge forms the southern boundary. **A** foot and horse trail follows main Beegum Creek and the North Fork and Middle Fork of Beegum Creek Opportunities for primitive recreation, including fishing and hunting, are moderately low

***29.* West Girard** ***34,892* acres**

The McCloud Rver watershed forms the focus of West Girard. The McCloud Rver is classified as a world class trout stream. West Girard is located approximately *9* miles south of the town of McCloud This area is characterized by steep to veiy steep slopes with elevations ranging from 2,200 feet in river canyon bottoms to 5,600 feet near Tombstone Mountain Vegetation consists of brushfields and mixed conifers Wildlife include Rocky Mountain elk and wild turkey. Scientific interest is focused on limestone formations which occur in scattered locations throughout the area Limestone formations near Tombstone Mountain contain several unexplored caves

Table *C-2* shows the disposrtion of each roadless area by alternative It includes the area name, National Forest acreage, and the approximate percentage of each Management Prescnption applied in each alternative.

Table C-2
Roadless Area Prescriptions by Alternative
(Percent of Area)

Number	Roadless Area	National Forest Acreage	Management Prescription	PRF	RPA	CUR	CBF
1	Backbone	9.976	II	10	0	0	0
			III	20	30	35	25
			VI	60	35	5	40
			VII	5	<5	<5	<5
			VIII	5	35	60	35
2	Bell-Quinby(B)	11,707	VII	100	100	100	100
3	Bonanza King	16,386	II	<5	0	<5	0
			III	15	15	15	<5
			VI	45	35	25	70
			VII	5	0	0	0
			VIII	35	50	60	30
4	Castle Crags (B)	1,732	VI	0	0	0	15
			VII	90	90	90	85
			VIII	10	10	10	0
5	Chanchelulla	3,865	VI	5	5	5	5
			VII	95	95	95	95
6	China Springs (8)	707	VII	100	100	100	100
7	Chinquapin	21,520	I	0	0	0	10
			II	0	0	0	5
			VI	0	0	5	0
			VII	60	75	65	55
			VIII	15	25	20	5
			X	25	0	10	25
8	Cow Creek	23.152	I	<5	<5	5	<5
			II	10	10	5	10
			III	35	5	30	30
			VI	15	40	5	10
			VII	40	45	45	50
			VIII	<5	<5	10	<5
9	Devils Rock	13,896	I				
			II				
			III	0	20	20	<5
			IV	<5	<5	<5	0
			VI	35	25	0	<5
			VII	5	<5	<5	15
			VIII	5	55	45	<5
			X	30	0	30	30
10	Dog Creek	5,543	III	15	<5	<5	0
			VI	5	15	10	30
			VII	25	30	30	45
			VIII	55	55	60	25

Table C-2 (Continued)
Roadless Area Prescriptions by Alternative
(Percent of Area)

Number	Roadless Area	National Forest Acreage	Management Prescription	PRF	RPA	CUR	CBF
11	Eagle	6,798	III	25	5	20	25
			VI	30	25	0	0
			VII	15	15	15	50
			VIII	30	55	65	25
12.	East Beegum	7,963	I	80	0	0	90
			VI	5	80	80	<5
			VII	<5	<5	<5	<5
			VIII	10	15	15	5
			X	5	5	5	5
13	East Fork	5,195	I	0	0	0	60
			II	20	20	20	0
			III	0	0	5	<5
			IV	0	0	<5	0
			VI	0	0	<5	0
			VII	35	35	35	35
			VIII	45	45	40	5
14	East Girard	27.9 14	I	<5	<5	0	15
			II	0	0	0	<5
			VIII	25	45	35	30
15	Fisher Gulch	4,472	I	25	0	0	30
			III	0	0	30	0
			VI	5	25	0	0
			VII	70	70	70	70
			VIII	0	5	0	0
16	Kettle Mountam	4,865	II	40	0	0	0
			III	0	35	20	35
			VI	0	0	0	90
			VII	<5	5	5	5
			VIII	60	60	75	5
17.	Little French Creek	11,227	I	0	0	0	40
			III	45	30	30	10
			VI	10	25	25	0
			VII	45	45	45	50
			VIII	<5	<5	<5	<5
18	Mt Shasta (B)	2.958	I	25	0	0	55
			III	55	70	80	10
			VI	0	0	0	15
			VII	15	15	15	15
			VIII	0	10	0	0
			X	5	5	5	5

Table C-2 (Continued)
Roadless Area Prescriptions by Alternative
(Percent of Area)

Number	Roadless Area	National Forest Acreage	Management Prescription	PRF	RPA	CUR	CBF
19	Murphy Glade	1,018	III	0	0	5	0
			VII	5	0	0	5
			VIII	95	100	95	15
			X	0	0	0	80
20	Panther	11,727	III	45	45	50	50
			VI	20	20	15	0
			VII	35	35	35	50
21	Pattison	28,326	I	55	30	0	70
			III	10	<5	30	<5
			VI	15	5	10	<5
			VII	15	15	15	15
			VIII	20	50	45	<5
			X	0	0	0	15
22	Penney Ridge	4,844	I	35	30	30	95
			VI	15	30	0	0
			VII	<5	<5	5	<5
			VIII	65	40	65	5
23	Salt Gulch	6,657	III	<5	0	0	0
			VI	5	5	10	10
			VII	95	90	90	90
			VIII	0	5	<5	0
24	Slate Creek	6,616	VI	0	0	20	15
			VII	50	50	50	50
			VIII	50	50	30	35
25	South Fork	17,261	I	70	35	15	80
			II	<5	10	<5	<5
			III	5	5	15	0
			VI	<5	5	10	<5
			VII	20	15	20	20
			VIII	10	30	40	<5
26	Underwood	3,219	I	0	0	0	95
			VI	70	5	50	0
			VII	0	0	0	<5
			VIII	30	95	50	5
27	Wells Mountain	6,144	III	35	35	35	35
			VI	45	5	65	60
			VII	20	0	0	5
			VIII	0	60	0	0
28	West Beegum	5,480	I	90	0	0	90
			III	10	0	5	5
			VI	<5	70	85	<5
			VII	<5	5	0	<5
			VIII	<5	30	10	5

Table C-2 (Continued)
Roadless Area Prescriptions by Alternative
(Percent of Area)

Number	Roadless Area	National Forest Acreage	Management Prescription	PRF	RPA	CUR	CBF
29	West Girard	34.892	I	20	10	0	**30**
			II	0	0	0	<5
			III	*0*	t 5	<5	0
			VI	*20*	10	<5	<5
			VII	**60**	60	60	60
			VIII	0	*20*	**35**	<5
			X	0	0	0	10

Appendix D

Economic Efficiency Analysis

APPENDIX D
Economic Efficiency Analysis

Conceptual Background

Present Net Value

Present Net Value (PNV) is the criterion used to maximize net benefits in planning benchmarks and alternatives foi the Shasta-Trinty National Forests For each altemative PNV is the difference between the discounted value of al priced outputs and all Forest Service management anc investment costs over the analysis period The pricec outputs are those that are or can be exchanged in the market place They include the value of forage, timber stumpage, commercial fish in streams, miscellaneous harvested products, increased water flow, in-the-grounc minerals, and all recreation visitor days including those for wildlife, fishing, and wilderness experiences

The alternatives are designed and analyzed to achieve the goals and objectives for priced outputs in a manner that achieves the greatest excess in the value of priced outputs in relation to their cost, while meeting all specified constraints and objectives for non-priced outputs The alternatives are also designed to achieve the specified non-priced outputs and to meet constraints at the least cost Thus, the PNV of each alternative estimates the value of the maximum attainable net benefits of priced outputs It is the value of priced benefks realized in excess of all the Forest Service costs of producing priced outputs and non-priced outputs and meeting management constraints PNV, therefore, is an estimate of the market value of the current forest resources after all costs of producing outputs and meeting constraints have been subtracted from the value of the expected flow of priced outputs

Net Public Benefit

Net Public Benefit (NPB) is defined as the overall value to the nation of all outputs and positive effects (benefks) less all the associated Forest Service inputs and negative effects (costs) for producing those pnmary benefts, whether they can be quantitatively valued or not Thus, NPB conceptually are the sum of PNV plus the full value of non-priced outputs The full value of non-priced benefits is used because their cost of production has been accounted for in PNV The non-priced benefits included here are (1) outputs such as threatened and endangered species maintenance or enhancement, (2) natural and scientific areas, (3) cultural site reservations such as Indian religious srtes and historical or anthropological sites, (4) visual qualty. and (5) diversty objectives or air quality in excess of minimum management requirements Minimum management requirements in this context are standards that must be met in the production of any or all outputs from the Forests The minimum level, therefore, is a cost of production in the multiple use context

Secondary or induced benefits and costs also result from National Forest management activities These include local income and job *effects* on economic development of communities, net cost to taxpayers, price effects on consumers of forest products and other producers of those products, payments to communities in lieu of *taxes,* and subsidies to specfic users of National Forest outputs All these are distributive welfare effects of National Forest production The foregoing distributive effects and impacts have been the object of national policy issues and discussions in both the Administration and the Congress Because they are distributive effects, they are essentially questions of equty rather than efficiency, and they involve questions of who should get benefits and who should pay the costs They cannot be assessed in the context *of* the efficiency criteria associated with the PNV and the NPB concepts

Final EIS Presentation

The methodology, background, and results of the economic efficiency analysis that was conducted during the planning process is presented throughout this Final Environmental Impact Statement (FEIS) As a result, all of the major sections of this document, including those listed below, must be read in order to get a complete picture of the analysis that was conducted

Context	Reference
Discussion of how economic efficiency analysis was used in the process of developing alternatives	Chapter II, parts B and F
Outputs, total cost, and PNV for each of the benchmarks	Chapter II, parts C and F
Results of the constraint analysis and a comparison of the alternatives in terms of PNV This is the most comprehensive summary of the analysis results in this document	Chapter II, part F
Background information on economic conditions and their resource supply-demand situation for the Forests	Chapter III
How and why PNV of the alternatives differs	Chapter IV
Technical details of the modeling and analysis process including a description of basic estimates and assumptions on benefits. costs, and interest rates	Appendix B

Appendix E

Wild and Scenic Rivers Evaluation

APPENDIX E
Wild and Scenic Rivers Evaluation

Introduction

A

Public Issues

This discussion includes an analysis of resource trade-offs involved in the potential additions to the Wild and Scenic Rvers System The Department of Interior completed a screening and evaluation of the inventoried rivers in the Nationwide Rivers Inventory in 1982

In January, 1981, 1064 miles of wild, scenic, and recreation rivers on the Shasta-Trinty National Forests were designated by the Secretary of Interior This designation was made in response to a request by the State of California for additions to the system under provisions of the Wild and Scenic Rivers Act Nofurtheranalysisor study is needed for these rivers

The following rivers have been identlfied for further study (1) the McCloud River, generally located northeast of Redding, in Shastaand Siskiyou Counties, with its terminus at Shasta Lake, (2) the Sacramento Rverfrom Box Canyon Dam to Shasta Lake, (3) The upper Sacramento River above Box Canyon Dam, (4) Beegum Creek from the Forest boundary to the headwaters, and (5) the upper segments of the North Fork and South Fork Trinity River and Virgin Creek, located west of Redding in Trinity and Tehama Counties The South Fork and North Fork Trinity River are the headwaters of the mainstem Trinty River, which is a tributary of the Klamath hver

In addition, based on public comments and recommendations, three other streams were evaluated (1) Canyon Creek, from the headwaters inthe Trinrty Alps Wilderness to the confluence with the mainstem of the Trinrty River, (2) Hayfork Creek, from 9 Mile Bridge to the confluence with the South Fork Trinity River, and (3) Squaw Valley Creek from the confluence of Cabin Creek to the confluence with the McCloud Rver

The following public issues focus on the Wild and Scenic Rivers and other water courses on the Forests

a. **How should the Forests' vegetative resources be managed for ecosystem diversity? Special consideration would be given to providing habitats that maintain or enhance populations of threatened and endangered (T&E) species and viable populations of sensitive species and/or management indicators.** (Public Issue #2)

There is public concern that a wide variety of ecosystems should be maintained on the Forests to specifically provide for the

1 Maintenance and/or enhancement of habitats for Federally listed T&E species (plants and animals),

2 Maintenance and/or enhancement of habitats sufficient to provide for viable populations of all other existing species (plants and animals),

3 Maintenance and/or enhancement of the Forests' existing ecosystems and the biodiversity (plants and animals) associated with them, and

4 Maintenance and/or enhancement of special elements or components of these ecosystems (i e , snags, down logs, cliffs, vegetative seral stages, etc)

b **How should watersheds be managed to maintain or enhance water quality and fisheries?** (Public *Issue #6)*

The Shasta-Trinity National Forests contain the headwaters of two important watersheds in the State. the Sacramento and Trinity Rivers These watersheds provide high quality water that has a broad variety of uses, including that of supporting an important anadromous (salmon and steelhead) fishery

c. **How should the Forests supply water-oriented recreation facilities and opportunities to meet increasing demand?** (Public Issue *#12)*

There is a statewide public need for additional water-oriented recreation activities The Forests have the potential to supply most forms of water-oriented recreation However, the current supply of support facilities will not meet estimated demand Conflicts are occurring between different types of use

d. How wide should riparian management zones (RMZs) be and what management activities should be allowed within them? (Public *Issue # 13)*

Forest management activrties have the potential to affect water quality and the fisheries resource on the Forests Timber harvesting, prescnbed burning, and road construction near streamcourses are of particular concern to many people, because these activities have a high potential for degrading water quality and fisheries habitat

e. What river segments should be recommended for inclusion in the federal Wild and Scenic Rivers System? (Public Issue *#20)*

Portions of New River, the North Fork and South Fork of the Trinity Rver, and the Trinity River were added to the National Wild and Scenic Rivers System in 1981 Several other major rivers and streams on the Forests have the potential for Wild and Scenic River designation This designation would maintain examples of pristine aquatic and riparian ecosystems and provide nver-oriented recreational opportunities There is concern that designation would restrict other management activities. such as timber harvesting, and adversely affect private inholdings

Description of Rivers

B

Refer to maps in this appendix for the geographic location of each of the following rivers

Beegum Creek

Beegum Creek forms the common boundary southwesterly and northwesterly of Shasta and Tehama Counties, respectively

Main Fork From Round Bottom in Section 5 (T28N R 10W) to the Forest boundary. Section 5 (T28N R 9W)

South Fork From headwaters of South Fork, Section 36 (T28N R 10W), adjacent to Forest Road 28N36 to the confluence of Middle Fork, Section 6 (T28N R9W)

Cultural/Historical Values. The drainage was used extensively by prehistoric Native Americans During World War II several chrome mines were developed wtthin the drainage, but they were abandoned at the end of the war

Fisheries. The stream supports a population of native rainbow trout Holding and rearing habitat for anadromous fishenes is found in the lower reaches of the creek However a waterfall located about three miles above the Highway 36 crossing prevents migration into the upper reaches of the stream

Geology. The stream is free-flowing with numerous pools and riffles In Beegum Gorge proper, the stream is incised in bedrock and is very rugged and scenic Above Beegum Creek Campground, side slopes are primarily serpentinized soils but the stream channel is relatively stable Elevations range from about 1,300 feet at the Highway 36 crossing to about 3,900 feet at Forest Road 28N10

Land Ownership. Above the Highway 36 crossing, the stream flows through lands administered by the Bureau of Land Management, the U S Forest Service, and through a small portion of private property

Management Activities. Local economies are dependent pnmanly on Federal and State programs, recreation. retirement, grazing. and hunter recreation

Recreation. Due to limited access, recreation use in the drainage is light There are a few opportuntties for camping. picnicking. swimming, and fishing

Socio-economic. The socio-economic focus is revenues generated from Federal and State employment, recreation. retirement. and revenues generated from timber harvest and cattle grazing allotments on Federal lands

Vegetation. Vegetation along the proposed corridor is varied At the lower elevations. it ranges from chaparral brushfields through stands of gray pine and oaks with associated brush species, and stands of Jeffrey pine Stands of mixed conifer are at the higher elevations Cottonwood, Calfornia laurel, and alder grow along the creek bottom and wet drainages

Visual Quality. The entire drainage is classed as Variety Class B and Sensitivity Levels 3 and 4

Water. Water quality is good

Wildlife. Due to the wide variety of habrtats. numerous wildlfe species live in this drainage The lower elevations are also important black-tail deer winter range

Canyon Creek

Segment 1, from the confluence with the mainstem Tnnity River, near Junction City, to the trailhead at Ripstein

boundary, measures 15 miles in length Segment 2, from the Trinity Alps Wildemess boundary to the headwaters, is 6 5 miles long

Cultural/Historical Values. The area was used by prehistoric Indians It also has evidence of histonc gold mining

Fisheries. Canyon Creeksupportssteelhead, salmon, and rainbowtrout in Segment 1, and trout only in Segment 2

Geology. Both segments meet the free-flowing condition However, the lower segment has an old water diversion dam which has been partiallyremoved.A historyof mining has altered the streamcourse though much of the evidence was altered during the 1964 flood

Land Ownership. Canyon Creek flows pnmarily through National Forest land There are some small, scattered private parcels as well

Management Activities. The local economy is based on timber harvesting, mining, and related support

Recreation. The area has high dispersed recreation values with moderate amounts of hunting, hiking, fishing, and dispersed camping

Socio-economic. Mining, recreation and timber production formed the socio-economic framework ofthe area in the recent past Today, roughly half of the watershed is wtthin the Trinity Alps Wilderness Recreation, in the form of hiking, camping, fishing and hunting, is the dominant socio-economic activity

Vegetation. The stream comdor supports mixed conifer and hardwood stands Generally, the corridor is classified as moderate to highly suitable for timber management

Visual Quality. The visual quality inventory classifies the corridor as Variety Class A and Sensitivity Level 1

Water. Water quality is excellent

Wildlife. A variety of wildlife lives in the area, including game species such as black bear, black-tailed deer, and many non-game species

Hayfork Creek

The 14-mile segment of Hayfork Creek is located approximately 6 miles west of the town of Hayfork The study segment begins at a crossing known as 9 Mile Bridge and flows through a steep canyon with side slopes up to 70 percent.

Cultural/Historical Values. The drainage was heavily used by prehistoric Indians The area also has evidence of an early history of gold mining

Fisheries. Hayfork Creek supports steelhead, salmon, and inland rainbow trout Overall, the steelhead and rainbow trout populations are moderate to high

Geology. The creek is free-flowing with numerous pools and riffles. Drafting of water for irrigation in the Hayfork Valley contributes to low summer flows though this condition improves downstream as the number of tributaries increases Portions of the streamcourse have reached bedrock and are rugged and scenic Soils are generally highly erodible within the watershed Earthflows are evident in several of the tributary watersheds

Land Ownership. Hayfork Creek flows primarily through National Forest land There are a few small, scattered private parcels

Management Activities. The local economy is dependent on timber harvesting, mining, and related support

Recreation. The area has moderate recreational values with light to moderate amounts of hunting, hiking, dispersed camping, and boating. Fishing potential is high for steelhead and trout

Socio-economic. Mining and the harvest of timber provides the socio-economic focus in the area Increasingly, however, social values emphasing water quality, scenic and wildlife amenities are moderatingthe economic focus

Vegetation. Both sides of Hayfork Creek support scattered stands of mixed conifer and hardwood Generally the corridor is classified as unsuitable or low suitability for timber management on the south-facing slopes and moderate to high suitability on the north-facing slopes

Visual Quality. The drainage is inventoried as Variety Class 4 and Sensitivity Level 2

Water. Water quality is good dunng high and moderate flows During low flows, water quallty is questionable due to increased temperatures and associated algae growth. As tributaries with colder water merge with Hayfork

Creek, the water quality improves Quality is considered good below the confluence with Corral Creek even dunng low flow conditions

Wildlife. Wildlfe includes game species such as black bear, black-tailed deer, and many non-game species

McCloud River (Upper and Lower)

The McCloud River is located northeast of Redding with headwaters near Deadhorse Summit in Siskiyou County The first five mile segment has such a low flow that it is not recommended for inclusion in the Wild and Scenic Rivers System Itflows southwest with its terminus at Shasta Lake The upper portion of this river flows through National Forest lands, wrth the remainder flowing primarily through pnvate ownership

Cultural/Historical Values. This entire drainage was heavily used by prehistoric Indian tribes Numerous well preserved Indian village sites, remnants of late 1800 and early 1900 resorts, and early logging still remain along the river

Fisheries. Excellent fishing opportunities exist along this segment It is a premium trout stream, containing the habitat of the redband trout, bull trout (Dolly Varden), and the rainbow trout The McCloud hver rainbow trout has been transplanted all over the world The McCloud Rver has been classified as a blue ribbon trout fishery

Geology. The upper five mile segment of the nver, starting at Deadhorse Summit, has a very minimal flow and no outstanding features Beyond the initial five miles, the nver meanders through a gently rolling, forested plateau with interspersed meadows and several popular campgrounds The river descends into a heavily forested canyon below a series of picturesque waterfalls. Big Springs, a unique volcanic geologic feature, increases river flow below the falls

land Ownership. The Upper McCloud River flows primarily through National Forest land About 15 miles of the 24 mile segment are on National Forest land The Lower McCloud hver flows primarily through private land with only about 6 miles of the 23 mile segment on National Forest land

Management Activities. Timber harvesting and recreation are the pnme uses which add to the economics of nearby communities and the region The water is of pnme importance for downstream power generation at Shasta Dam, and for imgation in the Sacramento Valley Nationally significant fishing opportunities are also available. but public access is restricted by pnvate land ownership.

Recreation. Recreation use has been light There are excellent opportunities for development of camping and picnicking sites The area is highly sutable for development of hiking and equestrian trails In recent years there has been increasing interest in whitewater rafting Fishing is popular but restncted, as are other potential activrties, because of the private land ownership

The Upper McCloud, from Lower Falls to McCloud Lake, is suitable for whitewater boating year-round due to heavy flows from adjacent springs The Lower McCloud is suitable for whtewater boating for a month or two in the spring following winter snow melt During this period of time. fishing is poor due to the high water levels

Socioeconomic. The socio-economic emphasis within the McCloud River watershed includes timber growth and harvest, the protection and enhancement of certain pristine private lands, the production of hydroelectnc power, and downstream irrigation. Recreation use is more of a perception of an opportunlty rather than a reality because of access restrictions related to terrain and private land ownership

Vegetation. Vegetation along the entire upper portion of the McCloud hver is pnmarily of a mixed conifer type, with scattered manzanita in the dryer sites and openings Willow and alder are found along the river bank

Visual Quality. Usual qualty within the foreground of this watercourse is Variety Class A Some timber harvesting can be observed near the nver from time to time, but most activity occurred earlier in the century The entire segment has been classified as highly senstive visual qualrty (Sensitivity Class I)

Water. Water qualty in the McCloud Rver is generally good but is marginal for dnnking without treatment The large influx of underground water at Big Springs increases the size of the nver tenfold

Wildlife. This nver contains a multitude of wildlife that are associated wrth a mixed confer forest Black-tail deer, mule deer, and black bear are common sights along the nver There have been two sightings of wolverine Bald eagles and vanous species of ducks can be seen in and adjacent to the water.

North Fork Trinity River

The North Fork Trinity Rver is located northwest of Weaverville in the western portion of Trinity County The study segment begins in the Trinity Alps Wilderness along the Salmon Mountains and ends near the trailhead at Hobo Gulch

Cultural/Historical Values. The area has an early history of gold mining with many relics of old townsites and cabins

Fisheries. The river supports native trout and anadromous fisheries (salmon and steelhead)

Geology. This river is a free-flowing stream with numerous pools and riffles. The streamcourse is incised in bedrock and is very rugged and scenic Side slopes are unstable, with large landslide areas along portions of the channel

Land Ownership. This nver is entirely within National Forest land.

Management Activities. The local economy is dependent on timber harvesting, tounsm, and recreationists within the Trinity Rver drainage

Recreation. The area has high recreational values with signlficant amounts of hunting, fishing, hiking, and camping occurring throughout the drainage

Socio-economic. The North Fork Trinity River is pnmarily in the Trinity Alps Wilderness. The social-economic focus is mostly related to amenity wilderness values, although the economic value of the salmon and steelhead fisheries is significant

Vegetation. Both sides of the nver are heavily forested with stands of Douglas-fir The soils are shallow and growing conditions are marginal.

Visual Quality. The entire drainage is classed as Variety Class A and Sensitivity Level 2

Water. Water quality is good

Wildlife. Numerous wildllfe species live in the area including black-tail deer and black bear

South Fork Trinity River

This river is located west of Weaverville and Hayfork in the southwest portion of Trinity County The 25-mile study segment begins at the headwaters of the South Fork of the South Fork Trinity Rver in the Yolla Bolly-Middle-Eel Wilderness and ends at the Highway 36 bridge at Forest Glen

Cultural/Historical Values. Several old homesteads can still be found, they provide good examples of lifestyles in the mid-1800s Some prehistoric sites are evident No thorough inventory of the drainage has been completed

Fisheries. The river provides important habitat for anadromous fish The South Fork Trinity has been identified as a Model Steelhead Stream Demonstration Project which demonstrates the compatibility of fisheries and resource management

Geology. This gradually sloping nver flows through extremely unstable areas Large pool and riffle sections dominate the upper river The lower river has rather wide floodplains and infilled pools as a result of the 1964 flood

Land Ownership. The river runs primarily through National Forest land Numerous small private land parcels are intermingled

Management Activities. Local communities count on the revenues derived from timber harvesting, ranching. and recreation within this watershed

Recreation. The nver is used primarily for fishing, hunting. and camping Several developed campgrounds and 11 summer homes are located in the area The South Fork Trinity National Recreation Trail (NRT) parallels the river for nine miles

Socio-economic. The South Fork Trinity River features diverse socio-economic factors featuring timber management, anadromous fisheries, ranching, and recreation Conflicting social values are most often underscored by land use decisions, especially those related to timber management activities The area is lightly populated but generates attention from environmental and industrial organizations far removed from its boundaries

Vegetation. Both sides of this nver support large stands of older over-mature Douglas-fir, except in areas close to old homesteads

Visual Quality. The entire length of this nver has been inventoried as Variety Class A and Sensitivity Level I

Water. A decline in water quallty for anadromous fish habitat has resulted pnmarily from past natural events, such as the 1964 flood

Wildlife. Many species of wildlife live in the area Black-tail deer, black bear, spotted owls, and bald eagles are common

Sacramento River (Segment I)

The Sacramento Rver is located north of Redding The portion under consideration begins at the Box Canyon Dam and flows south to a terminus at the boundary of the Whiskeytown-Shasta-Trinity National Recreation Area (NRA)

Cultural/Historical Values. The entire drainage was heavily used by prehistoric Indians

Fisheries. The river is a premium stream for rainbow trout

Geology. The river is free-flowing below the Box Canyon Dam with numerous sequences of rapids and pools Though an interstate highway, a railroad, and powerlines parallel the steep sided canyon walls, the heavily forested streamsides and rock outcrops screen the majority of obtrusive features and combine to form a very picturesque river corridor

Land Ownership. The Sacramento Rver flows through scattered public lands Only about 6 miles of the 37 mile segment are on National Forest land

Management Activities. Transportation corridors and recreation are the prime uses which add to the economics of nearby communities The water is of prime importance for downstream power generation at Shasta Dam and for irrigation in the Sacramento Valley Nationally signlficant fishing opportunities are also available, but public access is limted by private land ownership

Recreation. Recreation use has been light to moderate There are a few limited opportunities for camping and picnicking In recent years there has been increasing interest in whitewater rafting Fishing is popular but restricted because of very limted access

Socio-economic. The vast majority of the Sacramento River is in pnvate ownenhip and, therefore, there is little socio-economic effect related to Forest Service land management decisions The river canyon includes a major north-south highway (Interstate 5), a rail, and a power transmission line corridor through the Pacific Coast states from Washington to Southern Caltfornia The Sacramento River is one of the mqor rivers providing water resources for the Calfornia Central Valley Project, one of the largest power and irrigation projects in the world

Vegetation. Vegetation is primarily a mixed conifer/hardwood type, with scattered manzanta in the dryer sites and openings Willow and alder are found along the nver bank

Visual Quality. Visual quality within the foreground of the watercourse is Variety Class A Some of the cut and fill banks for Interstate 5 and the railroad are evident for short durations In addtion. some the railroad bridges constructed in the early 1900s are also evident The entire segment has been inventoried as highly sensitive visual quality (Sensitivity Class I)

Water. Water quality in the Sacramento River is generally good but marginal for drinking without treatment Highway spills and municipal sewage systems have caused periodic short-term pollution problems

Wildlife. This segment contains a variety of wildltfe associated with the vegetation type Black-tail deer and bear are common sights along the river Bald eagles and various species of ducks can be seen in and adjacent to the water

Sacramento River (Segment 2 Upper Forks)

North Fork

Mileage six miles from the headwaters to South Fork Road

Cultural/Historical Values. The area was used as a transportation corridor for prehistoric populations The historic Sisson-Callahan National Recreation Trail (NRT) follows this drainage Histonc railroad logging occurred in this area dunng the first two decades of the 20th Century

Fisheries. The North Fork Sacramento Rver is an important water quality stream and contains a healthy population of inland rainbow trout

Geology. This segment is free-flowing to Lake Siskiyou, it has numerous pools and riffles. Streamcourses are incised to bedrock, moderately rugged, and scenic Side slopes and channels are moderately stable The entire watershed is underlaid by ultramafic rock

Land Ownership. The North Fork ofthe upper Sacramento hver flows predominantly through National Forest land

Management Activities. Most of the stream corridor falls within a habtat conservation area forthe northern spotted owl Activities include low to moderate timber harvesting, mining, and hiking along the Sisson-Callahan NRT

Recreation. Most recreation use in this area is associated with the Sisson-Callahan NRT Equestrian use, hiking, mountain biking, and hunting take place

Socio-economic. Recreation, mining, and timber production represent the primary socio-economic values of the area Current trends suggest that an increase in recreational activity is possible

Vegetation. Mixed conifer stands dominate the stream corridor

Visual Quality. Variety Class B with Sensitivity Levels 1-3

Water. Water quality is good during high and moderate flows Recreation use and grazing may affect water quality during low flows

Wildlife. There is a variety ofwildlife in the area including game species such as black bear, black-tailed deer, and many nongame species Bald eagles and osprey are found adjacent to and above Lake Siskiyou

Middle Fork

Mileage 5 4 miles from Toad Lake to South Fork Road

Culturalklistorical Values. The area was used intensively as a transportation corridor for prehistoric populations

Fisheries. The Middle Fork Sacramento River is an important contributor of good quality water to the South Fork Sacramento hver It supports a fairly good population of inland rainbow trout

Geology. This segment is free-flowing to Lake Siskiyou: it has numerous pools and riffles Streamcourses are incised to bedrock, moderately rugged, and scenic Side slopes and channels are moderately stable The entire watershed is underlaid by ultramafic rock

Land Ownership. The Middle Fork of the upper Sacramento River flows through National Forest land

Management Activities. The area is Characterized by moderate timber harvesting and minimal recreation development

Recreation. This area offers excellent opportunities for hiking, dispersed camping, mountain biking, hunting, and backcountry skiing

Socio-economic. Recreation and timber production represent the primary socio-economic values of the area Current trends suggest that an increase in recreational activity is possible

Vegetation. Mixed conifer stands dominate the stream corridor

Visual Quality. Variety Class B with Sensitivity Levels 1-3

Water. Water quality is good during high and moderate flows Recreation use and grazing may affect water quality dunng low flows

Wildlife. There is a variety of wildlfe in the area including game species such as black bear, black-tailed deer, and many nongame species Bald eagles and osprey are found adjacent to and above Lake Siskiyou

South Fork

Mileage 10 4 miles from Gumboot Lake to Lake Siskiyou (10 2 miles are National Forest land, 0 2 mile is private land)

Culturalklistorical Values. This area was used intensively as a transportation corridor by prehistoric populations and probably served as a major connecting route between the upper Sacramento and upper Trinity watersheds

Fisheries. The South Fork Sacramento River is an important water quality stream and contains brook trout and rainbow trout The stream is stocked regularly during the summer with catchable rainbow trout

Geology. This segment is free-flowing to Lake Siskiyou, it has numerous pools and riffles Streamcourses are incised to bedrock, moderately rugged, and scenic Side slopes and channels are moderately stable The entire watershed is underlaid by ultramafic rock

Land Ownership. The majority of the stream corridor is on National Forest land There are small private land parcels at Cliff Lake and near Lake Siskiyou

Management Activities. Recreation and timber harvesting represent the main activities in this area

Recreation. This area represents a major recreation corndor There is access to hiking, fishing, hunting, dispersed camping, Castle Crags Wilderness trailheads. the Pacfic Crest National Scenic Trail (PCT), and numerous lakes along the Trinity Divide

Socio-economic. Recreation and timber production represent *the* primary socio-economic values of the area Current trends suggest that an increase in recreational activrty is possible

Vegetation. The stream corridor is characterized by mixed conifer stands

Visual Quality. Vanety Class B with Sensitivrty Levels 1-3

Water. Water qualrty is good during high and moderate flows Recreation use and grazing may affect water qualrty dunng low flows

Wildlife. There is a variety of wildllfe in the area including game species such as black bear, black-tailed deer, and many nongame species Bald eagles and osprey are found adjacent to and above Lake Siskiyou

Squaw Valley Creek

This creek is located northeast of Redding, with headwaters in an alpine meadow The first 10 miles of the upper segment, which terminate at the town of McCloud, have such a low flow that they are not recommended for inclusion in the Wild and Scenic Rivers System

The next 9 mile segment. or middle segment, from McCloud to the confluence of Cabin Creek, traverses a rural residential and pasture land area Again, since the flow is relatively low and there are no remarkably outstanding features, this second segment is not recommended for inclusion in the Wild and Scenic Rivers System

The lower segment travels 10 5 miles from the confluence of Cabin Creek to the confluence with the McCloud River

Cultural/Historical Values. This entire drainage was used by prehistoric Indian tribes

Fisheries. There are excellent native trout fishing opportunities along this segment

Geology. The upper river is of low gradient The middle and lower reaches are incised in bedrock and have interspersed pools and rapids

Land Ownership The lower segment flows through approximately 10 miles of public land and one-half mile of private land (located near the confluence with the McCloud Rver)

Management Activities. Timber harvesting and recreation are the primary uses which add to the economy of nearby communities The water is important for recreation as well as downstream power generation and irrigation uses

Recreation. Recreation use has been very light Land access is available via cross-country hiking for the first 3 5 miles from the PCT bridge crossing just below the confluence of Cabin Creek The next 7 miles are generally paralleled by a narrow dirt road with infrequent motorized use At present, this road is not open to motonzed use

There are excellent recreation opportunities for public use The area is highly suitable for most semi-primitive non-motonzed and motonzed recreation experiences There are also some excellent opportunities for roaded natural recreation activties Based on flow levels and current technology, the stream is only marginally sutable for whitewater rafting

Socio-economic. Squaw Valley Creek is tributary to the McCloud River and the pnmary socio-economic interests are timber harvesting and recreation Aesthetic and biological values strongly influence management decisions in the area

Vegetation. Vegetation along this segment is primarily a mixed conifer type with scattered manzanita in the dryer sites and openings Willow and alder are found along the stream bank

Visual Quality. Visual quality within the foreground of this watercourse is Variety Class A The entire segment has been classified as moderate visual sensitivity (Sensitivity Class II)

Water. Water quality in Squaw Valley Creek is generally good but marginal for drinking without treatment

Wildlife. This segment contains a multitude of wildlife that are associated with a mixed conifer forest Black-tail deer and black bear are common sights along the creek Bald eagles and various species of ducks can be seen in and adjacent to the stream

Virgin Creek

This I I-mile-long river is located within the Trinlty Alps Wilderness It is atnbutary of New River, which is classified as a part of the National Wild and Scenic Rvers System It is located on the western edge of Trinlty County

Cultural/Historical Values. The area has a past history of early California gold mining

Fisheries. The river supports native trout and anadromous fish (salmon and steelhead)

Geology. The study area is in a primttive condrtion and includes a free-flowing stream with numerous small rapids, falls, and pools It flows in a southerly direction beginning on the upper slopes of Salmon Mountain and terminating in the New Rver The streamcourse is incised in bedrock and is quite rugged and scenic

Land Ownership. Land is in National Forest ownership

Management Activities. The local economy in the area has been dependent on timber, mining, recreation, and, in the past, illegal cannabis growing Cannabis growing has decreased dramatically as resource management activities have increased

Recreation. Recreation activities in the Virgin Creek drainage have been restricted for the past few years due to illegal cannabis growing Management efforts have eliminated this conflict, and the area is again open to the public The primary recreation activrties are fishing, hiking, and equestrian use.

Socio-economic. Virgin Creek is totally wtthin the Trinity Alps Wilderness The social-economic values are primarily related to the amenities of a wilderness environment, i e , solitude, scenic quality, wildlife, fish, etc.

Vegetation. Vegetation varies from dense Douglas-fir stands to open grass areas Southerly-facing slopes have many outcrops of brush

Visual Quality. Visual resources include Variety Class A within the stream corridor and Sensitivity Level I

Water. Water quality is excellent Old mining activities have had no long-term effect on water quality

Wildlife. Numerous wildlife species are present in the area including black-tail deer and black bear

C Evaluation Criteria for River Eligibility

The rivers analyzed in this appendix were identlfied in the Nationwide hvers Inventory (NRI) and through the land management planning process as being potentially eligible for designation as part of the Wild and Scenic hvers System The eligibility of a river is determined by testing it against the requirements of Section 2(b) of the Wild and Scenic Rivers Act, as supplemented by Guidelines for Evaluating Wild, Scenic, and Recreation River Areas Proposed for Inclusion in the National Wild and Scenic Rivers System, September 7, 1982

A number of criteria is included in the Act and Guidelines Among the most important are 'Yree-flowing" and "outstandingly remarkable" These crtteria were applied to the corridors of study rivers to determine the presence of any special values or features **Tables E-I** and **E-2** describe these values and features for each study river

An analysis was conducted in order to determine the eligibility/classification of each proposed wild and scenic river segment **Table E-3** depicts the results of this analysis

D Alternatives and Effects of Alternatives

Alternative PRF (Preferred Alternative)

Alternative PRF recommends classification of all or portions of six of the I I study rivers If approved by an Act of Congress, the free-flowing condttion of these rivers would be assured They include Beegum Creek, Hayfork Creek, North Fork Trinity River, South Fork Trinity Rver, Virgin Creek, and Canyon Creek *(See* **Table IV-I9**)

Beegum Creek -- extends from the Forest boundary above State Highway (SH) 36 to Beegum Gorge It includes 2 5 miles of river on National Forest land It becomes the Bureau of Land Management (BLM) designation south of the Forest boundary

Hayfork Creek – includes 14 0 miles of nver About 2 5 miles are within pnvate ownership and 11 5 miles are wrthin National Forest land

North Fork Trinity River -- extends the existing wild and scenic nver into the Tnnity Alps Wilderness It includes 11 7 miles of nver, all within National Forest lands

South Fork Trinity River -- extends the existing wild and scenic river to its headwater; It includes 26 3 miles of river About 1 5 miles are within pnvate ownership and 24 8 miles are within National Forest land

Virgin Creek -- includes 11 7 miles of nver, all of which are on National Forest land within the Tnnrty Alps Wilderness

Canyon Creek -- includes 21 5 miles of nver About 4 0 miles are in pnvate ownership and 17 5 miles are National Forest land

Approximately 79 7 miles of river (National forest lands only) would be added to the National Wild and Scenic Rivers System under Alternative PRF as follows

48 5 miles - Wild hver
17 3 miles - Scenic River
13 9 miles - Recreation Rver

Water-oriented recreation and scenic quality would be enhanced by designation Resource management activrties requiring river crossing. road access, and transmission rights-of-way would be curtailed wrthin designated "wild" and "scenic" river segments Water impoundments would be curtailed for all designated segments

The Wild and Scenic Riven Act authorizes acquisition of land or easements once a nver is designated However, land acquisition is authorized only on a willing seller basis Easements can be acquired by the Federal government in lieu of fee acquisition Assuming that pnvate lands remain in pnvate ownership, the State and County, alongwrth the landowners, would be encouraged to cooperate in the planning and administration of the wild and scenic nvers

Both the North fork Trinity River and Virgin Creek recommendations, if approved by Congress, would extend wild and scenic river classlfication into the Tnnity Alps Wilderness Such classfication would provide specific prohibrtion against the damming of these nvers wthin the Wilderness

Vegetative manipulation, for the purposes of improving timber yields or wildlife habrtat, would be most constrained in river areas designated "wild" or "scenic" River areas with a "recreation" designation allow more opportunities for wildlife and timber management, provided the nver values for which the nvers were designated are protected or enhanced

In general, land uses wrthin the nver areas which exist when the nvers are designated may be permitted to continue However, new land uses must be evaluated for their compatibility with the laws, regulations and policies associated wrth legally designated wild and scenic rivers

Restrictions on land use are greatest for "wild" river areas Such rivers represent pnmitive vestiges of America accessible primarily by trail Fewer restrictions on management would be placed on "scenic" river areas These areas, however, would remain largely undeveloped "Recreational" nver areas would have the least restrictions on management activities. and development, consistent with guidelines, could take place

Alternative PRF does not recommend designation for the upper and lower McCloud River, the Sacramento River, and Squaw Valley Creek The effects of this nondesignation are as follows

1 Fisheries and water quality would be protected by doing no scheduled timber harvest within an average nparian management zone (RMZ) width of 350 feet on each side of creeks and rivers

2 Dams or diversions could be proposed

3 Legal mineral exploration and extraction would be allowed outside of wilderness boundaries Within wildernesses exploration and extraction would be subject to valid existing rights

4 In the remaining 1/4 mile river corridors outside of RMZs, timber harvest would be as permitted in the prescription being applied (see Alternative PRF map) This ranges from no scheduled timber harvest where the Semi-primitive Non-motorized (SPNM) prescription is applied to modified timber harvest where the Roaded Natural (RN) prescription is applied

5 Late successional habitat would be retained within wildernesses and SPNM areas However, this habitat would decline significantly within RN areas outside of RMZs.

6 A Coordinated Resource Management Plan has been developed between the Forest Service and private landownen along the lower McCloud to govern uses within the river corridor (See Appendix N in the Forest Plan)

Private landowners along the lower McCloud hver would generally be satisfied with the recommendation for non-designation, since they have voiced opposition to designation Private landowners along the upper McCloud River have also objected to designation and would be dissatisfied wrth a recommendation for designation However; there are many individuals and nver interest groups who favor designation

Alternatives RPA (1990 RPA Program Emphasis) and CUR (No Action/No Change)

Alternatives RPA and CUR do not recommend designation for any additional wild and scenic nvers The effects of this nondesignation are as follows

1 Fisheries and water quality would be protected for Alternatives RPA and CUR by doing minimal timber harvest within an average RMZ width of 350 feet on each side of creek and nven

2 Dams or diversions could be proposed

3 Legal mineral exploration and extraction would be allowed outside of wilderness boundaries Within wildernesses exploration and extraction would be subject to valid existing rights

4 In the remaining 1/4 mile nver corridors outside of RMZs, timber harvest would be as permitted in the prescription being applied (see Alternative RPA and CUR maps) This ranges from no scheduled timber harvest where the SPNM prescription is applied to intensive timber harvest where the Timber Management (TM) prescription is applied.

5 Older over-mature habrtat would be retained within wildernesses and SPNM areas However, this habitat would decline slightly within Semi-primitive Motonzed (SPM) areas and significantly within RN and TM outside of RMZs

Private landownen along the upper and lower McCloud River would generally be satisfied wrth not recommending the river for wild and scenic river designation. Many individuals and river interest groups favoring a designation recommendation would be dissatisfied

Alternative CBF (Citizens for Better Forestry)

Alternative CBF recommends designation of nine study rivers and a portion of another one If approved by an Act of Congress, such designation would assure the free-flowing conditions of these rivers (see **Table IV-19**). They include

Beegum Creek-. extends from the Forest boundary above SH 36 to Beegum Gorge It includes 2 5 miles of nver on National Forest land It becomes the Bureau of Land Management (BLM) designation south of the Forest boundary

Canyon Creek -- includes 2 1 5 miles of river. About 4 0 miles are in private ownenhip and 1 7 5 miles are National Forest land

Hayfork Creek -- includes 1 4 0 miles of nver. About 2 5 miles are in private ownenhip and 1 1.5 miles are National Forest land

McCloud River -- includes 24 3 miles of the upper segment and 23 3 miles of the lower segment

North Fork Trinity River -- includes 1 1 7 miles of nver, all within National Forest land

South Fork Trinity River-- includes 26 3 miles of nver, 1 5 miles are in pnvate ownership and 24 8 miles are within National Forest land

Sacramento River -- includes,

Seement 1 37 3 miles from Box Canyon Dam to the boundary of the Whiskeytown-Shasta-Trinity National Recreation Area,

Seement 2 - Upper Forks

North Fork 6 0 miles above Box Canyon Dam from the headwaters at the Sission-Callahan Trail crossing to the confluence of South Fork,

Middle Fork 5 4 miles from the headwaters of Toad Lake to the confluence of South Fork,

South Fork 10 4 miles from the headwaters in the Gumboot Lake area to Lake Siskiyou

Squaw Valley Creek -- includes 10 5 miles, **all** wrthin National Forest land

Virgin Creek -- includes 11 7 miles, all within National Forest land

Approximately 116 6 miles (National Forest lands only) would be added to the National Wild and Scenic Rvers System, as follows

56 8 miles - Wild River
25. 1 miles - Scenic River
34 7 miles - Recreation Rver

Water-oriented recreation and scenic qualtty would be enhanced by designation Resource management activities requiring river crossing. road access, and transmission rights-of-way would be curtailed for designated wild and scenic segments Water impoundments would be curtailed for all designated segments

The Wild and Scenic hvers Act authorizes acquisition of land or easements once a river is designated However, any future land acquisition is envisioned to be only on a willing seller basis Easements can be acquired by the Federal government in lieu of fee acquisition Assuming that pnvate lands remain in pnvate ownership, the State and County, along with the landowners, would be encouraged to cooperate in the planning and administration of the wild and scenic rivers

In general, land uses within the river areas which exist when the rivers are designated may be permitted to continue However, new land uses must be evaluated for their compatibilty with the laws and regulations associated wrth wild and scenic rivers.

Restrictions on land use are greatest for "wild" nver areas Such rivers represent primitive vestiges of America accessible primarily by trail Fewer restrictions on management would be placed on "scenic" river areas These areas, however, would remain largely undeveloped "Recreational" river areas would have the least restrictions on management activities. and development, consistent wlth guidelines, could take place

Vegetative manipulation, for the purposes of improving timber yields or wildlife habrtat, would be most constrained, assuming all else is equal, in river areas classified "wild" or "scenic" hver areas with a "recreation" classification allow more opportunities for wildlrfe and timber management, provided the nver values for which the rivers were classified are protected or enhanced

Pnvate landowners along the upper and lower McCloud River would object to designation Designation is favored by many individuals and river interest groups

Table E-4 summarizes the significant impacts by altemative for each river

Table E-I
Identificationstid-Descriptionof River Segments

River - Segment	Description	length (mites)*	Status
Beegum Creek			
Main Fork	From Round Bottom to the Forest boundary in Section 5.	8 5 total (2.5 NF Wild, 6.0 NF Recreabon)	Managed under mulbple use Portion of river from Forest boundary to State Highway 36 on **BLM** was determined to be eligible for Wild by BLM All NF land.
South Fork	From the headwaters of South Fork, Section 36 adjacent to Forest Road 28N36 to the confluence of Middte Fork, Section 6.	7 0 total. (7 0 NF Wild)	Managed under multiple use. All NF land
Canyon Creek			
I	Trailhead at Ripstein to the confluence *of* the mainstem of the Trinity River.	15 0 total (I I 0 NF kcreaton)	Managed under multiple use Majority of area is NF land
2	Trailhead at Ripstein to the headwaten in the Trinity **Alps** Wilderness.	6.5 total (6 5 NF Wild)	Entire segment is within the Tnnity Alps Wilderness
Hayfork Creek			
I	Nine Mile Bridge to the confluence of the South Fork of the Trinity River	14.0 total. (I I.5 NF Scenic)	Managed under multiple use. Majority of *the* area is NF land
McCloud *Rier* (upper)			
I-3	Bartle to McCloud Reservoir	24 3 total (147 NF kcreabon)	Managed under multiple use. Majority of the area is NF land.
McCloud River (lower)			
4-I0	McCloud Reservoir to Shasta Lake	23 3 total (4 3 NF Wild: I 8 NF Scenic)	Small amount of area is NF managed under mulbple use Scenic quality maintained. Majority of area is private land
North Fork Trinity River			
I	From headwaters in the Trinity Alps Wildemess to existing designated nver	I I 7 total (I I 7 NF Wild)	Designated Trtnity Alps Wildemess.

* - Total miles includes National Forest and pnvate lands However, the number of miles of pnvate land is not broken **down**
BLM - Bureau of Land Management
NF - National Forest

Table E-l (continued)
Identification and Descriptionof River Segments

River - Seement	Description	Length (miles)*	status
South Fork Trinity Rivet I-5	Fromheadwaters ofthe South Fork Tnnrty Rver in the Yolla Bolly-Middle €el Wilderness to Highway 36, Forest Glen	26 3 tot4 (16 I NF Wild, 5 8 NF Scenic; 2 9 NF Recreabon)	Managed under multiple use outside of Yolla Bolly-Middle €el Wilderness Managed as Wilderness inside Yolla Bolly-Middle Eel Wilderness
Sacramento River I	Box Canyon Dam to the boundary of Whiskeytown-Shasta-Trinity Natioiial Recreatton Area	37 3 total (6 I NF Recreabon)	Small amount of *area* is NF land managed under mulbple use Scenic quality is protected Majorrty of area is pnvate land
Sacramento River 2 North Fork	Above Box Canyon Dam From headwaters at the Sission-Callahan Trail crossing to the confluence of South Fork	6 0 total (6 0 NF Recreation)	Managed under mulbple use The upper 1/2 is located in the Mt. Eddy Further Planning Area. All NF land
Middle Fork	From headwaters of Toad Lake to the confluence of South Fork	5 4 total (5 4 NF Recreation)	Managed under mulbple use All NF land
South Fork	From headwaters in the Gumboot Lake area to Lake Siskiyou.	10 4 total (10 2 NF Recreation)	Managed under mulbple use Majority of **area is** NF land
Squaw Valley Creek I-2	Confluence of Cabin Creek to the confluence of the upper McCloud Rver	10 5 total (4 0 NF Wild, 6 0 NF Scenic)	Managed under mulbple use Small amount of pnvate land near confluence with upper McCloud Rver
Virgin Creek I	From headwaten wrthin the Salmon Mountains of the Tnnrty Alps Wilderness to the confluence of New River	11 7 total (11 7 NF Wild)	Designated Trinity Alps Wilderness
TOTAL MILES		**217.9 (Federal and Private land)** **151.2 (NF land)**	

Table E-2
Outstandingly Remarkable Values Summary

Beegum Creek

Values	Segments I-2; I
Cultural/Historical	Pre-historic Indians and some mining
Fisheries	Moderate populations of nabve rainbow trout A waterfall outside the Forest boundary' prevents fish migrations into upper portions of the river
Geology	* Rugged in gorge below the Forest boundary Serpentinized soils above the Forest boundary with a stable stream channel.
Visual Quality/Scenery	Variety Class B, Sensitivity Levels 3 and 4
Wildlife	Common

Canyon Creek

Values	Segments I-2
Cultural/Historical	Prehistonc Indians and history of gold mining
Fisheries	Moderate populations of steelhead, salmon and native trout.
Geology	Rugged. 70 percent (+) side slopes, unstable soils and past flooding have created landslides
Visual Quality/Scenery	*Variety Class A, Sensitivity Level I, rugged topography, access road parallels segment I, some evidence of early mining in segment I
Wildlife	Common

Hayfork Creek

Values	Segment I
Cultural/Historical	Prehistonc Indians and history of mining
Fisheries	* Moderate to high populabons of steelhead, salmon, and native rainbow trout
Geology	Rugged. 70 percent (+) side slopes, unstable soils have created landslides
visual Quality/Scenery	*Variety Class A, Sensitivity Level 2, rugged topography, two road crossings, one residence evident, a few secondary roads terminate near streamside
Wildlife	Common

*Outstanding Remarkable Values

'The Bureau of Land Management (BLM) has identified this section of Beegum Creek as eligible for Wild River designation

Table E d (continued)
Outstandingly Remarkable Values Summary

McCloud River

Values	Segments 1-3	Segments 4-10
Cultural/Historical	Significant Indian encampment, cave	* Large Indian encampments. historical settlements, remnants of late 1800 and early 1900 resorts
Fishenes	* Home of redband trout	* Nationally signficant *trout* fishenes, Dolly Varden trout
Geology	* Deep flat soils. waterfalls, Big Springs due to volcanic formations	* Rock outcrops, waterfalls, pools
Visual Quality/Scenery	* Variety Class A, headwaters. perennial stream, falls, camping, private homes, logging visible	Rugged topography, low stream flow, falls
Wildlrfe	Common	Common

North Fork Trinity River

Values	Segment 1
Cultural/Historical	Remnants of old gold mining
Fishenes	* Excellent native trout and anadromous fisheries
Geology	Unstable sideslopes, gold deposrts present
visual Quality/Scenery	*Variety Class A, spectacular views. rugged, waterfalls, pools
Wildlrfe	Common

South Fork Trinity River

Values	Segments 1-5
Cultural/Historical	Remnants of old homesteads
Fishenes	* Excellent anadromous fishery Has been designated as a Model Steelhead Stream Demonstration Area because of habtat
Geology	Very unstable sideslopes
visual Quality/Scenery	* Vanety Class A, scenic stream, pools, rapids
Wildlrfe	Common area for spotted owls and bald eagles

*Outstandingly Remarkable Values

Table E-2 (continued)
Outstandingly Remarkable Values Summary

Sacramento River

Values	**Segment** I
Cultural/Historical	Significant Indianencampments
Fishenes	* Nabonally significant trout and salmon fishery
Geology	Rugged, waterfalls, pools, Box Canyon, Carte Crags
Visual Quality/Scenery	* Vanety Class **A,** rugged, waterfalls, pools, vegetation
Wildlife	Common

Values	**Segment 2 -Upper Forks**
Cultural/Historical	The area was used as a transportanon corridor by pre-histonc populabons and probably served as a major connecting route between the upper Sacramento and upper Trinity watersheds
Fishenes	Important water qualirty stream containing inland rainbow trout South Fork is stocked regularly during the summer months
Geology	All segments are free-flowng to Lake Siskiyou with numerous pools and nffles The streamcourses are incised in bedrock, moderately rugged and scenic Side-slopes and channels are moderately stable The entire watershed is underlaid by ultramafic rock
Visual Quality/Scenery	Vanety Class B, Sensitivrity Levels 1-3
Wildlife	Common area for spotted owls and bald eagles

Squaw Valley Creek

Values	**Segments 1-2**
Cultural/Historical	Prehistoric Indians
Fishenes	* Native trout fisheries
Geology	Rugged, waterfalls, pools, deep, flat soils
Visual Quality/Scenery	* Variety Class **A,** rugged. waterfalls, pools
Wildlife	Common

*Outstandingly Remarkable Values

Table E-2 (continued)
Outstandingly Remarkable Values Summary

Virgin Creek

Values	Segment I
Cultural/Historical	Remnants of old mining
Fisheries	*Native trout and anadromous fisheries
Geology	Rugged, waterfalls, unstable sideslopes, shallow soils
Visual Quality/Scenery	Variety Class A, rugged, waterfalls, pools
Wildlife	Common

*Outstandingly Remarkable Values.

Table E-3
Wild and Scenic Rivers Study - Eligibility/Classification Analysis

	Block Wild				I ck 2 - Sce			Blc 3– Recreation			Block 4 - All	
Qualifying Answers	free of Impound-ments	Generally Inacces-sible except by Trail	Natershed Shoreline Essentially Primitive	Waters Inpolluted	Free of Impound-ments	Accessible n Places by Roads	Water shed/ Shoreline argely Un-leveloped	Readily Accessible by Road	Past Impound-ments or Diversions are Unob trusive	May have Developmei on Shoreline	Possesses Outstand-ingly Remark-able Resource Values	Classifi-cation/ Eligibility
Beegum Creek												
Main Fork												
Segment I	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Scenic
Segment 2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Wild
South Fork												
Segment I	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	No	No	Wild
Canyon Creek												
Segment I	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Recreation
Segment 2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	Wild
Hayfork Creek												
Segment I	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	No	Yes	Scenic
McCloud River												
Segment I	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Recreation
Segment 2	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Scenic
Segment 3	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Recreation
Segment 4	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Scenic
Segment 5	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Wild
Segment 6	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Scenic
Segment 7	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Wild
Segment 8	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Scenic
Segment 9	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Wild
Segment 10	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Scenic
North Fork Trinity River												
Segment I	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Wild

EXPLANATION To qualify for Wild, there must be 4 yesses in Block I, for Scene, there must be 3 yesses in Block 2 and one yes in Block 4, for Recreation, there must be one yes in Block 3 and one yes in Block 4

Table E-3 (continued)
Wild and Scenic Rivers Study - Eligibility/Classification Analysis

	Block 1 - Wild				Block 2 - Sce			Block 3 - Recre on			Block 4 - All	
Qualifying Answers	Free of Impound-ments	Generally Inacces-sible except by Trail	Watershed Shoreline Essentially Primitive	Waters Unpollutec	Free of Impound-ments	Accessible in Places by Roads	Water-shed/ Shoreline argely Un developed	Readily Accessible by Road	Past Impound-ments or Diversions are Unob-trusive	May have Develop ment on Shoreline	Possesses Outstand-ingly Remark-able Resource Values	Classifi-cation/ Eligibility
South Fork Trinity River												
Segment 1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Wild
Segment 2	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Scenic
Segment 3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Wild
Segment 4	Yes	Yes	No	yes	Yes	Yes	Yes	No	Yes	No	Yes	Scenic
Segment 5	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Recreation
Sacramento River												
Seement 1	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Recreation
Segment 2												
North Fork	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Recreation
Middle Fork	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Recreation
South Fork	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Recreation
Squaw Valley Creek												
Segment 1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Wild
Segment 2	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Scenic
Virgin Creek												
Segment 1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Wild

Table E-4
Summary of Significant Impacts of Alternatives on Potential Wild and Scenic Rivers*

Beegum Creek

Resource	Alternative PRF	Altemative RPA	Alternative CUR	Altemative CBF
Recommended Designation	Yes, Segment 2 only	No	No	Yes. Segment 2 only
Fisheries and Water Quality	Wild Segments, no effects	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF
Minerals	Open to exploration and extraction consistent wrth the law	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF
Timber	SPNM, no timber harvest, RN, modified timber harvest outside of RMZs	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF
Visual Quality and Recreation	ROS Class of SPNM, RN, R, VQO of R, PR, M, MM	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF
Wildlife	SPNM. older over-mature habitat would remain, RN, older over-mature habitat would decline slightly, R, older over-mature habitat would decline	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF

* See the last page of this table for abbreviated terms and meanings

Table E-4 (continued)
Summary of Significant Impacts of Alternatives on Potential Wild and Scenic Rivers

Canyon Creek

Resource	Alternative PRF	Alternative RPA	Alternative CUR	Alternative CBF
Recommended Designation	Yes	No	No	Yes
Fisheries and Water Quality	Wild segment, *no* effect, Recreation segment has an average RMZ width of 350 feet on each side of the creek with no bmber harvest Dams or diversions not permitted	Wlderness. no effect, R N has an average RMZ width of 350 feet on each side of the creek with minimal bmber harvest Dams and diversions could be proposed	Same as Alternabve RPA	Wild segment, no effect, Recreabon segment has an average RMZ width of 350 feet on each side of the creek with no timber harvest Dams or diversions not permitted
Minerals	Wild segment, subject to valid exisbng nghts, otherwise corridors are withdrawn from mineral entry Recreation segment. open to explorabon and extraction consistent with the law	Same as Alternabve PRF	Same as Alternative PRF	Wild segment, subject to valid existing nghts, otherwise comdon are wtthdrawn from mineral entry Recreation segment, open to exploration and extraction consistent with the law
Timber	Wilderness, no bmber harvest, RN modified timber harvest would occur outside of RMZs	Same as Alternabve PRF	Same as Alternative PRF	Same as Alternabve PRF
Visual Quality and Recreation	Wilderness. ROS dass of P, VQO of P, R N ROS dass of RN, VQO of PR	Same as Alternative PRF	Same as Alternabve PRF	Same as Alternative PRF
Wildlife	Wilderness. older over-mature habltat would be retained, RN, older over-mature habrtat outside of RMZs would decline significantly	Same as Alternative PRF	Same as Alternative PRF	Same as Alternabve PRF

Table E-4 (continued)
Summary of Significant Impacts of Alternatives on Potential Wild and Scenic Rivers

Hayfork Creek

Resource	Alternative PRF	Alternative RPA	Alternative CUR	Alternative CBF
Recommended Designation	Yes	*No*	*No*	Yes
Fisheries and Water Quality	Average RMZ width of 350 feet on each side of the creek with no bmber harvest Dams and diversions not permitted	Average RMZ width of 350 feet on each side of the creek with minimal tlmber harvest Dams and diversions could be proposed	Same as Alternabve RPA	Average RMZ wdth of 350 feet on each side of the creek with no timber harvest Dams or diversions not permitted
Minerals	Open to explorabon and extraction consistent with the law	Same as Alterntive PRF	Same as Alternative PRF	Same as Alternabve PRF
limber	SPNM. no bmber harvest RN, modified bmber harvest would occur outside of RMZs	SPNM, no bmber harvest Modfied bmber harvest would occur in remaining areas outside of RMZs	RN, modfied timber harvest would occur outside of RMZ	Scenic designation would allow minimal tlmber harvest outside of RMZs
Visual Quality and Recreation	SPNM, ROS class of SPNM, VQO of R RN, ROS class of RN, VQO of PR	SPNM, ROS class of SPNM. VQO of R Timber management, ROS class of RN, VOO of M	ROS class of RN, VQO of PR	SPNM, ROS class of SPNM, VQO of R RN, ROS class of RN, VQO of PR
Wildlife	SPNM, older over-mature habltat would be retained RN, older over-mature habitat would decline significantly outside of RMZs	Same as Aternatwe PRF	Older over-mature habltat would decline significantly outside of RMZs	Older over-mature habitat would decline slightly outside of RMZs

Table E-4 (continued)
Summary of Significant Impacts of Alternatives on Potential Wild and Scenic Rivers

Upper McCloud River

Resource	Alternative PRF	Alternative RPA	Alternative CUR	Alternative CBF
Recommended Designation	*No*	*No*	No	Yes
Fisheries and Water Quality	Average RMZ width of 350 feet on each side of the river with no timber harvest. Dams or diversions not permitted	Average RMZ width of 350 feet on each side of the river with minimal timber harvest. Dams or diversions could be proposed	Same as Alternative RPA	Same as Alternative PRF
Minerals	Open to exploration and extraction consistent with the law	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF
Timber	Modified timber harvest would occur outside of RMZs	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF
Visual Quality and Recreation	**ROS** class of RN. VQO of PR	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF
Wildlife	Older over-mature habitat outside of RMZs would decline significantly	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF

Table E-4 (continued)
Summary of Significant Impacts of Alternatives on Potential Wild and Scenic Rivers

lower McCloud River

Resource	Alternative PRF	Alternative RPA	Alternative CUR	Alternative CBF
Recommended Designation	No	No	No	Yes
Fisheries and Water Quality	Average RMZ width of 350 feet on each side of the river with no timber harvest Dams or diversions could be proposed	Average RMZ width of 350 feet on each side of the river with minimal ttmber harvest Dams or diversions could be proposed	Same as Alternative PRF	Average RMZ width of 350 feet on each side ofthe river with no ttmber harvest Dams or diversions not permitted
Minerals	Open to exploratton and extraction consistent wtth the law	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF except Wild segments are subject to valid existing rights, otherwise, corridors would be wtthdrawn from mineral entry
Timber	SPNM, nottmber harvest SPM, minimal ttmber harvest outside of RMZs	SPNM, nottmber harvest Modfied timber harvest in remaining areas outside of RMZs	Modfied timber harvest would occur wtthin areas outside of RMZs	Same as Alternative PRF
Visual Quality and Recreation	SPNM. ROS dass of SPNM, VQO of R SPM, ROS class of SPM, VQO of R	SPNM, ROS dass of SPNM, VQO of R ROS dass of RN. VQO of PR and M on remainder of area	ROS dass of RN, VQO of PR	Same as Alternative PRF
Wildlife	SPNM, older over-mature habitat would be retained SPM, older over-mature habitat would decline slightly	SPNM. older over-mature habitat would be retained Older over-mature habitat would decline signdcantly in remainder of the area	Older over-mature habitat would decline significantly outside of RMZs	Same as Alternative PRF

Table E-4 (continued)
Summary of Significant Impacts of Alternatives on Potential Wild and Scenic Rivers

North Fork Trinity River				
Resource	**Alternative PRF**	**Alternative RPA**	**Alternative CUR**	**Alternative CBF**
Recommended Designation	Yes	No	No	Yes
Fisheries and Water Quality	No effect Dams or diversions not permitted	No effect Dams or diversions could be built consistent with the Wilderness Act	Same as Alternative RPA	Same as Alternative PRF
Minerals	Subject to valid existing rights, otherwise corridon would be withdrawn from mineral entry	Same as Alternative PRF	Same as Aternatwe PRF	Same as Alternative PRF
Timber	No timber harvest	Same as Alternative PRF	Same as Aternatwe PRF	Same as Alternative PRF
Visual Quality and Recreation	ROS class of P, VQO of P	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF
Wildlife	Older over-mature habitat would be retained	Same as Aternatwe PRF	Same as Alternative PRF	Same as Alternative PRF

Table E-4 (continued)
Summary of Significant Impacts of Alternatives on Potential Wild and Scenic Rivers

South Fork Trinity River

Resource	Alternative PRF	Alternative RPA	Alternative CUR	Alternative CBF
Recommended Designation	Yes	No	No	Yes
Fisheries and Water Quality	Wild segments, no effects Recreabon and Scenic segments. average RMZ width of 350 feet each side of the river and inner gorges with no tlmber harvest Dams and diversions not permitted	No timber harvest in inner gorges Average RMZ width of 350 feet on each side of the river with minimal timber harvest Dams and diversions could be proposed	Same as Alternabve RPA	Same as Alternative PRF
Minerals	Open to exploration and extraction consistent wlth the law except Wild segments are subject to valid existing nghts, otherwise corndon are withdrawn from mineral entry	Open to exploration and extraction consistent with the law.	Same as Alternative RPA	Same as Alternative PRF
Timber	Wild segments. no timber harvest Scenic segments, minimal timber harvest Recreabon segments, modtfied timber harvest	SPNM, no timber harvest SPM. minimal timber harvest RN, modtfied timber harvest	Same as Alternative RPA	Same as Alternatlve PRF
Visual Quality and Recreation	Wild segments, ROS class of SPNM, VQO of R Scenic segments, ROS of SPM, VQO of PR Recreabon segments, ROS of RN, VQO of PR	SPNM, ROS dass of SPNM, VQO of R SPM, ROS dass of SPM. VQO of PR RN, ROS class of RN, VQO of PR	Same as Alternative RPA	Same as Alternative PRF
Wildlife	Wild segments. retain older over-mature habitat Scenic segments, habitat would decline slightly Recreatlon segments, habitat would decline significantly	SPNM. retain older over-mature habitat SPM, habitat would decline slightly RN, habitat would decline significantly	Same as Alternative RPA	Same as Alternative PRF

Table E-4 (continued)
Summary of Significant Impacts of Alternatives on Potential Wild and Scenic Rivers

Sacramento River - Segment I				
Resource	**Altemative PRF**	**Alternative RPA**	**Alternative CUR**	**Alternative CBF**
Recommended Designation	No	No	No	Yes
Fisheries and Water Quality	Average RMZ width of 350 feet on each side of the nver with no timber harvest Dams and diversions not permitted	Average RMZ width of 350 feet on each side of the river with minimal bmber harvest Dams and diversions could be Drowsed	Same as Alternabve RPA	Same as Alternabve PRF
Minerals	Open to explorabon and extraction consistent with the law	Same as Alternabve PRF	Same as Alternative PRF	Same as Alternaave PRF
Timber	Modified amber harvest would occur outside of RMZs	Same as Alternative PRF	Same as Alternabve PRF	Same as Alternaave PRF
Visual Quality and Recreation	ROS dass of RN, VQO of PR	Same as Alternative PRF	Same as Alternabve PRF	Same as Alternative PRF
Wildlife	Older over-mature habitat outside of RMZs would decline significantly	Same as Alternabve PRF	Same as Alternabve PRF	Same as Alternabve PRF

Table E-4 (continued)
Summary of Significant Impacts of Alternatives on Potential Wild and Scenic Rivers

Sacramento River - Segment 2 - Upper Forks

Resource	Alternative PRF	Alternative RPA	Alternative CUR	Alternative CBF
Recommended Designation	No	No	No	Yes
Fisheries and Water Quality	No Effect Dam exists at Lake Siskiyou below the three segments	Same as Alternative PFU	Same as Alternative PRF	Same as Alternative PRF
Minerals	Open to exploration and extraction consistent with the law	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF
Timber	Minimum timber harvest outside of RMZs located within HCAs	Same as Alternative PFU	Same as Alternative PRF	Same as Alternative PRF
Visual Quality and Recreation	ROS class of SPNM. SPM. RN, VQO of R, PR, M	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF
Wildlife	Older over-mature habitat would be retained Areas outside of HCAs would have a slight decline in habitat	Same as Alternative PRF	Same as Alternative PRF	Same as Aternatwe PRF

Table E-4 (continued)
Summary of Significant Impacts of Alternatives on Potential Wild and Scenic Rivers

Squaw Valley Creek				
Resource	**Alternative PRF**	**Alternative RPA**	**Alternative CUR**	**Alternative CBF**
Recommended Designation	No	No	No	**Yes**
Fisheries and Water Quality	Wild segments, no effect Scenic segment has an average RMZ wdth of 350 feet on each side of the creek with no timber harvest Dams or diversions not permitted	Average RMZ wdth of 350 feet on each side of the creek with minimal timber harvest Dams or diversions could be proposed	Same as Alternative WA	Same as Alternative PRF
Minerals	Wild segments, subject *to* valid exisbng nghts, otherwise corridors are withdrawn from mineral entry Scenic segments, open to exploration and extraction consistent with the law	Open *to* explorabon and extraction consistent with the law	Same as Alternabve WA	Same as Alternative PRF
limber	Wild segments. no timber harvest Scenic segments. minimal timber harvest outside of RMZs	Modified timber harvest in areas outside of RMZs	Modified timber harvest in **areas** outside *of* RMZs	Same as Alternabve PRF
Visual Quality and Recreation	Wild segments, ROS dass of P, VQO of P Scenic segments, ROS dass of SPM, VQO *of* R	ROS class *of* RN, VQO of M	ROS dass of RN, VQO of PR	Same as Alternative PRF
Wildlife	Wild segments, *retain* older over-mature habrtat Scenic segments. older over-mature habltat would decline slightly outside of RMZs	Older over-mature habrtat would decline significantly outside *of* RMZs	Same as Alternative RPA	Same as Alternative PRF

Table E-4 (continued)
Summary of Sianificant Impacts of Alternatives on Potential Wild and Scenic Rivers

Virgin Creek

Resource	Altemative PRF	Altemative RPA	Alternative CUR	Alternative CBF
Recommended Designation	Yes	No	No	Yes
Fisheries and Water Quality	No effect Dams or diversions not permitted	No effect Dams or diversions could be built consistent vvth the Wilderness Preservabon Act	Same as Alternabve RPA.	Same as Alternative PRF
Minerals	Subject to valid existing nghts. otherwise corridors are withdrawn from mineral entry	Same as Alternabve PRF	Same as Alternabve PRF	Same as Alternative PRF
limber	No timber harvest	Same as Alternative PRF	Same as Alternabve PRF	Same as Alternative PRF
Visual Quality and Recreation	ROS class of P, VQO of P	Same as Alternabve PRF	Same as Alternabve PRF	Same as Alternabve PRF
Wildlife	Older over-mature habitat would be retained	Same as Aternabve PRF	Same as Alternabve PRF	Same as Alternabve PRF

Abbreviated Terms and Meanings:

HCAs = Habitat Conservation Areas

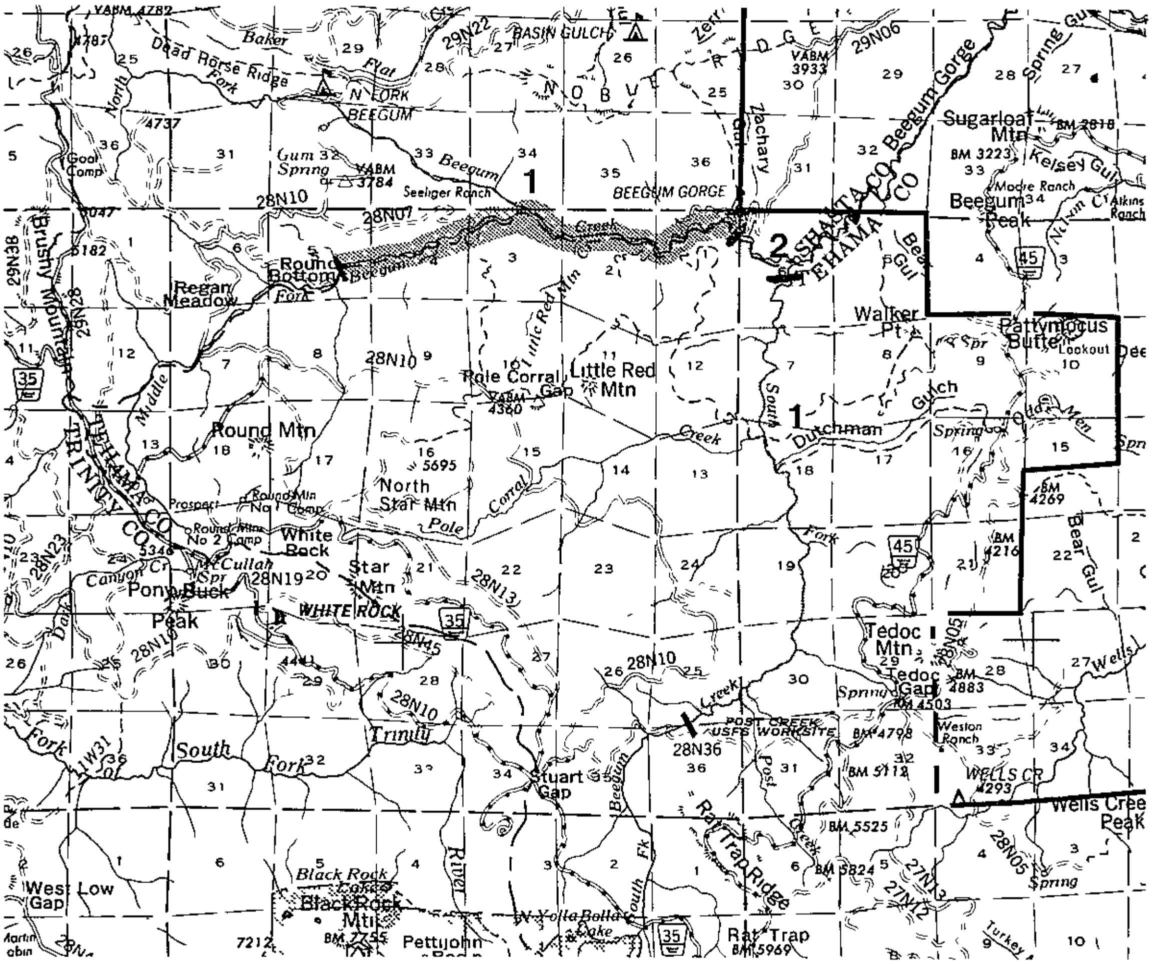
RMZ = Riparian Management Zone

ROS = Recreabon Opportunity Spectrum

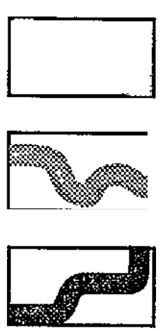
ROS Classes
- P = Primitive
- SPNM = Semi-primitive Non-motorized
- SPM = Semi-pnmtive Motonzed
- RN = Roaded Natural
- R - Rural

VQO = Visual Quality Objective

VQOs
- P = Preservabon
- R = Retention
- PR = Partial Retention
- M = Modification
- MM = Maximum Modification
- UM = Unacceptable Modification



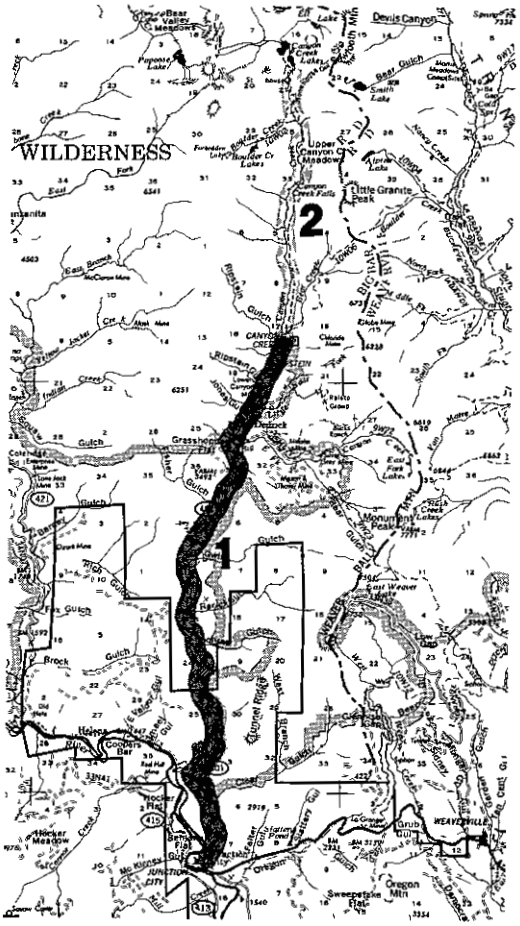
Wild & Scenic Rivers
BEEGUM CREEK



wilc

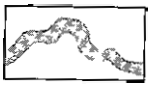
Scenic

Recreation



Wild & Scenic Rivers

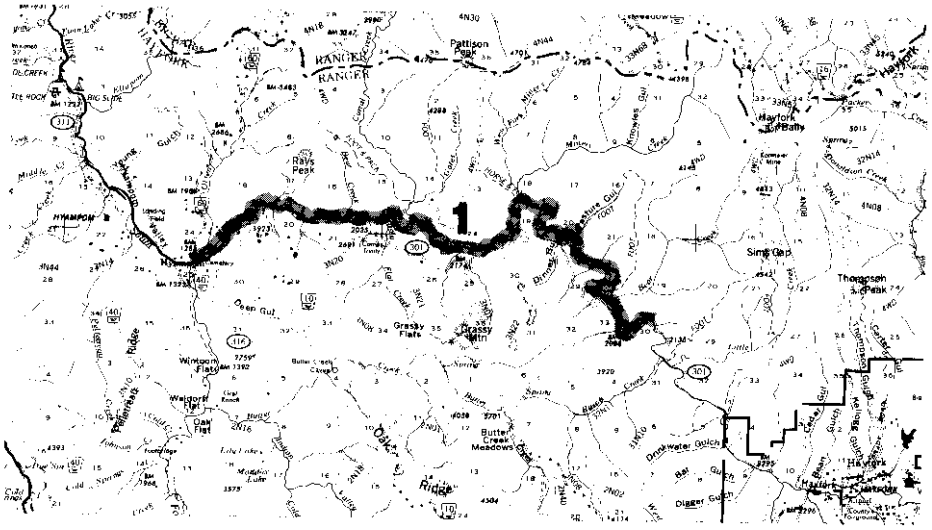
CANYON CREEK



Wild

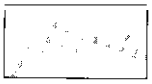
Scenic

Recreation



Wild & Scenic Rivers

HAYFORK CREEK



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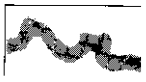
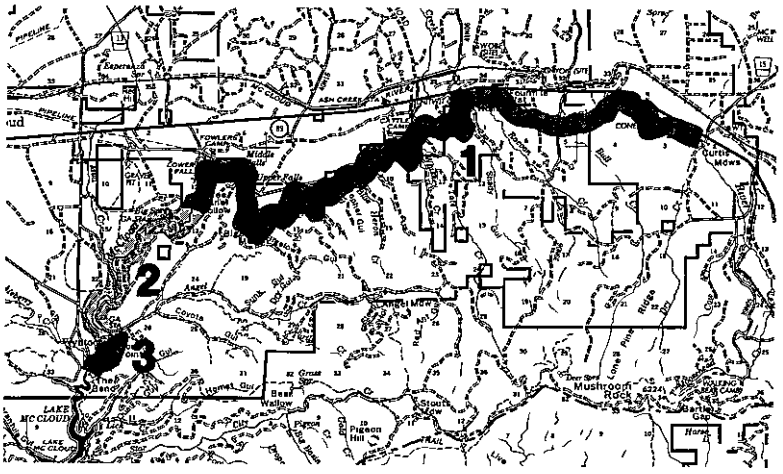


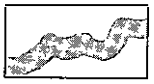
Scenic

Recreation



Wild & Scenic Rivers

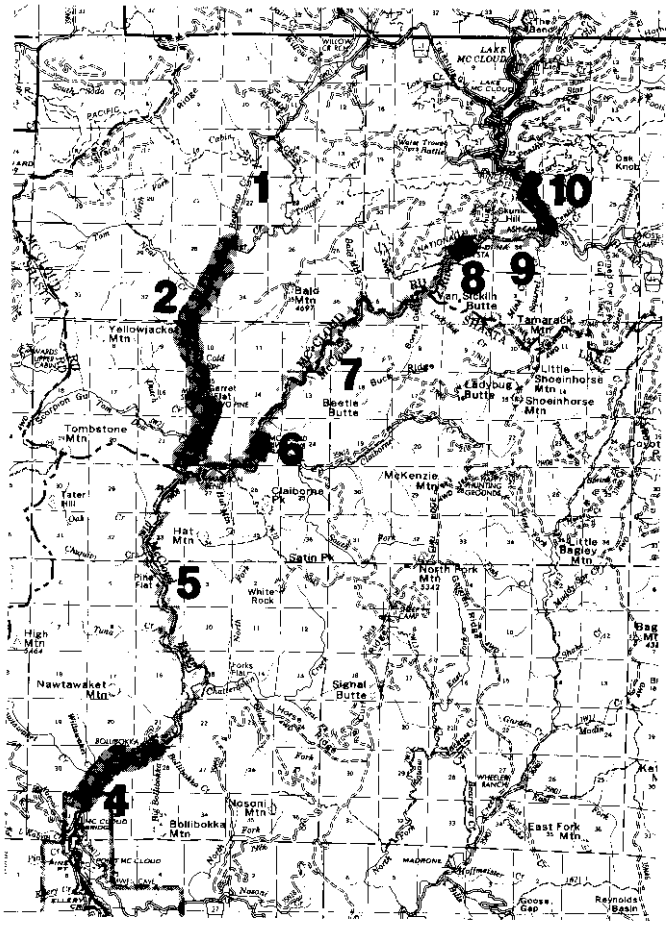
UPPER McCLOUD RIVER



Wild

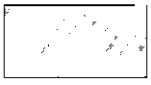
Scenic

Recreation



Wild & Scenic Rivers

LOWER McCLOUD RIVER & SQUAW VALLEY CREEK



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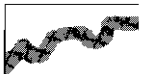
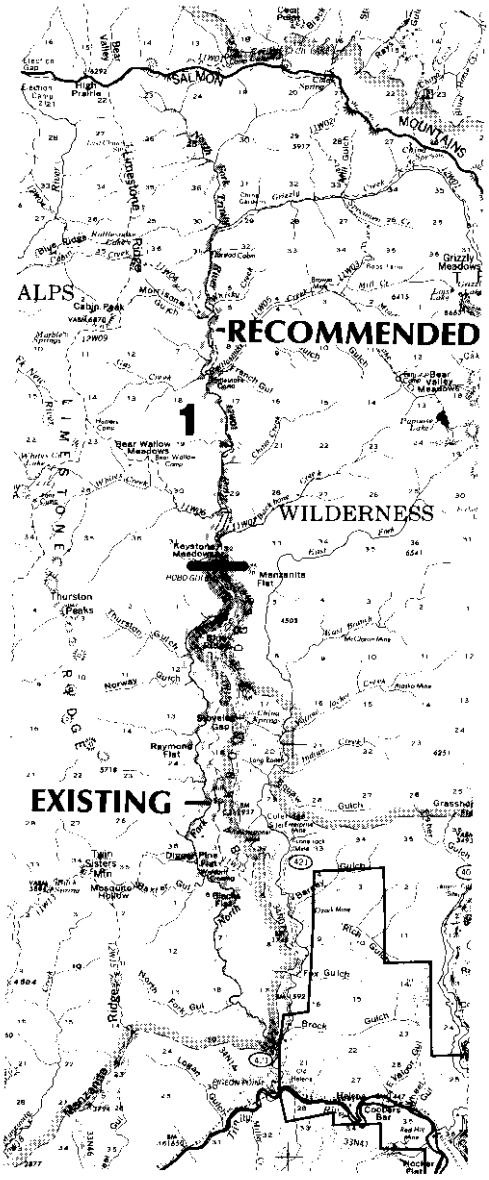


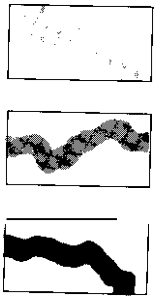
Scenic

Recreation



Wild & Scenic Rivers

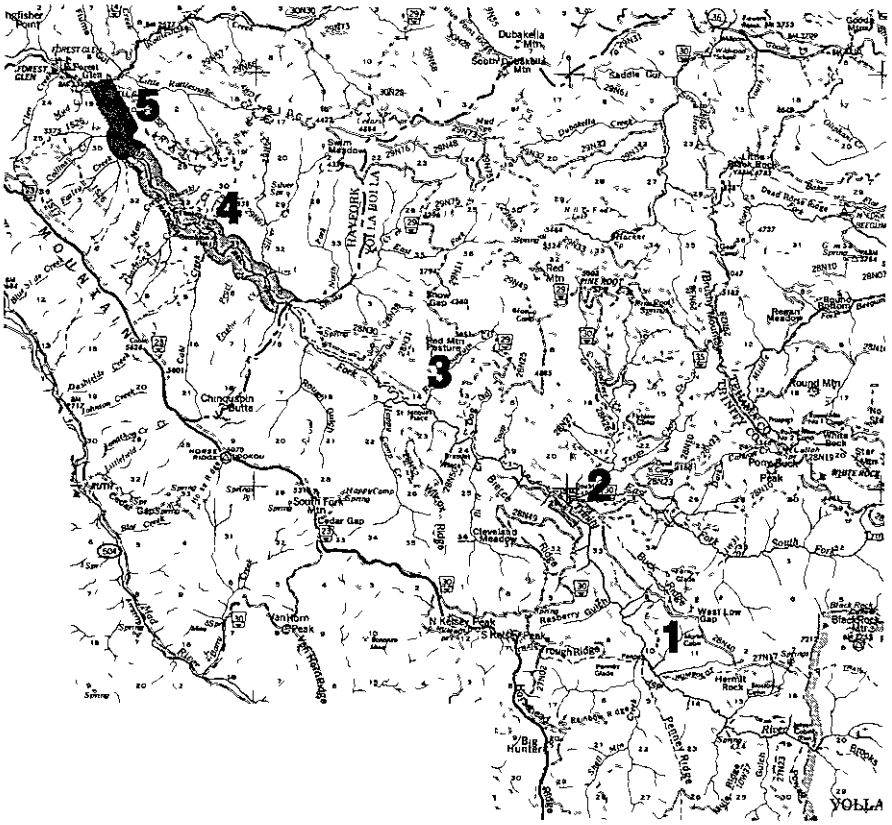
NORTH FORK TRINITY RIVER



Wild

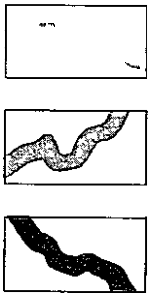
Scenic

Recreation



Wild & Scenic Rivers

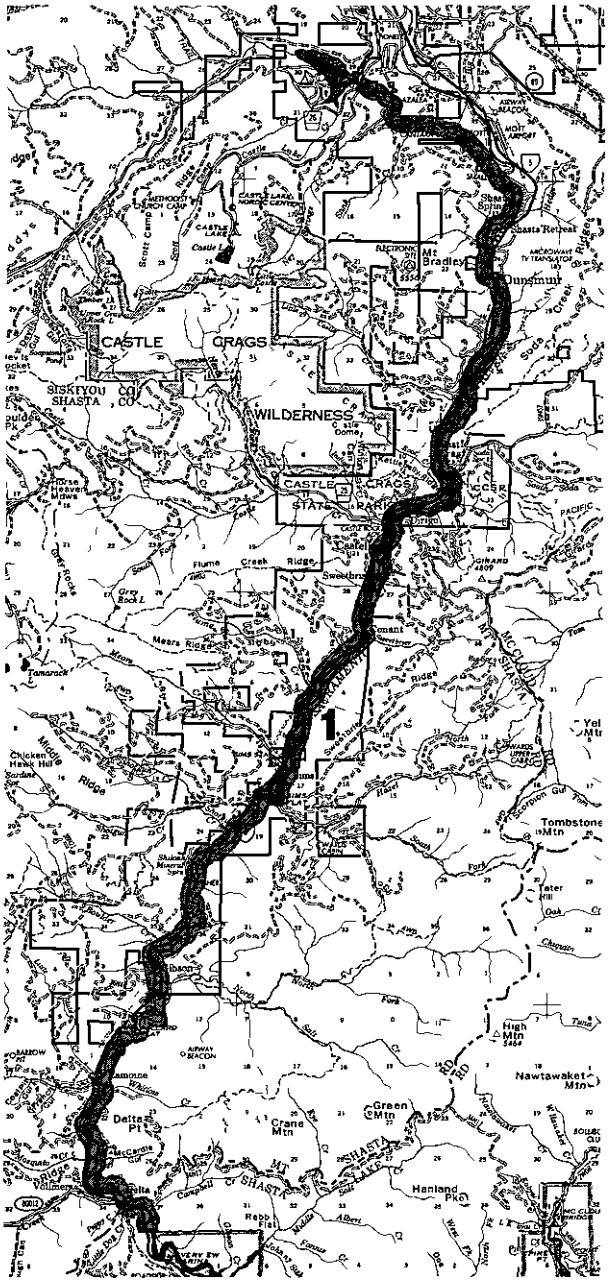
SOUTH HALF OF THE SOUTH FORK TRINITY RIVER



Wild

Scenic

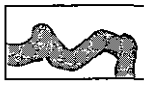
Recreation



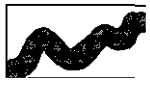
Wild & Scenic Rivers

SACRAMENTO RIVER

Wild



Scenic



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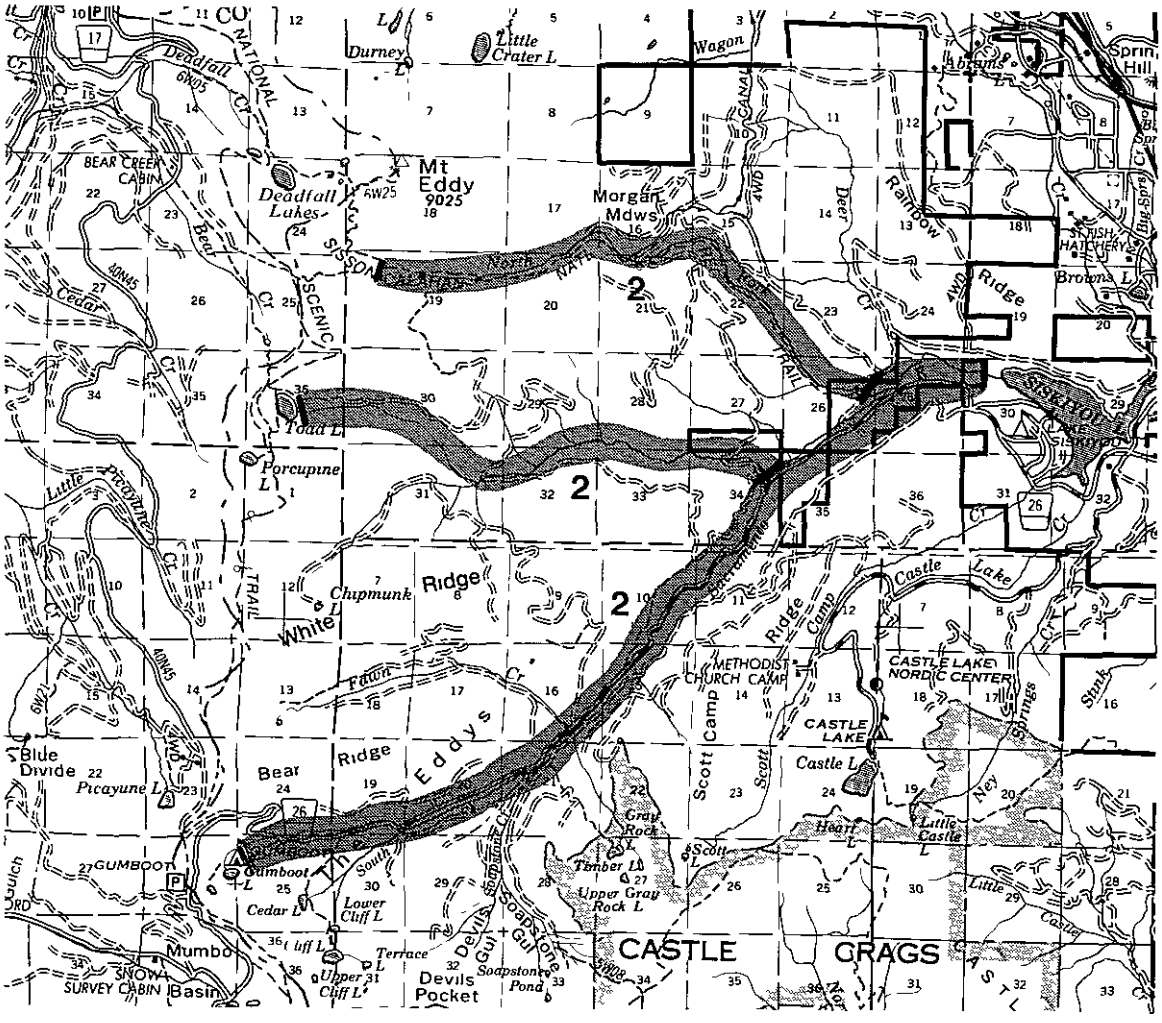
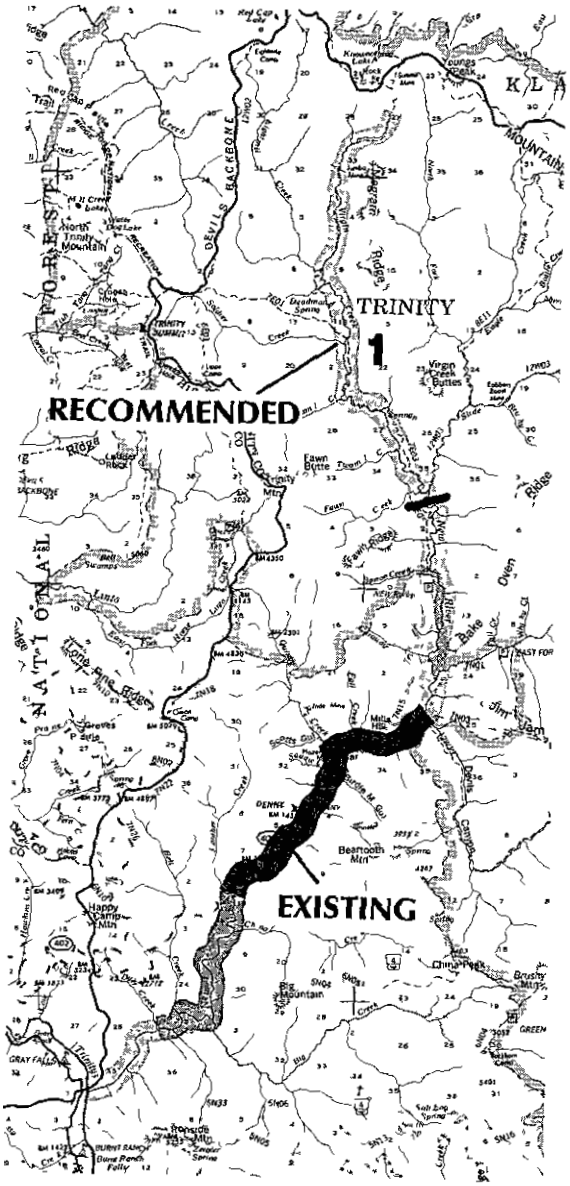


Wild & Scenic Rivers
SACRAMENTO RIVER
UPPER FORKS

wild

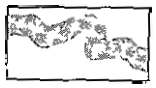
Scenic

Recreation



Wild & Scenic Rivers

NEW RIVER & VIRGIN CREEK


Wild

Scenic

Recreation

Appendix F

Research Natural Area Analysis

APPENDIX F
Research Natural Area Analysis

One Research Natura Area (RNA) has been establishec on the Shasta-Trinity National Forests The Shasta Muc Flow RNA was designated by the Chief of the Fores Service in 1971 It represents the young-growth Pacific ponderosa pine target (Society of American Forester! [SAF] type number 244)* for the Cascade Rangr Physiographic Province and the scientific geologic value: of a volcanic mud flow

Fourteen proposed candidate areas are in various stage: of the screening and establishment process (Refer tc Chapter III - Special Areas Section) These candidates wil be addressed in the Forest Plan and this Final Environmental Impact Statement (Final EIS) until the RNA committee completes its evaluation and the Regional Forester make: final recommendations.

Removal of candidate areas from the timber base will have an insignificant effect on timber outputs Approximately *90* percent of the sutable timber acres would have beer allocated to non-timber prescriptions in all the alternative: considered Refer to Chapter IV for a detailed discussior of environmental consequences of RNA designation

Scientific values of the candidate areas, wth respect tc Regional RNA network goals and present use and condition of these areas, are shown by **Tables F-I** and **F-2.** respectively

The target system descnbed in Forest Service Manua (FSM) Title 4063, Pacific Southwest Region, Supplement No 3, was used to determine vegetation elements in I I physiographic provinces of Calfornia needed for representation in the RNA system The Shasta-Trinity National Forests are located within parts of the Klamath Mountains, Cascade Range, and Modoc Plateau Physiographic Provinces Personnel of the Shasta-Trinrty National Forests are responsible for coordinating with the other Forests in these physiographic provinces and for nominating candidates representative of 34 desired elements

Of the 34 elements, 8 consttute the main elements found in the I4 proposed candidate areas Eight other elements are also represented among the candidate RNAs, and three do not occur on the Forests (i.e , the three Baker Cypress targets) Refer to **Table F-I** "Representation of RNA Targets in the Shasta-Trinity RNA Candidates" Unfilled targets will become future inventory needs for RNA representation on the Forests unless they are filled by RNAs established on other Forests

Forest personnel also projected resource allocations which would take place if the RNA Committee rejected a candidate area and released it for other land management purposes This "in-lieu-of' analysis is part of the official planning records which are available for on-premise review at the headquarters of the Shasta-Tnnrty National Forests in Redding, California

*See glossary for an explanation of Forest cover types

Vegetation Type	Physiographic Province	Bald Mountain Creek	Bear Creek	Cascade	Basin	Devils Hosselkus	Creek	phy Glade
SAF 207 Red Fir*	Klamath Mtn							P
SAF 207 Red fir	Cascade Range			P				
SAF 211 White fir	Klamath Mtn						S	
SAF 211 White fir	Cascade Range							
SAF 222 Black cottonwood/willow	Klamath/Cascade							
SAF 229 Pacific Douglas-fir	Klamath Mtn						S	
SAF 230 Douglas-fir/w hemlock	Klamath Mtn							
SAF 231 Port-Orford-cedar	Klamath Mtn				P			
SAF 234 Douglas-fir/tanoak/Pacific madrone	Klamath Mtn							
SAF 237 Interior ponderosa pine	Modoc Plateau							
SAF 243 Sierra Nevada mixed conifer	Klamath Mtn				S	S	S	
SAF 243 Sierra Nevada mixed conifer	Cascade Range							
SAF 244 Pacific ponderosa pine/ Douglas-fir	Klamath Mtn					S	P	
SAF 244 Pacific ponderosa pine/ Douglas-fir	Cascade Range							
SAF 246 California black oak	Klamath Mtn					P/S		
SAF 246 California black oak	Cascade Range							
SAF 247 Jeffrey pine	Klamath Mtn							
SAF 247 Jeffrey pine	Modoc Plateau							
SAF 248 Knobcone pine	Klamath Mtn							
SAF 248 Knobcone pine	Cascade Range							
SAF 256 California mixed subalpine	Cascade Range							
K-24 Western juniper**	Modoc Plateau							
K-30 Foothill woodland	Cascade Range							
K-34 Montane chaparral	Klamath Mtn							
Darlingtonia bog	Klamath Mtn				S			
Moss bog	Klamath Mtn							
Alpine Fellfields	Klamath Mtn							
Brewer spruce	Klamath Mtn							
Enriched conifer	Klamath Mtn							
Foxtail pine	Klamath Mtn							
MacNab cypress***	Cascade Range							
Baker cypress***	Klamath Mtn /Cascade Range/Modoc Plateau							
Other Unique Elements	All	U	U		U	U		

S = Secondary RNA Targets
U = Undetermined at this time

** Kuchler's Vegetative Types
*** Targets are not applicable to Shasta-Trinity National Forest lands

Table F-I

Vegetation Type	Physiographic Province	Mt. Eddy	Preacher Meadows	Red Butte-Red Fir Ridge	Rough Gulch	Smoky Creek	South Fork Mtn.	Stuart Fork
SAF 207 Red Fir*	Klamath Mtn.							
SAF 207 Red fir	Cascade Range			P				
SAF 211 White fir	Klamath Mtn.							
SAF 211 White fir	Cascade Range							
SAF 222 Black cottonwood/willow	Klamath/Cascade							
SAF 229 Pacific Douglas-fir	Klamath Mtn.				P		P	
SAF 230 Douglas-fir/w hemlock	Klamath Mtn.							
SAF 231 Port-Orford-cedar	Klamath Mtn.							
SAF 234 Douglas-fir/tanoak/Pacific madrone	Klamath Mtn.							
SAF 237 Interior ponderosa pine	Modoc Plateau							
SAF 243 Sierra Nevada mixed conifer	Klamath Mtn		P					
SAF 243 Sierra Nevada mixed conifer	Cascade Range							
SAF 244 Pacific ponderosa pine/ Douglas-fir	Klamath Mtn				S	P		
SAF 244 Pacific ponderosa pine/ Douglas-fir	Cascade Range							
SAF 246 California black oak	Klamath Mtn							
SAF 246 California black oak	Cascade Range							
SAF 247 Jeffrey pine	Klamath Mtn.					S		
SAF 247 Jeffrey pine	Modoc Plateau							
SAF 248 Knobcone pine	Klamath Mtn.							
SAF 248 Knobcone pine	Cascade Range							
SAF 256 California mixed subalpine	Cascade Range			S				
K-24 Western juniper**	Modoc Plateau							
K-30 Foothill woodland	Cascade Range							
K-34 Montane chaparral	Klamath Mtn							P
Darlingtonia bog	Klamath Mtn.		S					
Moss bog	Klamath Mtn							
Alpine Fellfields	Klamath Mtn.							
Brewer spruce	Klamath Mtn							
Enriched conifer	Klamath Mtn							
Foxtail pine	Klamath Mtn	P						
MacNab cypress***	Cascade Range							
Other Unique Elements	All		U		U			

lands.

Table F-2
Research Natural Area Candidates -Present Use Situation

RNA Candidate	Bald Mtn. Creek	Bear Creek	Cascade	Cedar Basin	Devils Rock-Hosselkus	Manzanita Creek	Murphy Glade
Timber Strata (Acres)							
00 Not Suitable		2,700	208	500	2,740	7,250	40
05 HX					1,150		
09 M2G		130					
11 M3G		1,170	240		510		850
12 M3P		500	40	660	580		92
18 R3G			862	-	-		210
19 R3P	-	-	650				68
Estimated Potential Biological Yield (Thousand Board Feet [mbf] /Year)							
05 HX					5		
09 M2G	-	52	-	-	-	-	-
11 M3G		498	95		95		350
12 M3P		240	15	260	20		36
18 R3G			340				66
19 R3P			260				28
Recreation (Recreation Visitor Days [RVDs])							
Dispersed Camping			270	300			10
Off-Highway Vehicle (OHV) Hunting		6	100	400	70		15
Fishing		60		60			
Snowmobile				45			
Threatened, Endangered and Sensitive (T,E&S) Animals (acres)							
00 Low Suitability	-	4,500	2,000	0	5,470	7,210	1,140
03 High Suitability		0	0	60	80	40	120
T,E &S Plants (Acres)							
00 No Known Occurrences	800	4,500	2,000	1,160	5,550	7,250	1,260
03 Known Occurrences	0	0	0	0	0	0	0
Potential T,E&S Animals (Acres)							
00 Low Suitability		2,940	2,000	1,160	0	7,250	1,140
03 High Suitability		1,560	0	0	4,980	0	120
Potential T,E&S Plants (Acres)							
00 Low Suitability	600	4,450	1,960	1.100	0	6,250	1,220
03 High Suitability	200	<50	<40	<60	5,550	< 1,000	<40
Wildlife Harvest Species (Acres)							
00 Not Suitable		720	60	100	1,340	2,240	
01 Low		600	1,460	250	0	470	1,190
02 Moderate		1,680	480	700	190	590	70
03 High		1,500	0	110	3,450	3,950	
Minerals (Acres)							
00 Not Suitable		0	2,000	1,160	0	56	1,260
03 Suitable		4,500	0	0	4,980	7,194	0

Table F-2
(Continued)

RNA Candidate	Mt. Eddy	Preacher Meadows	Red Butte-Red Fir Ridge	Rough Gulch	Smoky Creek	South Fork Mtn.	Stuart Fork
Timber Strata (Acres)							
00 Not Suitable	890	1,850	1,640	1,110	-	119	1,500
05 HX		-	-	-			
09 M2G		-	-	300		119	
11 M3G		-	-	2,130	523	823	
12 M3P	-	-		420	477	119	
18 R3G	-	-					
19 R3P	-	-	-	-			
Estimated Potential Biological Yield (Thousand Board Feet [mbf] /Year)							
05 HX	-	-	-	-	-	-	-
09 M2G	-				-		
11 M3G		-	-	854	190	138	
12 M3P	-	-		165	166	11	
18 R3G	-	-	-				
19 R3P	-	-	-	-	-	-	-
Recreation (Recreation Visitor Days [RVDs])							
Dispersed Camping	-	655					
0%-Highway Vehicle (OHV)	-	438					
Hunting		-	62			10	-
Fishing		6	-	-			
Snowmobile			-				
Threatened, Endangered and Sensitive (T,E&S) Animals (acres)							
00 Low Suitability	890	1,850	1,640	3,960	1,000	1,180	1,500
03 High Suitability	0	0	0	0	0	0	
T,E &S Plants (Acres)							
00 No Known Occurrences	730	1,850	1,600	3,920	950	1,180	1,500
03 Known Occurrences	160	0	40	40	0	0	0
Potential T,E&S Animals (Acres)							
00 Low Suitability	890	1,850	1,235	3,860	1,000	1,124	1,500
03 High Suitability	0	0	405	100	0	56	0
Potential T,E&S Plants (Acres)							
00 Low Suitability	0	1,800	1,480	2,920	850	1,100	1,400
03 High Suitability	890	50	120	<1,000	100	80	100
Wildlife Harvest Species (Acres)							
00 Not Suitable	350	1,350	84	0	0	0	480
01 Low	540	220	1,276	210	0	174	540
02 Moderate	0	280	280	3,080	110	710	480
03 High	0	0	0	670	890	296	
Minerals (Acres)							
00 Not Suitable	310	335	1,640	820	0	0	0
03 Suitable	580	1,515	0	3,140	1,000	1,180	1,500

Bald Mountain Creek

Description: The 800 acre Bald Mountain Creek area only recently has been proposed (Spring of *1993)* by the Crtizens for Better Forestry This RNA would serve as a completely undisturbed benchmark watershed representative of other adjacent watersheds under timber management and would be monrtored as a control watershed

Map boundanes have not been defined as of this printing.

Figure F-l
(not available
because boundaries have not been defined)

Bear Creek

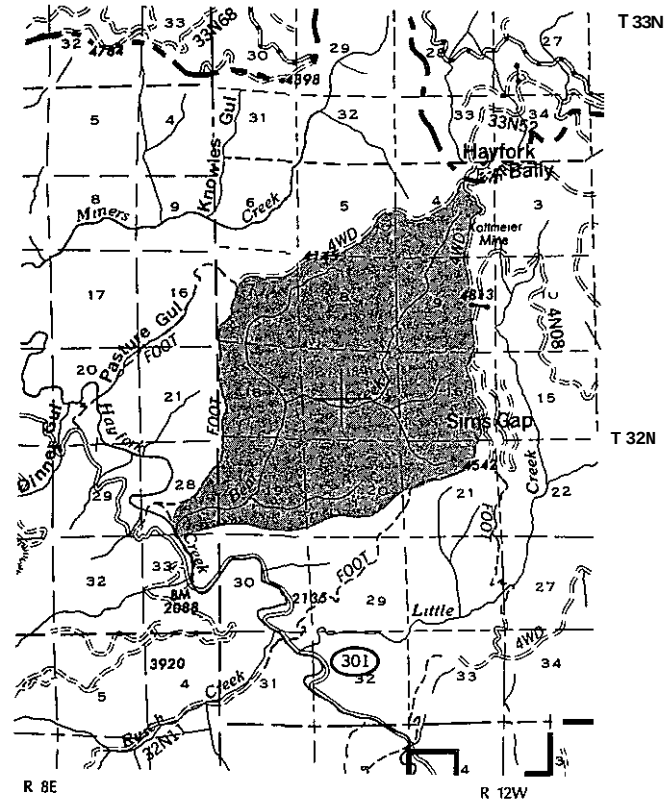
Description: The proposed Bear Creek Research Natura Area (RNA) is located on the Hayfork Ranger Distric approximately 6 air miles northwest of Hayfork The area totals about 4,500 acres, including nearly 640 acres o private land Bear Creek is a tributary to Hayfork Creek which in turn is a tributary to the South Fork Tnnity River Elevations range from 650 to 1,900 feet The Fores cover type is mixed conifer Soils in much of the area arc developed from granrtic geologic matenal which is ofter highly erodible

Planning Status: This area was proposed by the Citizen: For Better Forestry in 1987 There has been no fielc reconnaissance or ecological survey

Research Values: The Bear Creek area was proposed as a RNA to serve as a monrtoring benchmark watershed tc determine the effects of land management activities or highly erodible granitic soils The Bear Creek watershec would be monitored as a control watershed

Resource Conflicts: Approximately 42 percent of the area contains potentially suitable timber land which could be managed for intensive timber management The average annual sustained yield would be about *790* thousanc board feet (mbf) The section of private land within the area, if managed for timber harvest or other land disturbing objectives, would conflict with the intended purpose of the RNA (watershed monitoring) There are no locatable mineral values within the proposed area Prospecting for and possible removal of locatable minerals would be in conflict with the purpose of a RNA The area is not usec for livestock grazing.

Figure F-2
Bear Creek



BEAR CREEK

Cascade

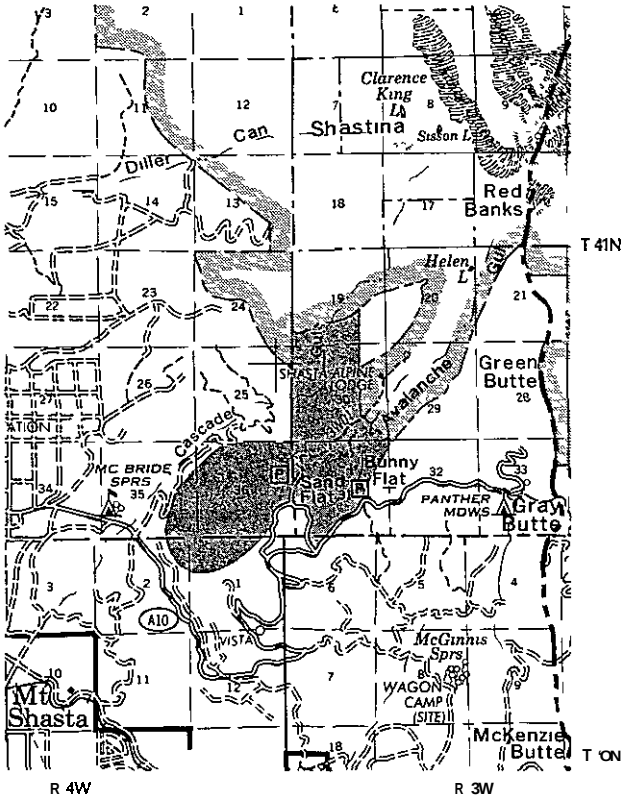
Description: The proposed Cascade **RNA** is located or the Mt Shasta Ranger Distnct about 3 air miles northeast of Mt Shasta City and adjacent to, but outside of, the Mt Shasta Wilderness Area. This area encompasses about 2,000 acres, all of which are on National Forest land Elevations range from about 5,200 to 8,000 feet. Forest covertypes are classed as mixed confer wtth considerable amounts of Shasta red fir (*Abies magnifica shastensis*)

Planning Status: The Cascade area was proposed as a RNA by the Citizens For Better Forestry in 1987 No fielc reconnaissance or ecological evaluation has been conducted

Research Values: The Cascade area was proposed tc meet the requirements for the red fir vegetation type (SAF 207) in the Cascade Range Physiographic Province The Red Butte - Red Fir Ridge RNA also represents the red fir vegetation type

Resource Conflicts: About *90* percent of the area contains tentatively surtable timber land which could be managec for intensive timber management This would represent an annual sustained yield of about 710 mbf The area receives some dispened recreational use which could conflict wlth RNA objectives No livestock grazing taker place

Figure F-3
Cascade



CASCADE

Cedar Basin

Description: The proposed Cedar Basin RNA is located on the Mt Shasta Ranger Distnct approximately 10 air miles southwest of Mt Shasta City The area totals about 1,160 acres and lies near the upper headwaten of the South Fork of the Sacramento River. Elevations range from 5,400 to 7,100 feet The proposed area contains Cedar Lake, Cliff Lake, Lower Cliff Lake, Upper Cliff Lake, Terrace Lake, and two unnamed ponds Forest cover types are generally classed as mixed confer with a Port-Orford-cedar *Cupressus lawsoniana* (=*Chamaecyparis lawsoniana*) component Much of the area consists of a myriad of plant communities and vegetative types

Planning Status: The proposed area was initially screened by a field reconnaissance during the summer of 1980 and subsequently nominated in October 1980 ***An*** ecological survey was completed in the summer of 1982.

Research Values: This area best fulfills the Port-Orford-cedar vegetation type (SAF 23 1) target within the Klamath Mountains Physiographic Province. Other botanic elements represented within this area include the Sierra Nevada mixed confer (SAF 243) and the Darlingtonia bog vegetation types The basin contains excellent examples of inland Port-Orford-cedar in both pure and mixed stands from 5,400 *to* 6,400 feet

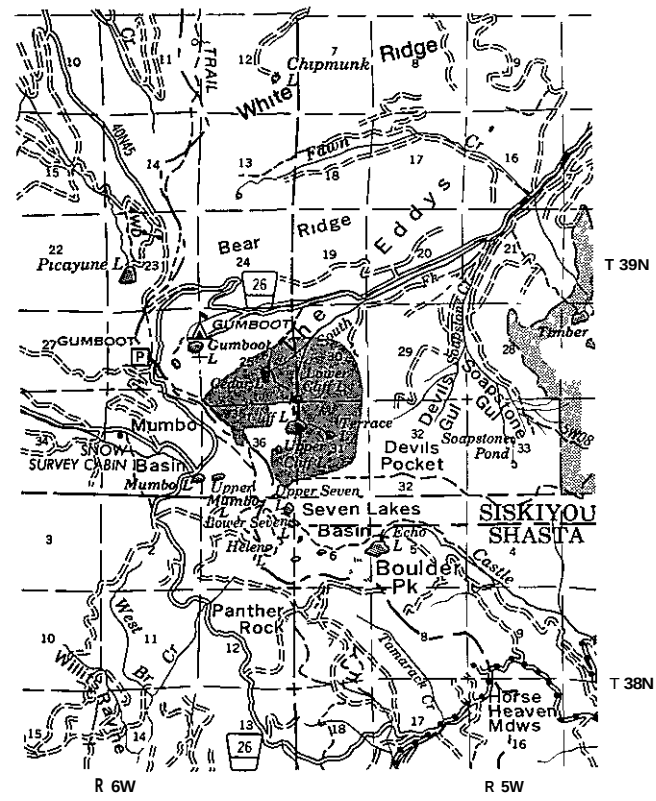
At least two beneficial research objectives could be met (1) because of infestation of many of the coastal Port-Orford cedar stands by *Phytophthora lateralis* and the possibilty of further spread in the coastal areas, these stands provide opportunities to protect areas from exposure to the fungus, and (2) these stands are representative of inland Port-Orford cedar that are ecologically and genetically distinct from coastal populations Protecting this distinct area will provide for the conservation of a wider genetic resource

The area includes a large number of plant communities and 11 different species of confers. It also contains the type locality for the sensitive plant species Klamath manzanita (*Arctostaphylos klamathensis*)

The most signficant conflict of the proposed research activities in this area with other land users is with dispersed motonzed recreationists and fishermen using the low-grade Cedar Basin road (#39N05Y). This road has also provided a means of access for woodcutting, both permrtted and illegal Keeping this road open provides an avenue for introduction of *Phytophthora lateralis* and the associated threat to Port-Orford cedar in this RNA Of lesser impact are recreationists using the Pacfic Crest Trail (PCT), which essentially forms the proposed southern boundary of the area The area is within the South Highland grazing allotment

Resource Conflicts: Nearly 57 percent of the area contains tentatively sultable timber land which could be managed for intensive timber management About 260 mbf of potential sustained annual yield would be foregone under RNA designation. The private lands adjacent to the proposed RNA boundary pose a potential conflict However, the current landowner do not intend to initiate any ground-disturbing developments on their land

Figure F-4
Cedar Basin



CEDAR BASIN

Devils Rock-Hosselkus

Description: The proposed Devils Rock-Hosselkus **RNA** is located on the Shasta Lake Ranger Distnct about 24 air miles northeast of Redding The boundanes of the proposed area include some *5,550* acres The area can be accessed for research studies by a barely passable jeep road and trail near Chirpchatter Campground. The proposed Dewls Rock RNA lies immediately to the east and contiguous to the Hosselkus area **A** small portion of the south end of the area also lies wthin the Shasta Unit of the Whiskeytown-Shasta-Tnnity National Recreation Area (NRA)

The proposed area straddles a prominent north-south trending limestone ndge dominated by Brock Mountain on the south and Devils Rock and Brock Butte on the north This ndge forms the main diwde between the Squaw Creek and Pit River watersheds Elevations range from 1,280 to 3,450 feet just south of Devils Rock Major perennial streams include Low Pass Creek Canyon, Madison Canyon, Dinner Gulch. and Bars **Creek** in the Squaw Creek watershed and Susanville Canyon, Brock Creek, and Flat Creek in the Pit River drainage The vegetative type is generally classed **as** oak woodland. but there are also other minor cover types wthin the area including low elevation mixed confer, canyon npanan, and limestone scrub

Planning Status: The Devils Rock portion of the area was intially screened by a field reconnaissance dunng the summer of 1984 No action has been taken since Apnl 1985

The Hosselkus portion was intially visited by a group of University of California scientists in 1966 and was proposed to the Regional RNA Committee that same year In December, 1974 the area was nominated by the Committee and recommendations were made to proceed wth an ecological evaluation The ecological evaluation was completed by Virginia and Todd Keeler-Wolf during the summer of 1975

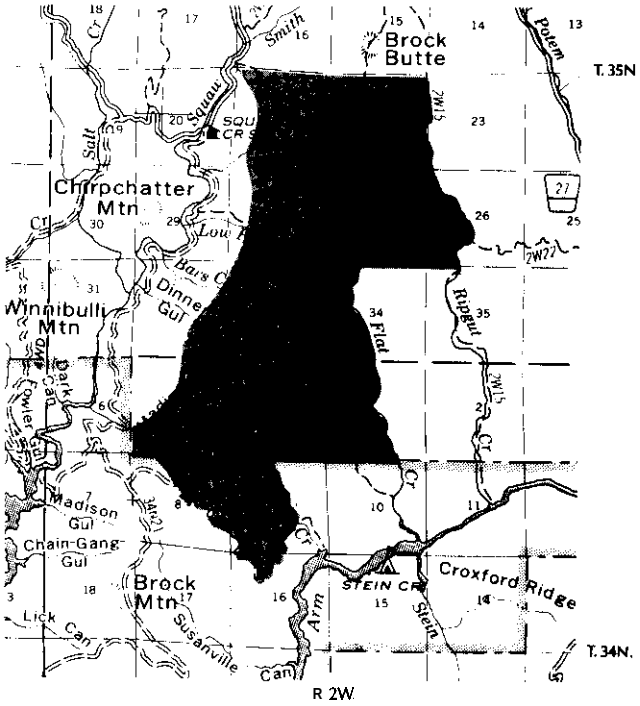
Research Values: The Devils Rock portion of the RNA ideally fulfills the California black oak vegetation type (SAF 246) target within the Klamath Mountains Physiographic Province The oak stands are dense and result in little diversity of woody shrubs and herbaceous vegetation Most of the California black oak (*Quercus kelloggii*) trees in this area are 40 to 80 years old, although much older monarchs are present The complex geology in this area adds to its value as a target vegetation type

The Hosselkus portion does not specifically meet a designated terrestrial vegetation target The area was originally proposed pnmanly for its unique paleontological features which are found in nch abundance in the limestone formations in the heart of the area, and the unique biotic communities which are associated with these habitats However, in 1992 a new species of shrub in the rose family was discovered growing off of Highway 299 on Hosselkus limestone The new plant, Shasta snow-wreath (*Nevusia cliftonii*), has since been located in two other locations, near or on the border of this RNA This species. whose closest relative occurs in the southeastern part of the Unted States, is thought to be a relic from the Arcto-Tertiary geologic period It is likely that this area will provide many research opportunities Other endemic species known to occur here are the Shasta eupatory, *Eupatorium shastense*, in the sunflower family, and the Shasta salamander (*Hydromantes shastae*) This amphibian is a Federal Category 2 candidate and a State-listed threatened species Current scientific thinking indicates that this area may yield other new and previously undescnbed plants or animals

The area also satisfies the secondary vegetation targets for Calfomia black oak (SAF 246). Sierra Nevada mixed confer (*SAF* 243). and Pacific ponderosa pine/Douglas-fir (SAF 244) types within the Klamath Mountains Physiographic Province The area has been a focal point for paleontologists since 1895

Resource Conflicts: Approximately 47 percent of the area contains tentatively sutable timber land which could be managed intensively for timber without adverse impacts on the environment Potential yields are about 120 mbf per year However, about one-third of the suitable timber lands consist of hardwood stands The confer stands in the area are in small patches and would be costly to harvest and regenerate Few impacts on dispersed recreation use (mostly hunting) are anticipated **by** the proposed **RNA** designation The area is not used for livestock grazing

Figure F-5
Devils Rock-Hosselkus



DEVILS ROCK • HOSSELKUS

Manzanita Creek

Description: The proposed Manzanita Creek RNA is located on the Big Bar Ranger Distnct about 17 air miles west of Weaverville The area under consideration totals 7,250 acres, all of which are in National Forest ownership Elevations range from 1,200 to 5,932 feet The area is bounded on the west by Treloar Ridge and on the east by Manzanta Ridge, it extends from wthin one mile of the mouth of Manzanta Creek to the head of this stream near Twin Sisters Mountain Only a small portion of the area is broadly classed as mixed confer A large part of the balance of the area consists of shrub and chapanal types, with subalpine chaparral types growing at the higher elevations The area is wthin the boundaries of the Trinity Alps Wilderness

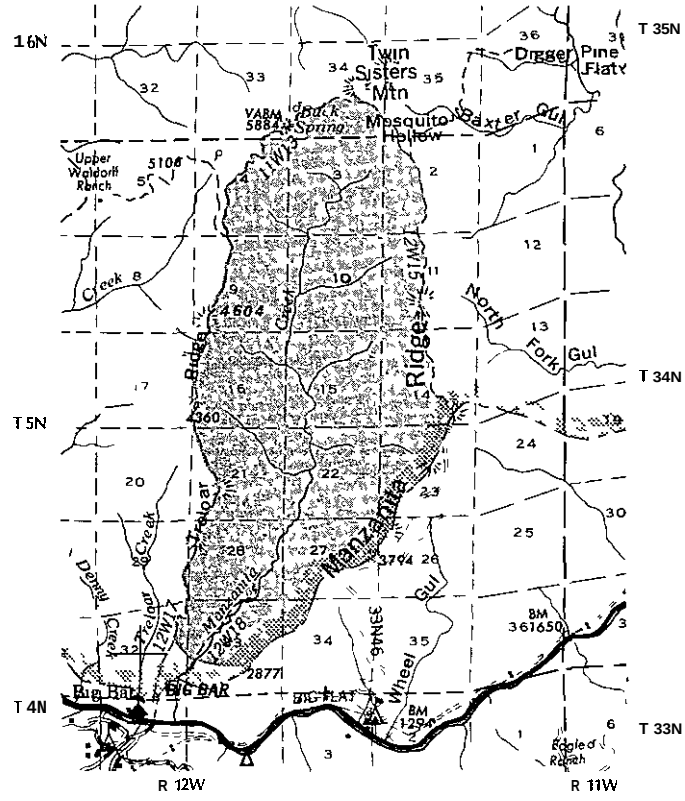
Planning Status: The area was originally proposed for RNA consideration in 1973. An initial field reconnaissance was conducted in October, 1978 The area was subsequently nominated and recommended for ecological survey in early 1979 Taylor and Tease completed the ecological survey in October 1979 The survey was accepted, and in September, 1980, the Regional RNA Commrttee recommended the area for RNA classification

Research Values: The area meets the RNA targets for Pacific ponderosa pine/Douglas-fir (SAF 244) vegetation type for the Klamath Mountains Physiographic Province The SAF 244 type is also represented by the proposed Smoky Creek area on the Hayfork District Other target elements represented include wht e fir (SAF 211), Pacific Douglas-fir (SAF 229), and Sierra Nevada mixed conifer (SAF 243) vegetation types However, past fires in the area have created a high diversity of subclimax plant communities

The proposed RNA boundary encompasses an entire watershed, 3,950 acres of which were disturbed by the Treloar Fire of July, 1985 The watershed has a gauging station which would be available for controlled watershed studies

Resource Conflicts: Recent Congressional designation of the area, as part of the Trinlty Alps Wilderness, has eliminated off-highway vehicle (OHV) recreation use along Manzanta Rdge up to as far as the foot of Twin Sisters Mountain Prescribed burning would no longer be possible except under very special circumstances There would be some conflicts with Wildemess users, as recreation is not encouraged under a RNA classlfication However, the heaviest recreation use would probably remain confined to the outside edges of the area along Treloar and Manzanita Ridges The area is within the Big Bar grazing allotment Although livestock grazing use is light, there could be some conflict between grazing and the objectives of *the* RNA

Figure F-6
Manzanita Creek



MANZANITA CREEK

Murphy Glade

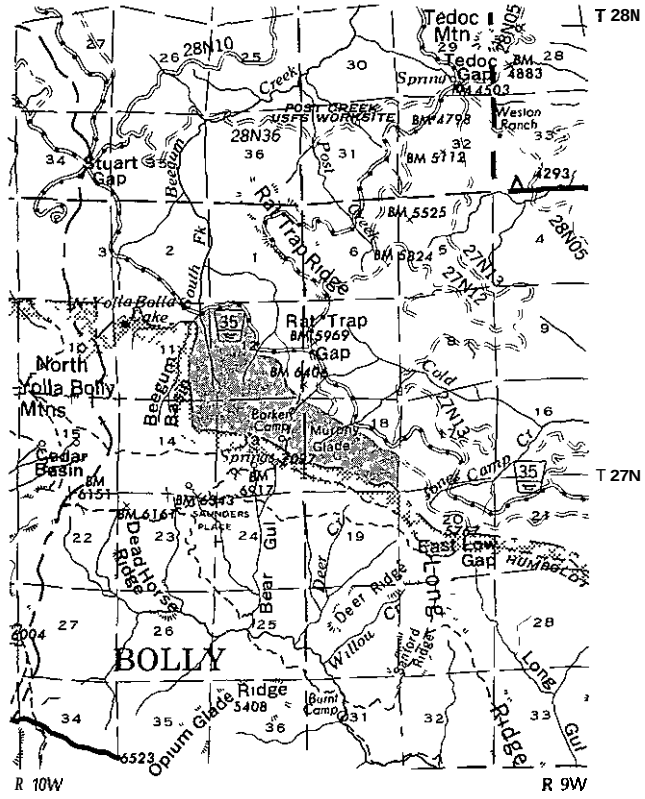
Description: The proposed Murphy Glade RNA is located on the Yolla Bolla Ranger District about 12 air miles south of Platina. This area is adjacent to the Yolla Bolly-Middle Eel Wilderness Area and is about 1,260 acres in size. The entire area is on National Forest land. Elevations range from about 5,600 to 7,200 feet. Forest cover types are classed as mixed conifer with considerable amounts of red fir (*Abies magnifica*).

Planning Status: The Murphy Glade area was proposed as a RNA by the Citizens For Better Forestry in 1987. No field reconnaissance or ecological evaluation has been conducted.

Research Values: The Murphy Glade area was proposed to meet the requirements for the red fir vegetation type (SAF 207) in the Klamath Mountains Physiographic Province.

Resource Conflicts: The area receives some dispersed recreational use, but this should not be a conflict. This area is within the Cold Fork grazing allotment, and livestock grazing could cause a conflict. The area is entirely within LSR so timber management should not be a conflict.

Figure F-7
Murphy Glade



MURPHY GLADE

Mt. Eddy

Description: The proposed Mt Eddy RNA is located on the Mt Shasta Ranger Distnct about nine air miles west of Mt Shasta *City* The area totals 890 acres, all of which are on National Forest land The entire area is within the Mt Eddy Roadless Area which was placed in a "further planning" category Mt Eddy is being analyzed for both Wlderness and non-wilderness options within this Final EIS (refer to Appendix C) Topographically the area includes a ridge extending south from Mt Eddy, another ridge extending southwest, and a lower ndge to the south of the Deadfall Lakes Elevations range from 6,400 feet to 9,025 feet at the summit of Mt Eddy

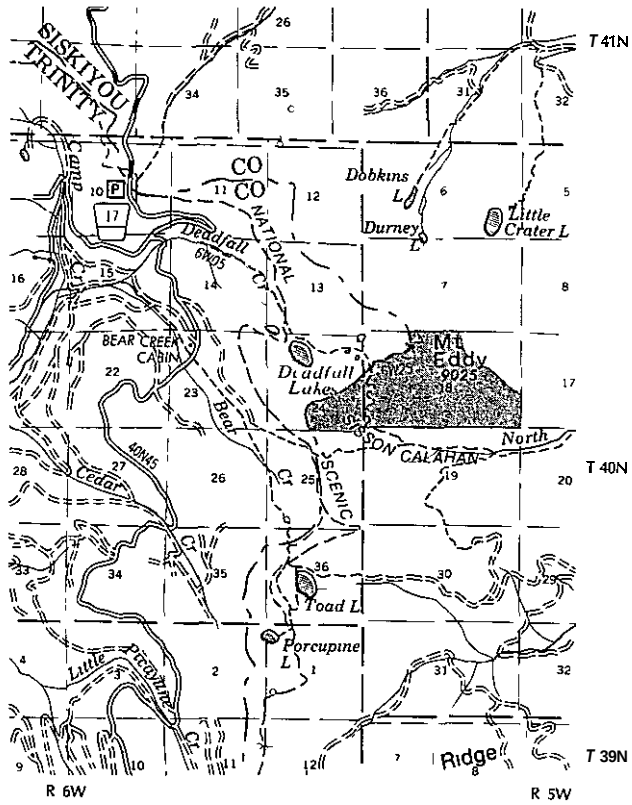
The major feature of this area is Mt Eddy The vegetation is composed pnmarily of high elevation open pine forests with sparse rocky slope herbs and a noticeable lack of shrub understory The most extensive vegetation is a western whte pine *(Pinus monticola)* dominated forest Above the western white pine forest is a nearly pure foxtail pine *(P balfounana)* forest

Planning Status: The area was intially screened through field reconnaissance in 1976 ***An*** ecological survey was completed in July, 1978, with acceptance by the Regional RNA Committee in June, 1980 It was recommended that a RNA be established Because of the RARE II decision to place the Mt. Eddy Roadless Area in a "further planning" status, no further action on the RNA proposal has been taken

Research Values: The proposed area fulfills the target requirements for foxtail pine for the Klamath Mountains Physiographic Province The Mt Eddy foxtail pine population covers 240 acres within the proposed RNA The foxtail pine population is large and healthy and provides an excellent example of this target The need for this target is high No other RNA proposals within this physiographic province contain signficant populations of foxtail pine The entire area is botanically exceptional, with a number of sensitive plant occurrences, including the State listed threatened species Tnnity buckwheat *(Eriogonum alpinum)*

Resource Conflicts: There is a trail running through the proposed area, with some insignificant dispersed recreation use taking place There are no tentatively suitable timber lands within the area Livestock grazing is sporadic

Figure F-8
Mt. Eddy



MT. EDDY

Preacher Meadows

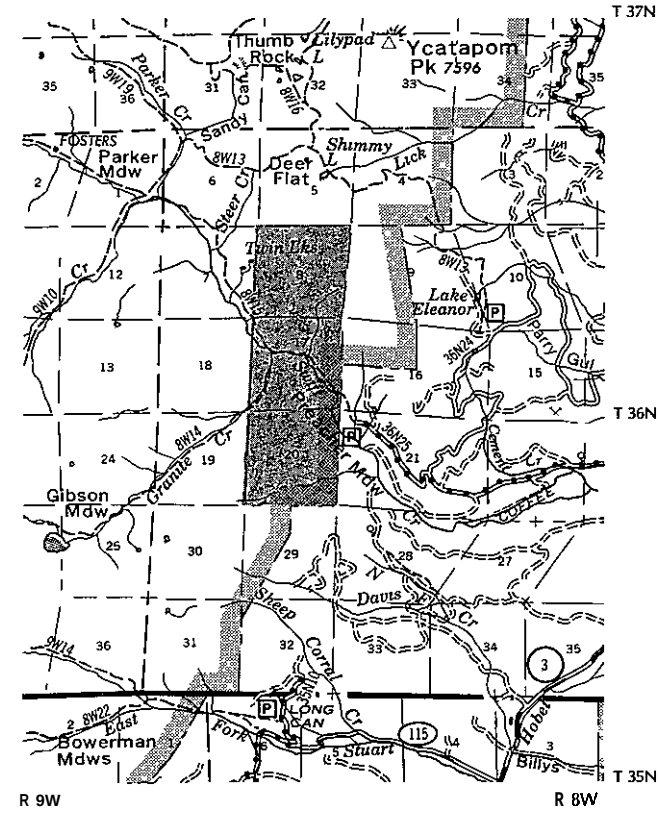
Description: The proposed Preacher Meadows RNA is located on the Weaverville Ranger District about 16 air miles north of Weaverville The boundaries of the area encompass 1,850 acres, all of which are in National Forest ownership The entire area is within the boundaries of the Trinity Alps Wilderness. Access is by road up to the eastern edge of the area. Elevations range from 3,800 (along Swift Creek) to 6,100 feet. Forest cover types are broadly classed as mixed conifer, but other non-forested types occur, such as montane chaparral and various bog plant communities Major features include Swift Creek Granite Creek, and Preacher Meadows

Planning Status: It is unknown exactly when the area was reconnoitered The Regional RNA Committee recommended candidacy for this area and further recommended that an ecological survey be conducted The ecological survey was completed in July 1978 and accepted by the RNA Committee in July 1980 No further planning has been done

Research Values: The area meets the Sierra Nevada mixed conifer forest cover type (SAF 243) target for the Klamath Mountains Physiographic Province. The need for this target is moderate to high Undisturbed samples of adequate size in commercial timber stands are difficult to locate in this province The Darlingtonia bog containing California pitcher plant (*Darlingtonia californica*), as well as the rare orchid California lady's slipper (*Cypripedium californicum*), a Siskiyou Mountains serpentine endemic, add to the value of this area

Resource Conflicts: The most significant impact of a RNP classification would be on recreationists entering the Trinity Alps Wilderness from the trailhead at the end of the Swift Creek Road **An** estimated 1,200 recreation visitor days (RVDs) of use occur in this area annually. Research activities would need to avoid the trail along Swift and Granite Creeks. There is no livestock grazing use

Figure F-9
Preacher Meadows



PREACHER MEADOWS

Red Butte-Red Fir Ridge

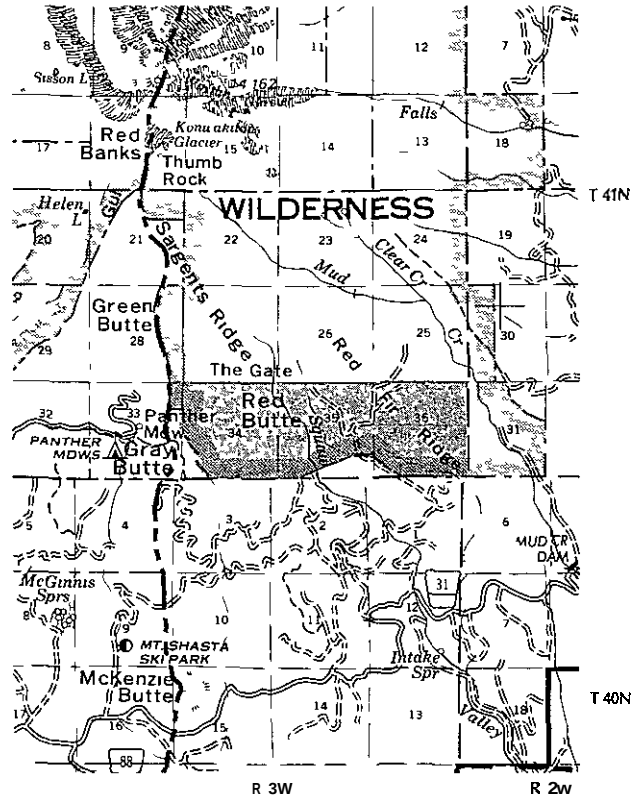
Description: The proposed Red Butte-Red Fir Ridge RNA is located on the McCloud Ranger District on the south slopes of Mt Shasta It is about 7 miles northeast of Mt Shasta City and 7 miles northwest of McCloud The area totals 1,640 acres, all of which are on National Forest lands The total area is within the expanded boundaries of the Mt Shasta Wilderness, as designated by Congress in 1984 Topographically, Red Butte (elevation 8,950 feet) dominates the area, rising more than 400 feet above the surrounding terrain Elevations range from 7,200 to 8,950 feet The cover type is generally classed as red fir forest However, there is some alpine and California mixed subalpine cover type

Planning Status: The area was originally nominated in July 1973 A field reconnaissance was conducted in July 1981 Due to an obvious scarcity of red fir targets, the area was recommended by the Regional RNA Committee in early 1983 for inclusion in at least one of the alternatives of this Final EIS and for subsequent RNA establishment An ecological survey is under contract and is due for completion in September, 1988

Research Values: The area meets the RNA requirements for the red fir vegetation type (SAF 207) in the Cascade Range Physiographic Province It represents the undisturbed conditions occurring at the higher elevations of the red fir range A secondary element of the California mixed subalpine forest (SAF 256) is also found within the area Several populations of the sensitive plant species Wilkins' harebell (*Campanula wilkinsiana*) also occur near or at the borders of this proposed RNA along Swift and Granite Creeks

Resource Conflicts: Because of the 1984 designation of the Mt Shasta Wilderness, resource conflicts will be limited to possible impacts on wilderness and primitive recreation opportunities Recreation use within the area is sporadic Some dispersed camping occurs at Squaw Valley Creek Meadows, but this is outside the proposed boundaries of the area There is no livestock grazing use

Figure F-10
Red Butte-Red Fir Ridge



RED BUTTE • RED FIR RIDGE

Rough Gulch

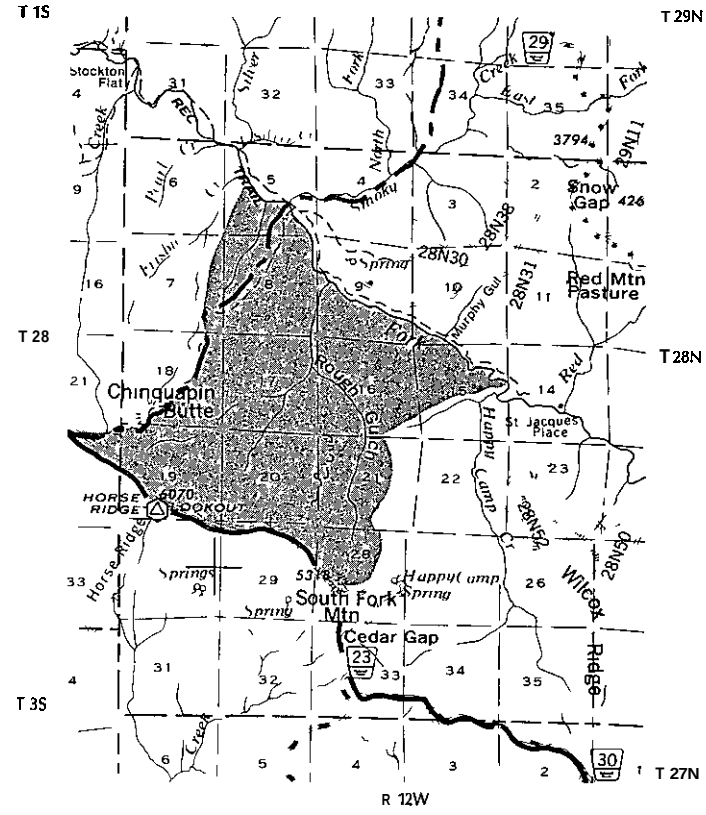
Description: The proposed Rough Gulch RNA is locate on the Yolla Bolla Ranger District about 19 air miles soutl of Hayfork The area under consideration totals 3,96(acres, all of which are on National Forest land Elevation range from 2,540 to 6,070 feet The proposed are, includes an area which is being proposed for establishmen as a RNA - South Fork Mountain The Rough Gulch are includes a broad-topped, moderately sloping ridge knowr locally as Chinquapin Rdge, it also includes the steep-slop ing lands within Rough Gulch and portions along the Soutl Fork Trinty River The Rough Gulch inner gorge anc portions along the South Fork Trinity Rver are very steep (60-80 percent slopes), they contain significant areas o mass instability Forest cover types are generally classec as mixed conifer with Douglas-fir (*Pseudotsuga menziesii*) anc golden chinquapin (*Castanopsis chrysophylla*) components

Planning Status: The proposed area was initially screenec by a field reconnaissance conducted on May 9, 1981 Further field evaluation was made in the fall of 1984 by Todd Keeler-Wolf The boundary for this proposal was recommended by Todd Keeler-Wolf to include what he considered the best representation of the target type

Research Values: The proposed Rough Gulch RNA area contains a Douglas-fir/giant chinquapin/beargrass community which appears to be uniquely different from the communities within the Pacific Douglas-fir vegetation type (SAF 229) represented by the contiguous, proposed South Fork Mountain RNA Many of the individual chinquapins in the area are in excess of 3 feet diameter at breast height and 100 feet or more tall The area would meet the target requirements for the Pacrfic Douglas-fir vegetation type (SAF 229) for the Klamath Mountains Physiographic Province The area has secondary targets which are representative of the Pacific ponderosa pine/Douglas-fir vegetation type (SAF 244) and the aforementioned beargrass communty

Resource Conflicts: There are no locatable mineral values within the candidate area Dispersed recreation uses along the South Fork Tnnty Rver are topographically isolated from most of the proposed area and would pose no impacts now or in the future There is a road to a private inholding in sections 20 and 21 not shown on the map Much of the area is either within extremely unstable landscapes (inner gorges) or within the territory of a known nest site of the northern spotted owl, athreatened species There is no livestock grazing within this area

Figure F-11
Rough Gulch



ROUGH GULCH

Smoky Creek

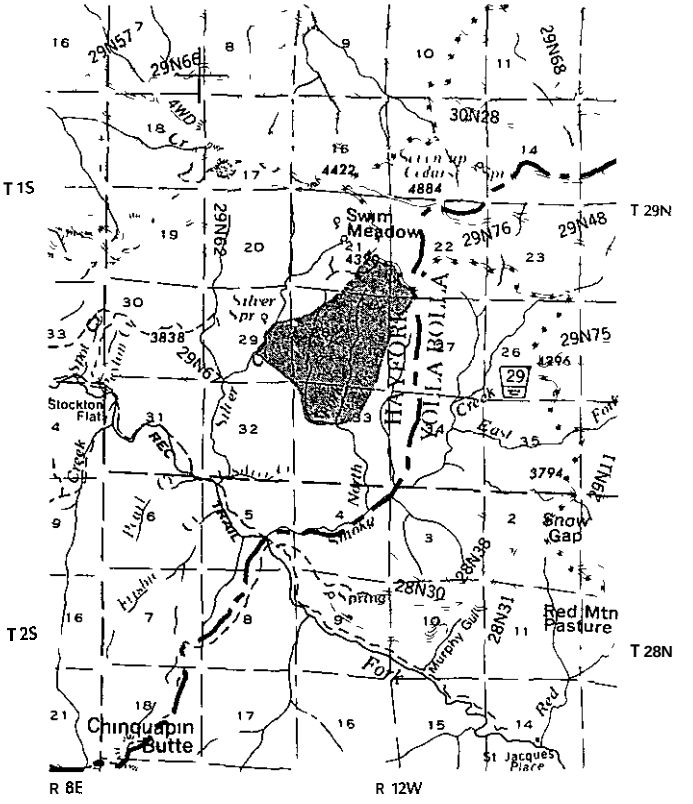
Description: The proposed Smoky Creek RNA is located on the Hayfork Ranger Distnct about I 6 air miles south of Hayfork The area encompasses some 960 acres, all of which are in National Forest ownership The area lies wlthin the Smoky Creek drainage, atnbutary to the South Fork Trinrty River The area is easily accessible by Forest roads and the Smoky Creek trail which crosses the middle of the area Elevations range from 3,200 to 4,200 feet The forest covertype is generally classed as mixed confer

Planning Status: The area was inrtially screened through afield reconnaissance conducted in October, I978 It was recommended for candidacy by *the* Regional RNA Committee in November, 1978 **An** ecological survey was completed in October, I979, and subsequently accepted by the RNA Commrttee in September, 1980, wlth a recommendation for RNA establishment

Research Values: The proposed area meets the RNA target for Pacfic ponderosa pine/Douglas-fir (SAF 244) in the Klamath Mountains Physiographic Province **A** secondary target, the Jeffrey pine type (*SAF* 247), is also represented and may well be needed as a primary target for the network There *are* indications through the official file and area reports that the low densrty of the over-mature overstory is a disadvantage in the proposed area This type is also represented by the proposed Manzantta Creek RNA

Resource Conflicts: Most of the proposed area contains tentatively suttable timber land which could be managed intensively for timber without adverse impacts on the environment Potential yields are about 356 mbf per year The area is used very little other than for sporadic uses in the hunting season This area is wlthin the Post Creek grazing allotment, livestock grazing is incidental

Figure F-I2
Smoky Creek



SMOKY CREEK

South Fork Mountain

Description: The proposed South Fork Mountain RNA is located on the Yolla Bolla Ranger Distnct about 20 air miles south of Hayfork The area totals 1,180 acres all of which are in National Forest ownership The proposed RNA lies on the lower and midslopes of South Fork Mountain along the South Fork Trinlty hver Elevations range from about 3,100 to 4,200 feet The aspect is generally northeasterly in the lower portions of the Happy Camp Creek drainage About 1 5 miles of the South Fork Trinlty hver and nearly all of Happy Camp Creek are included in the area A large portion of this area contains highly unstable, over-steepened landscapes (inner-gorges) The major forest type is Douglas-fir wrth minor components of white fir

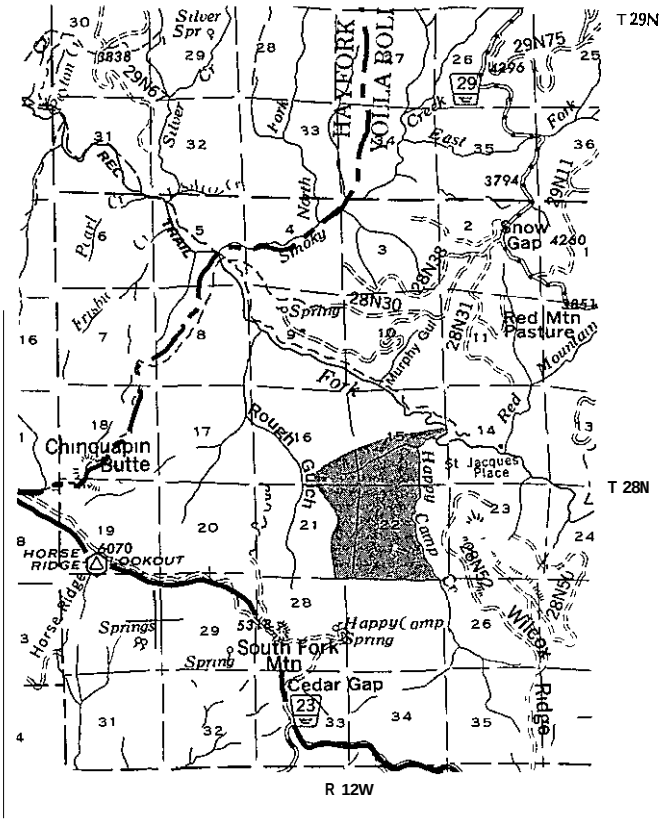
Planning Status: The area was initially proposed for RNA evaluation in 1973 In May, 1974, the area was initially screened by a field reconnaissance The area was subsequently nominated by the Regional RNA Commrttee An ecological survey was conducted by Dean Taylor during the summer of 1975 The latter survey was accepted by the RNA Commrttee, and work was initiated on the RNA establishment Environmental Analysis (EA)

A preliminary draft of this EA was completed in December 1977 The EA was in the process of being revised when planning began under the Second Roadless Area Review and Evaluation (RARE II) This was followed by the California vs Berglund lawsuit which arose over the decisions in the Final Environmental Impact Statement (Final EIS) for RARE II, issued in 1979 All further work on the RNA establishment EA was suspended until Congress or administrative action, through the National Forest Management Act (NFMA) planning process, resolved the issues in the lawsuit In 1984, Congress enacted the California Wilderness Act, releasing this area (which was within the Chinquapin Roadless Area) for non-wilderness resource uses

Research Values: The area meets the Pachc Douglas-fir vegetation (SAF 229) target for the Klamath Mountains Physiographic Province No sensltive plants are known to grow in this area This target can also be satisfied in another area proposed for RNA establishment - Rough Gulch

Resource Conflicts The boundaries of this area were adjusted to minimize impacts on future use of the adjacent Rough Gulch area Intrusions by man along the South Fork Trinity River would be minimal Recreation use within the area is extremely light. There is no livestock grazing use.

Figure F-13
South Fork Mountain



SOUTH FORK MOUNTAIN

Stuart Pork

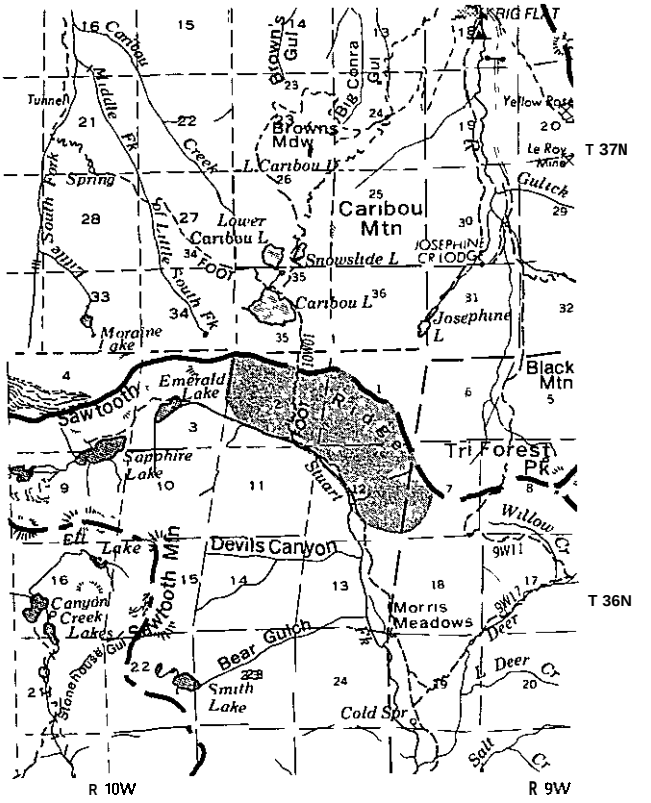
Description: The proposed Stuart Fork RNA is located on the Weaverville Ranger Distnct about 18 miles north of Weaverville The area totals 1,500 acres, all of which are in National Forest ownenhip The area lies within the Trinity Alps Wilderness Access to the area is difficult, limlted to a trail up the Stuart Fork valley The entire area lies on the southerly and southwesterly-facing slopes below Sawtooth Ridge Numerous perennial streams and springs originate within the area Emerald Lake and Stuart Fork are adjacent to the boundaries of the proposed area Elevations range from 4,500 feet near Morns Meadows to 7,600 feet at the summit of Sawtooth Ridge The major cover type in the area is subalpine shrub, consisting of montane chaparral

Planning Status: The area was proposed for RNA consideration in 1984 No field reconnaissance has been done

Research Values: The area appears to meet the targets for montane chaparral for the Klamath Mountains Physiographic Province Good examples of this vegetation type are extremely difficult to find in suitable sizes and in an undisturbed state The major drawback with this area is the difficult access Conversely, location of the area within the Trinity Alps Wilderness would maintain the undisturbed conditions found here

Resource Conflicts Little conflict with primitive recreation uses in the Trinity Alps Wilderness is anticipated The majority of the montane chaparral type lies almost one-fourth mile away from the Stuart Fork Trail A steep trail, connecting the Stuart Fork valley with Canbou Lake on the Klamath National Forest, crosses through the area but is seldom used by hikers There is no livestock grazing in this area

Figure F-14
Stuart Fork



STUART FORK

Appendix C

Fish, Wildlife, and Botany Habitat Management

APPENDIX G
Fish, Wildlife, and Botany Habitat Management

General Discussion

Four major concepts have been used in the assessment of the effects of the various alternatives described in this Final Environmental Impact Statement (Final EIS) upon fish and wildlife populations and habitats (1) fish and wildlife assemblages as management indicator, (2) viable populations, (3) diversity, and (4) standards and guidelines The latter is discussed in Chapter II of the Final EIS, and in the accompanying Forest Plan

Management indicator, viable populations, and diversity are treated as interrelated concepts Wildlife and fish populations and habitats are ultimately affected by various levels of management practices applied to an ecosystem, (i e , the Shasta-Trinity National Forests)

Viable Populations. A viable population for all species is defined as a population capable of maintaining itself over time in the face of anticipated environmental changes, both natural and human-caused It is not a maximum or a desired population level Instead, it is the level below which the population is considered to be subject to local elimination due to habitat loss or alteration, disease, disturbance, or some other factor Threatened or endangered species are considered to be below viable levels

The development and application of the Forest standards and guidelines is intended to help provide for viability of the Forests' species The primary mechanism for maintaining viability is through providing a sufficient amount and distribution of habitat types, seral stages, and special habitat components over time

Application Of The Concepts

It is important to note that management prescriptions and Forest-wide standards and guidelines are written with the intent that they provide for minimum levels of habitat diversity and viable populations of species, regardless of how these prescriptions are assigned by alternative to the land base

Individual land allocations were made for selected key habitat areas for the following species and/or species groups bald eagle (endangered), peregrine falcon (endangered), spotted owl (threatened), goshawk (sensitive), black bear, deer, and sensitive plants For each of these species, geographical areas have been identified for special management for protection and/or enhancement of their habitats The amount of area allocated varies by alternative

Land allocations are actually prescriptions for management Each prescription has a set of standards and guidelines to be applied directly within the prescription or through application of Forest-wide standards and guidelines

Fish, Wildlife and Botany Programs

Management of the wildlife. fisheries and botany programs on the Forests occurs through two primary efforts (1) direct management which includes the hands on management, protection or manipulation of a species and/or its habitat, and (2) indirect management, which is the mechanism through which input is provided to proposed projects (i e , timber sales) which have the potential to affect the species and/or its habitat Indirect management includes inventory of known populations and their habitats, reconnaissance for potentially affected populations and/or habitats in project areas, mitigation of impacts, and protection of individual species and habitats

A general overview for existing and future management of the Forests' wildlife, fisheries and botany programs is displayed in **Figure G-3** This figure indicates that general management direction can be applied to four categories (1) T&E and sensitive, (2) consumptive, (3) non-consumptive, and (4) special habitats All of the species habitats can be placed into one or more of these categories and managed accordingly The remaining figures show the various management groups by specific species and the framework for individual species habitat improvement projects

The total magnitude of this program, based on five year plan projections, would be at the $4 million level, not including partnerships.

Fish and Wildlife Tables and Figures

The following tables and figures are part of this appendix

Table G-1 - Fish Species Assemblages

Table G-2 - T&E Species

Table G-3 - Wildlife Species Assemblages

Table G-4 - Sensitive and Endemic Plants

Figure G-1 - Seral Stage Descriptions

Figure G-2 - Figure has been dropped

Figure G-3 - Wildlife/Fisheries/Botany Programs

Figure G-4 - Wildlife

Figure G-5 - Wildlife Program

Figure G-6 - Fisheries

Figure G-7 - Fisheries Program

Figure G-8 - Botany

Figure G-9 - Botany Programs

Fish and Wildlife Assemblages as Management Indicators

The basis for the selection of wildlife species was the North Cascades Zone Wildlife Habitat Relationships (WHR) program The WHR program displays species needs and habitat use by Kuchler vegetation type by seral stage and by special habitat requirements The relative value of the seral stages for breeding, feeding, and resting by each of the Forests' species is displayed in the WHR program

Selection of management indicators was based on how well a species met the following (1) species of primary emphasis on the Forests harvest species or threatened, endangered or sensitive species, (2) potential for a species within a group to be impacted by the Forests' land management activities, (3) the degree to which a species' biological potential is dependent on the aquatic habitat within National Forest lands, and (4) how well a species represents the habitat requirements for a species management group

The basic intent of this concept is that by providing suitable habitat for management indicator the habitat needs of all other species would be provided To provide for these needs, standards and guidelines were developed for management and protection of special habitat components Forest management under the National Forest Management Act of 1976 (NFMA) must provide for the monitoring of management indicator The feasibility of monitoring, including biological factors and logistics, was considered in the management indicator selection process

Table G-1
Fish Species Assemblages

Management indicators were generally selected based on three criteria (1) extent of basin-wide or Forest-wide distribution, (2) extent of Forest Service management developments that could potentially benefit or impact the indicator species and (3) the intensity of public interest for the recognition of a group of fish

The listed fish species, except for the bull trout, occupy habitats that can be impacted by Forest Service management activities

Two fish species (redband trout and rough sculpin) were not selected as management indicators for their respective assemblages for the following reasons:

Redband Trout. The redband trout was not selected as a management indicator species because of low reproductive numbers, limited instream system distribution, and the large contingency of private ownership adjacent to redband trout streams

Rough Sculpin. Fisheries investigation by BioSystems Analysis, Inc , in 1983 and 1984 in the Pit River system, located rough sculpin in aquatic habitats on private lands and Lassen National Forest administered lands, but not on the Shasta-Trinity National Forests These investigations indicated the presence of Pit and Marbled sculpin, but not the rough sculpin Therefore, the rough sculpin was not selected as a management indicator

Several assemblages were combined to form three assemblages discussed here These are the anadromous fish assemblage, inland coldwater fish assemblage, and the inland warmwater fish assemblage

Anadromous Fish Assemblage

Inland Coldwater Sportfish
Inland Threatened, Endangered and Sensitive Sportfish
Inland Coldwater Nongame Fish

Inland Warmwater Fish Assemblage

Inland Warmwater Sportkh
Inland Warmwater Nongame Fish

Anadromous Commercial/Recreational Sportfish

Group Representatives:

Coho
Fall-Run Chinook
Spring-Run Chinook
Winter-Run Steelhead

Group MIS Representative:

Spring-Run Chinook (South Fork Trinty River only)
Winter-Run Steelhead

California Species of Special Concern on the Shasta-Trinity National Forests:

Coho (*Onchorhynchus kisutch*) [C3]
Fall-Run Chinook (*Oncorhynchus tshawytscha*) [C2]
Spring-Run Shinook (*Oncorhynchus mykiss gairdneri*) [C5]

Anadromous Threatened, Endangered, & Sensitive Sportfish

Group Representative:

Spring-Run [Summer] Steelhead

Group MIS Representative:

Spring-Run [Summer] Steelhead (South Fork Trinity River only)

California Species of Special Concern on the Shasta-Trinity National Forests:

Spring-Run [Summer] Steelhead (*Oncorhynchus mykiss gairdneri*) [C I]

Anadromous Nongame Fish

Group Representative:

Pacific Lamprey

Group MIS Representative:

None identified

California Species of Special Concern on the Shasta-Trinity National Forests:

Sea-Run Pacific Lamprey (*Lampetra tridentata tridentata*) [C5]

Inland Coldwater Sportfish

Group Representatives:

Brook Trout
Brown Trout
Rainbow Trout

Group MIS Representative:

Rainbow Trout

California Species of Special Concern on the Shasta-Trinity National Forests.

Resident Rainbow Trout (Oncorhynchus mykiss goirdnen) [C5]

Inland Threatened, Endangered, & Sensitive Sportfish

Group Representatives:

Bull Trout
Redband Trout [Emphasis Species]

Group MIS Representative:

None identified

California Species of Special Concern on the Shasta-Trinity National Forests:

Bull Trout (*Salvelinus confleuntus*) [extinct]
McCloud River Redband Trout (*Oncorhynchus* mykiss ssp) [C3]

Inland Coldwater Nongame Fish

Group Representative:

Rough Sculpin

Group MIS Representative:

None identified

California Species of Special Concern on the Shasta-Trinity National Forests:

Klamath Smallscale Sucker (*Catostomus rimiculus*) [C5]
Klamath Speckled Dace (*Rhinichthys osculus klamathensis*) [C5]
Riffle Sculpin (*Cottus gulosus*) [C5]
Rough Sculpin (*Cottus asperrimus*) [ST]
Sacramento Hrtch (*Lavinia exilicauda ecalicauda*) [C5]

Inland Warmwater Sportfish

Group Representatives:

Largemouth Bass
Smallmouth Bass

Group MIS Representative:

Largemouth Bass

California Species of Special Concern on the Shasta-Trinity National Forests:

None identified

Inland Warmwater Nongame Fish

Group Representative:

None identlfied

Group MIS Representative:

None identified

Species of Special Concern Classification

Class I Species [Cl]

These are taxa that seem to conform to the state definitions for threatened or endangered species They should be added to the official list (i e , spnng-run [summer] steelhead)

Class 2 Species [C2]

These are taxa having populations that are low, scattered, or highly localized Their populations have declined in abundance in recent years, and they require management to prevent them from becoming threatened species (i e., spring-run chinook)

Class 3 Species [C3]

These are uncommon taxa occupying much of their natural range They were formerly more abundant, but they still have pockets of abundance wlthin their range These species should be monitored periodically to see if their decline is accelerating Taxa wrth very restricted, but stable, distributions are also included here, (i e Coho salmon and McCloud River redband trout)

Class 4 Species [C4]

These fishes have declined in abundance wrthin their natural range, but they have been introduced and established in greater numbers outside their native range Special management is required to prevent loss of native populations

Class 5 Species [C5]

These are common or widespread taxa whose populations appear stable or increasing in the face of habtat alterations, (i e resident rainbow trout and winter-run steelhead)

Table G-2
Threatened, Endangered, and Sensitive Species on the Shasta-Trinity National Forests'

Amphibians

California red-legged frog (*Rona aurora draytoni*) - FC2
Shasta salamander (*H* [illegible]) ST

Birds

bald eagle (*Haliaeetus leucocephalus*) - FE, SE
peregrine falcon (*Falco peregrinus*) - FE, SE
spotted owl (*Strix occidentalis*) - FT
goshawk (*Accipiter gentilis*) - FS
willow flycatcher (*Empidonax traillii*) - FS

Fishes

bull trout (*Salvelinus confluentus*) State extinct
McCloud River redband trout *(Oncorhynchus mykiss)* - ST emphasis
rough sculpin (*Cottus asperrimus*) - ST
spring-run chinook salmon *(Oncorhynchus tshawytacha)* - ST emphasis
spring-run steelhead (*Oncorhynchus mykiss)* - FS

Mammals

Pacific western big eared bat (*Plecotus townsendii*) - FC2
martin (*Martes americana*) - FS
fisher (*Martis pennanti*) - FS
Sierra Nevada red fox (*Vulpes fulva*) - ST, FS (may not occur on the Shasta-Trinity National Forests)
White-footed vole (*Arborimus albipes*) - FC2

Invertebrates

Franklin's bumble bee (*Bombus franklini*) - FC2
Klamath Mountains ground beetle (*Nebria sahlbergii trias*)-FC2
Siskiyou ground beetle (*Nebria gebleri siskiyousensis*)-FC2
Trinity bristle snail (*Monadenia* setose)-ST

* FE = Federally Endangered
FT = Federally Threatened
FC2 = Federal Candidate 2
SE = State Endangered
ST = State Threatended
FS = Forest Service Sensitive
S-T Emphasis = *Shasta-Trinity* National Forest Emphasis

Table G-3
Wildlife Species Assemblages as Management Indicators

The following lists ore of species assemblages or species that are highly associated with the hobitots ond hobitot components on the Shasta-Trinity National Forests (see literature references on the lost page of this Appendix) ** Indicates the species recommended for monitoring

Aquatic habitats in general (Species con use either fast or slow woter components)*

Common Name	Scientific Name
Olympic salamander	*Rhyacotriton olympicus*
** black solomonder	*Aneides flavipunctatus*
common goldeneye	*Bucephala clangula*
Barrow's goldeneye	*Bucephala islandica*
buffleheod	*Bucephala albeola*
hooded mergonser	*Lophodytes cucullatus*
common mergonser	*Mergus* mergonser
osprey	*Pandion haliaetus*
bold eogle	*Haliaeetus leucocephalus*
spotted sandpiper	*Actitis macularia*
ring billed gull	*Larus delawarensis*
Colifornio gull	*Larus californicus*
herring gull	*Larus argentatus*
Caspian tern	*Sterna caspia*
Forster's tern	*Sterna forsteri*
belted kingfisher	*Ceryle alcyon*
cliff swallow	Hirundo *pyrrhonota*
beaver	*Castor canadensis*
muskrat	*Ondatra zibethicus*
river otter	*Lutra canadensis*

Fast moving oquotic hobitot only (Fast woter required, usually indicates river or stream habitats)*

Common Name	Scientific Name
Pacific giant solomonder	*Dicamptodon ensatus*
toiled frog	*Ascaphus truei*
Foothill yellow-legged frog	*Rana boylei*
Amencon dipper	*Cinclus* mexiconus

Slow moving aquatic hobitots only (Areas of slow woter required, ton occur in lacustrine or riverine habitats)*

Common Name	Scientific Name
Northwestern solomonder	*Ambystoma gracile*
long-toed solomonder	*Ambystoma macrodactylum*
rough-skinned newt	*Taricha granulosa*
Colifornio newt	*Taricha torosa*

Western toad	*Bufo boreas*
Pacific treefrog	*Hlya regilla*
**California red-legged frog	*Rana* aurora *draytoni*
**Northern red-legged frog	*Rana* aurora *aurora*
Cascades frog	*Rana cascadae*
bullfrog	*Rana catesbeiana*
common loon	*Gavia immer*
pied-billed grebe	*Podilymbus podiceps*
horned grebe	*Podiceps auritus*
eared grebe	*Podiceps nigricollis*
Western grebe/ Clark's grebe	*Aechmophorus occidentalis/Clarkii*
double-crested cormorant	*Phalacrocorax auritus*
Amencon bittern	*Botaurus lentiginosus*
great blue heron	Ardea *herodias*
great egret	*Casmerodius albus*
green-backed heron	*Butorides striatus*
block-crowned night heron	*Nychcorax nychcorax*
tundra swan	Cygnus *columbianus*
Canada goose	*Branta canadensis*
woad duck	*Aix sponsa*
green winged teal	*Anus* crecca
mallard	Anus *platyrhynchos*
Northern pintail	**Anus** *acuta*
cinnamon teal	Anus *cyanoptera*
Northern shoveler	Anus *clypeata*
gadwall	Anus *strepera*
American wigeon	Anus *americana*
canvasback	*Aythya valisineria*
redhead	*Aythya americana*
ring-necked duck	*Aythya collaris*
greater scaup	*Aythya marila*
lesser scaup	*Aythya affinis*
ruddy duck	*Oxyura jamaicensis*
Virginio rail	*Rallus limicola*
sora	*Porzana carolina*
American coot	*Fulica americana*
Bonaparte's gull	*Larus philadelphia*
marsh wren	*Cistothorus palustris*
Western pond turtle	*Clemmys marmorata*

Riparian vegetation (species ore associated with riporion vegetation, volley foothill riparian (VRI) or montane riparian (MRI))

Common Name	**Scientific** Name
toiled frog	*Ascaphus truei*
Pacific treefrog	*Hlya regilla*
**California red-legged frog	*Rana aurora draytoni*
**Northern red legged fog	*Rana aurora aurora*
green backed heron	*Butorides striatus*
black-crowned night heron	*Nycticorax nycticorax*
sharp-shinned howk	Accipiter *striatus*
red-shoulderedhowk	Buteo *lineatus*
merlin	*Falco columbarius*

Common Name	Scientific Name
peregrine falcon	*Falco peregrinus*
ruffed grouse	*Bonasa umbellus*
**turkey	*Meleagris gallopavo*
mourning dove	*Zenaida macroura*
blockthinned hummingbird	*Archilochus alexandri*
rufous hummingbird	*Selasphorus rufus*
belted kinghsher	*Ceryle alcyon*
red-breasted sopsucker	*Sphyrapicus ruber*
Nuttoll's woodpecker	*Picoides nuttallii*
Western wood-pewee	*Contopus sordioulus*
**willow flycatcher	*Empidowax traillii*
Western Rycotcher	*Empidonax difficilis*
block phoebe	*Sayornis nigricans*
purple martin	*Progne subis*
**tree swallow	*Tachycineta bicolor*
violetgreen swallow	*Tachycineta thalassina*
blocktopped chickadee	*Parus atricapillus*
house wren	*Troglodytes aedon*
winter wren	*Troglodytes troglodytes*
Swoinson's thrush	*Catharus ustulatus*
hermit thrush	*Catharus guttatus*
yellow worbler	*Dendroica petechia*
MacGillivary's worbler	*Oporornis tolmiei*
common yellowthroat	*Geothlypis trichas*
Wilson's worbler	*Wilsonia pusilla*
yellow-breasted chat	*Ictena wrens*
black-headed grosbeak	*Pheucticus melanocephalus*
Lincoln's sporrow	*Melospiza lincolnii*
red-wingedblackbird	*Agelaius phoeniceus*
brown-headed cowbird	*Molothrus ater*
hooded oriole	*Icterus cucullatus*
Northern oriole	*Icterus galbula*
Virginio opposum	*Didelphis virginiana*
vogront shrew	*Sorex vagrans*
woter shrew	*Sorex palustris*
small-footed myotis	*Myohs leibii*
mountoin beover	*Aplodontia rufa*
beover	*Castor canadensis*
block rot	*Rattus rattus*
Western lumping mouse	*Zapus princeps*
raccoon	*Procyon lotor*
mink	*Mustela vison*
river otter	*Lutra canadensis*
common goiter snoke	*Thamnophis sirtalis*
Western terrestrial garter snoke	*Thamnophis elegans*
Western oquotic garter *snoke*	*Thamnophis couchi*

Chaparral Community (Species associated with the following WHR types ADS, BBR, MCP, MCH, CRC)

Common Name	Scientific Name
gray flycatcher	*Empidonax wrightii*
wrentit	*Chamaea fasciata*
California thrasher	*Toxostoma redivivum*
water pipit	*Anthus spinoletta*
**green-tailed towhee	*Pipilo chlorurus*
brown towhee	*Pipilo fuscus*
sage sparrow	*Amphispiza belli*
pallid bat	*Antrozous pallidus*
Nuttoll's cottontail	*Sylvilagus nuttallii*
Sonoma chipmunk	*Tamias sonomae*
Great Basin packet mouse	*Perognathus parvus*
brush mouse	*Peromyscus boylii*
gray fox	*Urocyon cinereoargenteus*
**mule deer	*Odocoileus hemionus*
sagebrush lizard	*Sceloporus graciosus*
California whipsnoke	*Masticophis lateralis*
stnped whipsnoke	*Masticophis taeniatus*

Hardwoods (Habitat types VFH, VHC, MHW, MHC, ASP Oaks, madrone, aspen)

Common Name	Scientific Name
great egret	*Casmerodius albus*
Cooper's howk	*Accipiter cooperii*
band-tailed pigeon	*Columba fasciata*
Allen's hummingbird	*Selasphorus sasin*
** acorn woodpecker	*Melanerpes formicivorus*
downy woodpecker	*Picoides pubescens*
scrub jay	*Aphelocoma coerulescens*
plain titmouse	*Porus inornatus*
white-breasted nuthatch	*Sitta carolinensis*
Hutton's vireo	*Vireo huttoni*
warbling vireo	*Vireo gilvus*
house sparrow	*Passer domesticus*
Western gray squirrel	*Sciurus griseus*
wild pig	*Sus scrofa*

Open habitat in general (Species can be associated with meadows, open areas, seral stoges 1, 2 ond 3a and WHR types PGS, AGS, WTM)**

Common Name	Scientific Name
turkey vulture	*Cathartes aura*
golden eagle	*Aquila chrysaetos*
California quail	*Callipepla californica*
mountoin quail	*Oreortyx pictus*
**Western screech owl	*Otus kennicottii*
great horned owl	*Bubo virginianus*

Common Name	Scientific Name
common nighthawk	*Chordeiles minor*
common poorwill	*Phalaenoptilus nuttallii*
Vaux's swift	*Chaetura vauxi*
Calliope hummingbird	*Stellula calliope*
rufous hummingbird	*Selasphorus rufus*
Pinyon jay	*Gymnorhinus cyanocephalus*
Clark's nutcracker	*Nucifraga columbiana*
block-billed magpie	*Pica pica*
Amencon crow	Corvus *brachyrhvnchos*
common raven	CONUS *corax*
rock wren	*Salpinctes obsoletus*
Western bluebird	*Sialia mexicana*
chipping sporrow	*Spizella passenna*
Vesper sporrow	*Pooecetes gramineus*
**song sporrow	*Melospiza melodia*
golden-crowned sparrow	*Zonotrichia atricapilla*
dark-eyed junco	*Junco hyemalis*
Brewer's blackbird	*Euphagus cyanocephalus*
house finch	*Carpodacus mexicanus*
pine siskin	*Carduelis pinus*
lesser goldfinch	Curduelis *psaltria*
Amencon goldfinch	Curduelis *tristis*
little brown myotis	*Myotis lucifugus*
long-eared myotis	Myohs *evotis*
fringed myotis	*Myotis thysanodes*
Colifornio myotis	Myohs *californicus*
big brown bot	*Eptesicus fuscus*
Brazilian free-tailed bot	*Tadanda brasiliensis*
brush rabbit	*Sylvilagus bachmani*
snowshoe hore	*Lepus amencanus*
whitetoiled hore	*Lepus townsendii*
black-toiled hore	*Lepus californicus*
Colifornio kangaroo rot	*Dipodomys californicus*
creeping vole	Microtus *oregoni*
porcupine	*Erethizon dorsatum*
coyote	*Canis latrans*
red fox	*Vulpes vulpes*
** black bear	*Ursus amencanus*
ermine	*Mustela erminea*
stnped skunk	*Mephitis mephitis*
mountoin lion	*Felis concolor*
bobcat	*Felis rufus*
**elk	*Cervus elaphus*
** mule deer	*Odocoileus* hemionus
Western pond turtle	*Clemmys marmorata*
Western fence lizard	*Sceloporus occidentalis*
Northern alligator lizard	*Gerrhonotus* coeruleus
ringneck snake	*Diadophis punctatus*

Gross ond meadows specifically (Species associated with WHR types PGS, AGS, WTM· Meadows, grasslands, seral stage 1)**

Common Name	Scientific Name
Canada goose	*Branta canadensis*
Northern harrier	*Circus cyaneus*
red-tailed hawk	*Buteo jamaicensis*
ferruginous howk	*Buteo regalis*
rough-legged hawk	*Buteo lagopus*
Amencon kestrel	*Falco sparverius*
prairie falcon	*Falco mexiconus*
killdeer	*Charadrius vociferus*
common snipe	*Gallinago gallinago*
ock dove	*Columba livia*
mourning dove	*Zenaida macroura*
common barn owl	*Tyto alba*
Western kingbird	*Tyrannus verticalis*
horned lark	*Eremophila alpestris*
Northern rough-winged swallow	*Stelgidopteryx serripennis*
born swallow	*Hirundo rustica*
Amencon robin	*Turdus migratorius*
woter pipit	*Anthus spinoletta*
European starling	*Sturnus* vulgaris
lark sporrow	*Chondestes grammacus*
savannah sporrow	*Passerculus sandwichensis*
grasshopper sparrow	*Ammooramus savannarum*
Western meadowlark	*Sturnella neglecta*
Cassin's finch	*Carpodacus cassinii*
coast mole	*Scapanus orarius*
broad-footed mole	*Scapanus latimanus*
Belding's ground squirrel	*Spermophilus beldingi*
California ground squirrel	*Spermophilus beecheyi*
Botta's pocket gopher	*Thomomys bottae*
Western pocket gopher	*Thomomys mazama*
mountoin pocket gopher	*Thomomys monticola*
** Western harvest mouse	*Reithrodontomys megalotis*
montane vole	*Microtus montanus*
**California vole	*Microtus californicus*
long-tailed vole	*Microtus longicaudus*
house mouse	Mus *musculus*
bodger	*Taxidea taxus*
short-horned lizard	*Phrynosoma douglassi*
Western skink	*Eumeces skiltonianus*
racer	*Coluber constrictor*
gopher snake	*Pituophis melanoleucus*

Shrubs - early seral stages (All forested habitat types Openings, seral stages 2 and 3a)**

Common Name	Scientific Name
Anna's hummingbird	*Calypte anna*
dusky flycatcher	*Empidonax oberholseri*
ash-throated flycatcher	*Myiarchus cinerascens*
bushtit	*Psaltriparus minimus*
Bewick's wren	*Thryomanes bewickii*
ruby-crowned kinglet	Regulus *calendula*
blue-gray gnatcatcher	*Poliophila caerulea*
Townsend's solitaire	*Myadestes townsendi*
cedar waxwing	*Bombycilla cedrorum*
phainopepla	*Phainopepla nitens*
orange-crowned warbler	*Vermivora celata*
Nashville warbler	*Vermivora ruficapilla*
yellow-rumped warbler	*Dendroica coronata*
black-throated gray warbler	*Dendroica nigrescens*
Western tanager	*Piranga ludoviciana*
lazuli bunting	*Passerina amoena*
rufous-sided towhee	*Pipilo erythrophthalmus*
fox sparrow	*Passerella iliaca*
white-crowned sparrow	*Zonotrichia leucophrys*
purple finch	*Carpodacus purpureus*
yellow-pine chipmunk	*Tamias amoenus*
Allen's chipmunk	*Tamias senex*
golden-mantled ground squirrel	Spermophilus *lateralis*
dusky-footed woodrat	*Neotoma fuscipes*
heather vole	*Phenacomys intermedius*
ringtail	*Bassariscus astutus*
Western spotted skunk	*Spilogale gracilis*
Western whiptail	*Cnemidophorus tigris*
Southern alligator lizard	*Gerrhonotus multicarinatus*

Late seral forests (All forested habitat types late seral stages 4a, 4b, 4c and Multi-layered)

Common Name	scientific Name
Del Norte salamander	*Plethodon elongatus*
great blue heron	*Ardea herodias*
**Northern goshawk	*Accipiter gentilis*
blue grouse	*Dendragapus obscurus*
**Northern spotted owl	*Strix occidentalis*
hairy woodpecker	*Picoides villosus*
white-headed woodpecker	*Picoides albolarvatus*
black-backed woodpecker	*Picoides arcticus*
**pileated woodpecker	*Dryocopus pileatus*
olive-sided flycatcher	*Contopus borealis*
Hammond's flycatcher	*Empidonax hammondii*
gray jay	*Perisoreus* canadensis
Steller's jay	*Cyanocitta stelleri*
mountain chickadee	*Parus gambeli*

Common Name	Scientific Name
chestnut-backed chickadee	*Parus rufescens*
red-breasted nuthatch	*Sitta canadensis*
pygmy nuthatch	*Sitta pygmaea*
brown creeper	*Certhia americana*
golden-crowned kinglet	Regulus *satrapa*
varied thrush	*Ixoreus naevius*
solitary vireo	*Vireo solitarius*
Townsend's warbler	*Dendroica townsendi*
hermit warbler	*Dendroica occidentalis*
red crossbill	*Loxia curvirostra*
evening grosbeak	*Coccothraustes vespertinus*
Trawbridge's shrew	*Sorex trowbridgii*
silver-haired bat	*Lasionycters noctivagans*
hoary bat	*Lasiurus cinereus*
Douglas' squirrel	*Tamiasciurus douglasii*
Northern flying squirrel	*Glaucomys sabrinus*
Western red-backed vole	*Clethrionomys californicus*
red tree vole	*Phenacomys longicaudus*
** black bear	*Ursus americanus*
**marten	*Martes americana*
**fisher	*Martes pennanti*
wolverine	*Gulo gulo*
** elk	*Cervus elaphus*

Snags/tree cavities (Tree cavity dependant species found in snags or live trees)

Common Name	Scientific Name
wood duck	*Aix sponsa*
common merganser	*Mergus merganser*
osprey	*Pandion haliaetus*
bald eagle	*Haliaeetus leucocephalus*
American kestrel	*Falco sparverius*
flammulated owl	*Otus flammeolus*
**Western screech owl	*Otus kennicottii*
** Northern pygmy owl	*Glaucidium gnoma*
** Northern spatted owl	*Strix occidentalis*
** Northern saw whet owl	*Aegolius acadicus*
Vaux's swift	*Chaetura vauxi*
lewis' woodpecker	*Melanerpes* lewis
** acorn woodpecker	*Melanerpes formicivorus*
red-breasted sapsucker	*Sphyrapicus ruber*
Williamson's sapsucker	*Sphyrapicus thyroideus*
Nuttall's woodpecker	*Picoides nuttallii*
downy woodpecker	*Picoides pubescens*
hairy woodpecker	*Picoides villosus*
white-headed woodpecker	*Picoides albolarvatus*
black-backed woodpecker	*Picoides arcticus*
Northern flicker	*Colaptes auratus*
** pileated woodpecker	*Dryocopus pileatus*
ash-throated flycatcher	*Myiarchus cinerascens*

Common Name	Scientific Name
purple martin	*Progne subis*
**tree swallow	*Tachycineta bicolor*
violet-green swallow	*Tachycineta thalassina*
black-capped chickadee	*Porus atricapillus*
mountain chickadee	*Puns gambeli*
chestnut-backed chickadee	*Porus rufescens*
plain titmouse	*Parus inornatus*
red-breasted nuthatch	*Sitta canadensis*
white-breasted nuthatch	*Sitta carolinensis*
pygmy nuthatch	*Sitta pygmaea*
Western bluebird	*Sialia mexicana*
mountain bluebird	*Sialia currucoides*
European starling	*Sturnus vulgaris*
red bat	*Lasiurus borealis*
Western gray squirrel	*Sciurus griseus*
Douglas' squirrel	*Tamiasciurus douglasii*
Northern flying squirrel	*Glaucomys sabrinus*

Dead and down (Dead and down woody material, logs, stumps, slash, litter, duff)

Common Name	Scientific Name
Pacific giant salamander	*Dicamptodon ensatus*
California newt	*Taricha torosa*
ensatina	*Ensatina eschscholtzi*
California slender salamander	*Batrachoseps attenuatus*
clouded salamander	*Aneides ferreus*
ruffed grouse	*Bonasa umbellus*
shrew-mole	*Neurotrichus gibbsii*
deer mouse	*Peromyscus maniculatus*
Pinyon mouse	*Peromyscus truei*
long-tailed weasel	*Mustela frenata*
rubber boa	*Charina bottae*
ringneck snake	*Diadophis punctatus*
sharp-tailed snake	*Contia tenuis*
common kingsnake	*Lampropeltis getulus*
California mountain kingsnake	*Lampropeltis zonata*

Talus/rocks

Common Name	Scientific Name
Del Norte salamander	*Plethodon elongatus*
rock wren	*Salpinctes obsoletus*
canyon wren	*Catherpes mexicanus*
rosy finch	*Leucosticte arctoa*
pika	*Ochotona princeps*
yellow-bellied marmot	*Marmota flaviventris*
bushy-tailed woodrat	*Neotoma cinerea*
night snake	*Hypsiglena torquata*
Western rattlesnake	*Crotalus viridis*

Cliff/caves

Common Name	Scientific Name
Shasta solomonder	*Hydromantes shastae*
turkey vulture	*Cathartes aura*
golden eagle	*Aquila chrysaetos*
peregrine falcon	*Falco peregrinus*
prairie falcon	*Falco mexicanus*
block swift	*Cypseloides niger*
Nodhern rough-winged swollow	*Stelgidopteryx serripennis*
Cliff swallow	*Hirundo pyrrhonota*
barn swallow	*Hirundo rustica*
little brown myotis	*Myohs lucifugus*
Yuma myotis	*Myohs yumanensis*
long-eared myotis	*Myohs evotis*
fringed myotis	*Myohs thysanodes*
long-legged myotis	*Myohs volans*
California myotis	*Myohs californicus*
small-footed myotis	*Myohs leibii*
big brown bat	*Eptesicus fuscus*
spotted bot	*Euderma maculatum*
Townsend's big-eared bot	*Plecotus townsendii*
pallid bot	*Antrozous pallidus*
Brazilian free-tailed bot	*Tadarida brasiliensis*

*Species in the aquatic guilds ore mutually exclusive **Species in open habitats ore mutually exclusive For example Brush rabbits ore in the shrub guild Meadowlarks ore in the gross guild Deer eot forbs and shrubs, they ore in the open hobitot guild

Literature Used to Develop Management Indicator Assemblages

Airolo, D A. 1988 Guide to the Colifornio Wildlife Hobitot Relationship System Colif Dept Fish 8 Gome 74 pp.

Brown, E R ed 1985 Management of Wildlife ond Fish Hobitots in Forests of Western Oregon ond Washington Port 2 -Appendices USDA, Forest Service, Pacific Northwest Region, Portland, OR Publ No R6-F&WL-192- 1985

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Stebbins, R C 1966 A Field Guide to Western Reptiles ond Amphibians Houghton Mifflin Company, Boston 279pp

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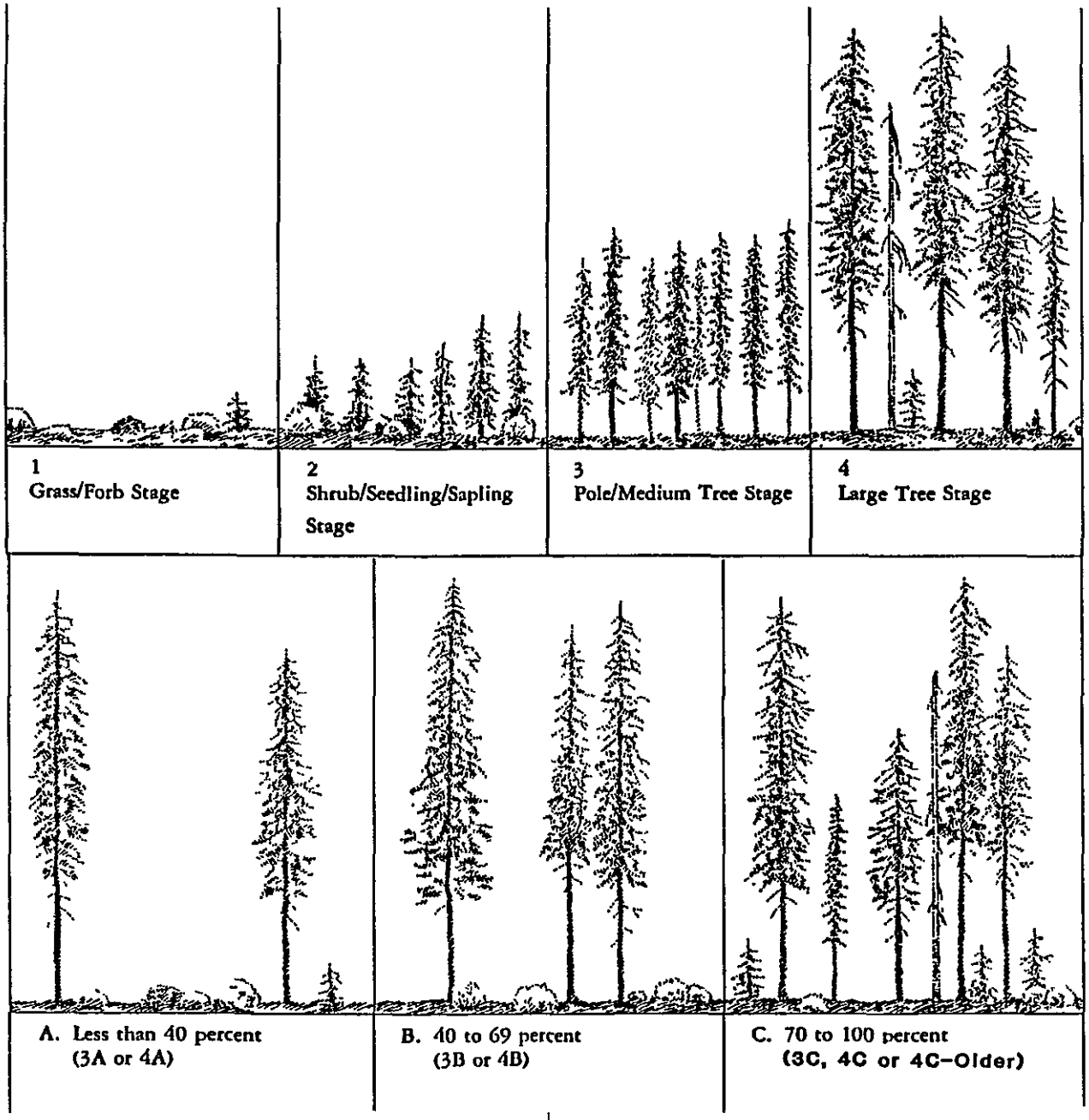
Zeiner, D C, W F Laudenslayer Jr, K E Moyer, and M White 1990 Colifornio's Wildlife Colif Dept Fish & Gome Vol III Mammals 407pp

Figure G-1
Seral Stage Descriptions Used For Wildlife Habitat Relationships



1 - Grass-Forb Stage

2 - Shrub/Seeding/Sapling Stages

3a- Pole/Medium Tree Stage, <40% Canopy Closure

3b- Pole/Medium Tree Stage, 40 to 70% Canopy Closure

3c- Pole/Medium Tree Stage, <70% Canopy Closure

4a- Large Tree Stage, <40% Canopy Closure

4b- Large Tree Stage, 40 to 70% Canopy Closure

4c- Large Tree Stage, >70% Canopy Closure

4c- Older - old growth, Same as 4c large tree stage, but exhibiting obvious signs of decadence.

Table G-4
Sensitive and Endemic Plant List

Scientific Name Common Name	Range on Shasta-Trinity Districts	Mgt. Areas	Elevation (in feet)	Habitat
Sensitive Plants Known to Occur on the Shasta-Trinity National Forests				
Arctostaphylos Klamathensis Klamath manzanita	Mt Shasta Weaverville?	5	5500-6500	Montane mixed conifer forest, serpentine & gabro soils: Scotland Trinity Mountains
Calochortus longebarbatus var *longebarbatus* Long haired star-tulip	McCloud	2	3000-4300	Wet meadows within pine forest or sagebrush communities
Campanula shetleri Castle Crags harebell	Mt. Shasta	4,5	3600-6000	Granite and diorite cliffs, north and northeast exposures
Campanula wilkinsiana Wilkins harebell	McCloud Mt Shasta Weaverville	3.4	5500-8600	Streambanks and springs in red fir and subalpine forests
Collomia larsenii (= *C debilis* var *larsenii*) talus collomia	McCloud	1	7200+	Cinder and scree slopes
Cordylanthus tenuis ssp. *pallenscens* pallis bird's beak	Mt Shasta	3,5	3600-5200	Lightly disturbed openings in ponderosa pine forest, gravelly volcanic or ultramafic soils
Draba aureola Golden draba	Mt Shasta	5	*7000-9000*	Among rocks on ridges, fell-fields; subalpine forests.
Draba carnosula Mt. Eddy draba	Mt. Shasta	5,6	7600-8400	Alpine and subalpine boulder fields and rock outcrops.
Epilobium siskiyouense Siskiyou fireweed	Mt. Shsata	5,6	5000-8000	Exposed, rocky serpentine ridges and slopes.
Eriastrum brandegeae (includes *E traci*) Brandegee's eriastrum	Hayfork	18	1000-2600	Dry, gravelly, flat openings in chaparral, foothill woodland.

* Information in this list is current as of March 1993
? Suspected to occur or not currently documented.

Table G-4 (continued)
Sensitive and Endemic Plant list

Scientific Name Common Name	Range on Shasta-Trinity Districts	Mgt. Areas	Elevation (in feet)	Habitat
Eriogonum alpinum Trinity buckwheat	Mt Shasta Weaverville?	5	6700-9000	Exposed serpentine ridges and talus slopes.
Eriogonum umbellatum var *humistratum* Mt. Eddy Buckwheat	Mt Shasta	5	*5700-9000*	Serpentine slopes and outcrops within mixed confer *forest* or subalpine, Scott and Trinity Mountains
Erythronium citrinum ** var *roderickii* Scott Mountain fawn lily	Weaverville	4.8	900-40007	Mixed coniferforest, Scott Mountains Serpentine & granitic soils (?)
Swertia fastigiata (incl *Frasera umpquaensis*) Umpqua green gentian	Hayfork Yolla Bolla Big Bar7	20	4000-6000	Meadows, springs, openings in Douglas-fir/white fir forest
Galium serpenticum ssp. *scoticum* Scott Mountain bedstraw	Mt Shasta Weaverville	4.6	5 100-7600	Serpentine talus slopes, rock outcrops in mixed conifer forest
Ivesia pickeringii Pickering's ivesia	Weaverville	6	25000-8000	Seasonally wet serpentine meadows and swales
Lewisia cotyledon var *heckneri* Heckner's lewisia	Big Bar Mt Shasta Weaverville	4,7	2500-8000	Moist rock outcrops in chaparral, *oak* or conifer forest
Lewisia cotyledon var *howellii* Howell's lewisia	McCloud Shasta Lake	10,12	500-4500	Rock outcrops in chaparral, oak or confer forest
Linanthus nuttallii ssp *howellii* Howell's linanthus	Yolla Bolla	22	4000-5000	Jeffrey pine woodlands, mostly on serpentine soils
Madia doris-nilesiae Nile's madia	Hayfork	19	2600-4400	Rocky serpentine slopes and openings in Jeffrey pine woodland

** Plants recommended to the regional Forester for addition to the sensitive species list, but not listed as of March 1993
? Suspected to occur or not currently documented

Table G-4 (continued)
Sensitive and Endemic Plant List

Scientific Name Common Name	Range on Shasta-Trinity Districts	Mgt. Areas	Elevation (in feet)	Habitat
Madia stebbinsii Stebbins' madia	Yolla Bolla	21.22	4000-5000	Rocky serpentine openings in chaparral, Jeffreypine forest.
Minuartia roset Peanut sandwort	Hayfork Yolla Bolla	18,19,21	2500-5800	Rocky serpentme slopes and openings in Jeffreypine and mixed conifer forest
*Nevinsia cliftonii*** Shasta snow-wreath	Shasta Lake	8,12	2400-30007	North-facing slopes on limestone-derived soils, within riparian areas
Penstemon filiformis Thread-leaved penstemon	Mt Shasta Weavemlle	4-7,9	2000-6000	Meadows and lightly disturbed openings: serpentine soils.
Penstemon tracyi Tracy's beardtongue	Big Bar Weaverville	4	6000-8000	Rock cliffs and outcrops, Trinity Alps
Phaceha cookei Cooke's phacelia	Mt Shasta	3	4100-5000	Lightly disturbed volcanic sand.
Phacelia dalesiana Scott Mountain phacelia	Mt Shasta Weaverville	4-6,9	5000-7000	Meadows and openings in red fir forest, serpentine soils
Phaceha greener Scott Valley phacelia	Weaverville	6	5000-7000	Gravelly serpentine slopes and forest openings
Potentilla cristae crested or Klamath potentilla	Mt Shasta	4,5	7000-9000	Rocky slopes and ridges in depressions where snow lingers, serpentine or basic substrate.
Raillardella pringlei showy raillardella	Mt. Shasta Weavemlle	4-6	4000-7500	Wet serpentine meadows, seeps and streambanks.
Raillardiopsis scabrida (= Raillardella scabrida) rough raillardella	Shasta Lake Yolla Bolla?	11	5500-7500	Rocky, open subalpine slopes

** Plants recommended to the regional Forester for addition to the sensitive species list, but not listed as of March 1993
? Suspected to occur or not currently documented

Table G-4 (continued)
Sensitive and Endemic Plant List

Scientific Name Common Name	Range on Shasta-Trinity Districts	 Mgt. Areas	Elevation (in feet)	Habitat
*Rorippa columbiae*** Columbia cress	McCloud	2	500-4500?	Seasonal lakebeds and drainages east of the Cascades.
Sedum Laxum ssp *flavidum* pale yellow stonecrop	Hayfork Yolla Bolla	18-20	2500-6000	Rock outcrops
Sedum paradisum (=*S obtusatum* ssp *p*) Canyon Creek stonecrop	Big Bar Shasta Lake? Weaverville?	4	3800-6500	Granite outcrops
Silene invisa short-petaled campion	Weaverville Mt Shasta?	4	5800-8000	Red fir and subalpine forest
Trillium ovatum ssp *oettingen* Salmon Mountains wakerobin	Weaverville McCloud	2,4,6,7, 10. 11	3900-6400	Moist, shady conifer forest. especially near streams and montane ripanan scrub
Trimorpha acris var *debilis* (=*Engeron a* var *d*) northern daisy	Mt Shasta	4	7000 +	On Shasta-Trinity known only from Mt Shasta, open rocky habitat above timberline
Sensitive Plants Suspected to Occur on the Shasta-Trinity National Forests				
Botrychium pumicola pumice moonwort	Mt. Shasta (poex)		5500-9000?	Pumice slopes, sometimes in lodgepole pine forest
Calochortus greener Greene's mariposa lily	Mt Shasta		4000-5000	Brushy openings in montane conifer forests
Ivesia longibracteata Castle Crags ivesia	Mt Shasta?		4000-5000	Granite and diorite outcrops near and above timberline
Lewisia cantelovii Cantelow's lewisia	Mt Shasta?		500-3000	Moist rock outcrops in broad-leaf and conifer forests

** Plants recommended to the Regional Forester for adition to the sensitive species list, but not listed as of March 1993
? Suspected to occur or not currently documented Poex Possibly extirpated (not relocated in recent times)

Table G-4 (continued)
Sensitive and Endemic Plant List

Scientific Name Common Name	Range on Shasta-Trinity Districts	Mgt. Areas	Elevation (in feet)	Habitat
Lomatium peckianum Peck's lomatium	Mt Shasta?		2500?	Pine-oak woodland, often on ultramafic soil.
Minuartia decumbens The Lassics sandwort	Yolla Bolla?		5100	Jeffrey pine woodland, dry serpentine soil.
Ophioglossum vulgatum adder's-tongue fern	Mt Shasta (poex)		1000?	Meadows, marshes, moist forests
Puccinellia howellii Howell's alkali grass	Weaverville?		1500	Mineral seeps.
Endemic to the Shasta-Trinity National Forests (In addition to enemic sensitive species)				
Ageratina shastensis (=*Eupatorium shastense*) Shasta eupatory	Shasta Lake	8,10,12	2000-6000	Limestone outcrops
Arnica venosa veiny arnica	Shasta Lake Weaverville	7,8,12	1500-5000	Mixed confer-hardwood forest with Douglas-fir, ponderosa pine, blackoak, mostly north slopes & ridgetops
Ericameria ophitidis (=*Haplopappus ophitidis*) serpentine macronema	Hayfork Yolla Bolla	19,21,22	2600-5600	Serpentine outcrops, open Jeffrey pine forest on serpentine soil.
Eriogonum libertini Dubakella Mountain buckwheat	Hayfork Yolla Bolla	19,21.22	2400-5500	Open Jeffrey pine forest on serpentine soil

? [illegible] not currently documented.
[illegible] Possibly [illegible]

Figure G-3
Shasta -Trinity National Forests
Wildlife/ Fisheries/ Botany Programs

Program Guided by Nation; Regional and Forest Policy, Management Direction, Mission Statements, Program! ike "RISE TO THE FUTURE" & "LET'S GET WILD", Forest Goals & Objectives, Species Priorities, etc

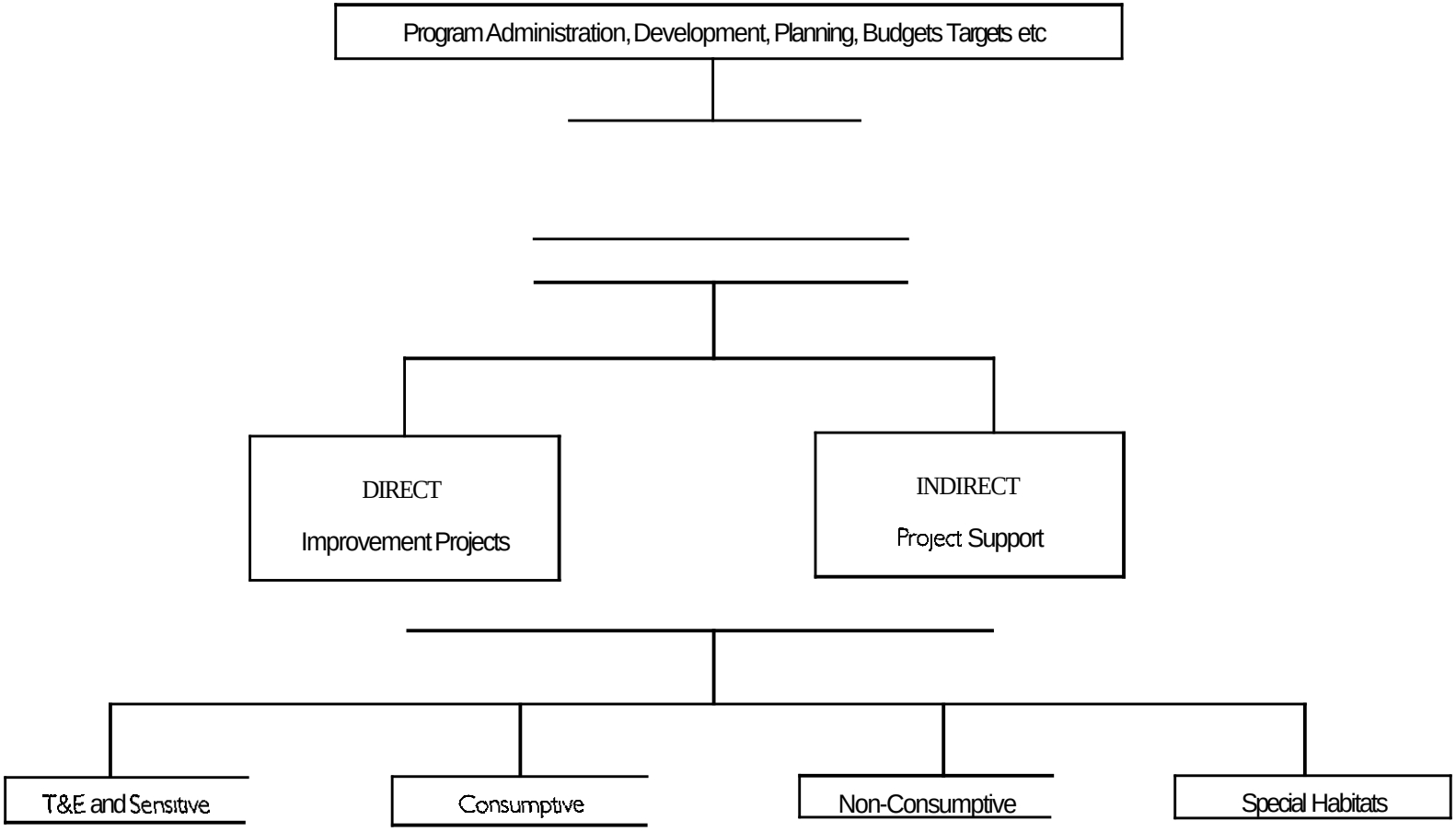
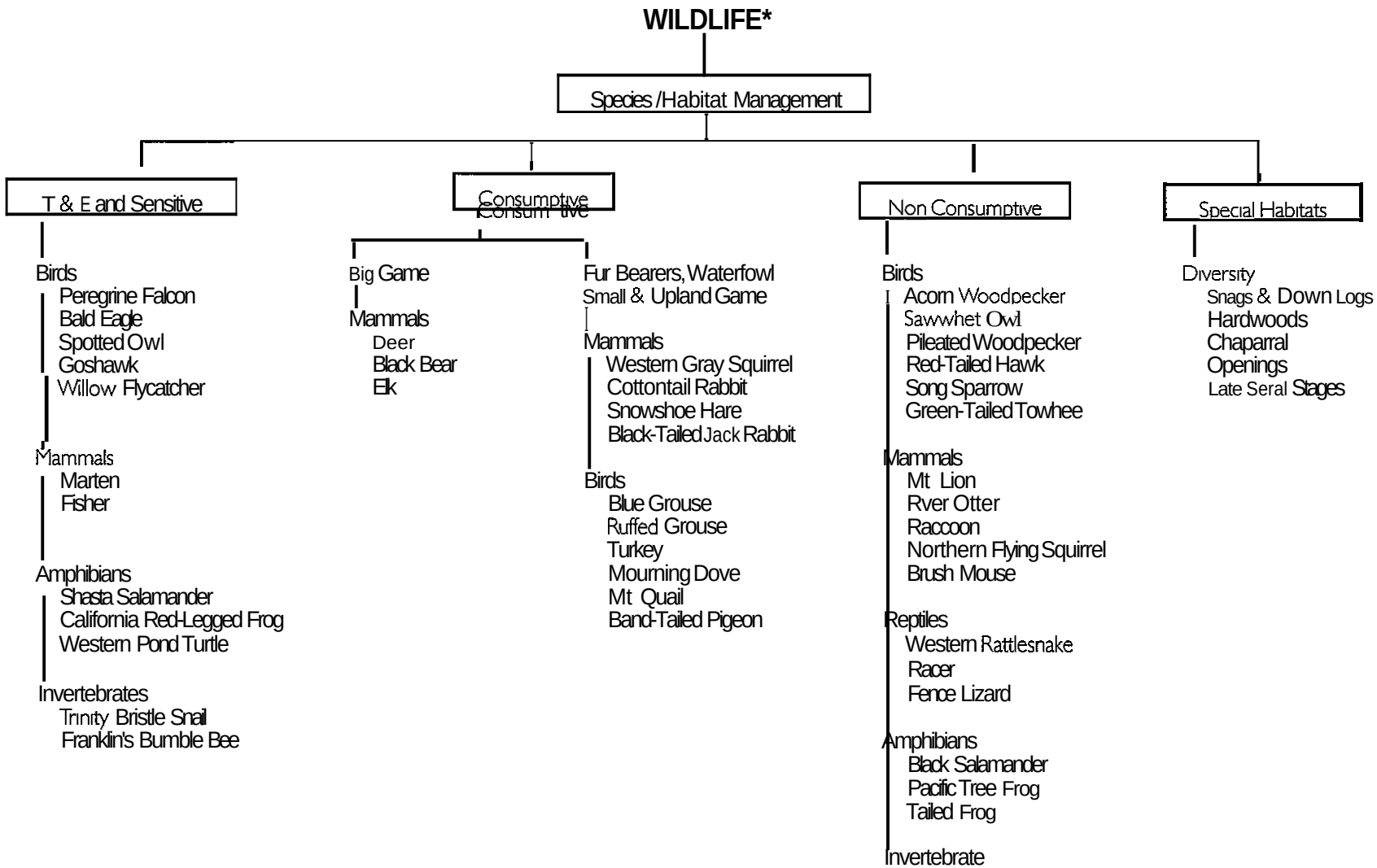


Figure G - 4
Shasta - Trinity National Forests
Wildlife / Fisheries / Botany Programs



* Lists do not include all species on the Forests

Figure G - 5
Shasta -Trinity National Forests
Wildlife Program

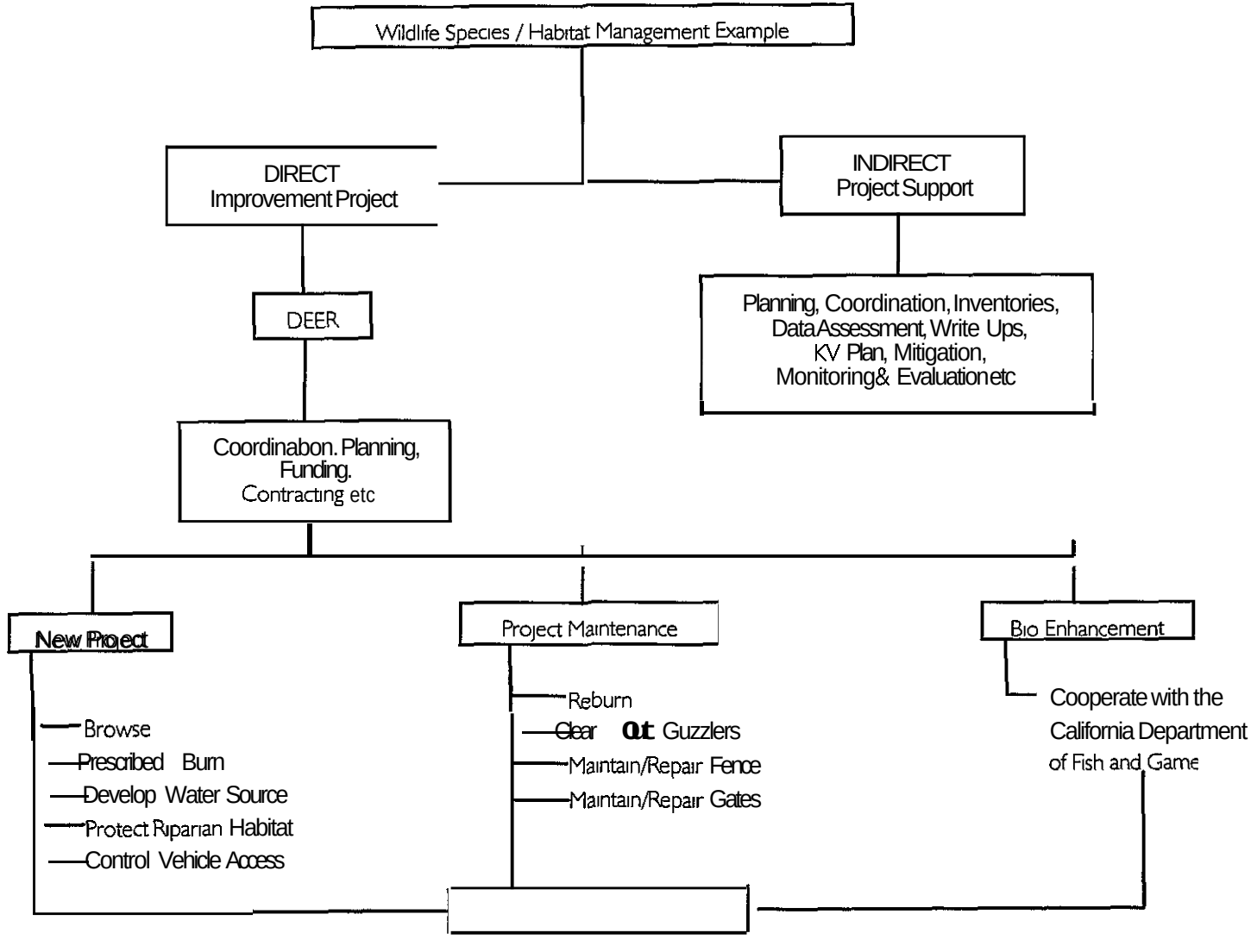
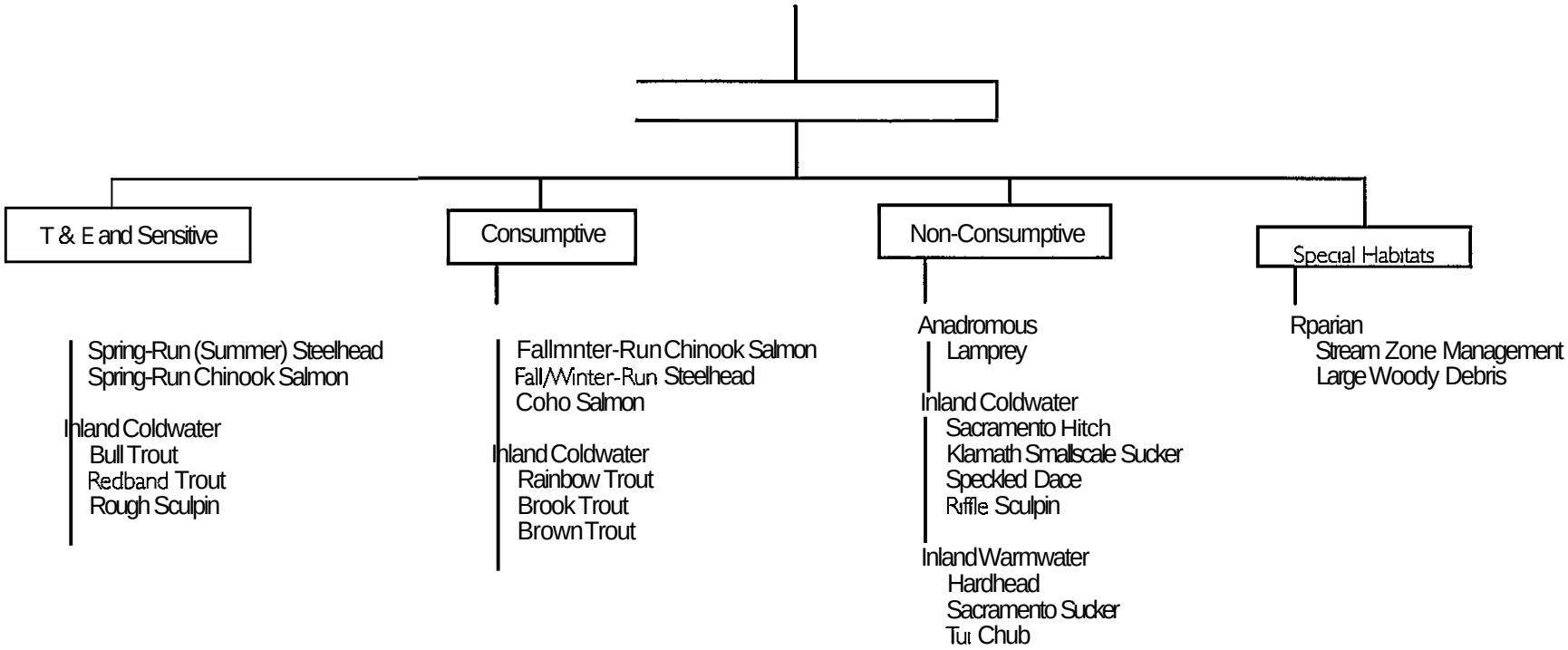


Figure G - 6
Shasta -Trinity National Forests



* Lists do not include all species on the Forests

Figure G - 7
Shasta -Trinity National Forests
Fisheries Program

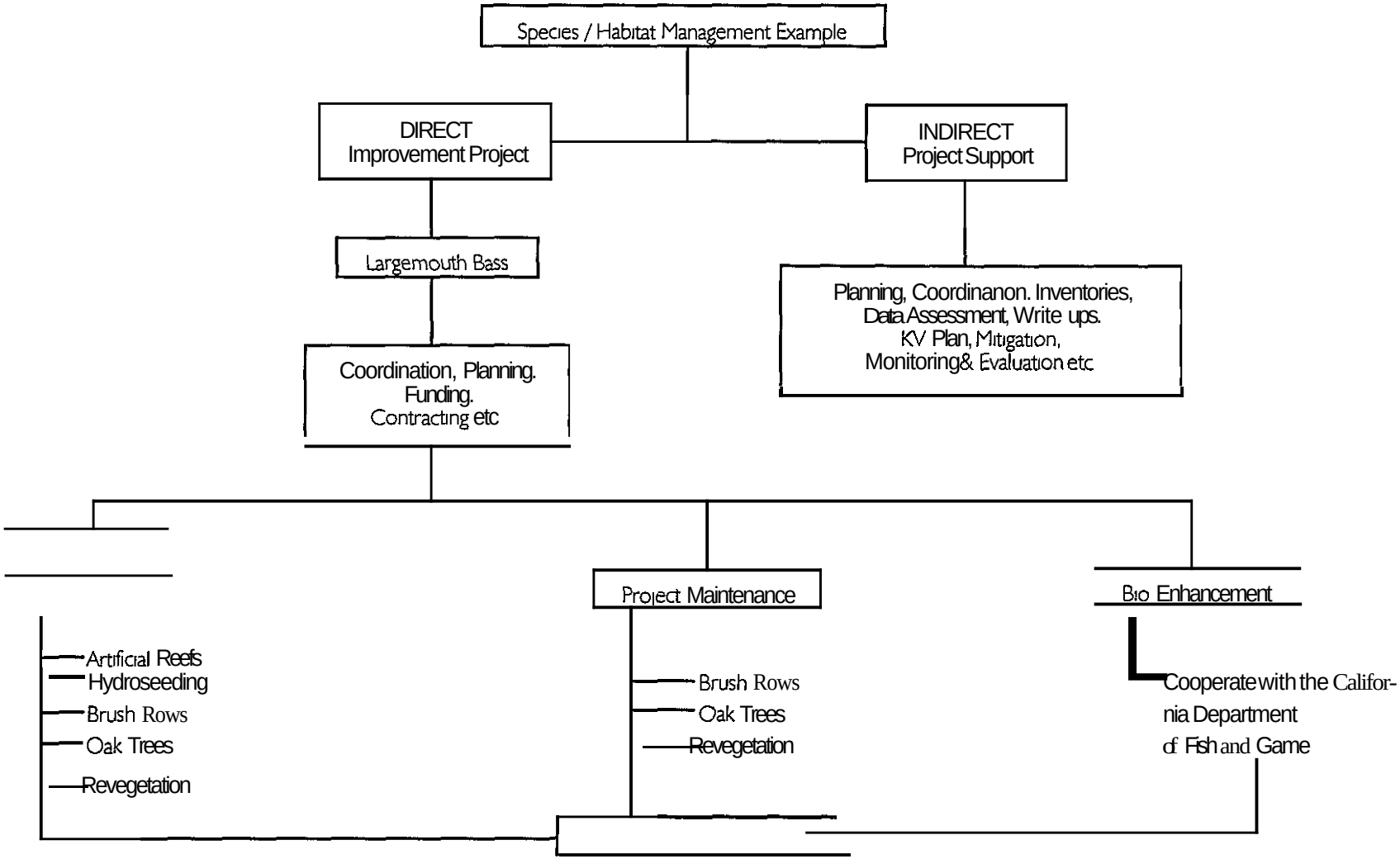
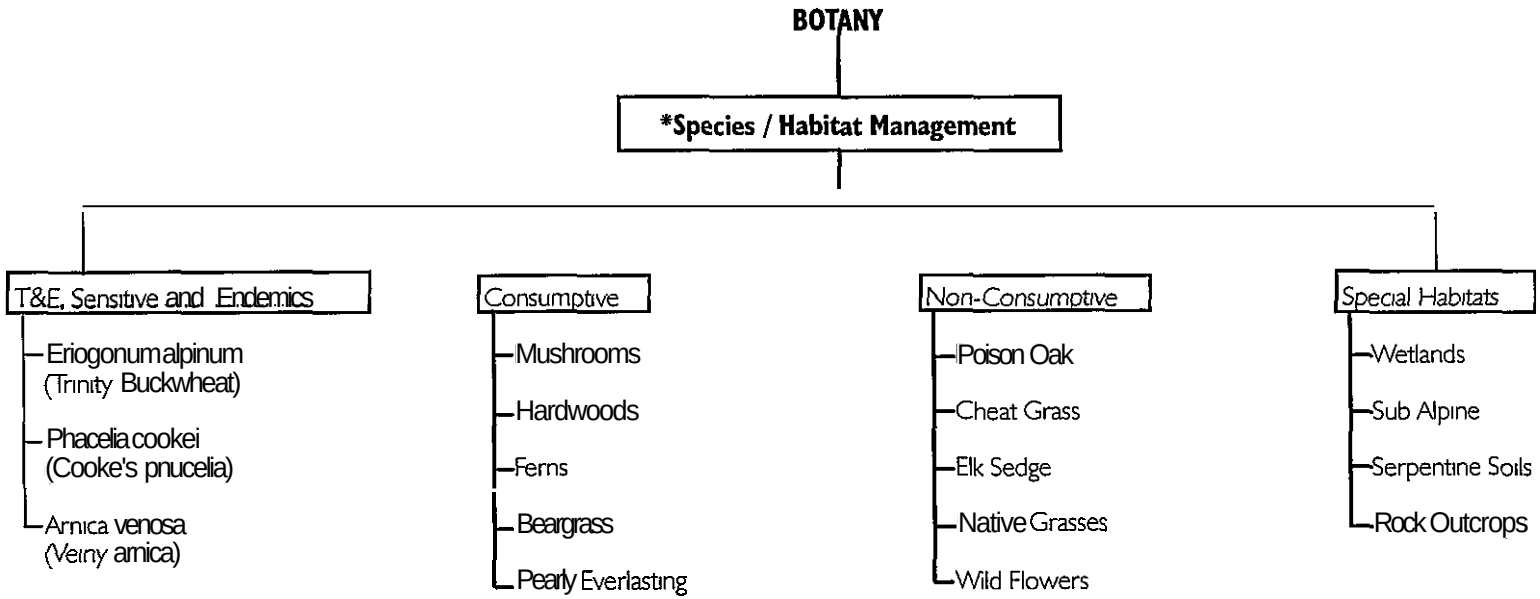
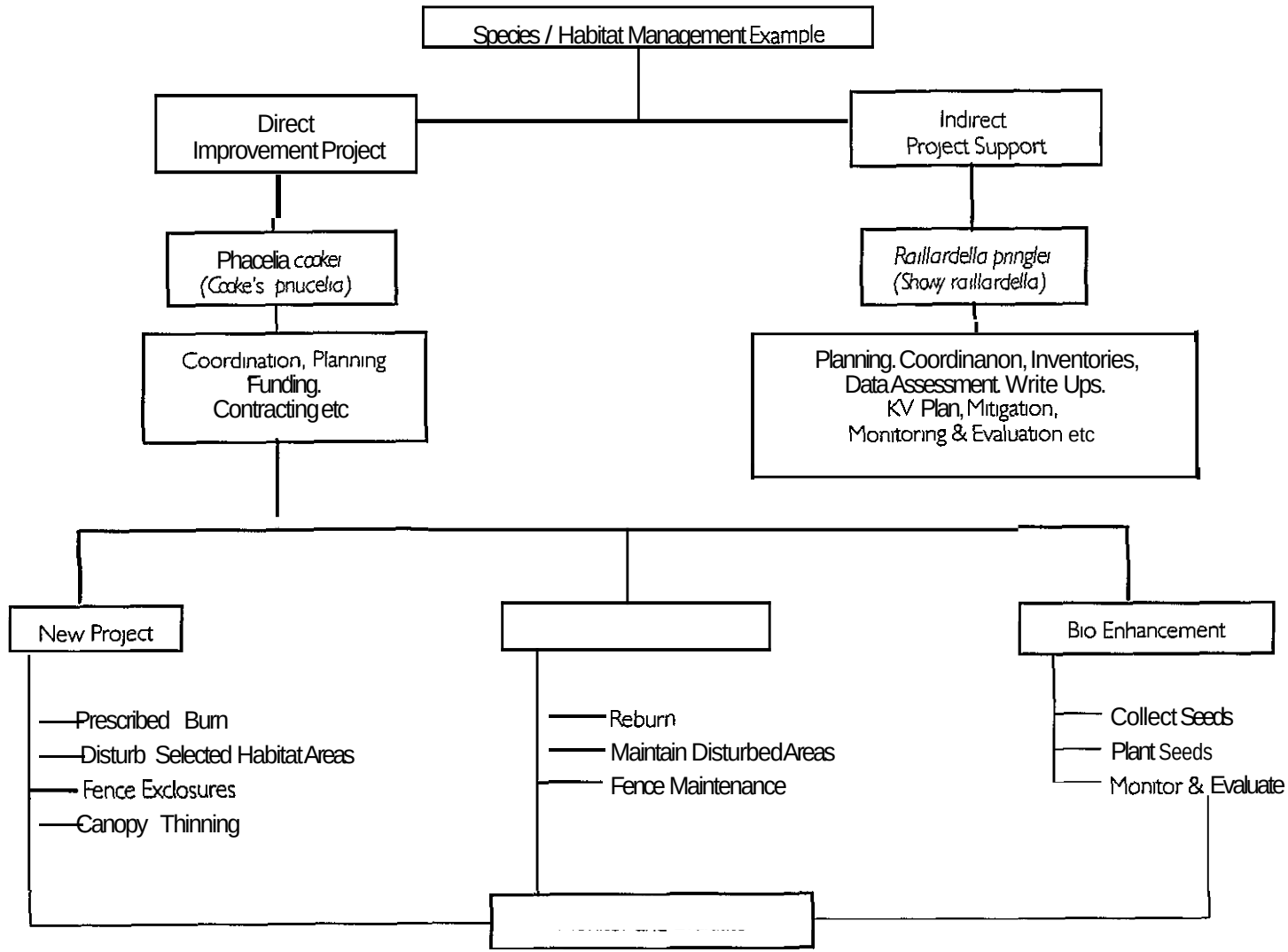


Figure G-8
Shasta -Trinity National Forests



** Lists do not include all species on the Forests*

Figure G-9
Shasta-Trinity National Forests
Botany Programs



Appendix I

Watershed Condition/Cumulative Watershed Effects

APPENDIX H
Watershed Condition/Cumulative Watershed Effects

Watershed condition. as described in the Forest Service Manual Section 2521, is a description of the health of a watershed, or portion thereof, in terms of the factors which effect hydrologic function and soil productivity Hydrologic function includes the quality, quantity, and discharge charactenstics of surface and groundwater resources Soil productivity is the capacity of a soil for producing a plant community or sequence of plant communlties under a specified system of management

The concept of watershed condition was conceived because watershed scientists and managers desired to have a holistic appraisal of a watershed, based on integrated soil, water, geologic, vegetative, and management facton There are a number offacton which influence watershed condition, natural and/or human induced, which can have either a negative or positive effect Examples of these factors include changes in peak streamflows, erosion (sheet, rill, and mass wasting), soil compaction, and deforestation Additionally, the cumulative effects of management activities, including the relative timing, location, type and level ofactivities are significant because they can affect any of the above factors

In watershed management in Northern California, the primary concerns are impacts resulting in (1) increases in erosion and sedimentation rates related to management activities which lead to decreased soil productivity and water quality, (2) factors which may lead to deleterious changes in stream channel condition, including road and harvest unit related impacts to peak streamflows, and (3) compacted areas, including roads, landings, and skid trails, which reduce site productivity and take land out of production

Successive and increasing amounts of soil disturbance and compaction decrease soil productivity and increase erosion and peak streamflows through increased surface runoff, interception of subsurface runoff, and more rapid delivery of runoff and sediment to stream channels Increased peak streamflows result in greater sediment carryingcapability, which allows for the mobilization of stored sediment Additionally, higher streamflows contribute to channel margin undercutting and downcutting, which often lead to valley inner gorge landsliding Sediment denved from these processes is transported and eventually deposited downstream, much to the detriment of fish habitat In order to monitor watershed condition over time, some system of measure is needed which considers these factors

The probable effects of implementation of each of the alternatives on watershed condition was evaluated in terms of the potential for initiating cumulative watershed effects Cumulative effects are a function of (1) the amount ofsensltive ground and its hazard level within a watershed, (2) the level of management activities, and (3) the location of impacts relative to hazardous areas In the Forest Plan and this Final EIS, both the amount of sensitive ground present within a watershed and the level of past and present harvesting activities were evaluated [1]

Sixty-one fourth and fifth-order watersheds were identified on the Forests They range in size from 11 to 410 square miles The available data base utilized to evaluate cumulative effects was the third-order Soil Resource Inventory, a harvest history of the Trinity Forest, a Forest-wide Water Resource Inventory, and a third-order Geologic Resource Inventory

The following factors were used to assess each watershed's sensitivty to cumulative effects (1) slope gradient, (2) soil erodibility, (3) mass wasting potential, and (4) the peak streamflow characteristics of each watershed These factors were weighted through a calibration process, and combined through a simple equation yielding a sensitivty index This sensitivity index ranged from 5 to 66, and served well in contrasting highly unstable, sensitive watersheds from low hazard, non-sensitive watersheds According to their sensitivity index, the 61 watersheds

1 Haskins, D M , 1986, A Management Model for Evaluating Cumulative Watershed Effects, Proceedings from the California Watershed Management Conference, West Sacramento, CA, November 18-20, 1986, pp 125-130

were grouped into low, moderate, high and extreme sensrtivity classes

The second factor in cumulative watershed effects, the level of management activities, was determined using the equivalent road area (ERA) method This is simply an accounting system used to normalize all forms of management activities which have occurred in different time penods The common denominator is the disturbed and compacted area of any activity related to an area of road It is used to normalize the disturbances from roads, skid trails. landings, cableways, and srte preparation activrties and their influence on peak streamflow and sediment delivery

Recent studies[3] have shown that there are management level thresholds within watersheds, where if exceeded, the risk of cumulative effects increase dramatically For high risk or extremely sensitive watersheds, various workers have defined a threshold of from 12 percent to 15 percent ERA It is apparent that watersheds having only small areas of sensrtive ground and therefore, a low sensitivity index, can withstand greater levels of management activity without undergoing cumulative watershed effects Therefore, different thresholds have been defined for the different sensrtivity classes 12 percent ERA for extremely sensitive, 14 percent ERA for highly sensrtive, 16 percent for moderate, and 18 percent for low sensrtivity watersheds

Thresholds in this methodology are not thought of as a point where if exceeded, erosion, sedimentation and water quality degradation will occur They are instead treated as "red flags" or thresholds of concern (TOC) where, if exceeded, it is realized that the risk has increased significantly and mitigation measures should be implemented to protect against the onset of cumulative effects Mitigation measures might include such things as increasing the size of culverts to carry potentially greater peak streamflows, rocking roads to reduce surface erosion. and wider riparian management zones to help insure their effectiveness Therefore, a watershed projected to be over the TOC could still be managed, but special management practices would be recommended to decrease the risk of initiating cumulative effects and watershed condition degradation. It is also recognized that if the TOC is exceeded and mitigation measures are not employed, that the nsk of initiating cumulative effects is signrficant and unacceptable

The FORPLAN model calculates and accumulates ERAs Forest-wide These are generated from timber harvest and road building activrties Through revegetation, re-establishment of surface cover and physical processes such as frost heaving, disturbed and compacted areas gradually recover To account for this, the calculated harvest ERA value is recovered linearly over a 30 year penod in the model However, a residual ERA value is retained to account for system roads which do not recover overtime

This methodology is linked to watershed condition through classifying watershed condrtion in terms of the level of ERAs for individual watersheds with respect to their individual TOC The classes are defined as follows

Class I
ERA is less than 40 percent of TOC (watershed condrtion is at or near potential)

Class 2
ERA is between 40 and 80 percent of TOC (watershed condrtion is between near'potential and a point near tolerance)

Class 3
ERA is greater than 80 percent of TOC (watershed condition is-near or below tolerance)

Field experience indicates that Class I watersheds, having ERA levels lower than 40 percent of their individual TOC, are generally in excellent condition Within the hundreds of subwatersheds that together comprise the typical fifth-order watershed, stream channel condrtions are generally good to excellent, and soil productivity is maintained at optimal levels Water quality generally exceeds objectives Within the subwatersheds, there is generally only a low potential for degraded water quality or soil productivity due to the initiation of cumulative watershed effects

2 Coats. R N , Miller, T O , Kallstom. D W , 1979, Assessing Cumulative Effects of Silvicultural Activities John Muir Institute Napa, CA

3 Seidelman, P J , 1980, Methodology for Evaluating Cumulative Watershed Impacts, U S Forest Service, Watershed Management, Pacrfic Southwest Region, Dept of Agric

On Class 2 watersheds stream channel conditions generally range from fair to good, while water quality generally meets objectives Soil productivity is maintained, although at lower levels than Class I watersheds Within subwatersheds, there is a low to moderate potential for increased erosion and accompanying decreased site productivity and water quality due to cumulative effects

Class 3 watersheds have ERA levels greater than 80 percent of their TOC Since this condition class straddles the TOC, which is defined as the point where the risk of initiating cumulative impacts increases significantly, it is apparent that actual conditions can vary tremendously as a function of actual ERAs. Therefore, watershed condition can range from good to poor Water quality can meet or be below objectives, and channel conditions can range from good to poor Soil productivity is acceptable but at levels lower than Classes I and 2 The potential for decreased water quality and soil productivity from erosion, related to cumulative effects, range from moderate to high

Sixty-one watersheds have been identified within the Forests (refer to map, **Figure H-I**). These watersheds range from 11 to 410 square miles in size. An inventory of the existing watershed condition of these watersheds indicates that most are presently Class I and Class 2 **(Tables H-I** and **H-2)** However, five watersheds have relatively high disturbance levels which cause them to be Class 3 These watersheds are the East Fork of the South Fork Trinity River, Rattlesnake Creek, Gulch, Hyampom and Upper Hayfork Creek. Cumulative effects have occurred within subwatersheds of these watersheds, and there remains a significant risk of initiating cumulative effects within the main channels which drain these watersheds In addition, some watersheds were extensively affected by the 1987 fires, and although they are considered to be in condition Class 2, they could undergo cumulative watershed effects in some of their subwatersheds These watersheds are Plummer and Butter Creek

Figure H-I
5th Order Watersheds

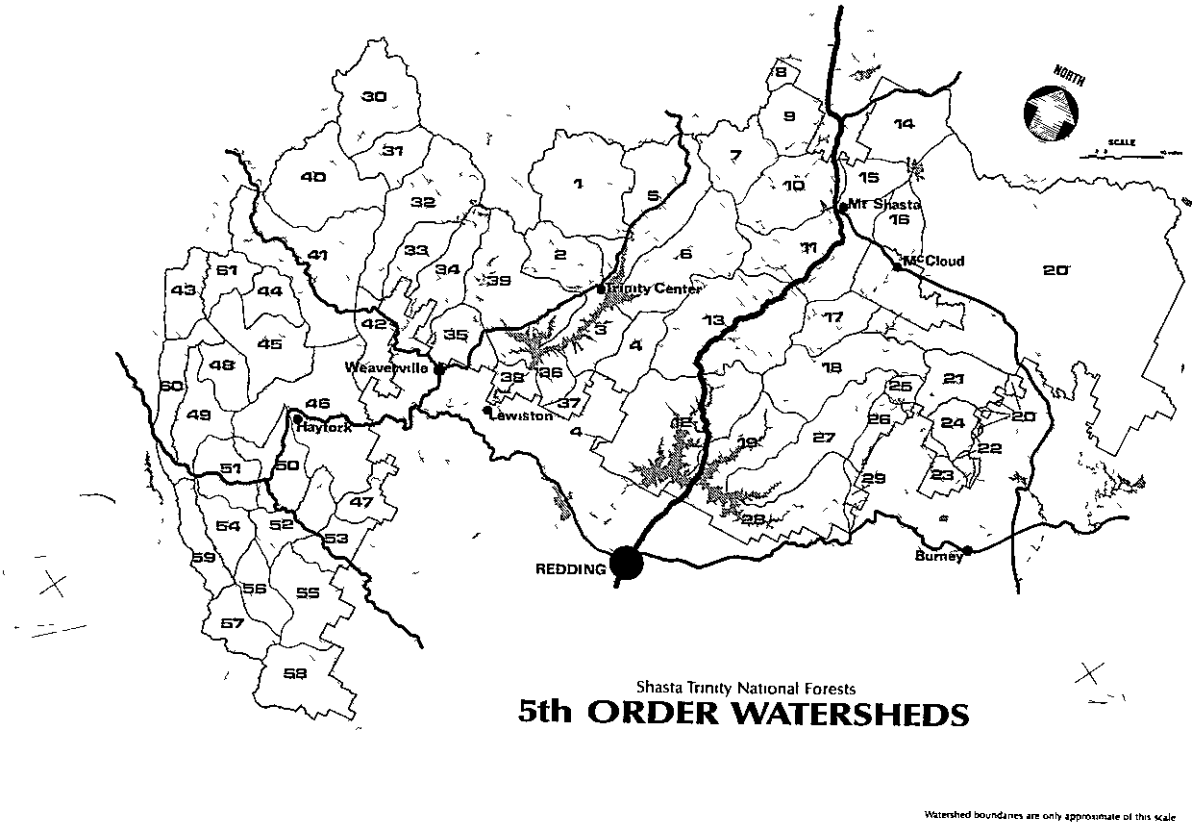


Table H-1
Shasta Forest
Watershed Summary

#	Watershed Name	Watershed Area* (Acres)	Threshold of Concern (%ERA)	Existing ERA (%ERA)	Watershed Condition (Class)
1	Coffee Creek	59,334	16%	1.5%	1
2	Swift Creek	35,790	16%	6 2%	1
3	East Trinity Reservoir	23,860	18%	6.6%	1
4	Clear Creek	20,334	16%	1.0%	1
5	Main Fork Trinity River	47,222	16%	5.0%	1
6	East Fork Trinity River	40,434	16%	6 2%	1
7	Upper Trinity River	19,864	16%	5 1%	1
8	Willow Creek	4,555	14%	4 0%	1
9	Parks Creek	20,406	16%	8 0%	2
10	South Fork Sacramento	40,139	16%	10 0%	2
11	Upper Sacramento Rver	28,855	16%	8 0%	2
12	Sacramento Arm	68,996	16%	1 0%	1
13	Lower Sacramento River	54,950	16%	6.0%	1
14	Whitney Creek	40,760	18%	4 0%	1
15	Avalanche Creek	15,810	18%	6 0%	1
16	Upper Squaw Valley Creek	18,110	16%	8.0%	2
17	Lower Squaw Valley Creek	22,215	16%	7 0%	2
18	Lower McCloud River	44,372	16%	1 0%	1
19	McCloud Arm	31,383	16%	1 0%	1
20	Upper McCloud River	263,934	18%	10.0%	2
21	Kosk Creek	11,812	14%	7 0%	2
22	Pit #4	6,996	16%	6 0%	1
23	Pit #5	11,930	14%	6 0%	2
24	Nelson Creek	7,464	14%	5 0%	1
25	Iron Canyon	7.757	14%	6 0%	2
26	Pit #6	9,520	14%	4 0%	1
27	Squaw Creek	46,074	14%	3 0%	1
28	Pit Arm	48,485	14%	2.0%	1
29	Pit #7	7,640	14%	4 0%	1
	Shasta Forest Total	**1,059,003**			

* Watenhed area includes only National Forest Lands

Table H-2
Trinity Forest Watershed Summary

#	Watershed Name	Watershed Area* (Acres)	Threshold of Concern (%ERA)	Existing ERA (%ERA)	Watershed Condition (Class)
30	Upper New Rver	56,536	14%	1 0%	1
31	East Fork New Rver	26, 152	16%	1 4%	1
32	North Fork Trinity Rver	67.056	16%	0 5%	1
33	East Fork North Fork Trinity River	23,919	16%	1 2%	1
34	Canyon Creek	32.617	14%	1 2%	1
35	Weaverville	22,156	16%	6 3%	1
36	West Trinity Reservoir	15.104	16%	10 6%	2
37	Upper Clear Creek	4,642	16%	3.0%	1
38	Lewiston	11,930	16%	4.6%	1
39	Stuart Fork	66,997	16%	7 0%	2
40	Lower New River	65,822	14%	2.5%	
41	Burnt Ranch	102,906	14%	3 5%	
42	Helena	21,569	16%	5 2%	
43	Hyampom	12,833	12%	10 5%	
44	Corral Creek	18,923	16%	9 8%	
45	Lower Hayfork Creek	47, 192	16%	3 8%	
46	Hayfork Creek	71,816	18%	6 0%	1
47	Browns Creek	15,457	18%	6 0%	1
48	Butter Creek	22,039	16%	10 0%	2
49	Plummer Creek	26,840	16%	7 8%	2
50	Salt Creek	30,149	16%	6 8%	2
51	Rattlesnake Creek	27.974	16%	158%	3
52	Upper Hayfork Creek	28,679	16%	129%	3
53	Middle Fork Cottonwood Creek	17,572	18%	8 0%	2
54	Smoky Creek	21,834	16%	8 2%	2
55	Beegum Creek	42,020	16%	7 2%	2
56	East Fork South Fork Trinity	23,864	14%	11 3%	3
57	Upper South Fork Trinity	26.741	14%	10 6%	2
58	South Fork Cottonwood Creek	45,557	16%	1 3%	1
59	Happy Camp Creek	23,120	12%	8 0%	2
60	Hidden Valley Watershed	27,688	12%	8 2%	2
61	Gulch Watershed	14,840	14%	10 0%	3
	Trinity Forest Total	**1,062,544**			
	Combined Shasta-Trinity Total	**2,121,547**			

* Watershed area includes only National Forest Land

Appendix

The Regional Timber Supply-Demand Situation in California

APPENDIX I
The Regional Timber Supply-Demand Situation in California

This appendix was created to address public concern about the broad level timber supply and demand situation in relation to supplies from individual National Forests Existing information from recent RPA assessments, University of California research, Forest Service research, and the State of California's Forest and Rangeland Resources Assessment Program (now renamed the Strategic Planning Program) was used for this purpose

Historical Harvests from Public and Private Lands - Statewide

Timber harvest in California has been in a downward trend for over 30 years In 1955, record timber harvests in the State from all lands totaled 6 billion board feet In that year, harvest from private lands was 4 9 billion and harvest from National Forest was 1 0 billion Less than 100 million board feet were harvested from other public lands Since that time, total harvest in the State has trended downward, with shorter term fluctuations associated with the business cycle

As shown in **Table I-1**, harvest levels fluctuate widely from year to year rather than following a smooth pattern Year to year variations are influenced primarily by changes in housing markets and general business conditions Only over the long term do available timber inventory and growth levels limit harvests

Statewide Demand for Timber Products and the Relationship to Harvest Levels

Wth a population of over 30 million people and a high level of income per capita, California is one of the largest markets for lumber, wood, and paper products in the world When discussing the relationship between the demand for timber products (lumber, wood, and paper) and the demand for timber harvest (stumpage), it is necessary to translate the demand for timber products into its timber harvest equivalent Expressed in these terms, the demand for timber has been increasing, at a rate about equal to the population growth rate Per capita consumption of lumber has declined while per capta consumption of paper and reconstituted wood products has increased over the past 40 years. As population in the State grew from 10 6 million in 1950 to over 30 million at present, total demand increased from 4 billion board feet annually in 1950 to about 12 billion board feet annually

While the demand for timber has been increasing, timber harvests in the State have been decreasing The difference between the growing demand and the declining supply has been made up by increased imports to the State - primanly from Oregon, Washington, and Canada The State has changed from a net exporter to a net importer of timber products over the last three decades

California now relies on imports from other States and countries for more than 75 percent of its overall timber product needs Although California receives only a small proportion of its imports from Canada, Canadian shipments to the U S have a significant effect on the State's ability to import timber products from the Pacific Northwest In contrast to California's reliance on imports, the bulk of the timber products produced in both Washington and Oregon are exported to other States and countries Increases in Canadian shipments to the eastern half of the U S have displaced timber products from the Pacific Northwest The result has been an increase in the availability of timber products from the Pacific Northwest for California markets Increased production in the South has also been displacing the Pacific Northwest in eastern markets, which has also increased the availability of products from the Northwest in California markets

Broad Level Socioeconomic Effects

About 95 percent of California's population lives in urban areas As consumers, the primary effect of changes in harvest levels in the State on them is a change in prices paid for timber products A reduction in timber harvests in the State reduces competition among suppliers, raises market prices, and leads to increased use of imported products Econometric analysis done by the Pacific Northwest Forest and Range Experiment Station in 1990 indicates that a one billion board foot change in harvest level would change lumber prices by about four percent This translates into a $250 change in the price of the typical new house at current conversion efficiencies For the U S economy as a whole, this would amount to a cost to home buyers of about $400 million annually The high level of

Table I - I
California Timber Harvests by Ownership
1952 " 1993

Year	Priiate	Other Public	National Forest	Total
	- billion board feet -			
1952	4 40	05	61	5 06
1953	5 32	04	63	5 99
1954	4 79	05	76	5 60
1955	4 93	06	1 03	6 02
1956	4 69	08	1 09	5 86
1957	4.36	07	92	5 35
1958	4 47	09	1 1 1	5 67
1959	4 29	12	1 4 8	5 89
1960	3.70	11	1 3 3	5 14
1961	3 85	11	1 3 8	5 34
1962	4.05	11	1.38	5 54
1963	3 69	11	1 6 6	5 46
1964	3.50	11	1 8 6	5 47
1965	3.21	14	1 92	5 27
1966	2 97	11	1 9 3	5 0 1
1967	3.06	11	1 89	5 06
1968	2.82	16	2.36	5.34
1969	2 88	12	2 00	5 00
1970	2 62	10	1 84	4 56
1971	2 59	13	2 06	4 78
1972	2 66	12	2 22	5 00
1973	2 8 1	10	2 0 1	4 92
1974	2 86	11	1 7 3	4 70
1975	2 7 1	.10	1 5 2	4 33
1976	2 76	08	1 89	4 73
1977	2 96	09	1 74	4 79
1978	2 78	.08	1 8 0	4 66
1979	2 26	09	1 73	4 08
1980	1 8 6	07	1 5 1	3 4 4
1981	1 72	04	1 09	2 85
1982	1 50	06	94	2 50
1983	1 89	08	1 6 8	3 65
1984	2 09	03	1 56	3 68
1985	2 1 7	06	1 82	4 05
1986	2 3 1	09	1 96	4 36
1987	2 58	10	1 97	4 65
1988	2 60	06	2 18	4 84
1989	2 64	06	2 02	4 72
1990	2 67	05	1 5 3	4 25
1991	2 07	06	1 34	3 47
1992	2 12	06	1 03	3 21
1993	2 26	05	58	2 89

Sources
California Department of Forestry and Fire Protection
Calrfornia State Board of Equilization
Bureau of Indian Affairs, USDI
Bureau of Land Management, USDI
Forest Service, USDA

competrtion in the market for timber products means that individual National Forests or individual pnvate timber owners can not significantly affect consumer prices However, National Forests or private timber owners in aggregate can significantly affect consumer prices. For example, the price relationship described above means that changes in overall National Forest timber supplies since 1990 have resulted in timber product price increases of more than 25 percent

Another effect on the urban population is through "indirect and induced employment. While the employment effect of changes in harvest levels is felt most strongly in the communrties where the logging and sawmilling takes place, some broader level employment effects also occur This is because most firms that manufacture and supply goods and services to logging and sawmill companies are typically located in the major urban centers rather than in the rural areas where the logging and milling takes place

Logging and milling by itself typically requires 3-6 person years of employment per million board feet processed Newer, more specialized and automated mills using readily accessible timber are at the bottom of this range, while more labor intensive operations are at the top of this range This direct employment generates indirect employment in fms that supply goods and services to logging and milling firms and induced employment in firms and governments providing goods and services to those employed directly and indirectly In undeveloped rural areas there is little rfany indirect and induced effect because suppliers are located outside of the area and logging and sawmilling employees must "drive into the city" to make major purchases In addrtion, on most National Forests a portion of the logs harvested are trucked well outside of the primary zone of influence for manufacturing into lumber products As a result, total statewide employment effects of changes in harvest levels are larger than employment effects occurring in the primary zones of influence for individual National Forests. Employment effects on a statewide basis range between 10 and 20 person years per million board feet of timber harvested These employment effect estimates were made wrth input-output models constructed by the Forest Service and the U S. Department of Commerce They reflect present technologies As the trend toward increased timber utilization efficiency continues, employment *generated* per *unit* of timber processed is expected to decline

The Outlook for Timber Supplies - Private Lands

According to projections completed by the University of Calrfornia in July 1990, timber supplies from private lands in California can be maintained at over 2 2 billion board feet annually over the 10-15 year life of the Forest Plans An alternative projection prepared by the California Department of Forestry and Fire Protection in 1988 projected private timber harvests at 1 96 billion board feet annually during the life of the Forest Plans The pnmary difference between the two projections is the projected response of nonindustrial private owners to higher market demand for their timber Timber harvests from this ownership are well below the level that can be supported by available timber inventories and growth

Both projections indicate reduced timber supplies from industnal timberland ownerships and increased supplies

Table I - 2
Projected Timber Harvest, Growth, and Inventory on Private Land in the Four Major Timber Supply Regions of California

Area	Average Annual Harvest, MMBF *1995-2005*	Net Annual Sawtimber Growth MMBF, *1995-2005*	Sawtimber Inventory BBF, 1995-2005
North Coast	1,100	1,080	39 4
Northern Interior	542	503	18.0
Sacramento	467	413	19.7
San Joaquin	145	148	6.4
All Private Land	2,254	2,144	83.5
Industrial Private	1,760	1,169	41 5
Non-industrial Private	496	974	42 1

Source Krumland, Bruce, and William McKillop, Prospects for Supply of Private Timber in California, University of California, July 1990

from nonindustrial timberland ownerships dunng the life ofthe Forest Plans The pnmary reason for this shift is that harvest levels on industnal ownenhips have been at a higher rate than can be sustained by available timber inventories and growth By contrast, nonindustrial ownership harvests have been well below the level that car be sustained by the timber inventory and growth on these ownerships Both projections consider the fact that many ofthe smaller nonindustrialowners do not consider timber harvesting, and the income derived from it, to be a management objective Nether of the two projections account for harvest restrictions that may be imposed on private harvests as a result of the listing of the northem spotted owl as threatened or changing State regulatory policies Large redudions in harvesting as a result of increased regulation of private timberlands are possible, but reliable projections are not currently available

Outlook for Timber Supplies - Imports

As discussed above, the Pacific Northwest is the pnmary source of imported timber products in California Through displacement effects in national markets, Canada and the South also play a major role in determining the supply of timber products from the Northwest that is available to California markets

Accordingto studies conducted by Forest Service research units, timber supplies from all regions ofthe United States - exceptthePacific *Coast* - are projectedto increasedunng the life of the Forest Plans The South is by far the largest timber supply region in the United States

Studies conducted in Canada indicate that available sawtimber supplies are not expectedto restrain exports to the U S duringthelife ofthe Forest Plans However,tariff and trade policies may affectCanadian exports to the US over this period

A decline in timber harvests in the Pacific Northwest over the next 10-15 years is expected This is due to reduced availability oftimber inventories on both public and pnvate lands

Siberia contains the largest undeveloped softwoodtimber resource in the world Chile and New Zealand are increasingly active exporters in world markets Increased supplies of logs and manufactured wood products from foreign sources appear likely to be importedto Calrfornia in the future

The overall outlook is that imports to Califomiafromother States and countries will continue to support increased demands by Caltfornia consumers over the next 10-15 {ears However, imports will likely increase at a lower rate than over the last 20 years -- particularly if growth of the State's economy continues at the slower pace of recent years

The Outlook for Timber Supplies - National Forests

The allowable sale quantities from individual Forest Plans are an indicator of future timber supply levels from National Forests in California The allowable sale quantrty places an upper limit on the average annual amount of green sawtimber from suitable timberlands that can be sold from a National Forest in the first ten year period of the Plan Nonchargeable timber (dead timber and fuelwood from either suitable or unsuitable timberlands) is in addition to the allowable sale quantrty Historically, nonchargeable volume increased the total amount sold by a few percentage points However, as a result of changes currently being made in Forest Plans, nonchargeable volume is likely to increase in relation to allowable sale quantties in the future

The amount oftimber offered for sale in an individual year is determined through the budget process When the amount of timber sold in an individual year is less than the allowable sale quantity, sales in future years may be higher than the allowable sale quantity since the ASQ is a limit on the average annual amount that can be sold over a ten year period

Over the long term. the volume harvested equals the volume sold However, over shorter periods the volume harvested can exceed (or fall short of) the volume sold by causing the uncut volume under contract to decline (or increase)

In the early 1980's the volume harvestedwaslessthanthe volume sold, and in the late 1980's and early 1990's volume harvested exceeded the volume sold

Timber sales projected under the individual National Forest Plans in Region 5 total between 540 and 725 million board feet annually This projection is based on likely allowable sale quantitites and nonchargeable volumes from Forest Plans that are being completed or are undergoing amendment These projections are subject to change as a result of decisions made through the Forest planning and budget processes

The timber sale program quantties projected are below the average annual volume sold in the early 1990's

Timber supplies are also below the 1990 RPA sale offering goal of 1 49 billion board feet for the penod 1995-2000. The 1990 RPA goal was based on information developed pnor to the amendment of Forest Service planning documents to reflect new information on management of habltat for northern and Calrfornia spotted owls and other old-growth related species

The Subregional Outlook

Based on the historical pattern of log flows to mills, the State can be divided into four major timber market areas North Coast, Northern Interior, Sacramento, and San Joaquin The Central Coast and Southern California areas are minor producing areas

Up until the 1990's, virtually all of the decline in the State's timber harvest that occurred over the last 30 years took place in the North Coast market area on private lands

North Coast	Six Rivers	77	12-26
Northern Interior	Klamath (1)	118	40-70
	Modoc	51	30-40
	Lassen	147	60-80
	Shasta-Trinity	123	75-95
Sacramento	Mendocino (2)	39	10-15
	Plumas (3)	175	70-90
	Tahoe	88	50-60
	Eldorado (4)	166	50-70
	Lake Tahoe Basin	8	4-10
San Joaquin	Stanislaus (5)	177	30-40
	Sierra	99	60-70
	Sequoia	70	40-50
	Inyo (6)	8	8-10
	R5 Total	**1,236**	**540-725**

(1) Typically about one half of the logs from the Klamath National Forest flow into Oregon Most of the remainder are milled in the Northern Interior area.

(2) Mendocino logs typically flow 30 percent to the Sacramento area, 30 percent to the Northem Interior area, and 40 percent to the North Coast

(3) Plumas logs typically flow 40 percent to the Northern Interior area and 60 percent to the Sacramento area

(4) Eldorado logs typically flow 60 percent to the Sacramento area and 40 percent to the San Joaquin area

(5) Stanislaus logs typically flow 20 percent to the Sacramento area and 80 percent to the San Joaquin area.

(6) Inyo logs typically flow 50 percent to the San Joaquin area and 50 percent to the Northern Interior area

* All figures are subject to change as a result of decisions made through planning and budget processes Forest Plans for the Six Riven, Klamath, Shasta-Trinity, and Mendocino National Forests are now being finalized. Forest Plans for all other Forests shown are undergoing amendment

The outlook now is for relatively stable output from private lands over the 10-15 year life of the Forest Plans in all major market areas

Since the early 1990's the contribution of National Forests to regional timber supplies has declined sharply During the 1980's, National Forests provided roughly 40 percent of the regional timber supply In the mid 1990's and the future, they will provide roughly 25 percent of the timber available for processing by local mills on a Statewide basis

The relative contribution of National Forests to the timber supply also differs between market areas of the State In the North Coast area, private supplies are dominant and National Forests are projected to supply less than 2 percent of the timber In the Northern Interior and Sacramento areas, National Forests supply roughly 30 percent of the timber In the San Joaquin area they supply roughly one half of the timber

Timber supplies from National Forests are projected to remain well below levels of the early 1990's Since sawmill capacity exceeded available timber supplies in all major producing areas in the early 1990's, and many existing mills had not been upgraded to use the best currently available technology, mills have been closing in all areas of the State This pattern is expected to continue until there is a better balance between available supplies and sawmill capacity that employs the most efficient technology Closures are expected to continue in all areas of the State during the life of the Forest Plans

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Appendix 3

Major Silvicultural Systems and their Application

APPENDIX J
Major Silvicultural Systems and their Application

Introduction

A

The purpose of this appendix is to describe the major silvicultural systems used in land management planning for the Shasta-Trinity National Forests, and the advantages and disadvantages of each, considering both biological and managerial perspectives However, almost all of the information in this appendix also applies to selecting an appropriate silvicultural system for a particular stand

Silvicultural systems are used to manage forest stands A silvicultural system is a planned sequence of treatments for controlling the species composition and structure of the vegetation during the life of a stand A stand is a community of trees sufficiently uniform to be distinguishable as a silvicultural or management unit Typically, stand sizes vaty from about 5 to over 30 acres on National Forest lands

Management objectives for stands typically are combinations of forest products and amenities An example is specific amounts of livestock forage, water runoff, and wood products, kinds of wildlife habitat, and specific scenic view qualities No single silvicultural system can produce all desired combinations of products and amenities from a particular stand, or from a National Forest

Forests are managed by using combinations of silvicultural systems to achieve the forest management objectives The combinations vary greatly, depending on the characteristics of local forest ecosystems and differing management objectives

Selection of the appropriate silvicultural systems occurs at both the National Forest land management planning level and Ranger District project level The Forests' selection is based on a broad match of silvicultural systems with the overall planning objectives and ecological characteristics of broadly-defined land classes Examples of land classes are areas capable, available and suitable for growing commercial wood products, riparian management zones, and spotted owl habitat conservation areas At the Ranger District, project level selection of silvicultural systems is typically made by a certified silviculturist Choices are based on matching the attributes of the silvicultural systems with specific management objectives and the ecological characteristics for specific stands

Descriptions of the Silvicultural Systems

B

A silvicultural system typically includes cutting trees, growing new trees, and controlling competing plants Cuttings are classified as regeneration cuttings (those that help to replace stands), and intermediate cuttings (those that maintain or improve the character of existing stands)

Silvicultural systems are not just the creation of professional foresters, rather, they are adaptations of natural occurrences Nature makes "regeneration cuttings" by means of fire, insects, disease, wind, and other phenomena, by removing a single tree, a small group of trees, a stand, or sometimes an entire forest

Regeneration cuttings strongly influence stand characteristics and management options Therefore, the five major silvicultural systems are named after them clearcutting, seed-tree, shelterwood, single-tree selection, and group selection Each of these systems includes regeneration cuttings to establish new tree seedlings or sprouts, and intermediate cuttings to develop the desired stand characteristics, such as species composition, spatial distribution, and plant vigor

The clearcutting, seed-tree, and shelterwood systems are even-aged systems This means that all of the trees in the stand are approximately the same age The single-tree and croup selection systems are uneven-aged systems, the trees in the stand differ markedly in age, with at least three major age classes present Uneven-aged stands have no beginning or end points in time

Even-aged Systems

Clearcutting is the harvesting, in one operation, of all merchantable trees in a stand or a larger area to help establish a new even-aged stand The new stand may be created by natural processes, such as seeding from trees in adjacent stands, or by sprouting from the stumps or roots of the cut trees The new stand can also be created by man through broadcast scattering of seeds, or by planting seeds or seedlings On the Shasta-Trinity National Forests, clearcut stands are usually regenerated by planting seedlings

Clearcutting does not necessarily mean that all unmerchantable trees are removed Where feasible, high-quality unmerchantable trees are saved to become part of the new stand It is estimated that high-quality unmerchantable trees, in logical treatment units, can be retained on about 10-20 percent of the acres to be regenerated by clearcutting on the Forests, particularly on gentle terrain

The clearcutting silvicultural system is illustrated in **Figure J-1**

The seed-tree system (shown in **Figure J-2**) requires leaving a few good seed-producing trees per acre (typically about 3 to 10) during the regeneration cutting These trees produce the seed needed to establish a new even-aged stand Following seedling establishment, the seed trees are harvested This system has seldom been used for intensive timber management on the Forests The primary reasons are frequent unreliability of natural regeneration in the desired periods, invasion of cleared lands by unwanted vegetation (particularly shrubs), and the poor economics of harvesting the few seed trees after natural seedlings were established

The shelterwood system (shown in **Figure J-3**) requires leaving sufficient trees per acre (typically 10 to 20), during the regeneration cutting, to provide an environment that protects (shelters) the seedlings of a new even-aged stand This is referred to as the "seed step" Protection may be needed from excessive moisture stress or frosts in some forest areas The new stand can be created by the natural or artificial processes described above

Regeneration by planting seedlings under shelterwoods is a common practice on the Forests The shelterwood trees are normally harvested following establishment of the seedlings of the new even-aged stand Removal of the shelterwood trees is called the "overstory removal" step The shelterwood system is most commonly used in stands where red or white fir are to be regenerated

Seed and shelter trees left after a seed tree or shelterwood seed step cut may be retained through the life of the newly regenerated stands When this occurs, these cuts are commonly referred to as green tree retention This is most commonly done to meet ecological needs such as for wildlife habitat

Uneven-aged Systems

In the single tree selection system (shown in **Figure J-4**), each tree is evaluated for its contribution to the desired characteristics of the uneven-aged stand Regeneration and intermediate cuttings are usually done in one operation The desired seedlings or sprouts grow in the spaces created by harvesting of individual trees

Repeated selection cuttings, part of the single-tree selection system, have been used frequently to manage National Forest lands, particularly in the Sierra Nevada and Cascade Mountain Ranges There has been a major shift to using the clearcutting or shelterwood systems over the last two decades The primary reason is that the selection cuttings caused significant understocking in many stands, thereby reducing productivity There are many examples of poor selection cuttings in California, under the guise of the single-tree selection system High quality, large trees were cut, leaving inferior, small trees Genetic principles were ignored. and many stands were left understocked. with slow-growing, small trees that are more susceptible to attacks by insects and diseases In these situations, establishing a new even-aged stand typically is the most efficient way of regaining desired productivity levels and other stand qualities

The group selection system requires harvesting trees in small groups (usually less than two acres) The opening; created in the stand resemble miniature clearcuts The uneven-aged stand consists of a mosaic of even-aged groups Thus, the group selection method uses the principles of even-aged systems described above to manage much smaller units of land

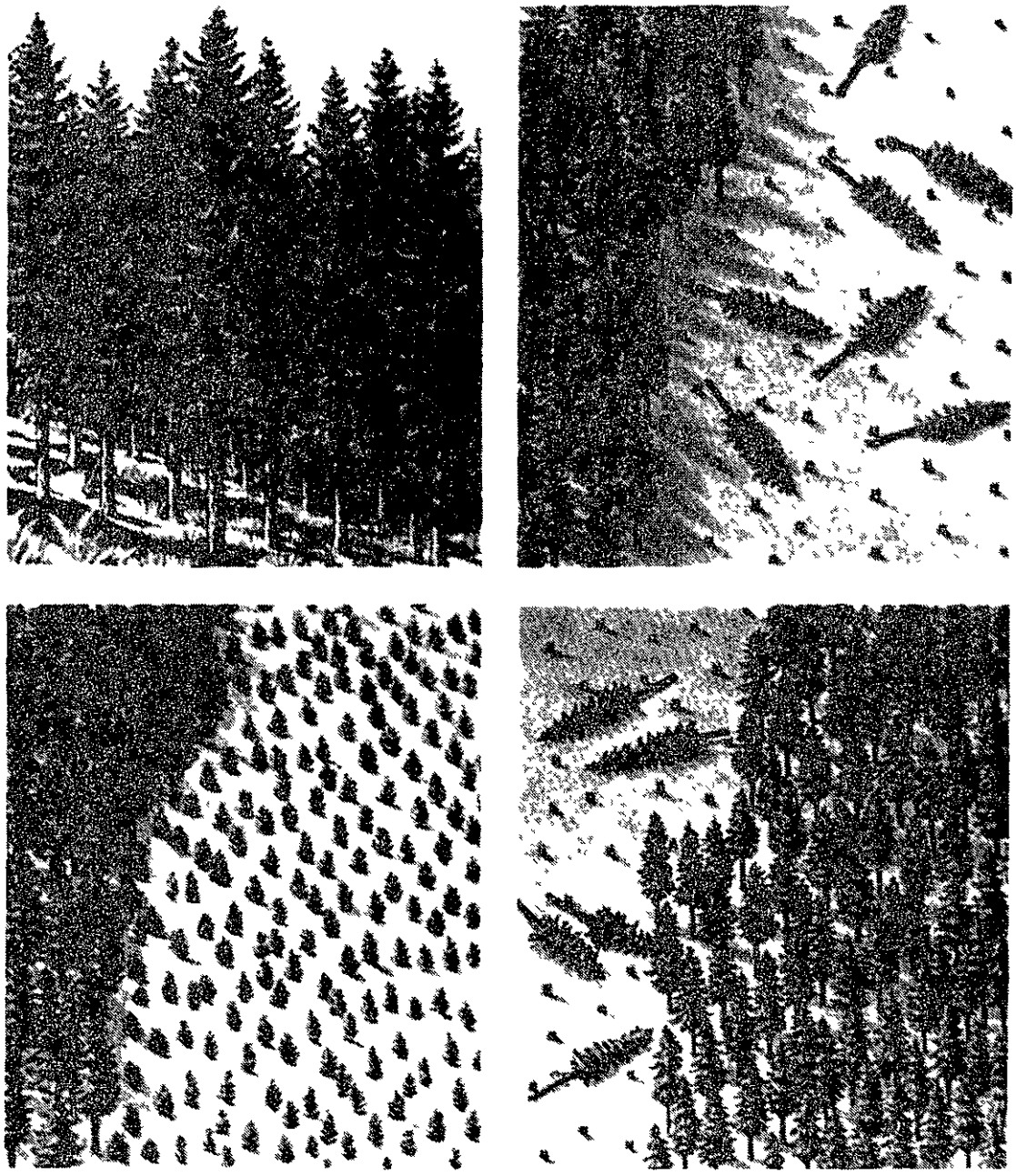
Even-aged systems are more practical than uneven-aged systems for intensive management of wood products The reasons are explained in Section E, "Managerial Contrasts Among Forests and Stands Managed by Different Silvicultural Systems"

C Timber Yield and Regulation of Forests and Stands

Timber yield is the amount of wood that is harvested from a specified forest area The maximum yield allowed from the Shasta-Trinity National Forests for a planning period (typically one decade), is called the allowable sale quantity (ASQ) By Federal law, the ASQ generally cannot exceed the long-term, sustained capacity of the Forests to grow wood Within each National Forest, stands are managed by silvicultural systems to achieve a continuous production of the ASQ

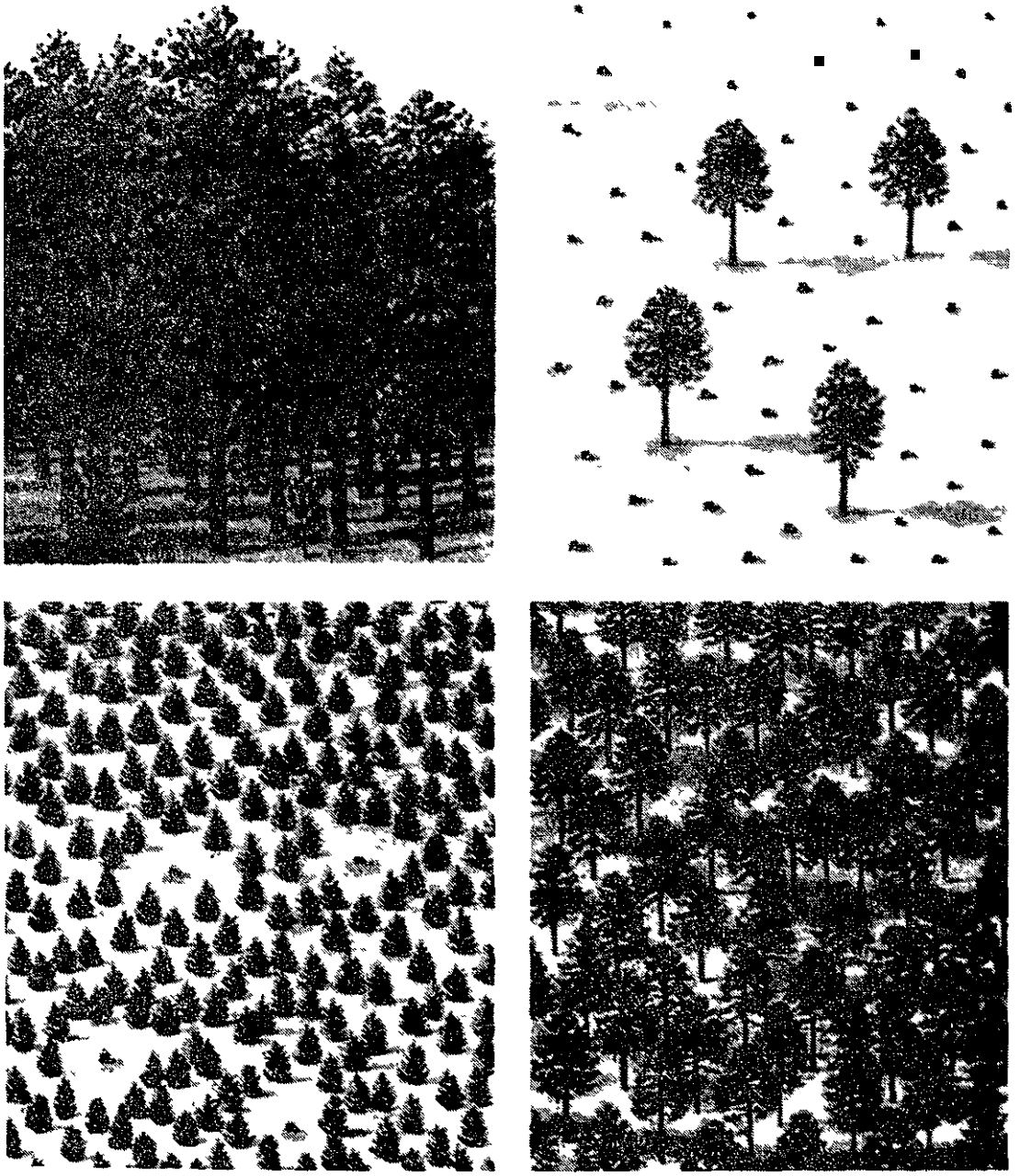
When this continuous production level is achieved, the forest and stands are said to be "regulated" Where the single-tree selection or group selection silvicultural sys-

FIGURE J-1
CLEARCUTTING SYSTEMS



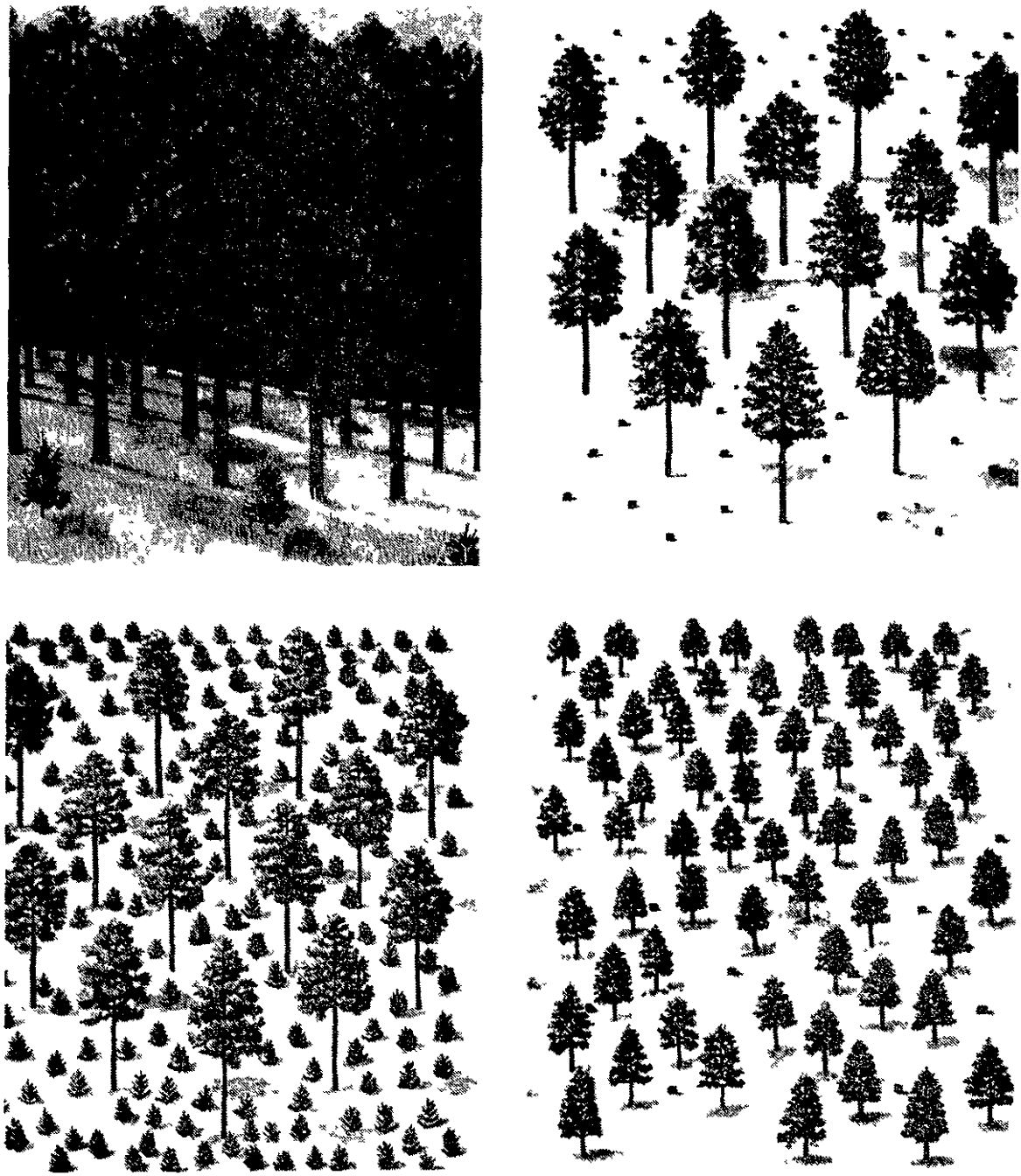
Clearcutting. *Part of a mature stand is cut, removing all trees. A new Stand arises from seeds of surrounding trees or from sprouts sent up by roots or stumps. Seedlings may also be planted or seeds broadcast When the new trees are well on their way in the unobstructed light of the clearing, a neighboring stand of mature trees is cut in turn. (The illustration is from* The Secret Life of the Forest *by Richard M Ketchum, copyright 1970 by American Heritage Press, and is used with the permission of McGraw-Hill Book Company.)*

FIGURE J-2
SEED-TREE SYSTEM



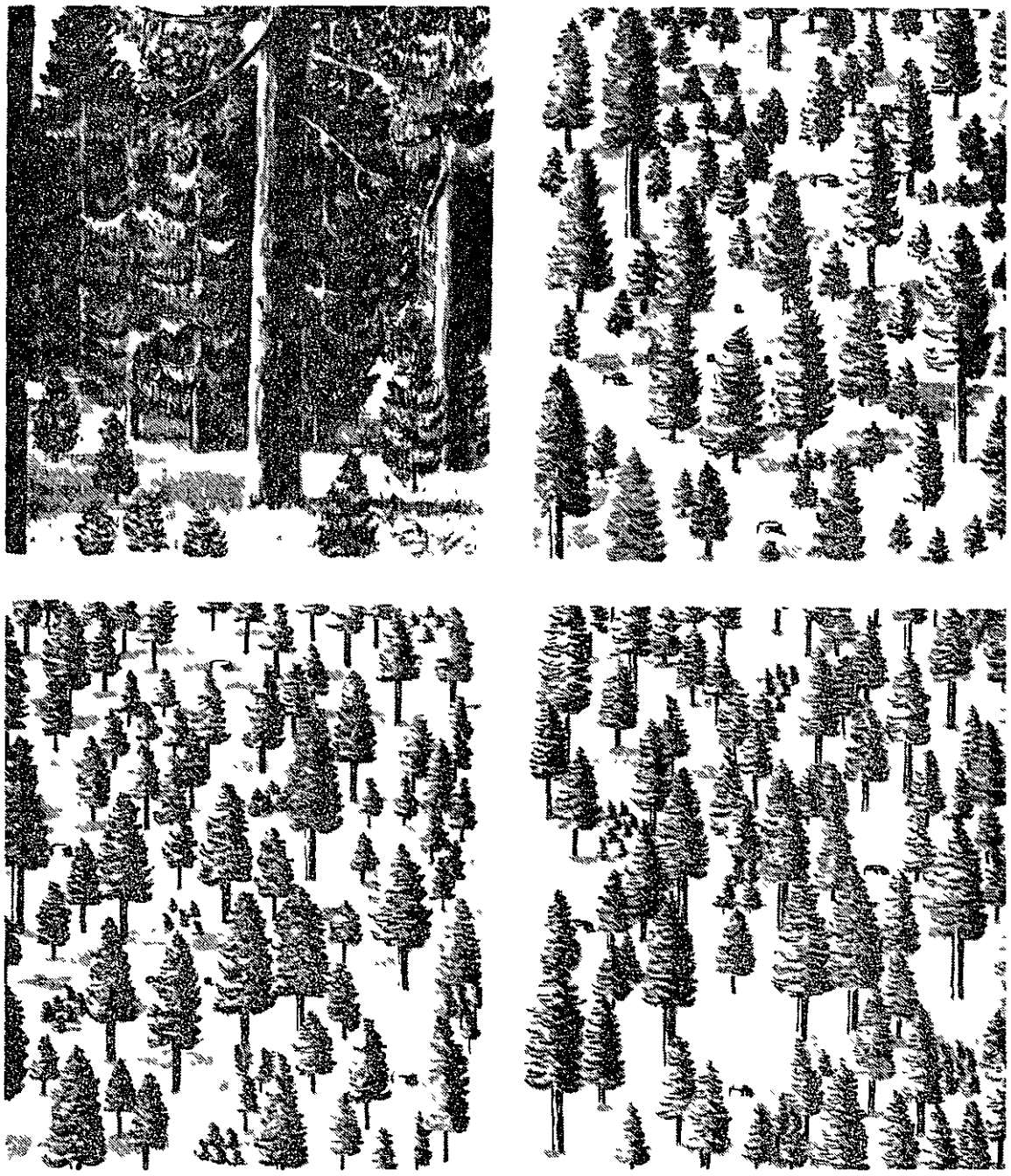
Seed-tree System. *The mature stand is logged, but enough trees are left to reseed the area The seed trees usually are large and valuable, and may be harvesred when they have fulfilled their purpose Lihe clearcutting, the system favors light-demanding species. (The illustration is from* The **Secret Life** of the Forest *by Richard M. Ketchum, copyright 1970 by American Heritage Press, and is used with the permission of McGraw-Hill Book Company)*

FIGURE J-3
SHELTERWOOD SYSTEM



Shelterwood System. *A mature stand ispartially cut, leaving some of the better trees of desired species to grow, cast seed, and provide shade and perhaps other shelter for the new stand. Usually more trees are left per acre than in the seed-tree system. These shelter trees will be harvested after seedlings have become established and no longer need protection.*

FIGURE J-4
SINGLE-TREE SELECTION SYSTEM



Single-tree Selection System. *Cuts are made more often than in other systems, but since the entire stand is never removed, appearances are not much affected. Undesirable trees are removed, overly dense areas are thinned, and mature trees are harvested during each cut. Seedlings of shade-tolerant species develop wherever they can find room. The stand contains trees of many ages.*

tems are used, each regulated stand would produce approximately the same yield from each harvest This would occur about every 10 years By contrast, where the even-aged systems are used, yields from each harvest in a regulated stand would not be equal, but the average yield for the forest would be the same

The conversion of wild stands to regulated stands has just begun The goal of regulation will take many decades to achieve No National Forest in California has been regulated yet

D Biological Contrasts among Forests and Stands Managed by Different Silvicultural Systems

The key biological contrasts are summarized in **Table J-I**

Appearance

Variation in tree age. A forest managed by even-agec silvicultural systems consists of a mosaic of even-agec stands Every age class would be represented in a regulated forest, and each age class would be represented by approximately the same number of stands A regulatec forest managed by the group selection system would resemble forests managed by the even-aged silvicultural systems. except that the even-aged components (groups) would be much smaller and more numerous By contrast, each stand in a regulated forest, managed by the single-tree selection system, would have trees of many ages (perhaps all ages)

The oldest (or largest) trees in any managed forest depend primarily on the management objectives, not on the silvicultural systems In particular, the amount of large trees or old-growth to be produced or maintained depend more on the willingness to forego yields than on the kinds of silvicultural systems used to manage stands

Variation in developmental stages. In the even-aged and group selection systems, all stages of forest development are present in the forest, including grasses, forbs, shrubs, tree seedlings, and larger trees Each stage is represented by entire stands or groups By contrast, in the single-tree selection system the areas dominated by small plants, such as grasses, forbs, or shrubs are commonly very small (for example, less than one-hundredth of an acre), but they typically occur somewhere in every stand In a regulated forest, the total area occupied by each stage should be about the same, regardless of the silvicultural system used

Occurrence of shade-tolerant and intolerant plants. Even-aged and group selection systems favor plants that can readily be established and which grow well in full sunlight (shade-intolerant plants) These include grasses, most forbs and shrubs, and many of the most valuable commercial tree species, such as ponderosa pine and Douglas-fir The single-tree selection system favors plants that can readily be established and grow well at low light levels (shade-tolerant plants) Examples are many ferns, few grasses, forbs, and shrubs, many non-commercial hardwood tree species, and a few commercial conifer tree species, such as white *fir* and incense-cedar

However, on low-quality forest lands, where lack of soil moisture or other soil conditions cause low plant densities. shading by trees is greatly reduced There, shade-intolerant plants will persist if the single-tree selection system is used.

Diversity of plant species. Species diversity depends on the biological and physical environments, how diversity is evaluated, and how the stands are managed under the different silvicultural systems

On moderate- to high-quality lands, stands managed by the single-tree selection system shift toward shade-tolerant species In California, many stands and forests, which were previously dominated by more valuable pine and Douglas-fir, now have large components of less valuable tanoak, madrone, or white fir due to single-tree selection This process could reduce tree species diversity in such stands, compared with management by other silvicultural systems The shift towards more shade-tolerant species also means that the species diversity of plants near the ground would eventually be lower in stands managed by the single-tree selection system

The species composition of commercial tree species may be significantly increased or decreased during stand regeneration, depending on the environmental conditions, availability of natural seed, selection of species to be planted, and the success of the plantings If artificial regeneration fails in stands with mixed species, the diversity in the naturally-regenerated stand may be reduced significantly Potential seed trees of some species could have been harvested, or certain species (for example, white fir) could regenerate naturally under the brush that rapidly occupies newly harvested areas

If artificial and natural regeneration fail, the species diversity of commercial trees is significantly reduced The risk of a complete regeneration failure is least for the single-tree selection system There is a high probability of successful natural regeneration of all species where openings are

small, seed sources are present, and environmental conditions are suitable for tree seedling establishment The risk of loss of diversity in large openings can be reduced by planting all appropriate species or by designating appropriate seed trees or shelterwood trees of mixed species

Vertical diversity. The vertical diversity in stands managed by the even-aged or group selection systems can be limited Typically there is a single dominant layer of seedlings, saplings, or larger trees However, there is usually considerable diversity in stands with the larger trees because some trees are significantly taller and have fuller crowns than others Full vertical diversity still occurs, but not in each stand or group By contrast, in the single-tree selection system. the vertical diversity within each stand should be much greater Seedlings. saplings. and trees in larger tree classes should be seen from any point in the stand

Tree vigor. If the stands are well managed, tree and stand vigor should be independent of silvicultural systems, with three exceptions First, new seedlings in openings (particularly shade-tolerant species such as red fir and white fir) are heavily stressed by heat and lack of adequate water until they develop good root systems These stresses often cause heavy mortality (especially of natural seedlings, or of low-quality or mishandled or poorly planted seedlings from nurseries) Second, seed-lings in openings are more susceptible to damage or mortalrty from frosts, particularly at high-elevation sites Where seedling mortality (even of high-quality or properly handled and planted nursery seedlings) is expected to be excessive, use of the single-tree selection, shelterwood. and group selection (where groups are small) systems are favored Third, maintaining good vigor of small shade-intolerant species, such as ponderosa pine. can be very difficult in stands managed by the singletree selection system To promote vigor and growth of these trees, tree density may have to be reduced This can significantly reduce timber yields

Many stands are severely infected with certain root diseases or dwarf mistletoes It would be very difficult and costly to maintain or improve tree vigor and productivity on these stands if the single-tree selection system were used These root diseases and dwarf mistletoes infect other trees more easily when this system is used

Genetic Resources

Conservation of genes. Genetic diversity is basically unaffected when natural or artificial regeneration of commercial tree species is successful (Successful artificial regeneration means that appropriate procedures were used during seed collection to ensure a large genetic diversity in the collected seed) However, if regeneration of a particular species were to fail repeatedly over broad areas, genetic diversity would be reduced

Quality of genes. Where improperly applied. the single-tree selection system can lead to "high-grading", which in turn reduces genetic quality for wood production High grading is the selective removal of the best trees (most rapidly growing, largest, and most valuable for wood), so that most regeneration comes from seed produced by the lower-quality, remaining trees

The average genetic qualtty may be significantly lowered in a stand managed by the single-tree selection system because of higher rates of inbreeding Some forest geneticists theonze that inbreeding may also increase under the shelterwood or seed-tree systems Nearby trees of the same species are usually closely related. and they can pollinate each other The natural seedlings can become even more inbred. By contrast, artificial regeneration or natural regeneration from edges of large openings reduces the probability of significant inbreeding Large openings facilitate pollen movement from more distant, less closely related trees, thus promoting genetic quality

Productivity

No scientific long-term comparisons of wood production, using the different silvicultural systems, have been made anywhere in the world This comparison will be possible many decades from now at Blodgett Forest, a University of California research facility Theoretically, the total biological productivity (biomass) may be greatest for stands managed by the single-tree selection system This is because of more continuous tree cover, compared to the other systems However, merchantable stand growth and timber yields may not be higher for the single-tree selection system Merchantable yields are strongly influenced by managerial factors

E Managerial Contrasts Among Forests and Stands Managed by Different Silvicultural Systems

The major managerial contrasts described in this section are summarized in **Table J-2**

Public Concerns

In the last two decades the clearcutting system, and to a lesser extent the shelterwood and seed-tree systems, have generated controversy in the Unrted States and Europe

There are at least six major concerns in California

- Clearcut areas are regarded as visually unattractive
- The risks of signrficant soil erosion and loss of soil productivity are thought to be much greater for the clearcutting system
- Regeneration of clearcut stands is thought to be unreliable
- The risks of significant genetic losses are thought to be much greater for the clearcutting system because new stands may be monocultures
- The use of chemical herbicides (strongly opposed by some groups and individuals) is thought to be much greater if even-aged systems are used, particularly the clearcutting system
- Artificial regeneration, particularly of even-aged stands, is thought to be too costly

All of these undesirable effects can occur under any silvicultural system However, the risks of some are significantly different among certain systems The concerns about genetic losses were addressed earlier in the sections on Diversity of Plant Species and Genetic Resources The other five concerns are discussed in the following sections on Effects on Scenic Quality, Risks of Adverse Effects on Watersheds and Soils, Scientific Knowledge Base, Management Experience, and Wood Production

Other managerial aspects of the silvicultural systems are also discussed in the sections below They cover risk of major wildfires, risk of damage by insect, disease, or wildlife pests, production of livestock forage, protection of archeological resources, administration of silvicultural projects, timber harvesting efficiency: genetic improvements in forests, and effects on fisheries and wildlife

Effects on Scenic Quality

It is usually easier to create or maintain naturally-appearing landscapes with uneven-aged systems rather than even-aged systems Uneven-aged systems are usually less noticeable because they create less contrast and are more flexible in design However, long-term maintenance of natural appearing landscapes can be more difficult under the uneven-aged systems, particularly for the single-tree selection system, because the inevitable natural wildfires are more difficult to control (see the section on Risk of Major Wildfires)

Depending on circumstances, all silvicultural systems may achieve visual qualty objectives, whether the emphasis is on wood production or natural-appearing landscapes Regeneration cutting in some srtuations can meet retention or partial retention objectives, for example, partial cuttings, such as shelterwood or single-tree selection. or openings that emulate and blend wrth natural conditions Which alternatives are optimal, or even feasible, depend on factors such as location relative to the viewer, slope steepness, and available topographic or vegetative screening

Risks of Adverse Effects on Watersheds and Soils

These risks depend more on the characteristics of the watershed and soils, and on the care and quality of work, than on the kind of silvicultural system used Adverse effects associated wlth any silvicultural treatment can usually be avoided or mrtigated The major possible adverse effects are erosion, sedimentation in waterways, soil compaction, and loss of soil productivity through soil or nutrient loss

The risks of significant, cumulative erosion and sedimentation effects in watersheds usually depend more on road quality and location than on silvicultural treatments

The risk of significant erosion within stands depends on how much protective vegetation and litter cover is removed, as well as on road quality and location This risk is generally higher for the clearcutting system than for other silvicultural systems, because more cover is removed The risk is least for the single-tree selection system

Extensive and frequent use of heavy machines can cause significant compaction of some soils The risk of this occurring should not be significantly different among the silvicultural systems

The risk of soil nutrient losses is increased where vegetation or litter is cleared or high-intensty fires occur Again, the risk due to clearing vegetation or litter is greater for the even-aged silvicultural systems High-intensity tires

may occur in any stand if controlled fires are used improperly However, the risk of high-intensity fires is greater for the single-tree selection system because crown wildfires are more likely (see the section on Risk of Major Wildfires)

Scientific Knowledge Base

There is less knowledge about the single-tree selection system than other silvicultural methods for National Forest lands in California.

Biological. Considerable research has been completed on the biological foundations for all of the silvicultural systems Planting, natural regeneration, and genetic principles have been studied extensively for all systems Research is more complete on early growth of young potential crop trees and control of competing plants for the even-aged and group selection systems Similarly, stand growth model research is more complete for the even-aged and group selection systems There are no major differences in the knowledge base about intermediate cuttings or about insect and disease pest management, among the silvicultural systems

Managerial aspects. Research on the managerial aspects of California's Forests has focused on the even-aged and group selection systems Only in the last decade have concerted efforts been made to research the long-term practicality of the single-tree selection system Earlier studies were not completed because of difficulties with controlling regeneration of some desired species, controlling stocking, or sustaining the desired stand structures and merchantable yields This resulted in strong recommendations against the single-tree selection system by many forest research scientists New interest has been generated by demands for continuous forest cover, maintenance of an unmanaged appearance, and an alternative to management by the even-aged systems However, several decades of management will be required before analyses of overall effectiveness can be made

Research in the group selection system is also underway in California It, too, will require several decades of treatments to achieve regulated stands

Management Experience

Timber harvesting has occurred in California for over 140 years However, experience with managing forests with the goal of regulating potential yields, has been limited to the last several decades Regulation of National Forest lands has involved only the even-aged silvicultural systems, particularly clearcutting However, extensive experience has been gained with all of the silvicultural systems in managing certain stands

Single-tree selection. Most of the harvesting from National Forest lands and many pnvate timber lands in California has been selection cuttings of large trees These cuttings were typically made with no long-term plan for managing the stands by the single-tree selection system This system can require cutting trees in all size classes during each operation Regeneration from natural seeding was usually counted on *Also,* growth of the young trees and the uncut smaller merchantable trees was counted on to offset the reduction in the forest inventory due to harvesting the largest trees Unfortunately, repeated harvests of the largest trees have often caused undesirable results understocked residual stands with lower quality, lower value trees These stands will have to be regenerated using one of the even-aged silvicultural systems or the group selection system, so as to re-establish full stocking levels of desired species

Group selection. The group selection system was tried extensively on National Forest land in the Pacific Southwest Region about 20 years ago Small openings were made to encourage natural regeneratton, particularly of sugar and ponderosa pines Special cutting guidelines were developed for different kinds of naturally-occurring groups of trees The system, called Unit Area Control, failed for three reasons First, the many small groups of natural regeneration could not be managed efficiently They could not be monitored The necessary subsequent treatments were not made The young trees did not grow well or died Some groups could not be treated due to the higher costs of treating small areas Second, the cutting guidelines could not be used consistently There was great difficulty in determining which kinds of groups were actually present in the stand and the location of their boundanes Third, many of the small groups were unavoidably destroyed when large trees in adjacent groups were felled or when logs were moved out of the stand in later harvesting projects It is difficult and costly to save small groups of trees on steep slopes from excessive damage during harvesting or site preparation

Even-aged systems. The oldest plantations on National Forest lands in the Pacific Southwest Region are about 60 years old Some are to be harvested soon and replanted, thus completing the cycle of an even-aged silvicultural system. Extensive experience has been gained in the promotion of young tree growth, intermediate cutting, and regeneration cutting treatments for even-aged systems in all major timber types in the Region Overall,

artificial regeneration following clearcutting has been very reliable in ponderosa pine, Douglas-fir, and mixed conifer stands, Artificial regeneration has been significantly less reliable in red or white fir stands The primary causes of planting failures are· (1) difficulties with consistently producing high-quality seedlings in the nurseries, and (2) planting when the environmental conditions are inappropriate The shelterwood system, with natural or artificial regeneration, is presently used in red or white fir stands where regeneration after clearcutting is expected to be unreliable

Wood Production

Need for the control of competing vegetation (including the use of herbicides). Control of competing vegetation is needed in all of the silvicultural systems to ensure establishment and good growth of tree seedlings or sprouts Some have theorized that less control is needed in the single-tree selection system Under this system tree cover is more continuous, resulting in fewer competing grasses, forbs, and shrubs However, these competitors cause significant moisture stress in the seedling and sapling potential crop trees (in addition to the substantial moisture stress caused by the larger trees), thereby reducing their survival and growth There is no compelling theoretical basis for concluding that the need for control of competing vegetation should be reduced if the single-tree selection system were used. Certain commonly-occurring, major competing plants can retain good vigor when shaded by most conifers (such as manzanita, bear clover, tanoak, or madrone) Using the single-tree selection system would definitely not reduce the need for controlling competition from such plants

Frequency of control treatments varies by silvicultural system Treatments under the single-tree selection system could be needed somewhere in every stand as often as every 5 to 10 years. The average treatment frequencies in the other systems are much lower For example, in any of the even-aged systems, up to about three treatments could be needed in the first ten years of a new stand. No additional treatments may be needed until the stand is regenerated - a period that could exceed 50 years. Thus, the average period between treatments would be greater than 20 years Regardless of the silvicultural system used, the total acres treated (and the total pounds of herbicide applied per acre, if herbicides were used) should be about the same over the long term

The aerial application of herbicides (usually the most cost-effective and frequently the most controversial method of applying herbicides) could not be used in the single-tree selection system. Depending on topography and vegetation structure, it could also be impractical in the group selection system.

Treatment costs. The size of a treatment area is a major factor in determining treatment costs and managerial feasibility Generally, costs per acre in intensively managed forests are higher when the treatment units are smaller Therefore, the even-aged *systems* are the most cost efficient, and the group selection and the single-tree selection system (in that order) are the least cost-efficient

Regeneration by clearcutting is the most cost-efficient among the even-aged systems Shelterwood and seed tree systems are less so, in that order The removal of shelterwood trees or seed-trees, after the seedlings are established. is a second cost not required in the clearcutting system

In theory, the total cost of natural regeneration should be less than for artificial regeneration The costs of seed collection, nursery operations, seedling handling, and planting are eliminated. However, these savings are often offset by increases in pre-commercial thinning costs Natural regeneration often results in much greater densities of trees than would be planted, or are desirable Also, unreliable seed production by many commercial tree species often delays natural regeneration This reduces wood productivity When natural regeneration is delayed, the sites are occupied by competing plants, the control of which can be costly Overall, artificial regeneration insures prompt reforestation of preferred species at desirable densities If natural regeneration is to be used, the shelterwood and seed-tree systems are usually more cost-efficient than the uneven-aged systems The reason is the economic savings associated with larger scale treatment areas Where artificial regeneration is to be used, the clearcutting and shelterwood systems are more cost-efficient, for the same reason

Achieving regulated forests, while maintaining Forest timber harvest levels. Regulation can be accomplished most easily with the even-aged or group selection silvicultural systems There are two critical disadvantages of the single-tree selection system First, foresters lack the knowledge about trees that is needed for cutting on a stand-by-stand basis There are tens of thousands of stands on a typical National Forest in California, with up to about 10,000 potential crop trees per stand Currently, inventory data needed for the single tree selection system are lacking for about two-thirds of these stands Second, in the Mediterranean climate in Califomla, large forest wildfires are inevitable. Reforestation after these fires creates many, new even-aged stands It is very difficult to regulate a forest

under a single-tree selection system when substantial acreages of unplanned even-aged stands occur

Planning, contracting, and record keeping. The many small units used in the uneven-aged systems makes for ineffective and costly operation and administration If stands in a typical Ranger District were managed by uneven-aged systems, in excess of 50,000 separate areas would have to be inventoried, planned for, treated, and monitored Even with computers the management complexrty would be excessive Therefore, the extent to which uneven-aged management systems are used for intensive timber management are necessarily very limtted

Timber harvesting. Five important aspects of timber harvesting are strongly influenced by the choice among silvicultural systems (I) variability in the sizes of harvested trees, (2) area to be harvested. (3) complexity of the harvesting treatments, (4) the probability of causing significant damage to trees left in the stand, and (5) the probability of causing long-term root disease problems The first three aspects influence harvesting efficiencies, and the other two affect the vigor, tree stocking, and value of the residual stand

There is wide size variation in trees harvested in each operation under the single-tree selection system This reduces harvesting efficiency because logging equipment is size-dependent However, this disadvantage could be insignificant in young-growth stands

Harvesting in the single-tree selection system is much less efficient than for the other systems because more land must be treated in each operation to harvest the desired yield from the forest

The complexity of harvesting treatments is also greatest in the single-tree selection system Identifying which trees to cut, determining where they are to be felled, felling the trees in the designated areas, and removing the trees or logs out of the stand without damaging the residual trees can be very difficult and costly In the single-tree selection system, cuttings occur as frequently as every five to ten years In the other systems, only the intermediate cuttings are as complex The regeneration cuttings in the other systems are more straightforward operations Group selection and clearcutting are the most efficient

Logging damage to trees left in the stand is typically greatest for the single-tree selection system It is very difficult to selectively harvest trees in dense stands without damaging many residual trees, particularly on steep slopes Damaged trees are often infected by wood-decaying fungi that can persist in the soil for long penods, thus retaining the capacrty to infect new trees The fungi reduce the windfirmness, vigor, commercial value, and stocking of residual trees This characteristic is a particular concern in developed recreation areas where selection systems are often applied Stands with red or white fir have an especially high probabilrty of being infected with wood-decaying fungi when damaged

Genetic improvements in Forests. Genetic improvements to increase timber growth, improve tree form and wood quality, or increase resistance to disease and insect pests, depend primarily on planting trees wlth desirable genetic characteristics Therefore, the potential for genetic improvement is greater for silvicultural systems that use artificial regeneration The clearcutting, group selection, and shelterwood systems (if artificial regeneration is used) have the greatest potential for improving the genetic quality of forest trees The single-tree selection system, with its natural regeneration and higher rates of inbreeding, has the least potential

Risk of Major Wildfires

The even-aged systems (clearcutting in particular) are best for reducing the risk of major wildfires because the greater control of fuel distribution makes wildfire prevention and suppression easier and less costly The single-tree selection system is least desirable because fires burn intensely and are more difficult to control Openings, which can serve as fuel breaks, occur less frequently in forests or stands managed by this system *Also,* the multiple tree layers create "ladders", permitting ground fires to spread into the crowns of the large trees Crown fires are more destructive and more difficult to control than ground fires Finally, the use of controlled fires to reduce the risks of large wildfires is most difficult and costly in the single-tree selection system

Risk of Significant Pest Damage

Silvicultural treatments reduce risks by selecting appropriate tree species. by diversifying within and among stands, and by maintaining tree vigor Diversification within stands is increased through use of multiple species or uneven-aged silvicultural systems Vigor is promoted by preventing the trees and other plants from becoming too dense Competing plants also provide habttat for animal pests such as pocket gophers and rabbrts Well managed stands in all systems reduce the risk of significant pest damage However, there are exceptions

Risk of significant insect or disease damage to trees increases if the trees have been wounded Many wounds occur during silvicultural treatments Accidental scarring of trees can be caused by felling nearby trees, or by bumping them with machines or logs moving through the forest Risk increases with frequency of stand treatments, particularly cutting Cutting frequency is much higher for the single-tree selection system than for others, so the risk of significant insect and disease damage is highest

Two serious diseases, dwarf mistletoes and some root rots, can be difficult, costly and, in some cases, impossible to control under selection systems Damage from these diseases is most easily controlled by managing the entire stand Dwarf mistletoe plants can project seeds down on trees within about 100 feet horizontally, thereby infecting nearby susceptible species Even-aged systems allow the manager to control damage from this pest through cutting treatments

Many root disease fungi infect susceptible trees by root-to-root contact Some root diseases start at harvest time and spread to other trees in the stand Control may require killing trees in a zone around the infected area Uneven-aged management, particularly the single-tree selection system, can perpetuate root disease "centers" and spread infection

Generalizations about wildlife pest damage and silvicultural systems are difficult The major potential wildlife pests in the Region include pocket gophers, deer, porcupines and rabbits These animals feed in vegetation dominated by grasses, forbs, shrubs, or tree seedlings Use of the even-aged or group selection systems can create large areas temporarily dominated by this kind of vegetation This can cause higher densities of potential pests which increase the nsk of significant damage to potential crop trees However, the actual damage levels are not increased where this occurs

Production of livestock Forage and Browse

Even-aged systems and the group selection system are best for livestock production Grasses, forbs, and shrubs used by livestock occur in the greatest quantity in openings Management efficiency increases in large forage areas because livestock control and access is easier and less costly

Protection of Archaeological Resources

There should be no significant differences among the silvicultural systems in their risk of damage to undetected archaeological resources Damage depends more on the intensity and frequency of management treatments than on the kind of silvicultural system, particularly when large machines are used

Effects on Fisheries and Wildlife Habitat

Fisheries habitat is most easily protected where the water quality is high, stream temperatures are kept moderate through shading, and where the runoff quantity is sufficient to maintain spawning areas The single-tree selection or group selection systems are usually more advantageous than the even-aged systems for managing the vegetation in riparian management zones However, the silvicultural systems used outside these zones do influence the amount of sediment in the water (see the discussion in the section titled Risks of Adverse Effects on Watersheds and soils)

The choice of silvicultural systems to best manage wildlife habitat depends on which species are to be emphasized Regardless of which treatment is used in a stand, some species will benefit and others will not Most wildlife species are adapted to thrive in specific structures and species of forest vegetation For example, the use of the even-aged or group selection systems favors deer, quail, and rabbits that use herbaceous and shrubby vegetation most abundant in large openings in the forest The single-tree selection system may favor animals that need vertical diversity, such as spotted owls and tree squirrels

Almost all forest wildlife species could use a particular young-growth stand at some time in its development regardless of the silvicultural system (The exceptions are the few species that may be totally dependent on very large, decadent trees for habitat) The kind of silvicultural system used would influence the proportions of wildlife species and when and how they could use the stand as habitat A significant exception is single-tree selection management applied to large areas The absence of large openings could prevent use by wildlife adapted to this kind of habitat, such as soaring hawks Overall, a mix of the silvicultural systems would probably best meet most wildlife management objectives

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Table J-1
Ratings of the Major Silvicultural Systems by Principal Biological Attributes

is Good, Excellent, or many
is Good to Moderate
is Moderate or Few
is Poor or None

IOLOGICAL ATTRIBUTES	CLEAR-CUTTING	SHELTER-WOOD	SEED-TREE	GROUP SELEC-TION	SINGU TREE SELEC TION
ppearance					
a Diversity of tree sizes in a stand:					
(1) Vertical					
(2) Horizontal					
b. Number of openings in a forest:					
(1) Larger than 2 acres					
(2) 1/10th to 2 acres					
(3) Smaller than 1/10th acre					
c. Potential for conserving or improving plant species diversity in a stand.					
enetics					
a Resistance to inbreeding effects;					
b. Resistance to degradation by "high-grading";					
c. Potential for conserving genes in a forest[3].					
oductivity (potential for producing biomass)					

Exclusive of roads and natural openings wch as meadows or rock outcrops.

Assumes no major fires; otherwise "Poor.'

Assumes all harvested species are planted successfully, or will regenerate naturally; otherwise "Poor.'

Table J-2
Ratings of the Major Silvicultural Systems by Key Managerial Attributes

■ is Good, Excellent, or many
□ is Moderate or Few
□ is Poor or None

MANAGERIAL ATTRIBUTES	CLEAR-CUTTING	SHELTER-WOOD	SEED-TREE	GROUP SELEC-TION	SINGLE TREE SELEC-TION
Overall Public Acceptance	□	□	□	□	■
Natural Appearance	□	□	□	□	■
Soil Protection in Stands					
Soil stability where soils have high erosion potentials.	□	□	□	□	■
Scientific Knowledge Base and Management Experience	■	□	□	□	□
Wood Production					
a. Cost efficiency of treatments:					
(1) General (based on treatment unit size)	■	■	■	□	□
(2) Regeneration	□	□	□	□	□
(3) Feasibility of aerial application of herbicides	■	■	■	□	□
(4) Harvesting	■	□	□	□	□
b. Potential for regulating the forest, while maintaining harvest levels.	■	□	■	□	□
c. Administrative efficiency (planning, contracting, and record keeping).	■	□	□	□	□
d. Need for control of competing vegetation.	■	■	■	■	■
e. Potential for retaining vigor and value of residual trees'.	■	■	■	□	□
f. Potential for genetic improvement of trees by planting.	■	■	■	□	□
Controlling Wildfires in a Forest					
a. Potential for controlling major wildfires.	■	■	■	■[2]	■[3]
b. Potential for using controlled fires to manage fuels.	■	■	■	□[2]	□[3]
Risk of Significant Pest Damage					
Potential for controlling damage from dwarf mistletoes and certain tree root deseases.	■	■	■	■[2]	□
Livestock Production Potential in a Forest	■	■	■	□[2]	□

Table J-2 (continued)
Ratings of the Major Silvicultural Systems by Key Managerial Attributes

■ is Good, Excellent, or many
▒ is Moderate or Few
□ is Poor or None

MANAGERIAL ATTRIBUTES	CLEAR-CUTTING	SHELTER-WOOD	SEEP TREE	GROUP SELEC-TION	SINGLE TREE SELEC-TION
Streamside Management Zones					
Potential for protecting fish habitat	□	▒	□	▒	■
Wildlife Habitat in a Forest					
a. Potential for deer, rabbits, and quail	■	■	■	■	□[3]
b. Potential for spotted owls and tree squirrels	▒	□	□	■	■
c. Potential for soaring hawks and eagles.	■	■	■	□[2]	□[3]

Assumes gentle slopes; otherwise "Moderate", but "Poor" for the Group and Single-tree selection systems.
Assumes openings of about 1-2 acres; "Poor" if smaller.
Assumes highly productive land; otherwise "Moderate" or "Good".

Appendix K

Response to Public Comment

Appendix K
Response to Public Comment

Introduction

The public comment period for the Shasta-Trinity National Forests Draft Environmental Impact Statement (DEIS) and Proposed Forest Land and Resource Management Plan (Proposed Plan) began on September 29, 1993 and closed January 6, 1994 Agencies, government officials, private industry, private organizations, and the public were invited to comment on the DEIS and Proposed Plan Public briefings were held in Weaverville, Redding, and Weed, California Numerous other briefings were given upon request from interested groups, including county boards of supervisors for Shasta, Tehama, Trinity, Siskiyou and Humboldt counties, local chapters of the League of Woman Voters, the Society of American Foresters, and the Californra Native Plant Society, the Shasta Alliance for Resources and Environment (SHARE), the Mount Shasta and Dunsmuir Rotary Clubs, College of the Siskyous, local offices of the California Department of Fish and Game, USDI Bureau of Land Management, and the California Department of Fish and Game; the Trinity Bio-Region Planning Group, the Shasta-Tehama Bio-Regional Group, the Interagency Adaptive Management Area Group, and the Northern California Bio-Regions Group

During the 90 day public comment period, 394 letters were received containing a total of approximately 1,403 written comments Of the 394 letters, 147 were form letters or modified form letters States responding included California (84%), Illinois @%), and the remaining states included Georgia, Iowa, Minnesota, Montana, North Carolina, Nevada, New York, Oregon, Virginia and Washington Within California, cities with 5 or more respondents included Mt Shasta, San Diego, Hayfork, Redding, Menlo Park, San Francisco, Sacramento, Weaverville, Los Angeles, Hyampom, Mad River, Oakland, and Yreka

organizations responding included 32 environmental groups, 15 recreation oriented groups, 7 forest products groups, 2 professional societies, 1 church, 1 newspaper and 1 Indian tribe

Government responses included the U S Department of Energy, the U S Department of Interior (Office of Environmental Affairs), Region IX, E P A , Congressman Wally Herger, the Resources Agency of California, the California Department of Fish and Game, the California Department of Forestry and Fire Protection, the Siskiyou Board of Supervisors, the Siskiyou County Farm Bureau, the Tehama County Board of Supervisors, and the Trinity County Board of Supervisors Copies of these letters are also included following the comments and responses

The largest volume of comments were related to timber, water and fisheries resources, wilderness and roadless area management, Mt Shasta, wild and scenic rivers designation, and old-growth ecosystems

Organization of Appendix K

This appendix contains the responses to public comments After analyzing the substantive comments described above, the Shasta-Trinity National Forest Land Management Planning Team grouped related topics to avoid cumbersome text duplication, then responded to the concerns expressed in the comments The comments and responses are intended to be only explanatory in nature If there are any apparent contradictions between Appendix K and the text of the Final EIS and Forest Plan, the Final EIS and Forest Plan direction prevails

The Environmental Protection Agency has a legal obligation under Section 309 of the Clean Air Act to review and comment on environmental impact statements Their letter reviewing the Draft EIS and Proposed Forest Plan appears following the comments and responses

The acronym, ROD, used in Appendix K references the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl, April, 1994 The term Forest Plan or Final Plan refers to the Shasta-Trinity National Forests Forest and Land and Resource Management Plan FEIS refers the the Shasta-Trinity National Forests' Final Environmental Impact Statement for the Land and Resource Management Plan

Air Quality

Comment: The EIS must commit to using the best methodology available to maintain air quality standards

Response: The Forest is committed to maintaining or exceeding air quality standards as required by the Clean Air Act and through compliance with local air pollution control district standards and requirements

Comment: The EIS must provide more information, including the identification of air pollution control districts, the location/description of Class I and II airsheds, and the identification of non-artainment areas, by pollutant, on the Forest

Response: These items have been addressed in Chapter 3 of the Final EIS and Forest Plan

Comment: The EIS should include a discussion of particulate matter (PM 10) from direct emissions, including mitigations, and a discussion of particulate matter historical averages and future estimates

Response: There is no available data for this topic

Comment: The EIS should identify applicable Prevention of Significant Deterioration (PSD) Class I areas

Response: PSD's are typically associated wrth coal-burning utility powerplants, and there are none of significance within the Forest's scope of consideration

Comment: The EIS fails to evaluate air quality degradation associated with a wildfire

Response: The EIS recognizes the potential adverse effects of wildfire to air quality However, because of the unplanned nature of wildfire, it is exempt from air quality standards prescribed by the Clean Air Act

Comment: The EIS should provide a detailed discussion on the status of air quality planning for the area. and indicate if there is a approved air quality implementation plan We recommend the Forest Service consult and coordinate with the Siskiyou County Air Pollution Control District to ensure the proposed action conforms with existing efforts to maintain and improve air quality

Response: The State of California does not have an approved air quality implementation plan, so a conformity determination can not be completed at this time The Forest has coordinated with the Siskiyou County Air Pollution Control District, and other APCD's during the development of this Forest plan These agencies are also contacted on an on-going basis prior to and during project implementation

Comment: The EIS must display the effects of management activity upon air quality, and provide specific air quality standards and guidelines

Response: Chapter IV of the FEIS provides an alternative comparison of four management activity criteria The Forest Plan displays specific standards and guidelines. Ia - Id, which provide management direction

Comment: How is it possible to have less prescribed burning in the future as stated in the EIS?

Response: The FEIS anticipates a substantial reduction in regeneration harvest acres from current levels, thus a substantial reduction in the use of prescribed fire for site preparation in the future However, the Final Plan estimates non-timber related fuels treatment to increase beyond previous levels as a result of ecosystem needs

Biodiversity

Comment: The objective of maintaining a minimum of 5% of each forest seral stage is an arbitrary standard inadequate to the maintenance of biodiversity

Response: The requirement of a minimum five percent for each timber type/seral stage ensures that an adequate distribution of biodiversity will be available on the Forest The ecosystem management process provides for additional biodiversity opportunity when planning at the landscape level

Comment: The influence of private lands and past management activities upon biodiversity has not been discussed or evaluated

Response: The forest does not control actions on non-federal land and it is often difficult to obtain accurate information on conditions on private property The viability analysis at the Forest level assumes that private activities would neither be beneficial nor detrimental and that NFS land must adequately provide for species viability alone The Regional viability analysis in the FSEIS (President's Plan) which covers the entire northern spotted owl range has been incorporated by reference in the Final EIS Landscape patterns will be analyzed during ecosystem analysis at the watershed/ landscape level

Comment: The viability analysis presented in the EIS is inadequate, and needs to be more like the analysis presented in the FEMAT report

Response: The viability analysis presented in the FEMAT report, further refined in the ROD and FSEIS. is incorporated into the ecosystem management approach of the Preferred Alternative The land allocation decisions and application of the standards and guidelines of the ROD and FSEIS, tiered to by the Preferred Alternative, are designed to ensure continued species viability

Comment: Treatments should be allowed within the late-successional reserves in stands of over 80 years old

Response: The ROD for the FSEIS provides direction for the Forest Plan The Forest is within the California Cascades and California Klamath Provinces The Guidelines to Reduce Risks of Large-scale Disturbance apply within these provinces, and have been incorporated into the LSR Standards and Guidelines for the Forest Plan Generally, stands over E0 years old will not be treated

Comment: Biodiversity needs to be analyzed in terms of species and habitat, not just in the context of conifer-based seral stages

Response: The "Timber" inventory is an acceptable proxy when the level of analysis deals only with Forest-wide averages, with the objective being programmatic direction Additional inventories, specifically Ecological Unit Inventories (EUI), may be conducted to assist in the analysis for ecosystem management planning

Comment: The EIS should provide for the enhancement and reclamation of natural openings

Response: The Forest Plan, Standard and Guideline 2a, provides for the management of natural openings to be determined at the project level

Comment: The EIS does not adequately describe forest diversity Describe how biological diversity will be obtained as required by Option *9*

Response: Chapter 3 of the Forest Plan, specifically the sections of Biological Diversity, Botany, Fisheries. Timber, and Wildlife describe the variety and richness of the biological environment. as well as the presence of unique, endemic species The Forest Plan and EIS tiers to and is provided management direction by the ROD and FSEIS (Option *9)*

Comment: Terminology such as "over-mature" and "high levels of decadence" is inappropriate

Response: This terminology has application when describing timber management attributes, and will be retained where appropriate When not specific to timber management considerations, these terms have been changed in the Forest Plan and EIS

Comment: The SAT and FEMAT reports emphasize the protection of biological diversity and the restoration of natural ecosystems The EIS is still timber commodity oriented, and ambiguously applies the term biological diversity

Response: The Forest Plan and EIS tier to and incorporate the Standards and Guidelines of the ROD and FSEIS Ecosystem management principles will guide the management of affected Forest resources, including commodity outputs The definition and application of the term biological diversity used within the context of Forest resource management is evolving The Forest Plan, EIS, and Appendix G describe components of biological diversity which may assist the Forest during Ecosystem Management analysis.

Comment: The EIS must provide specific standards and guidelines for the spatial, temporal, and corridor habitat needs of wildlife Corridors must be more specifically addressed, including connectivity across non-federal lands and matrix areas

Response: The Forest Plan and EIS are programmatic documents which provide management direction for site-specific plans, such as ecosystem management planning Ecosystem management planning will protide for a site-specific analysis of affected resource considerations, including spatial and temporal habitat requirements, and corridor connectivity The standards and guidelines of the FSEIS (ROD) are designed to provide corridors and connectivity

Comment: If only 15% of the Forest is available for management, how can it be called biodiversity?

Response: The ROD and FSEIS provided land allocation decisions which were tiered to by the Forest Plan and EIS The intent was to provide for multiple use, with an emphasis on providing for aquatic and late-successional species habitat needs.

Comment: The Forest Plan must provide for a viability analysis of aquatic and riparian species

Response: Viability analysis was used to guide the development of land allocations, and the Aquatic Conservation Strategy, contained in the ROD and FSEIS .and allocation decisions and the Aquatic Conservation Strategy have been incorporated into the Forest Plan and EIS Watershed Analysis is required *to* adjust Riparian Reserve boundaries and to harvest in key watersheds and roadless areas Watershed Analysis will eventually be done for all watersheds on the Forest

Comment: Public lands should be managed to emphasize the preservation of late seral stage habitat

Response: Land allocation decisions in the ROD and FSEIS provide for late-successional reserves (LSR). LSRs were created with the objective of protecting and enhancing conditions of late-successional and old-growth forest ecosystems. The Forest Plan and EIS incorporate these land allocation decisions

Comment: The standard and guideline for the reduction of biodiversity deficits must be strengthened to emphasize the restoration, not just maintenance, of native plant and animal diversity

Response: The Ecosystem Management process provides an opportunity to address a variety of resource issues, including biodiversity Ecosystem Management and subsequent NEPA processes allow for site-specific remedy and management alternatives in response to native plant and animal diversity

Comment: The EIS inadequately addresses chaparral management considerations Potential adverse effects to native plants and animals during chaparral management activities was not addressed The potential value of older seral stages of chaparral was not addressed

Response: The Forest Plan and EIS are programmatic documents which provide management direction for site-specific plans, such as ecosystem management planning Ecosystem management planning will provide for a site-specific analysis of affected resource considerations. including botanical and wildlife values

Biomass

Comment: A standard and guideline should be developed to allow for the retention of areas within biomass projects that provide a shrub layer or a secondary tree layer to provide for nest, feeding, and escape cover for numerous species

A standard and guideline is needed that states that biomass can only be removed in a manner that does not cause soil compaction

Response: Standards and guidelines which address wildlife and soils needs during biomass operations are included in Chapter 4 of the Final Plan Wildlife and soils, along with other resource needs, would be addressed during site-specific project analysis as part of ecosystem management planning

Comment: The Draft Plan does not address the need for biomass thinning nor does the plan establish an on-going biomass thinning program

Response: The need and benefits of a biomass program are included in the Forest Goals and Standards and Guidelines In addition. the current management situation and management opportunities dealing with the biomass issue are included in Chapter III of the FEIS

The biomass thinning program is included in the timber program as commercial thinning

Comment: Describe the role of biomass in undisturbed forest ecology and discuss how the loss of biomass is considered acceptable.

Response: The importance of biomass in forest ecosystems, particularly in old-growth ecosystems, is documented in the FEMAT Report and the FEIS on Management of the Northern Spotted Owl Biomass within late-successional reserves and other areas withdrawn from timber production will remain undisturbed Within the matrix lands (15-20% of the Forests), biomass would be available for removal only after meeting other resource needs (see Standards and Guidelines in the Final Plan)

Botany

Comment: While the DEIS indicates the need to manage sensitive plants to provide disturbance, where necessary, it does not adequately discuss the long-term consequences of near total fire suppression on biodiversity (Ch III-24)

Response: See the Chapter 4, Final Forest Plan, Forest-wide Standards and Guidelines, 8 Fire and Fuels d which addresses the issue of fuel treatment and the natural role of fire in the ecosystem In addition to this direction, disturbance as it relates to biodiversity will be considered at the watershed analysis and landscape analysis level Conservation strategies, as they are developed, will also address the relationship of fire to individual species A Forest-wide GIS layer for fire history is currently being developed to assist these analyses

Comment: Management Prescription VII and Forest-wide standards and guidelines for sensitive plant species often lack time frames or other specifics that would make them much easier to interpret and implement

Response: Schedules and monitoring plans will be developed locally during ecosystem planning/watershed analysis

Comment: Suggested S&G, Sensitive Plants Projects will be managed to maintain or increase sensitive and Forest endemic plant populations and communities as well as to improve their habitat

Response: The new survey and manage standards and guidelines from the ROD are incorporated in the Preferred Alternative and address this concern See Chapter 4, Final Forest Plan, Standards and Guidelines from the ROD That Apply Forest-wide, Survey and Manage

Comment: Suggested S&Gs, Coordinate sensitive plant inventory and protection efforts with the CDFG,

USFWS, TNC, CNPS and other concerned agencies and groups. Provide reports of new and existing sensitive plant populations to the CDFG Natural Diversity Database and the CNPS inventory annually

Response: The Forest Plan contains these standards and guidelines See Forest Plan, Chapter 4, Standards and Guidelines, 4. Botany e and d

Comment: The CNPS Inventory yielded more than 90 plants known to occur on the Forests or in the immediate vicinity which meet the criteria for CNPS lists Ib, or 2, which denote a high degree of sensitivity The STNF sensitive plant list contains 42 species. Please consider surveying to determine the occurrence of these species and evaluating them as candidates for the STNF sensitive list The STNF's sensitive species list should be reviewed and updated annually We suggest contacting the FWS and other knowledgeable agencies, organizations, academics, and individuals for input

Response: Watershed analysis includes survey *of* these species and other species of concern The Forest Supervisor has recommended several species for listing to the Regional Forester based on Forest surveys See Table P- I for those species recommended and not yet listed The Regional Sensitive Species List is updated by authority of the Regional Forester every 2 or 3 years The Regional Office does the outreach to other agencies and organizations *for* input

Comment: Include discussion and/or standard and guideline for the collection of other forest products such as mushrooms, toyon berries, beargrass, ladybugs and decorative plant materials.

Response: Standards and guidelines were considered for miscellaneous products and not written due to the lack of sufficient Forest-wide data and analysis However, a grant has been awarded to Trinity County to begin inventory of special forest products on the Hayfork and Weaverville Ranger Districts When enough information is available from this and other studies, standards will be set and an amendment will be made to the Forest Plan

Comment: Practice the use of native species for all revegetation and erosion control projects (recommended Forest Goal) The Forest Botanist and/or Ecologist should determine the varieties, planting or seeding rate and methods to be used in revegetation projects, particularly post-wildfire rehabilitation Maintain a bank of local seeds and cuttings from a range of ecosystems in each Forest to be used for revegetation.

Response: On June 30, 1994 the Regional Forester issued a letter on the subject "Policy on the Use of Native Plant Material in Restoration and other Revegetation Projects" Page I of this letter states. "to the extent practicable, seeds and plants used in erosion control, tire rehabilitation, riparian restoration, forage enhancement and other vegetation projects shall originate from genetically local sources of native plants " It also states on page I· "Prescriptions for use of plant materials for revegetation must be developed by knowledgeable plant resource specialists prior to implementation to ensure that the project is feasible and suitable plant material is used Banking local seed is not possible for every revegetation project, e g , fires Policy is being formed to use local seed banks for restoration projects Banking would be addressed during the early planning stages of watershed analysis

Comment: The STNF DEIS botany and biodiversity section do not contain specific discussions of the current or projected status of native plant communities Suggested S&G, Every species noted in the field will be investigated to the extent necessary to ensure that it is not a sensitive species

Response: It is standard practice on the Forest to conduct floristic surveys at the project level From these surveys a comprehensive species list is included with the Biological Evaluation for each project In addition, the new Survey and Manage standards and guidelines from the ROD, incorporated in the Preferred Alternative, are designed to conduct broad surveys as well as to protect known sites. Conservation strategies address the current and projected status of native plant communities

Comment : Suggested S&G, Conservation strategies will be produced for all sensitive plants during this planning cycle Habitat guides rather than single species guides should be prepared for associations of co-occurring species in the same habitat They will be produced on a schedule of at least two sensitive plant species or habitat conservation strategies per year Species will be prioritized for conservation strategy development based on vulnerability to damage by management

Response: Based on staffing and funding, the Forest is currently producing one conservation strategy per year See Forest Plan, Chapter 4, 4 Botany f To-date, one strategy is completed and three are in draft The Forest has adopted the "associations of co-occurring species" concept for future strategies The decision of which species to schedule next has always been flexible depending on current issues and needs

Economic/Social

Comment: Will there be sufficient funding to ensure the Forest will fully implement ecosystem management as described in the Preferred Alternative?

Response: The Forest Plan and EIS designate land allocations and establish limits to management activities through the application of standards and guidelines The success of this aspect of the Forest Plan is not dependent upon the level of funding The Forest Plan and EIS provide the basis for decision making to propose budgets and allocate funds, but cannot guarantee funding The Forest budget is a function of Congressional appropriations, and is outside the scope of this EIS A general discussion of how budget allocations are made when the budget is less than fully funded is contained in Chapter III of the EIS, and Appendix H of the Forest Plan

Comment: Below-cost timber sales should be a thing of the past

Response: Under an ecosystem management approach that considers multiple resource values, timber sales represent only one of these values that continues to have a place in the broad spectrum of management practices and tools available to implement sound ecosystem management Timber sales can be an efficient and effective means of achieving not only silvicultural goals, but other, nontimber resource management goals In these cases, timber sales may occur, even though the value of the timber does not exceed the cost of the entire ecosystem management project

The Forest has traditionally been funded and evaluated based on its ability to economically sell timber Current planning approaches generate additional costs attributable to management of the intangible or difficult-to-quantify values that are equally important components of the ecosystem Managing ecosystems strictly for a positive return would limit opportunities to maximize the intangible benefits of nonquantifiable resource values, resource protection, and provision of overall ecosystem management These factors will be considered when evaluating the below-cost question in the future

Comment: The use of 1991 as a baseline year against which to compare economic consequences distorts the true historic perspective of timber sale levels and economic effects

Response: In preparation of the Forest Plan and EIS, the best available information was used in the analysis Chapter II Part F, Chapter III, Chapter IV, and Appendix I of the EIS provide historic economic perspective, including anticipated economic cumulative effects analysis

Comment: There was inadequate consideration of the potential impacts to state and local governments resulting from actions proposed by the EIS and Forest Plan

Response: The EIS considered five elements of the role the Forest has in the economy of locally-affected counties These elements include economic efficiency, shared receipts with counties. employment, local unemployment and NF budget levels Where applicable, two general time frames of reference are considered, including "historical" and post-Northern spotted owl listing *Also* where applicable, direct, indirect, and induced economic effects are considered in the analysis These discussions are found in Chapters III and IV of the FEIS

Comment: The EIS gave inadequate consideration to direct and indirect social and economic impacts of job loss attributable to scientific decisions

Response: The Forest Plan and EIS tier to land allocation decisions provided by the ROD and FSEIS Those documents provided direction that social and economic considerations be given high priority consideration in the ROD and FSEIS The intent is to provide for the greatest possible human, social. and economic benefits consistent with agency conservation mandates while providing for long-term health of late-successional and old-growth forest ecosystems in the Forest Plan and EIS

Comment: The economic discussion does not accurately reflect the impact of the forest on the regional economy

Response: The Forest Plan and EIS provide a detailed discussion of potential economic affects associated with the alternatives considered in Chapter II of the FEIS Economic factors considered were those which would provide for a reasoned, informed decision by the @eciding Official

Comment: Non-commodity economic revenues need to be fully considered

Response: An array of commodity and non-commodity costs and revenues are considered in detail in the Forest Plan, Chapter II of the FEIS, and Appendix B of the FEIS

Comment: A large portion of timber sales sold on the Forest should be sold to and processed by local mills to benefit the local economy

Response: Forest Service timber sales are sold through a competitive bidding process Forests, in coordination with the Small Business Administration, also provide for small business set-aside offerings Federal law provides for the domestic processing of National Forest timber. Most local mills are actively involved in the bidding process for National Forest timber, but they still must be successful in the competitive bidding process to be awarded the contract to harvest National Forest timber.

Comment: The Forest Service should require as a condition of agreement or permit that any new powerlines built across National Forest land require that a substation capable of handling electricity produce both a local market for thinnings and a source of employment for McCloud

Response: It is outside the scope and authority of the Forest Plan and EIS to require such a condition Co-generation plants within the sphere of influence of the Forest are currently providing a market for non-traditional forest products, such as biomass

Comment: The management of local forest reserves for values other than agriculture, lumbering, mining, and livestock undermines the economic stability of Siskiyou County and the security and prosperity of local resource-dependent industries The EIS must give commensurate management consideration to valuing and protecting the viability, diversity and uniqueness of local human communities and cultural lifestyles as is given to the non-human communities on the Forest

Response: The alternatives present different management scenarios, each makes a contribution to the maintenance of social and economic stability as well as maintenance of biological diversity and providing recreational opportunities Each alternative would provide for different levels of outputs Many approaches were explored to try to find creative ways of providing for all the conflicting demands on the Forest Members of the public helped develop alternatives As demonstrated in the EIS, Chapter II, Direction Common to All Alternatives; the space for making decisions is very constrained after compliance with all environmental laws and regulations which are designed to protect the environment

Comment: Revenue generated from the sale of commodity yields is still the best way to provide funding for non-revenue generating projects

Response: Most of the revenue generated by the sale of National Forest commodities is sent directly to the U S Treasury However, the Knudsen-Vandenburg (KV) Act provides for the collection and expenditure of timber sale-generated funds to be used within project areas under specific requirements Under prescribed conditions, this is still anticipated to be a partial source of project funding for some ecosystem management projects.

Comment: I want to see our forests preserved for my grandchildren and their grandchildren through sustained yield timber harvesting The Draft Forest Plan is and will remain deficient until management direction is changed from preservation to pro-active vegetation management

Response: Alternative RPA was developed in response to those concerns Species viability analysis was used to guide the development of land allocation decisions by the President's Plan Those land allocations decisions were incorporated into the Forest Plan and EIS The intent was to provide for multiple use, with an emphasis on providing for aquatic and late-successional species habitat needs

Ecosystem Management

Comment: Use of the term overmature is inappropnate

Response: This term has application when describing timber management attributes, and will be retained where appropriate When not specific to timber management considerations, this term has been changed to "Late-Successional" in the Forest Plan and EIS

Comment: The President's Plan incorporates an ecosystem approach to Forest planning that should be incorporated into the Forest Plan and EIS

Response: Direction provided by the ROD and FSEIS have been incorporated into the Forest Plan and EIS

Comment: The EIS must distinguish between the terms "ancient forest" and "old growth" in the context of planning and direction

Response: A effort to provide for consistent application of the use of ecosystem management terminology was done throughout the Forest Plan and for the Preferred Alternative of the EIS Refer to the Glossary for definitions The Commentor's position that "ancient forest" is a more apt description of pre-settlement forest stands and not a description of stand age, is noted

Comment: The reserve system proposed in the LMP is too large

Response: The ROD and FSEIS provided for land allocation decisions which were tiered to by the Forest Plan and FEIS Species viability analysis was used to

guide the development of land allocations The intent is to provide for multiple use, with an emphasis on providing for aquatic and late-successionalspecies habitat needs

Comment: The LMP should provide an adequate data base indicating precisely which resources are available on the Forest, as well as coordinate information from environmental organizations and the scientific community

Response: The Forest is continually improving and updating resource databases and baseline data Ecological Unit Inventories are currently being conducted on selected areas of the Forest to assist with ecosystem management planning Public involvement is a key element of the site-specific NEPA project planning process Publicly-provided information is often useful, and can be used by the interdisciplinary team during the analysis process for NEPA projects

Comment: The Plan should display ecosystem management planning units and display a schedule for prioritizing and completing ecosystem management plans

Response: Identification of formal ecosystem management planning units has not yet been determined for the Forest The scheduling of ecosystem management planning is beyond the scope of the Forest Plan and EIS

Comment: The Forest Plan should provide for a standard and guideline requiring that ecosystem management practices reflect historic patterns of forest structure and seral stage distribution be experimented on areas not having significant environmental issues, that management activities in late-seral/old-growth stands be tried first in the Matrix, and that silvicultural prescriptions or practices having other than timber management objectives be tried experimentally first in non-sensitive areas

Response: Forest-wide Standards and Guidelines and specific land allocation standards and guidelines provide Forest direction for site-specific project analysis The Commentor's proposed S&Gs are factors which need to be considered by affected project-level interdisciplinary teams and line officers, but are not appropriate to adopt as formal S&Gs

Comment: Forest ecosystem management and forest health are not really defined well Ecosystem management should be an integrated system of management tools and practices across resource disciplines

Response: The application and use of *these* terms has been incorporated into *the* Forest Plan Ecosystem management principles will guide Forest resource management activities using an interdisciplinary, integrated approach

Comment: Provide for the development of individual project standards and guidelines during project NEPA analysis

Response: Site-specific project NEPA analysis will tier to Forest Plan Standards and Guidelines, apply Management Area supplemental direction, and provide for project-specific management requirements and mitigation measures If S&G's proposed at the project level are inconsistent with the Forest Plan, a Plan amendment may be considered as part of the Adaptive Management Process

Comment: The EIS should develop the criteria, outcomes, management goals, and protocol for developing partnerships with local agencies and consensus-based working groups

Response: The development and function of partnerships is an evolving process on the Forest Partnerships provide an important link in Forest planning to affected and potentially affected groups The Forest is in the process of developing guidelines which provide for partnership development and application under the guidelines of the Federal Advisory Committee Act (FACA)

Comment: Agency polices solidified as "prescriptions" have had a devastating effect on the ecological health of the forest "Put objectives in the plan and leave it to the managers on the ground to achieve those objectives with various tools"

Response: The EIS and Forest Plan provide programmatic management direction Ecosystem management planning and site-specific NEPA analysis using an integrated resource management approach are the responsibility of the authorized line officer Part of the Adaptive Management Process is to amend the Plan prescriptions when ecosystem analysis determines they are inappropriate

Comment: Fragmentation of forest ecosystems are the chief ecological problem for the region

Response: The issue of fragmentation and connectivity of habitat were primary concerns in the development of ROD and FSEIS land allocation decisions The EIS and Forest Plan tier to those land allocation decisions

Comment: Forest Service land has to justify itself with a saleable product as a primary goal, which is not ecosystem management

Response: Ecosystem management is an ecological approach in land management to sustain diverse, healthy, and productive ecosystems Site-specific application of ecosystem management practices are

guided by Forest-wide standards and guidelines, land allocation direction, and management area direction Commodity products may or may not result from application of the process

Comment: The management of the National Forests should be focussed on maintaining a healthy, productive forest

Response: These are two of the guiding principles of ecosystem management, which will provide the basis for management under the direction of this Forest Plan and EIS

Comment: For ecosystem management to be successful it must be practiced on all acres, not just what is left over after single uses have been removed from the management base

Response: The ROD and FSEIS provided for land allocation decisions which were tiered to by the Forest Plan and EIS Species viability analysis was used to guide the development of land allocations The intent is to provide for multiple use, with an emphasis on providing for aquatic and late-successional species habitat needs

Comment: Potentially destructive management activities should be deferred or limited to non-sensitive areas Locate resource extraction and other potentially damaging or disturbance-promoting activities away from areas with high levels of biological diversity

Response: Application of Forest Plan direction, and subsequent ecosystem management and NEPA analysis will provide for an integrated, interdisciplinary approach to resource management The identification of affected resources and resource values and anticipated environmental consequences will be determined prior to initiating project implementation

Comment: Provide for FEMAT mitigation measures in Matrix lands

Response: FEMAT provided most of the framework for the ROD and FSEIS, which in turn were tiered to by the Forest Plan and EIS Specific management direction for Matrix lands is described in Chapter 4 of the Forest Plan

Comment: The Forest should establish control plots in each vegetation and soil type within each managed watershed

Response: Chapter **5** of the Forest plan describes the Forest Monitoring Action Plan, which details monitoring methodology, standards, frequency, precision, and needs for further evaluation/corrective action.

Comment: Establish the Desired Future Condition with public input, and provide for biological diversity goals, timelines, and monitoring for all watersheds

Response: The Desired Future Condition has been developed for all 22 Management Areas on the Forest, and was influenced by public involvement Biodiversity goals are described in Chapter 4, and biodiversity monitoring is described in Chapter **5** of the Forest Plan. The Desired Future Condition will be further refined, with public involvement, at the watershed/project level If Watershed Analysis discovers that the Forest Plan DFC is inappropriate, a Plan amendment may be triggered

Comment: Emphasize management activities that promote the increase of desirable native plant species and communities

Response: Chapter 4 of the Forest Plan provides for Botany Standards and Guidelines which emphasize protection and monitoring of sensitive and endemic plant species The ecosystem management analysis process will provide additional opportunities

Comment: We need more old-growth on high productivity sites

Response: An estimated 75% of the Forest land base is reserved from timber management Though Old-Growth stands are located on a variety of site classes, a large percentage of stands are located on average or better than average site class lands

Comment: The EIS should include recommendations for the management of non-federal lands as necessary to ensure forest ecosystem integrity and species viability

Response: Direction for management activities on non-federal land are beyond the scope of this FEIS However, impacts from past and future anticipated management activities on non-federal lands were considered as part of the cumulative effects analysis

Comment: If preservation is the goal, the Forest Service should be disbanded and the land turned over to the National Park Service

Response: The Forest Service will continue to redeem management responsibilities on National Forest System Lands as provided for by statutory requirements and within the context of Ecosystem Management, an integrated resource management system

Facilities

Comment: Forest roads should be closed, decommissioned, and/or obliterated Construction of new roads and overall road density should be decreased.

Response: Expected new road construction is reduced from 22 to 3 miles per decade in the Alternative PRF Roads will be retained in the transportation system which will be needed for future management activities Uninventoried roads will be analyzed to determine whether they should be added to the transportation system or obliterated

Comment: Eliminate dams

Response: The regulatory agency responsible for water impoundments such as dams is the Federal Energy Regulatory Commission (FERC)

Comment: How will road maintenance needs be met in lieu of reduced funding levels Roads should be maintained

Response: Maintenance of roads will continue to emphasize the prevention of resource damage, user safety, contractual and legal obligations, and to provide an efficient transportation system The objective is to maintain all Forest roads to at least Maintenance Level I The annual program of road maintenance is dependent upon funds and resources available

Fire/Fuels

Comment: There is no effective direction to accommodate naturally-occurring fires

Response: Chapter 4 of the Forest Plan, Management Area Direction. provides for the development of fire management plans for designated wilderness areas Fire management plans can provide for planned and unplanned ignition to restore and maintain natural conditions within designated wilderness areas If provided for by watershed analysis, ecosystem planning, and/or late-successional reserve plans, some natural fires may be allowed to burn under prescribed conditions within late-successional reserves and in Matrix and AMA

Comment: Language should be added to the Forest Plan which allows for the use of fire as an appropriate management tool

Response: The Forest Plan and EIS recognize the use of prescribed fire and mechanical fuels treatment as appropriate management tools Language incorporating land allocation decisions and standards and guidelines contained in the ROD and FSEIS have been incorporated into Chapter 4 of the Forest Plan concerning the application of fuels treatments
The FEIS and Plan encourage returning fire to it's natural role in the ecosystem, to the extent possible

Comment: Fuels reduction activities should be the focus of Forest Service management activities

Response: The Forest Plan contains standards and guidelines (Chapter 4 of the Plan) which provide for the treatment of fuels surplus to other resource management needs Fuels management is a component of integrated resource management and will be emphasized under this Plan

Comment: The FEIS only discussed prescribed fire, with no discussion of steps to reduce wildfire

Response: Wildfire control will continue to be the primary suppression response with limited exceptions, as provided for by the Forest Plan Standards and Guidelines, Chapter 4

Comment: With road closures, reduced timber harvest, and a large percentage of lands devoted to late-successional reserves, what provisions were made to provide for fire management activities?

Response: Guidelines to reduce risks of large-scale disturbance within the late-successional resews were provided for by the ROD and FSEIS The Forest Plan, Chapter 4, details these guidelines

Comment: Provide evidence to support your statement that " the negative consequences of burnings, such as smoke, energy waste, loss of soil protection and modification of wildlife habitat " as stated in the Forest Plan have significant. long-term, and irretrievable environmental consequences

Response: These were publically-identified concerns used to develop the public issue regarding fire and fuels "Disposition" which immediately follows, discusses possible management activities which may be taken in response to the public issue

Comment: The EIS fails to acknowledge the wildland/urban interface situation which exists on the Forest

Response: The Forest recognizes management complexities caused by the wildland/urban interface The Forest Service and California Department of Forestry, in coordination with affected volunteer fire departments, provide for cooperative fire suppression management

through applicable Memorandum of Undentandings and Operating Plans The Standards and Guidelines (Chapter 4 of the Plan) prioritize the use of prescribed fire, and public safety is number I This suggests that the public risk associated with the wildland/urban interface is acknowledged and will be addressed

Comment: The Standard and Guideline detailing application of the fuels photo series is overly restrictive

Response: The Standard and Guideline references to the use of the fuels photo series has been deleted from the Forest Plan

Comment: The Forest Plan should include a I0 year fuel-reduction plan to return the Forest to more natural fuels conditions

Response: Ecosystem management analysis will identify fuels surplus to other resource considerations as part of an integrated resource management approach It is estimated that 30,000-90,000 acres of fuels treatment per year may be necessary as a part of ecosystem management

Comment: The EIS and Forest Plan are deficient in the analysis of how tire disturbance regimes relate to ecosystem management

Response: The FEIS and Forest Plan is based on the premise natural tire regimes will be a main component of ecosystem management Detailed analysis and development of fire management direction will occur at the landscape level through watershed/landscape-level analysis, Late-Successional Reserve Assessments, and Adaptive Management Areas plans

Comment: The EIS offers conflicting statements regarding the use of prescribed tire Under Air Quality, statements support the continued application of prescribed fire, while under Biomass it states " there is concern that prescribed burning of logging debris is detrimental to other resource values and should be reduced "

Response: The statement following the Biomass heading was a publicly-identified concern used to help focus the analysis of the fire/fuels issue As part of ecosystem management it is expected that an important component of fuels treatment will be to leave enough dead and down woody debris behind to satisfy other resource requirements

Comment: The merits of uneven-aged forests in slowing fires has been overlooked

Response: Wildfire risk and hazard is a complexity of inter-related environmental and biological factors, including stand structure and composition Fire plans developed during ecosystem management analysis will recommend management actions which best meet wildfire risk and hazard objectives while meeting other integrated resource management objectives

Comment: The generic prescriptions and standards specified within Option 9 that will be incorporated into the Forest Plan are not compatible with re-establishment of the natural role of fire in the ecosystem

Response: The Forest Plan will provide for some natural fires to be allowed to burn under prescribed conditions after completion of, and in compliance with, ecosystem plans and/or Late-Successional Reserve assessment

Comment: The proposed annual fuel treatment program of 8,400 acres should be increased to allow for the treatment of backlog acres in need of fuel reduction

Response: The proposed fuel treatment program has been increased to 30,000-90,000 acres per year This level of fuels treatment is expected to occur as a result of ecosystem planning.

Comment: Fire management complexities caused by checkerboard land ownership patterns needs to be addressed

Response: Checkerboard land ownership patterns do provide for fire management complexities These factors were taken into account during application of the "Balance of Acres" concept applied by the Forest Service and California Department of Forestry in determining primary fire suppression response areas

Comment: The Forest Service's fire liability caused by its lack of management should be identified and displayed

Response: The Forest Plan provides for fuels management activities under prescribed conditions after completion of, and in compliance with ecosystem plans and/or late-successional reserve assessments

Comment: The acreage displayed in Appendix M, Table Y-2, are the same through Decade 5 Thus it appears the fire and fuels program will be ineffective in reducing losses to wildfire

Response: Table M-2 displays historical fire intensity levels for the Forest Modeling limitations make out-year extrapolations speculative, but a continuation of

historical trends are anticipated for wildfire effects While the acres burned may not decrease measurably because of the fuels management program, the intensity of fires and related resource loss should decrease

Comment: Biomass thinning should be used pro-actively to provide for fuelbreaks in high fire-risk areas

Response: Fire plans developed during ecosystem management analysis will recommend management actions which best meet wildfire risk and hazard objectives while meeting other integrated resource management objectives

Comment: The Forest Plan should provide data, standards and guidelines which restrict prescribed burns to specific time periods Prescribed burns can damage native plants and wildlife which reproduce and grow during typical prescribed burn time periods

Response: Resource management objectives are defined in advance of the use of prescribed fire by an interdisciplinary team working through the ecosystem management assessment process Objectives, benefits, and risks are considered, and provide for an integrated resource management prescription It is expected that in the future much prescribed burning will need to occur during fire season, if ecosystem objectives are to be met

Comment: Prescribed burning should be prohibited on National Forests because of air pollution, climate destabilization, the creation of water-impervious soil, the creation of nutrients not readily available to plants, and by drying the soil

Response: An interdisciplinary team of resource professionals consider the interaction of a complexity of environmental and biological factors relating to the use of prescribed fire The interdisciplinary recommendations are considered by a deciding official, who makes a decision. The decision then allows for development of a prescribed burn plan, which provides for environmental and physical attributes which must be met prior to implementing a prescribed burn action When making a decision about the use or non-use of prescribed fire, the burn effects of wildfire need to be compared with what is expected to occur from prescribed tire

Comment: The recognition of the role and management support for the use of prescribed fire is lacking in the Forest Plan

Response: The natural role of fire in ecosystem function and how that might translate into fuels treatment and prescribed fire, is an integral part of the Final Forest Plan

Comment: The prescribed use of fire should be timed to augment grazing, and not to replace grazing or conflict with the availability of forage

Response: Fire plans developed in conjunction with ecosystem management analysis will consider integrated resource management objectives, including range

Fisheries

Comment: The Forest Plan statement concerning fish kills in West Squaw Creek from acid mine waste is incorrect because, while improving. it is a continuing problem

Response: This statement is a "Desired Future Condition", not a statement of the current situation A Desired Future Condition (DFC) is a description of desired future conditions for resource, social, economic and/or cultural elements Implementation of the Forest Plan will help direct management activities toward attaining described DFCs

Comment: Analysis comparing 5th decade PRF and CUR fish pounds of output is ludicrous

Response: As discussed in Chapter II of the EIS, outputs are planned for decade 1, potential outputs are shown for decades 2 through 5 for long-term comparisons and disclosure of environmental consequences The National Forest Management Act requires the consideration of a 50 year base period for Forest land management plans Potential effects were quantified, where possible, to aid in long-term alternative comparison

Comment: Impacts from all aspects of artificial fish propagation in Forest watersheds was not disclosed The proper role of fish hatcheries must be integrated into management and the NEPA process

Response: Stocking hatchery-reared fish into suitable waters is the responsibility of the California Department of Fish and Game, and not within the scope of this EIS

Comment: Because of the low numbers of spring-run chinook, the measurement of impacts is no longer necersaty The time has come to make land management decisions that will improve its habitat and provide for its viability

Response: The Aquatic Conservation Strategy adopted by the ROD, which has been incorporated into this

Plan, includes the designation of Key Watersheds, the requirement for watershed analysis, the establishment of Riparian Reserves, and the expectation for watershed restoration Except for the mainstem of the Trinity River, the lower portion of Big French Creek, and some of the mainstem's smaller tributaries, most of the Trinity River Basin has been designated as Key Watershed. The New River, North Fork of the Trinity River, and Canyon Creek are viewed as refugia watersheds for maintaining wild stocks of spring chinook and summer steel head The South Fork Trinity River is a working watershed where watershed restoration activities are key to the recovery of these two species

Comment: We believe NEPA and NFMA require the Forest Service to recognize a relationship between naturally inherent problems such as flooding, fires, unstable soils, to Forest Service activities, such as logging. Without recognizing the relationship, the DEIS seriously underestimates the habitat constraints

Response: The EIS recognizes the relationship between physical, environmental, and biological factors For the purposes of analysis, only those human-induced activities within the administrative purview of the Forest were considered in the EIS

Comment: The Forest Plan does not appear to provide for the protection of intermittent or headwater streams, thus it is doubtful that steelhead habitat will be maintained

Response: The Aquatic Conservation Strategy, as detailed in the ROD and FSEIS, has been incorporated into the Preferred Alternative of the Forest Plan As described in Chapter 4 of the Forest Plan, "intermittent streams are defined as any nonpermanent flowing drainage feature having a definable channel and evidence of annual scour or deposition This includes what are sometimes referred to as ephemeral streams if they meet these two physical criteria " Areas meeting these criteria are accorded riparian management zone standards and guidelines

Comment: Fisheries are cited as an "output" on page B-7 but the only type of information mentioned includes "fish user days" and "direct habitat improvement programs " Ten percent of the background fish user days are "assumed to be produced from anadromous fish " How do these figures relate to the actual conditions of fish in the water?

Response: The information cited is contained in Appendix B, the Modeling and Analysis Process, detailed in the Forest Plan Two models were used to analyze fishery parameters for the alternatives considered in detail, FORPLAN and Wildlife and Fish Habitat Relationship (WFHR) system models Model outputs and assumptions are described in Appendix B Our estimated outputs are based on the best iniormation we have about what the habitat could support. Actual numbers of fish both now and in the future are based on habitat and other factors which our beyond the scope of this EIS

Comment: Key watersheds and strategies should be embodied into a Fisheries goal Restoration activities mentioned in item #15 need to be expanded to other streams Management direction for high mountain lakes should be embodied in a Fisheries goal

Response: The Aquatic Conservation Strategy provided for by the ROD and FSEIS and incorporated into the Forest Plan and EIS, provides for key watersheds and strategies Restoration activities not specifically addressed as a Forest Goal may be provided for through application of the watershed analysis and/or ecosystem management processes Management direction for high mountain lakes is provided for within Recreation, Riparian Area, and Wilderness standards and guidelines

Comment: Trinity and Shasta Lake FHI plans, and an inland fisheries standard and guideline should be added.

Response: Over the past 6-8 years, annual fishery habitat improvement plans were developed for each lake and implemented with CDFG concurrence. New policy direction directs that Trinity and Shasta Lake Fishery Habitat Improvement plans should more appropriately be addressed in ecosystem management/site specific NEPA analysis projects Inland fisheries standards and guidelines are embodied in current Fisheries, Riparian Areas, and Soils and Water standards and guidelines

Comment: In the Monitoring Action Plan, "Key watersheds" should be incorporated into the "Riparian habitat condition goals" and 'Anadromous fish population surveys" under the "Techniques and/or Data Sources" heading

Response: As indicated in the Monitoring Action Plan, specific assessment watersheds/streams have not been determined This allows for a full range of management factors, including key watersheds, to be considered in prioritizing monitoring areas

Comment: The subject heading "Enhancement" is more accurately labeled "Rehabilitation" under Inland Coldwater Fish Assemblage in Chapter III of the EIS

Response: Enhancement is used in a general term It refers to either (1) biological enhancement, i e the natural or artificial propagation of fish or (2) physical

enhancement, i e rehabilitation or restoration or replacement of habltat elements deemed as lacking and essential for the proper functioning of the npanan ecosystem.

Comment: The proposal to add fertilizer to lakes to increase fish production seems questionable

Response: The Forest Plan does not propose to add fertilizer to lakes to increase fish production The statement appears to be a reference to Appendix B, the Modeling and Analysis Process, which discusses "inland coldwater lakes would be improved through lake enrichment techniques (improvement of nutrient levels)

Comment: Can make no sense of the explanation of FUDs and acres in Appendix B

Response: This discussion was contained in Appendix B, the Modeling and Analysis Process Several computer models were used to simulate outputs for the alternatives considered in the EIS FUD is a fish user day, twelve hours of recreation use oriented to fish In the context of modeling for fisheries outputs, 'acres' refers to the number of fish habitat improvement structures constructed per acre of habitat

Comment: There seems to be conflicts in desiring the enhancement of introduced warmwater fish, and the survival of native coldwater fish You need to establish priorities

Response: These goals are not mutually exclusive The Forest has substantial habitat for both "types" of fish, and can provide for management activrties which enhance the habitat for each

Comment: You need to address the long-term problems associated with diversions and impoundments to fisheries habitat conditions

Response: Chapter 4 of the Forest Plan details Forest-wide Standards and Guidelines applicable to Hydroelectric Power Projects

Comment: To request the Bureau of Reclamation to manage water levels to benefit an introduced species to the detriment of downstream natives seems inappropriate

Response: *As* described in Chapter III of the EIS. "State Fish and Game Code 1743 states that, 'The department [DFG] shall improve shoreline habitat for black bass in waters where insufficient habitat exists and shall encourage reservoir operating agencies to carry out shoreline habitat improvement projects' This has been the emphasis at Shasta Lake since 1982 and at Trinity Lake since 1989 "

Comment: While building instream structures has become popular, it does not necessarily address the limiting factors in a given watershed Provide special protection for entire watersheds which sustain at risk (fish, amphibian) species

Response: *As* stated in Chapter III of the EIS, "[t]he purpose of installing log structures is to create instream structural complexity " Adoption of the Aquatic Conservation Strategy, as provided for by the ROD and FSEIS and as incorporated into the Forest Plan and EIS, addresses watershed considerations which may affect fisheries habltat

Comment: Fish biologists agree that hatchery fish can seriously undermine the genetic integrity of wild stocks The DEIS fails to reveal [this] issue, rendering its analysis insufficient to support public understanding and agency decision making

Response: The Forest has management responsibility to provide for fisheries habitat upon National Forest System lands The California Department of Fish and Game has management responsibility for the fish The consideration of hatchery/wild stock is outside of the management responsibility/authority of the Forest

Comment: How can you not project additional increases in pounds of anadromous fish over the next 50 years resulting from the direct and indirect improvements to water quality and fish habitat that is the essence of the Forest Plan?

Response: Currently, the Salmon and Steehead populations returning to the Shasta-Trinity National Forests are at an ebb Several stocks of fish listed as "at risk of extinction" are found within the Trinity River basin The basin's stocks have been impacted by a variety of internal and external impacts It would be extremely optimistic to predict a major upswing or significant increases when cumulative impacts have existed for so many years Even with watershed rehabilitation, ecosystem restoration, and better recovery *efforts* for salmon and steelhead stocks it may well take 100 to 150 years for the species to recover to near historic levels, if that high Meanwhile we need to cooperatively manage for what the impacted individual systems will yield naturally with the thought in mind that any additional impact(s) will lengthen the recovery period

Comment: Your desire to emphasize sport fisheries as a major recreation activity by expanding recreational fisheries opportunities is in conflict with your statement that increased recreational sport fishing could be detrimental to certain declining or sensitive fish stocks

Response: These statements are not in conflict Chapter IV of the EIS, Fisheries, under Recreation Management, details the anticipated affects of recreational sportfishing upon a variety of fishery resources.

Comment: We urge your final draft to downplay additional structure implementation and instead, feature maintenance of selected existing structures as justified through fish utilization monitoring.

Response: *As* detailed in Chapter III of the EIS, Fisheries, under Habitat Improvement, "[t]he effectiveness of habitat improvement structures may not be readily apparent due to other short term influences These influences may include annual and seasonal natural watershed variations, complications within the lifecycle of an anadromous fish species, or human-induced fisheries which may constrain the returns of fish to a stream which cannot be effectively qualified or quantified For example, the Klamath-Trinity River basin, after four drought years, is experiencing its lowest recorded anadromous fish returns Therefore, someone could conclude, erroneously, that installed structures are ineffective in increasing fish numbers because of the low numbers of adults or juveniles using the structures To determine structural effectiveness considerable long term monitoring and extensive documenting is necessary"

Comment: While a vanety of factors share responsibility for the dire conditions of anadromous fish in California, degradation of spawning and rearing habitat quality on federal lands is clearly an major cause of the crisis

Response: The Aquatic Conservation Strategy as provided for by the ROD and FSEIS has been incorporated into the Forest Plan and EIS The Aquatic Conservation Strategy was developed to restore and maintain the ecological health of watersheds and aquatic ecosystems, and *to* protect salmon and steelhead habitat The degradation of habitat on federal land is a contributor to the problem, but there are currently miles of stream with good habitat that are not being utilized This suggests that other factors may be involved

Comment: The wild trout gene pool was not completely eliminated by the Cantera incident Progeny from the survivors are expected to repopulate the entire river over a period of years

Response: Reference is made in Chapter IV of the EIS that "Fishing diversity would be enhanced as the wild trout population rebounds from the disastrous chemical spill of July, 1991 " This statement is in keeping with the intent of the comment.

Comment: The names Dolly Varden and Dolly Varden Trout should be changed to bull trout in Appendix N of the Forest Plan

Response: Appendix N, the McCloud River Coordinated Resource Management Plan was included in the appendix of the draft Forest Plan as an informational item This plan will not be included within Final Forest Plan appendices

Comment: There is concern that there is significant risk of damage to anadromous fish producing streams inherent in construction activities in and near streams Plans for artificial habitat improvement structures should be evaluated and developed in coordination with the DFG prior to implementation to avoid potential adverse impacts to stream ecosystems

Response: The Forest frequently consults and coordinates with other agency representatives, including the Department of Fish and Game

Comment: Make categorization of the redband trout as a sensitive species consistent in both the Forest Plan and EIS

Response: The inconsistency, as cited, was not found The redband trout is a emphasis species The management goal for an emphasis species is to maintain or improve habitat capability where economically and biologically feasible Confusion may come from the fact that Redband Trout is listed under the general category of Threatened/Endangered/Sensitive fish species in the Forest Plan in Chapter 3 Currently, the Shasta-Trinity National Forests have recommended to the Regional Forester that the McCloud Redband Trout be listed as sensitive Action is pending

Comment: With the redband being listed as a state threatened species, there should be no more management, including grazing, until the viability of this species can be insured Supplemental Management Direction should also include a goal to implement substantial changes in grazing management practices to bring an end to the serious damage currently occurring to redband trout streams on both public and private lands Reference to redband trout should be made in Supplemental Management Direction for the McCloud River Management Area The FS should work with DFG on seeking wild trout stream designation and management for the mainstem Upper McCloud from Upper Falls upstream

Response: A Redband Trout advisory committee has been established to address the major concerns with low population numbers, degraded or potentially impacted habitats, and introgression with hatchery-reared Rainbow Trout. Membership includes the Forest Service. the U.S. Fish and Wildlife Service, the California Department of Fish and Game, Private Timber Indus-

try, and several other interested parties The intent of the committee is to complete a draft conservation strategy plan for the management of the McCloud Redband Trout by early summer of 1995

Comment: In order to provide alpine lake fishing opportunities in the Trinity Divide area, the Forest Service should work with DFG to achieve wild trout designation and management for Toad and Dobkins Lakes

Response: Both lakes are found within the currently identified headwaters watershed analysis area of the South Fork Sacramento River and will be evaluated as part of the fisheries focus for the area Currently, both lakes receive supplemental fish plantings by the California Department of Fish and Game In 1994, Toad Lake received 4,000 Brown Trout and 2,000 Rainbow Trout fingerlings while Dobkins Lake received 2,000 Brown and/or Rainbow Trout fingerlings No decisions will be made on wild trout status designations and management for either lake until watershed analysis and the associated NEPA documentation is completed Fisheries status and management decisions will be developed in cooperation with the Department of Fish and Game

Forest Pests

Comment: Pests are a problem only in disturbed forests where there is slash and logging debris to act as host for pests I recommend that logging cease - thus eliminating slash, pests, damaged trees and chemical treatments

Response: Insects, pathogens, animals, and vegetation are only considered pests when they interfere with defined management objectives This is part of the integrated pest management (IPM) approach that the Forest follows Properly implemented management activities do not increase the levels of these organisms to damaging levels, and often aid in reducing their current or future impact Properly treated slash is not a reservoir for damaging agents and does not necessarily result in increased pest activity Chemicals will be used to control pests only when essential to achieve the land management objectives Alternative methods will be evaluated on a project specific basis

Comment: Stands containing Port-Orford-cedar shall not be entered until control of mortality from Port-Orford-cedar root disease is known and available

Response: Port-Orford-cedar root disease is not present on or within the Shasta-Trinity National Forests Prior to any management activity in areas with Port-Orford-cedar a risk analysis will be performed to assess the risk of introduction of the disease, to determine if the activity can be implemented within an acceptable risk, and to determine if special mitigation measures are needed This is part of the Supplemental Management Direction for Management Areas 4 and 5

Comment: The Forest is obsessed with dwarf mistletoe This obsession jeopardizes true landscape management and justifies the arbitrary 180 year rotation on matrix lands

Response: The Forest-wide standards and guidelines that addressed dwarf mistletoe have been changed to more accurately reflect the ecological role of these plants In the absence of natural fire, however, some actions directed at their control may be necessary to provide long-term, sustainable forest stands

Comment: Research is necessary on genetic variation in sugar pines in different locations within the Trinity NF The trees aged 200 plus years should all be left unlogged, since they appear unaffected

Response: Genetic analysis of sugar pine for resistance genotypes has been done rangewide, including on the Trinity NF The level of dominant gene resistance, what is currently employed, was found to be low Efforts are continuing to search for and identify sugar pines that carry this type of resistance to the blister rust fungus, as well as other forms of resistance This is part of the Forest's sugar pine management plan Regional policy for sugar pine management requires that apparently rust-free sugar pine will only be harvested or thinned if it is essential to meet management objectives

Geology/Soil

Comment: Much of the erosion in South Fork is due to badly designed and implemented roads

Response: Forest Service system roads are designed to minimize off-site affects Routine maintenance provides for the continuing function of design features The watershed analysis process identifies roads no longer needed for management activities which may be contributing to adverse off-site effects The subsequent NEPA process provides for the closure or decommissioning of roads as necessary to meet ecosystem management objectives

Comment: A Standard and Guideline is needed to require that the existing sediment load for all stream classes be determined prior to the implementation of soil-disturbing activities

Response: The Forest is moving toward the development of sediment yield models, but they are not yet

available for planning purposes The use of applicable Best Management Practices, Appendix E of the Forest Plan, the Soil Quality Standards, Appendix O of the Forest Plan, and site-specific mitigation measures provide for protection of the soil resource during the implementation of management activities

Comment: To consider a clearcut where the soil has been pulverized by heavy equipment the same as a fire is absurd The Plan lacks analysis of how the alternatives would address areas with high to very high erosion potential.

Response: Ecosystem analysis and subsequent NEPA process provide for site-specific analysis of proposed management activities upon the soil resource The application of Best Management Practices, Soil Quality Standards, and site-specific mitigation measures provide for protection of the soil resource during the implementation of management activities

Comment: Logging and roadbuilding activity will disturb vast areas of unstable land which will degrade stream ecosystems and aquatic habitat Remove all forest land on steep and moderately steep slopes from the suitable timber base until specific sites are certified as having low landslide risk

Response: General slope stability hazards have been completed for Forest areas with the greatest hazard These areas have been mapped and are tracked in Forest databases Watershed analysis, and site-specific project analysis provide for future identification of, and management requirements for, other areas of high slope stability hazard

Comment: How will soil productivity standards be monitored?

Response: Chapter 5 of the Forest Plan describes the monitoring plan that will be applied to affected management activities

Hazardous Materials

Comment: The EIS fails to address air and water pollution associated with asbestos aggregate surfaced roads

Response: Site-specific operating plans and NEPA analysis will identify mitigation measures, where needed, for identified affected areas

Herbicides

Comment: Herbicides should not be used on National Forest lands under ecosystem management

Response: Management direction for the use of herbicides is already covered in agency manuals and handbooks, and regional guidance (EIS) for vegetation management, and will be considered and analyzed in the environmental analysis for projects where their use is possible Forest standards and guidelines in the Final Plan limit the potential use of herbicides, except in special cases

Comment: The Forest should prepare documentation for each vegetation management project where herbicide use is an alternative, with specific guidelines and information of effects and consequences

Response: Forest standard and guidelines addresses the need for site specific analysis during the environmental analysis process for each project that considers possible herbicide use

Comment: Specific methods and timing of application, effects on sensitive plant populations, and mitigation measures pertaining to pesticide use should be assessed in the EIS

Response: Specific measures will be addressed in site specific, project level environmental documents Mitigation guidelines are found in manuals and handbooks, and the regional EIS for vegetation management

Comment: The Forest should discuss whether specific lands have been classified as capable or suitable because herbicides have been authorized

Response: There would be no change in the suitable timber land base for any alternative, because all lands are assumed to be regenerable to minimum stocking standards within five years after harvest, using methods others than herbicides (Chapter II, FEIS)

Comment: Have understocked lands been scheduled for full timber yields based upon the authorization of herbicide use?

Response: No Potential timber yields are based on data collected from forest stands and projected into the future The yield tables have not been adjusted based upon the authorization of herbicide use As noted in the Monitoring Action Plan in the Final Plan, yield tables will be adjusted if new inventory data indicates an adjustment is necessary

Comment: Have nonstocked lands, where reforestation has been unsuccessful to date, been scheduled for ASQ contributions because of the authorization of the use of herbicides?

Response: No The suitability of land fortimber production, based on regenerability, is determined by factors which do not include the use, or non-use, of herbicides (see Appendix I of the Final Plan) If regeneration cannot be reasonably assured within five years of harvest, for any reason, then the land is considered to be unsuitable

Comment: Manual control of vegetation, while more costly on a per acre basis, may ultimately prove cheaper than herbicides when all the hidden costs and benefits are factored in

Response: Economics is one of several factors considered when assessing alternative methods of vegetation control Effectiveness and environmental factors are other important considerations

Comment: Herbicides should only be used when their use is consistent with the biological diversity standards and guidelines, essential to meet management goals that include maintenance and enhancement of native plant communities, and only after all alternative methods have been considered with appropriate NEPA analysis

Response: All forest activities must meet the Forest Standards and Guidelines Herbicides would be used only when essential to achieve the assigned land management objectives, which may include the protection of native plant communities As noted in Forest Standard and Guidelines the method selected would be determined at the project level by site specific analysis during the environmental analysis process

Comment: If all herbicide applications to control forest pests are conducted under the FEIS for Vegetation Management for Reforestation, this should be clearly stated

Response: Most proposed herbicide applications would be done for reforestation purposes, and conducted under the direction found in the FEIS Herbicide use for any other purpose would require additional environmental analysis and documentation

Heritage Resource

Comment: Priority should be given to completing a comprehensive research design and plan to replace the ineffective policy of FIND-FLAG-AVOID The four Forests should cooperate in this effort The current policy of find-flag-avoid needs to be evaluated for compliance with 106 requirements Illegal MOUs should be renegotiated Executive Order 11593 should be followed

Response: The Forest has been working for many years with the State Historic Preservation Office's general concurrence of the avoidance method for site protection While the Forest agrees a more comprehensive evaluation and protection plan is desirable, funding levels have not been sufficient to implement such a program With the implementation of watershed analysis, however, Prescription XI (Heritage Resource Management) has been modified to include Native American participation early in the watershed/project planning process which will encourage more thorough evaluation of sites See Forest Plan, Chapter 4, Administratively Withdrawn Areas, Prescription XI, Standards and Guidelines The Forest doesn't have any MOUs dealing with SHPO or ACHP

Comment: The impacts of LIVESTOCK on heritage resources has not been analyzed Grazing permits should be reviewed for 106 compliance

Response: The Forest agrees with this statement Beginning in *N95* the Forest will be funding Section 106 compliance review for allotment renewals See also the new standard and guideline under Prescription XI that deals specifically with Section 106 compliance and Special Use Permits (Forest Plan, Chapter 4, Administratively Withdrawn Areas, Prescription XI, Standards and Guidelines)

Comment: Native Americans and other affected cultural groups and experts have not been adequately consulted to assess the value of heritage resources A programmatic agreement for assessing value should be developed that includes the concurrence of the Native Americans and other cultural groups which would be affected Where project overviews indicate that the site may be significant, consultations should ascertain whether this is so Native American should also be consulted to assist in locating heritage resources that can't be "physically located with any degree of precision" according to Chapter III of the DEIS

Response: One of the Forest-wide goals listed under Heritage Resources is to "Develop partnerships with Native American tribes and organizations to enhance those cultural resources that reflect their heritage" (Forest Plan, Chapter 4, Forest Goals) In addition, Prescription XI (Heritage Resource Management) now addresses the need to consult with Native Americans at the watershed/project planning level to assure that Native American concerns are addressed in the process See Forest Plan, Chapter 4, Administratively With-

drawn Areas, Prescription XI, Standards and Guidelines Recently, the Forest has consulted with Native Americans in several proposals of high public interest such as the Mt Shasta Ski Area Proposal, reforestation proposals, group-use permits and the Butter Creek Watershed Analysis Hundreds of letter have been sent out to those people and organizations who have shown interest in a particular area. These letters ask for comments and encourage participation in the planning process Anyone who has an interest in a particular area should write or call the Forest and ask to be put on the appropriate mailing list

Comment: What assurance is there that the Goals, Standards and Guidelines under Prescription XI will be applied in practice)

Response: Forest-scale monitoring plans are designed to ensure that standards and guidelines are being met During the monitoring process, if it is determined that standards and guidelines are not being met, corrective action will be taken or the Forest Plan will be amended, if appropriate See Forest Plan, Chapter 4, Administratively Withdrawn Areas, Prescription XI, Standards and Guidelines, #3 that covers protection plans and monitoring

Comment: The following studies should be referenced in Chapter III of the EIS and the bibliography

STATEMENT OF FINDINGS - NATIVE AMERICAN INTERVIEW AND DATA COLLECTION STUDY OF MOUNT SHASTA, by Theodoratus and Evans, Theodoratus Cultural Research, 1991, NATIVE AMERICAN HISTORIC CONTEXT - MOUNT SHASTA, CALIFORNIA, by Winfield Henn, Shasta Trinity NF, 1991: and MOUNT SHASTA IN LATE 19TH AND EARLY 20TH CENTURY NON-NATIVE AMERICAN HISTORY, by Conners and Elliott, Shah-Trinity NF, 1992

The College of the Siskiyous Mount Shasta Collection and the extensive 1200-source ANNOTATED BIBLIOGRAPHY OF THE MT SHASTA SPECIAL COLLECTION, by William C Miesse (College of Siskiyous, 1993) should also be consulted and listed as an information source.

Response: The USDI, National Park Service letter and Determination of Eligibility Notification (EO 11593) dated March 11, 1994 signed by the Keeper of the National Register is made part of the Forest Planning Record This letter contains references to the many studies that provide background to the Determination including the three references listed above

Comment: Quantitative rather than site specific comparisons are not fully appropriate with regard to cultural resources, since aboriginal traditional cultural values are closely linked to specific places Basing the risk of adverse effects on cultural resources on acres of timber management only partially compares the alternatives What would be more significant would be to compare how specific sites of importance to native people, such as Mount Shasta, are treated in the alternatives On those grounds, Alternative CBF, which allocates important places on Mount Shasta to primitive recreation, would come closer to true management for cultural resources

Response: Prescription XI, Heritage Resource Management, is applied specifically to protect the 300-400 eligible sites of importance on the Forest This prescription provides direction Forest-wide More detailed analysis and evaluation will occur at the watershed analysis and project planning levels See Forest Plan, Chapter 4, Prescription XI, C Description of Where Prescription XI Will Be Applied

Comment: The LMP DEIS ignores the Forests' own Multiple Property designation for Mount Shasta and the Advisory Council's advice that all of Mount Shasta be considered eligible for the National Register of Historic Places while the determination of eligibility is being decided by the Keeper of the National Register (see letter of October 8, 1993 from the Advisory Council to the Forests) Even though we disagree with the Multiple Property designation, the Forests have the obligation under its provisions to at least evaluate whether projects will have an effect on historic properties and abide by their own statements until eligibility is determined for all of Mount Shasta

Response: The Mt Shasta Historic District has been determined to be eligible for the National Register of Historic Places If this decision is reaffirmed after an additional comment period all proposed projects must include an expanded consultation process with all interested parties For a complete discussion on historic status of the Mt Shasta area please refer to the FEIS, Chapter III, Recreation

Comment: Need a Standard to prioritize sites eligible for the National Register of Historical Places and to write up and submit 20 sites per year

Response: Prescription XI, Heritage Resource Management, has already prioritized sites based on eligibility, scientific value, interpretative potential and importance to Native Americans Specific sites have not been submitted for listing due to limited staffing and funding.

Comment: PLAN, Chapter 3, Page 7, Cultural Resources, paragraph 4 Portions of the Shasta Unit of

the National Recreation Area have been heavily surveyed and the majority of it has been surveyed in the more sensrtive areas and in the vicinity of human activrty

Response: The Forest recognizes that many smaller areas have been surveyed in the Shasta Unit of the NRA, especially in the more developed areas These acres, however, constitute a relatively small portion of the entire area In general, most of the area of the Shasta Unit of the NRA has not been surveyed

Comment: DFC for heritage needs to be included in the Pit, Nosoni, and Front Management Areas

Response: Prescription XI provides Forest-wide direction for Heritage Resource Management for all Management Areas The watershed/project planning process will look at specific sites of importance in each management areas of a watershed or project area and consult with Native Americans to assure that Native American concerns are addressed

Comment: The Tsnungwe Council of Humboldt and Trinity Counties strongly objects to the proposed management plans for the Shasta-Trinity and Six Rivers forests We object because

1 We were not consulted or even contacted at any time during the development of the plans EVEN THOUGH OUR TRIBE IS OBVIOUSLY LOCATED WITHIN THE BOUNDARIES OF BOTH FORESTS

2 There is discussion of native cultural and historical resources, in the Shasta-Trinity plan, HOWEVER, OUR TRIBE ONCE AGAIN HAS HAD NO INPUT IN ANY OF THESE DISCUSSIONS THIS DOES NOT MAKE SENSE ON ANY LEVEL BECAUSE THE DISCUSSION WAS REGARDING RESOURCES AND HISTORICAL SITES RELATIVE TO OUR PEOPLE!

The Tsnungwe Council insists that you consult with our elders as soon as possible to correct these oversights'

Response: The Tsnungwe Council was not intentionally overlooked The Forest has been consulting with Federally recognized tribes from the early years of the planning process With the new standard and guideline to consult with Native Americans at the watershed/project planning level we expect to have more contact with all tribes including the Tsnungwe

Lands

Comment: Specific land adjustment comments
a The Crane Mills parcel at Ney Springs should be targeted as a high priority for acquisition
b As a stipulation of a land exchange with Dave Frase for a parcel in the vicinity of Mott. keep steeper portions of this parcel closest to the river as open space
c Hearst is opposed to land adjustment with the Forest Service that involves Forest Service acquisition of the Big Springs area

Response: a The Crane Mills parcel is a high pnority for acquisition b The Forest Service cannot impose this type of stipulation as a condrtion of a land exchange c The Big Springs area is a high priority for acquistion Supplemental Management Direction for Management Area 10, number 7 is revised to read "Where the opportunity arises, the Forest will seek to acquire public access along the McCloud River and Squaw Valley Creek

Comment: What Standards and Guidelines are specific to powerlines

Response: See Forest Standards and Guidelines for Transportation and Utility Corridors

Comment: The Plan should not preclude future electric facility expansion, including utility rights-of-way, and that existing permits are not superseded by the Plan

Response: The Plan does not supersede any existing permits and rights-of-way including reasonable access The designation of utility corridors is regulated by Section 503 of the Federal Land Policy and Management Act of 1976 which discourages the proliferation of rights-of-way The reference in the Forest Standard and Guideline under Transportation and Utility Corridors is consistent with this direction, while recognizing that there may be overriding economic and environmental reasons to designate new corridors

Comment: The Plan directs that new telephone and power lines less than 35 KV are to be buried underground This is an unrealistic economic burden to PG&E and its customers

Response: Forest Standard and Guideline under 12 Lands (b) is directed by Forest Service Manual (R5 Supplement 2700-92-4) direction which states at 2726 43 (a) Powerlines Up To and Including 35KV "Place all new powerline installations underground, except where the environmental analysis indicates that aerial construction provides better protection for National Forest resource and environmental values " In cases where utility companies have entered into MOUs with the Forest Service, the agreements of the MOUs will supersede the direction at FSM 2726 43(a)

Comment: Withdrawals under Section 24 of the Federal Power Act should be included in the Plan

Response: All proposed projects related to Section 24 of the Federal Power Act are subject to the regulations of the Act Section 24 Withdrawals have been inventoried and displayed on the land status maps at the Forest.

Comment: Eliminate the "checkerboard" landholding patterns It is unclear what lands the Forest Service is considering for exchange

Response: The discussion in Chapter III FEIS under Lands explains the land adjustment policy related to "checkerboard" ownership An ownership map and land adjustment guide is included with the FEIS and Forest Plan publication

law Enforcement

Comment: The Forest Service contributes to fish poaching by constructing roads into formerly inaccessible areas

Response: Enforcement of fish and game laws are principally the statutory responsibility of the California Department of Fish and Game, though the Forest Service provides cooperative enforcement activities on National Forest System lands Ecosystem management analysis and subsequent NEPA assessments provide the opportunity to address a variety of resource issues, including roading, to provide for integrated management activities

Comment: Law Enforcement Standards and Guidelines need to include the Forest Service will investigate all possible violations of law including resource theft and fraud, and prosecute when sufficient evidence is obtained. and the Forest will ensure that all labor laws for contractors are enforced

Response: Forest goals, detailed in Chapter 4 of the Forest Plan, provide for management direction for Forest law enforcement priorities, including the protection of resources, property, and public safety through prevention of law violations and associated loss and damage The Service Contract Act and Migrant Seasonal Protection Act provide most of the statutory authority for contract labor Contracting officers are responsible for ensuring contract provisions are enforced Cooperative law enforcement involvement with other agencies, or at the request of the Contracting Officer, is provided as requested within Forest Service statutory authority

Comment: Increase patrol and apprehension of violators

Response: The Forest Service fully redeems law enforcement responsibilities within budgetary constraints and statutory responsibilities The USDA Forest Service law enforcement program was reorganized in 1994 with an objective of providing more efficient and responsive service

Management Areas

Comment: Within Mount Shasta Management Area 3, management prescriptions III and VII threaten the mountain's integrity and value as a cultural resource These prescriptions should be changed to prescription XI The allocations of the mountain can best be met through a separate management plan This management area should be placed into prescription XI, I or X for areas designated Prescription I in the CBF alternative, and into prescription XI or II for areas that extend to the multiple property boundary The boundary of the Management Area should coincide with the multiple property boundary The unroaded, non-motorized recreation designation should be extended to preserve a park-like Shasta red fir stand along the trail to Shasta Alpine Lodge, which is inadequately protected by prescription VII

Within Management Area 8, to protect salamander habitat change the management prescription from 3 to 7 or 10 in the Marble and Potter Creek areas.

Within Management Area 9, land designated by T&E preservation are directly adjacent to areas of timber harvest, which is a concern

Within Management Area 20, these areas are designated for timber harvest This area has already suffered extreme damage from over cutting on both private and public land, and should not be entered for this purpose

Response: As detailed in Chapter II of the EIS, a Management Prescription is an overall strategy for managing the resources of a specific area of land in order to address issues and obtain desired goals and objectives The specific piece of land to which prescriptions are tied is the Management Area The Forests have been divided into 22 Management Areas, and their boundaries are constant in all alternatives

The boundaries of the Management Areas follow definite topographic features where possible and are generally consistent with Ranger District boundaries Yanagement Area boundaries are shown on the map of the Preferred Alternative (PRF) Several prescriptions may be applied to different parts of each Management Area depending on land capability and alternative theme

Management Prescription write-ups consist of a stated objective, management practices that are to be emphasized or permitted, a description of the areas where the prescription can be applied; and a list of standards and guidelines that apply to the prescription The Management Prescription S&Gs are in addition to the Forest-wide Standards and Guidelines Eleven Management Prescriptions have been developed for use in the Forests These prescriptions contain 'emphasized' and 'permitted' practices (see Chapter 4 of the Forest Plan) A suitability analysis, using resource suitability models, was then conducted to determine which activities were feasible on specific units of land This analysis also identified the best resource opportunities for applying the prescriptions depending on the theme of an alternative

Minerals

Comment: Eliminate all mining Eliminate all mining in wilderness

Response: Minerals development is permitted on all lands not withdrawn from mineral entry United States Mining Laws (30 USC 2 1-54) confer a statutory right to enter upon public lands to search for minerals Regulations in 36 CFR 228 Subpart A set forth rules and procedures designed to minimize adverse environmental impacts on National Forests resources Mining in wilderness may only be conducted on claims with valid existing rights

Comment: Discourage mineral exploitation where in conflict with wildlife, watershed, or general ecosystem concerns Minerals development plans must weigh the perceived benefits of any mining operation against costs to the environment Mineral management monitoring must be provided for

Response: Mining operations are conducted on National Forest lands in conformance with appropriate portions of the code of Federal Regulations (36 CFR 228) Those operations with the potential for significant disturbance require an environmental analysis before any activities can begin Administrative controls, mitigation measures, and a reclamation plan are developed for each specific project Operations are monitored. as appropriate. to assure compliance with the terms of the operating plan

Comment: The EIS should discuss the impacts of the President's Plan on mineral entry and leasing and indicate whether any late-successional reserves or riparian reserves are withdrawn from mineral entry

Response: The President's Plan does not withdraw LSRs and Riparian Reserves from mineral entry While locatable minerals will continue to be available, there will be more emphasis placed on minimizing potential impacts to surface resources in the LSRs and Riparian Reserves Salable minerals are sufficiently common so as to be generally available outside reserved areas or available without significantly affecting Aquatic Conservation Strategy objectives Leasable minerals will be, as they are now, subject to case-by-case review that considers all environmental factors Environmental review in conformance with NEPA is completed before the Forest Service makes leasing recommendations to the BLM

Comment: The Forest Service encourages mining. then places so many restrictions on it that exploration and production of minerals is practically impossible

Response: United States Mining Laws (30 USC 2 I-54) confer a statutory right to enter upon public lands to search for locatable minerals Regulations in 36 CFR 228 Subpart A set forth rules and procedures designed to reasonably minimize adverse environmental impacts on National Forest resources

Comment: Why were there no specialists from the field of mining shown in the list of preparers?

Response: The Forest has on staff a geologist who specializes in mineral resource management

Comment: You are proposing areas of mineral withdrawal in Management Areas I7 and I9 in proposed Wild & Scenic River areas You have regulated the Bureau of Land Management to withdraw from mineral prospecting and development areas in Management Areas 20 and 2I Mining should be as important. or more important. than any other Action Plan Why does the Monitoring Action Plan show annual cost for mining to be a mere $7,500?

Response: Access for mineral exploration and development is generally unrestricted, subject to the mitigation of adverse impacts to surface resources Exceptions to unrestricted access are wilderness, Wild portions of Wild and Scenic Riven, botanical areas, Research Natural Areas (RNAs), the National Recreation Area (NRA). and areas which are withdrawn from mineral entry Minerals in the NRA are not open to location but are available through the solid leasable regulations

Comment: Within the Minerals Standards and Guidelines, we question under a what you mean by exception, under c reword to "minimize adverse impact *of* mineral related activities on surface resources and the administration of plan of operations leaving lease stipulations on such minerals as gas, oil, and geothermal," under e why can't mining industry do the same as the

timber industry for federally listed threatened or endangered species, under g reword to "maintain an inventory of common vanety mineral sites, specify which are available for public minerals that are not viable at present may later become important enough to mine ", under j: reword to "Restrict access & development in legally designated areas (areas withdrawn from mineral entry were valid existing rights are may be exercised) " If valid existing mineral rights are held prior to withdrawal, they also have the right to existing roads and trail for development of the mineral claims, so access had to be allowed

Response: The Standards and Guidelines were carefully worded to provide management direction consistent with US Mining Laws and regulations "Exceptions" refers to unique resource values The Forest must recommend denial if the operation would jeopardize the survival or recovery of a Federally-listed Threatened or Endangered species or cause a species to become a candidate for listing as per the Endangered Species Act Access is considered during the preparation of the Plan of Operation

Comment: What happened to the modifications proposed by the Shasta-Trinity Miners Advisory Committee?

Response: United States Mining Laws (30 USC 21-54) establish statutory authority for mining activities on National Forest System lands 36 CFR 228 Subpart A provides regulations for rules and procedures Any actions promulgated by the Forest must be as per statutory authority and regulation

Comment: As per the Forest Plan Chapter 4, Riparian Management, will RMZ designation be initiated by proposed Plan of Operation or as a routine inventory What will be the consequences? Can the affected party challenge the determination? Acceptable activities within the RMZ must allow for discretion

Response: Riparian Management Zones (RMZs) are areas established by the Forest where special management consideration are provided for riparian-dependent resources RMZ size and management varies, and is primarily a function of stream class and aquatic ecosystem type Particular RMZ guidelines are provided for on a site-specific basis For mineral leases, they "may adversely affect" determination will be taken into consideration by the Bureau of Land Management in making a mineral lease decision. Standards and Guidelines concerning mineral activities were intended to allow for mineral activities while protecting from adverse environmental effects The Plan of Operation will provide for specific mitigation measures

Comment: To assure proper mineral performance up to and including rehabilitation, a performance bond should be used

Response: Regulations provided by 36 CFR 228 Subpart A allow for the use of reclamation bonds in some cases prior to approval of a plan of operation. Subpart A regulations do not give authority to use "performance" bonds, only reclamation bonds

Comment: You need to address the issue of valid existing rights where pertinent throughout the Forest Plan

Response: Statements to that effect are discussed in the EIS and Forest Plan where appropriate

Modeling and Analysis

Comment Are the modeling/simulating tools used appropriate for making management decision in the planning process' They are only simplified versions of the underlying complexity and, unless thoroughly tested and carefully used, cannot be trusted to give the kind of results that would allow management decisions to be made for a 150 year time span

Response: Many factors besides modelled outputs affect long-term planning decisions Outputs generated by models used in the FEIS help to provide the decision maker with a relative picture of some *of* the effects *of* the alternatives being considered Models are built with the best available data and are frequently updated as new information is acquired The Forest Plan will guide direction of the Forest for the next 10 to 15 years, not 150 years

Comment: The rationale used in Appendix B-15 to assign dollar values to water is inadequate

Response: Water values used in the model are taken from the 1990 RPA recommended market clearing prices. It is noted in the report that prices are for consumptive or withdrawal uses of water only and that data is not sufficient for estimating the total social benefit value of water

Comment: How will the growth and yield projections be evaluated against actual outputs?
I have no cofidence in the Forplan model

Response: Existing yield tables were developed from a Forest timber inventory completed in 1980 and updated in 1990 Future inventories will evaluate current projections and the need to adjust current tables.

Comment: The model (ERA) doesn't seem to include any provision for variation in soil type, slope, or other impacts like grazing. nor is there any overriding reason why the new roads will magically go away as planned, or the old ones in place now disappear

Response: The model does use slope gradient and soil erodibility, amongst other properties, to define each watereshed's sensitivity to cumulative wateshed effects Slope gradient is also used to define the disturbance coefficients, to distinguish between tractor harvest and cable harvest systems There was no attempt to model all disturbances such as grazing, since it is somewhat site specific and beyond the the scope ofthis analysis Following implementation ofthe ROD, there is little likelihood of a net increase of roads on the Forest The Forest is well-roaded and in areas such as Key Watersheds the managment emphasis is to reduce road density and attendant erosion and sedimentation through closure and obliteration

Monitoring

Comment: What is the purpose of the monitoring plan? It should focus on accurately determining the response of ecological systems, biodiversity and vegetation changes and set standards of threshold

Response: The monitoring plan provides the basis for evaluating the Forest Plan implementation process, effects, and outputs to determine how well the Forest Plan objectives are being met and how closely standards and guidelines are being followed Resources will be evaluated against a standard that may trigger further action. including, no action (standards and guideline met), refer action to the appropriate line officer for improved application of management area direction, modify standards and guidelines or change allocation of prescriptions in the form of a Plan amendment, revise the projected schedule ofoutputs, or initiate revision of the Plan (refer to Chapter 5, Forest Plan for more discussion on monitoring)

The Research and Monitoring Committee, a staff group that reports to the Regional Interagency Executive Committee. is preparing new monitoring guidelines forthe entire range ofthe northern spotted owl These guidelines will address both aquatic and terrestrial concerns After these guidelines are released, it could result in a modification of the Monitoring Plan These monitoring guidelines are expected to address the response of ecosystems at all scales

Comment: Monitoring has been inadequately executed in the past Projects should not proceed without adequate programs for monitoring Monitoring has been inadequately funded for in the past

Response: Monitoring is built into program budgets Costs have been eliminated from Table 5- I, Forest Plan because all projects should contain appropriate levels of monitoring funds in their costs or they should not be undertaken Monitoring at the project level is an on-going process where the majority of activities occur This type of monitoring will be used to check for trends of environmental improvement/degradation and attainment/non-attainment of Forest objectives Significant changes may trigger an administrative review and reevaluation of the Forest Plan

Comment: Monitoring should be accomplished through outside contractors, universities, research and/or other non-Government agents

Response: Monitoring may be implemented through a variety of techniques including service contracting and cooperative efforts with other organizations

Comment: How will the growth and yield projections be evaluated against actual outputs I have no confidence in the Forplan model

Response: The monitoring plan provides for evaluation of growth and yield assumptions. see Table 5- I under Timber in the Monitoring Plan, Chapter 5-Forest Plan FORPLAN is a linear programming model used to predict output schedules for alternatives and benchmarks The estimated outputs will be compared with the actual Forest program through the planning period rather than to individual projects

Comment: A monitoring report should be prepared that documents the findings and evaluations from monitoring The report should be available to the public

Response: Resource evaluation monitoring results will be periodically documented in an annual evaluation report available to the public (see Plan Chapter 5, C Evaluation Reports)

NEPA/NFMA

Comment: How can the public provide substantive comment to the Forest Plan and EIS when it is not clear how it will be affected by the President's Plan, A supplemental draft EIS and Forest Plan should be developed incorporating the President's Plan wrth the Preferred Alternative An additional comment period should be provided to allow for public input to the supplemental draft EIS and Forest Plan

Response: How the draft Forest Plan would be affected by the draft President's Plan was disclosed by the following methods,

A The draft President's Plan was referenced in the DEIS and was made available to the public The draft President's Plan was described in the draft SEIS, which described the relationship to the draft Forest Plan

B The DEIS included an Addendum that described the relationship to the draft President's Plan

C The relationship between the Forest Plan and the President's Plan was described at public meetings and briefings held on both the draft Forest Plan and the draft President's Plan

The Record of Decision (SEIS ROD) for the final President's Plan was signed on April 13, 1994 Changes made between the draft and final President's Plan were described in the SEIS and the SEIS ROD The changes made between draft and final versions of the President's Plan were relatively minor and did not warrant issuance of another supplemental EIS on the President's Plan

The relationship of the President's Plan to the draft and final Forest Plan was explained further in the SEIS and the SEIS ROD The SEIS supplemented the DEIS for the draft Forest Plan (SEIS ROD, page 12) and provided direction for completion of the final Forest Plan (SEIS ROD, Appendix A, page A-2) That direction has been fully incorporated in the final Forest Plan

Based on the opportunities for comment already provided, the relatively minor changes made to the Forest Plan as a result of public comment, and finalization of the President's Plan, an additional opportunity for comment is not warranted

Comment: We urge the Forest to expand the opportunty for the public to become involved and comment on the Forest Plan

Response: Opportunty for public comment was provided on both the draft President's Plan and the draft Forest Plan (see response to comment above) Changes made as a result of comment on the draft Forest Plan, and as a result of finalization of the President's Plan, were relatively minor and did not warrant an additional opportunity for formal public comment Issuance of a Record of Decision simultaneously with the FEIS for the Forest Plan is permitted by Council on Environmental Quality regulations [40 CFR 1506 10b] when there is an established appeal process The Forest Plan decision is appealable under 36 CFR 217

Comment: How will the President's Plan be implemented at the Forest level?

Response: The ROD and FSEIS, commonly referred to as the President's Plan, provide for land allocation decisions and management direction which were incorporated into the Forest Plan and EIS Ecosystem management planning will provide for broadly-defined goals and objectives using an Interdisciplinary, integrated approach Site-specific projects resulting from ecosystem analysis will require application of the NEPA process

Comment: The comparison of alternatives should provide for quantifiable comparisons of alternatives, and not just be a detailed impact analysis

Response: Where applicable and relevant, quantifiable comparisons of alternatives are displayed in the EIS Notwithstanding the relative abundance of information upon which the analysis is based, it is acknowledged that a great deal of professional judgement was relied upon in assessing the effects of the alternatives Contrary to the suggestion in the comment, however, this reliance is not a fatal flaw First, the judgements generally are well informed, at least relatively speaking, given the data upon which they are based Second, the judgements are of scientists who are among the foremost in their respective fields Third, a degree of professional technical judgement is inevitable in evaluations and predictions made in the sciences primarily relied upon in conduction the assessment of effects in this EIS Finally, this plan results no actual action on the ground, prior to project implementation there will be ecosystem analysis and project NEPA analysis which provides more quantifying of effects

Comment: The sections "Consequences Common to All Alternatives" and "Consequences Specific to An Alternative" are misnamed Neither presents a discussion of consequences Conclusory statements which do not refer to scientific or objective data supporting them do not satisfy NEPA's requirements for a detailed statement Mere listing of mitigation measures is insufficient to qualify as the reasoned discussion required by NEPA The DEIS fails to present sufficient scientific data as required by NEPA

Response: Although the Interdisciplinary Team used the best information and research results available at the time, it is true that much information that would have been useful simply does not exist or is unusable in its current form Nonetheless, NEPA acknowledges the inevitability of incomplete information, and the environmental analysis may be considered by the decision maker if the gaps in information are disclosed within the EIS (40 CFR 1502 22)

The Interdisciplinary Team examined the data and relationships used to estimate the effects of the alternatives There is a substantial amount of credible information about the topics addressed in the EIS, the basic data and the central relationships are well established The teams determined that, while the missing

information would frequently add precision to estimates or better specify a relationship, the basic data and central relationships are sufficiently well established in the respective sciences, and filling those information gaps would not likely reverse or nullify understood relationships Though acquisition of new information was considered. the team determined that the new information was not essential for the decision makers to make a reasoned choice among alternatives

There appears to be an implicit assumption in the comment that such sciences should produce precise or "certain" results But this assumption fails to account for the fact that not all sciences share the same certainty of knowledge and predictive capability That is, while some so-called "hard sciences" are more or less characterized by precise quantitative data, widely accepted theories, and research based on experiments capable of being repeated and conducted in controlled environments, the sciences utilized in the EIS do not generally fall into such a category Indeed, ecology, sociology, and economics generally are not as deterministic. are more complex (in large measure because they address living organisms vis-a-vis inanimate units), rely on more subjective assumptions, and ultimately yield less certain results than those normally possible in physics or chemistry, for example

Finally, the alternative analyzed in the EIS each include an adjustment process (adaptive management) that provides for modification of habitat management should new information warrant a change in management This adjustment process is guided by monitoring and research and provides the flexibility to adjust the management direction of the selected alternatives in the future

Comment: The seven page addendum incorrectly asserts that the President's Plan is within the range of alternatives considered in the DEIS

Response: The statement about the President's Plan falling within the range of alternatives considered is a qualitative assessment of all of the features of the alternatives -- not just a single measure The range of alternatives considered in the DEIS is also not limited to the alternatives considered in detail. but also includes those that were considered but eliminated from detailed study shown in the DEIS

This comment is directed at a single measure - the allowable timber sale quantity However, when this single measure is examined. the President's Plan ASQ of 60 MMBF for the Shasta-Trinity shown in the addendum compares to ASQs of 65 3, 55, and 36 for alternatives CBF, LBU, and 12C at the bottom of the range and ASQs of 236 5, 134, 129, and 112 4 for alternatives 1990 CUR, CEE, CEF, and RPA at the top of the range

Comment: The Forest is open to litigation by admitting human-induced activities have lead to a decline in fish population levels

Response: There are a number of variables which may have lead to the decline, including "[o]ver fishing of major basin fish stocks, inundation of limited critical spawning and rearing habitats, poor water release schedules at dam sites. and terrestrial habitat alteration in sensitive watersheds are contributing factors to this decline" as stated in the EIS The Forest Plan and EIS address those management activities within the scope of influence of Forest interdisciplinary teams and deciding officials The Forest Plan and EIS incorporate the Aquatic Conservation Strategy, as detailed in the ROD and FSEIS, to restore and maintain the ecological health of watersheds and aquatic ecosystems

Comment: Alternative 12C (Late Successional Forest Management) was eliminated from detailed study because it was not considered responsive to local social/economic needs This should be carefully examined on the local level, not accepted without question

Response: The land allocation decisions and management direction contained within the President's Plan were incorporated into the Preferred Alternative of the Forest Plan and EIS The intent of the Preferred Alternative is to provide for multiple use, with an emphasis on providing for aquatic and late-successional species habitat needs

Comment: The Forest's stated policy of good will and cooperation with Native Americans requires consultation with Native Americans as required by the American Indian Religious Freedom Act, the National Historic Preservation Act, the Secretary of the Interior's Guidelines for Preservation Planning, and the Advisory Councils's Guidelines for Public Participation

Response: Consultation with Native Americans has occurred during the development of the Forest Plan and EIS consistent with the scoping process outlined in Appendix A of the EIS

Comment: The Draft Forest Plan should be withdrawn pending reissuance of the Mount Shasta Ski Area EIS to properly consider the effects of the ski area The Draft EIS land allocation to downhill skiing on Mount Shasta is premature

Response: The Forest Plan provides for management prescriptions which describe permitted management practices The site-specific Mt Shasta EIS considers a range of alternative management strategies which may occur within the parameters of permitted management

practices The land allocation decisions of the Forest Plan provides management guidance for, and is not a result of, the site-specific Mt. Shasta Ski Area EIS

Comment: Your proposal violates the Constitution of the United States and the Constitution of the State of California What you propose constitutes a "taking" for which we hold you fully accountable Assess proposed "taking" with respect to mining and grazing

Response: The Forest Plan and EIS were prepared in full compliance with applicable Federal laws and regulations Primary guidance was provided by the National Forest Management Act and the National Environmental Policy Act. With respect to minerals management, the Forest Plan and EIS defer to existing laws and regulations pertaining to mining activities, as detailed in Chapter III, Minerals, of the EIS With respect to range management, implementation of the Forest Plan and EIS will provide for standards and guidelines necessary to ensure range management is integrated with other resource needs and objectives

Comment: The Organic Act recognized the states retain both civil an criminal jurisdiction in the administration of National Forests

Response: The Organic Administration Act states "[t]he jurisdiction, both civil and criminal, over persons within National Forests shall not be affected *or* changed *by* reason of their existence, except so far as the punishment of offenses against the United States therein is concerned, " The Forest Plan and EIS are consistent with this Act

Comment: The Forest Plan and DEIS appear to be in potential conflict with the Siskiyou Country Interim Land Management Plan.

Response: Chapter IV of the EIS, Possible Conflicts with Federal, Regional, State and Local Land-use Plans, discusses "possible conflicts between the proposed action and the objectives of Federal, regional, State, and local land use plans, policies, and controls for the areas concerned " The EIS and Forest Plan provide a vehicle to resolve problems with public agencies should a conflict result from any of the direction contained in the various alternatives, including the Forest Plan

Comment: The EIS must reveal the environmental effects of the proposed action By incorporating Option *9*, the DEIS fails to fulfill the requirement

Response: The Forest Plan and EIS have fully integrated land allocation decisions and management direction provided by the ROD and FSEIS The environmental effects of the Final Plan are within the range described in the DEIS, therefore, the changes in the final do not violate the requirement of the DEIS to reveal the consequences of the proposed action

Comment: The EIS does not consider a reasonable range of alternatives

Response: NEPA requires the agency to explore and evaluate "all reasonable alternatives" which respond to the "underlying purpose and need" (40 CFR 1502 14(a) and 1502 13). The alternatives presented in this EIS meet these requirements, and respond to the purpose and need defined in Chapter I of the EIS Several other alternatives were initially considered, but were not given detailed analysis because they were not consistent with the purpose and need, as detailed in Chapter II 'Alternatives Considered and Eliminated from Detailed Study" of the EIS

Comment: Adoption of the Preferred Alternative would violate at least five environmental statutes, including the National Forest Management Act, the Clean Water Act, the Endangered Species Act, the Wild and Scenic Rivers Act, and the National Environmental Protection Act

Response: The Forest Plan and EIS are in compliance with those acts as required by law, regulation, or policy

'Option *9*' (President's Plan)

Comment: How will hardwoods be managed on a 100 year rotation?

lesponse: Currently, hardwood stands are not a regulated component of the ASQ calculation for the Forest The ecosystem management process will identify hardwood management objectives and opportunities using an integrated resource management approach

Comment: If the goal is the development of old-growth characteristics, treatment limited to stands of less than 80 years is too rigid

lesponse: The President's Plan FSEIS and ROD provided the 80 year direction for Late-successional Reserves which were incorporated by the Forest Plan and EIS If that standard is too rigid, provisions for adjusting S&Gs are available through the adaptive management process and if necessary, a Forest Plan amendment

Comment: Oversight should be decentralized to the province level

Response: Appendix E of the President's Plan displays a copy of the Memorandum of Understanding between

affected federal entities and agencies detailing the structural hierarchy for implementation of, and oversight for, Forest Ecosystem Management within the Pacific Northwest. Oversight will occur at the appropriate level depending on the resource

Comment: The objectives. standards, guidelines, and components of the Aquatic Conservation Strategy should be retained

Response: Management direction and standards and guidelines provided by the Aquatic Conservation Strategy have been incorporated into Chapter 4 of the Forest Plan

Comment: What will happen to late seral and old-growth stands outside reserves?What process and criteria will be used to select stands for timber cutting?

Response: Late seral and old-growth stands outside reserves would be managed as per the standards and guidelines and management direction provided by the land allocation area they are located within The process used to select stands for timber 'cutting' will be a function of the objectives determined for the assessment area through ecosystem management analysis toward obtaining a desired future condition

Comment: Matrix lands should be managed using the ecosystem management approach Timber management in matrix should include NEPA analysis and an assessment on connectivity between late-seral /old-growth habitat

Response: Matrix lands are to be managed using an ecosystem management approach as described in Chapter 4 of the Forest Plan NEPA analysis will be accomplished prior to implementing site-specific management activities

Comment: Creative management should extend to all areas of the Forest, including riparian reserves

Response: The Aquatic Conservation Strategy provides the basis for riparian reserve management on the Forest Watershed analysis focuses on implementing the Aquatic Conservation Strategy The participation in watershed analysis *of* adjacent landowners, private citizens, interest groups, industry, government agencies, and other interested parties will be promoted

Comment: The only feasible defensible management prescription will be one that recognizes and attempts to emulate the historic norm

Response: Replicating the natural ecosystem function is a guiding principle of ecosystem management

Comment: Do not drop standards for Adaptive Management Areas A provision to add AMAs where citizen/agency biodiversity councils exist should be added

Response: Land allocation decisions provided by the President's Plan, including AMAs have been incorporated into the Forest Plan AMA areas were selected to provide opportunities for innovation, to provide examples in major physiographic provinces, and to provide a range of technical challenges The President's Plan provided for allocation of specific Adaptive Management Areas The Forest Plan allows for management *of* the AMA under Matrix S&G's until AMA planning, in cooperation with research, develops new, or modified. S&Gs

Comment: Management activities in stands adjacent to reserves must provide for "feathering" of activities at the boundary

Response: A concern such as this would be better addressed through ecosystem analysis directed toward obtaining a described desired future condition Ecosystem analysis will not stop at LSR or any other land allocation boundary

Comment: The plans fail to disclose which land is designated as administratively withdrawn in Option *9*

Response: Chapter 4 of the Forest Plan, and the Management Prescription for the Preferred Alternative map will describe/display administratively withdrawn areas for the forest

Comment: Expand the old-growth reserve system to protect all remaining stands of old-growth forests Allow no thinning salvage, road development, or logging activity in reserves

Response: Species viability analysis was used to guide the development of land allocation decisions, including late-successional reserves, as incorporated by the Forest Plan and EIS from the President's Plan Silvicultural treatments inside reserves must ensure they are beneficial to the creation of late-successional forest conditions

Range

Comment: Eliminate all grazing Phase out grazing

Response: With application of the Range Standards and Guidelines as detailed in Chapter 4 of the Forest Plan, livestock grazing can continue to be a compatible, integrated resource management practice

Comment: Increase the amount livestock owners must pay for grazing Require owners to pay private landowners when their cows graze on private land

Response: The consideration of user fees is outside the scope of the Final EIS and Final Forest Plan

Comment Reduce or eliminate livestock use where riparian systems are being adversely impacted Provide for monitoring

The EIS should describe how range management would be adjusted to meet the Aquatic Conservation Strategy objectives

Proper utilization standards must be developed

Use the process presented in the R5 direction for TES species

Utilization guidelines must be developed by ecological type, condition, and seral stage

Riparian standards for range management do not meet FEMAT

There should be no grazing in riparian areas

There needs to be a biological evaluation of the effects of grazing on the entire forest

A Desired Future Condition needs to be written for each allotment, along with a stepwise timetable for its attainment

The STNF LRMP contains few timelines and delegates most of the regulation of use and environmental condition to the AMP

Provide for more specific range standards and guidelines to provide for the protection of riparian areas and to be consistent with the President's Plan direction

Response: Application of the Range Standards and Guidelines as detailed in Chapter 4 of the Forest Plan will provide for livestock grazing compatible with other resource values, as well as providing for range management consistent with the Aquatic Conservation Strategy proposed by the President's Plan and incorporated into the Final EIS and Final Forest Plan

Comment: Forest representatives should work with appointed members of the Siskiyou County Grazing Advisory Board to overcome policy conflicts and develop a coordinated rangeland resource management plan for the rangeland portions of the Preferred Alternative

Response: Coordination of Forest range management personnel with affected range permittees and representatives will help ensure continued range management compatibility with other integrated resource objectives

Comment: Ecological rite inventories are irrelevant to carrying capacity Your methods for evaluating rangeland conditions should include scientifically sound methods to estimate forage production Native grasses From Siskiyou County are inherently shorter and recover more quickly

Response: The Range Standards and Guidelines detailed in Chapter 4 of the Final Forest Plan describe methodologies which will be used to evaluate range- and condition

Comment We are disappointed that in light of apparent under-utilization *of* rangeland potential that greater efforts have not been made to offer expansion of existing allotments

4 large percentage of livestock inventory in Siskiyou County is dependent upon continued availability of public range

3ur analysis indicates that the STNF should plan for a significant decrease in AUMs if it intends to rehabilitate riparian areas and poor and fair conditions rangelands and respond to the reduction in transitory range

Response: As described in Chapter III of the Final EIS, "It is expected that the demand for Forest range lands will remain at, or decrease slightly from, current levels over the next decade If increased demand for range and should occur, it could be accommodated in some areas by the development of suitable range that would not be in conflict with other resource uses Costs of development could be shared between the permittee and the government, thereby increasing the feasibility of such improvements "

Comment We are greatly concerned with any potential delays in the NEPA process and in preparation of range assessment work that could jeopardize preparation of Allotment Management Plans and the continuous utilization of existing allotments

NEPA analysis of the grazing program is required by both regional policy and federal law.

Response: Range Standards and Guidelines detailed in Chapter 4 of the Forest Plan, describes Rangeland Project Decision documents which provide for a site-specific NEPA analysis process and elements which are to be addressed

Comment: Threshold utilization standards for livestock must be in the Final Plan

Response: A table describing "Percent Allowable Utilization Levels by Ecological Condition" has been provided within the Range Standards and Guidelines in Chapter 4 of the final Forest Plan

Comment: Why does cutting of "X" MMBF necessarily result in 50 X AMs of grazing?

Response: Timber harvesting generally allows for increased levels of sunlight, moisture, and other site resources to be available for the increased development of rangeland browse species such as grasses, forbs, and brush A general correlation between harvest volume and rangeland development can be inferred. and can be a good indicator of predicting rangeland response to a variety of considered harvest levels

Comment: Do not burn grazed areas for a minimum of three years following wild or prescribed fire to allow natural revegetation to take place

Response: Range Standards and Guidelines, detailed in Chapter 4 of the Forest Plan, provide range management direction for "the appropriate livestock stocking intensities to achieve a balanced ecological status, prevent over utilization of any desirable vegetative types and maintain good livestock distribution "

Comment: The LRMP and FEIS should have a map showing all allotments, a history of NEPA analysis for all allotments, and an allotment-specific schedule for AMP revision

Response: Range allotment maps, history of NEPA analysis and AMP scheduling is maintained by Ranger Districts on the Forest which are affected by range allotments

Recreation

Comment: What are "level 5 type of facilities" as discussed in the Recreation Standards and Guidelines?

Response: Level 5 type of facilities are as per Forest Service Manual 2330 3 Exhibit 0 I "High degree of site modification Facilities mostly designed for comfort and convenience of users and usually include flush toilets, may include showers, bathhouses, laundry facilities. and electrical hookups Synthetic materials commonly used Formal walks or surfaced trails Regimentation of users is obvious Access usually by high-speed highways Development density 5 or more family units per acre Plant materials may be foreign to the environment Formal interpretive services usually available Designs formalized and architecture may be contemporary Mowed lawns and clipped shrubs not unusual " The reference to 'level 5 type of facilities' has been changed in the final Forest Plan

Comment: Citizens of the United States should not subsidize recreation for local residents

Response: It is Forest Service policy to pass on the cost of providing services to those who use the services subject to provisions of the Land and Water Conservation Act It is beyond the scope of the Forest Plan and EIS to consider user fee policy

Comment: The Forest Service should actively promote and participate in a master planning process for the Lake Siskiyou Area

Response: As part of the Desired Future Condition for Management Area 5 (Parks-Eddy), "[D]eveloped camping facilities complement the developments on surrounding private lands, including Lake Siskiyou " Lake Siskiyou is privately held, thus outside the scope of consideration of the Forest Plan and EIS

Comment: Recreation use projections are overstated significantly because you have less access through reduced road maintenance and new road construction

Response: FORPLAN models used to extrapolate recreation use make general projections, and are not directly sensitive to reduced road maintenance levels or new road construction However, most of the projected increase would occur near already roaded areas where future allowance for road maintenance is expected

Comment: Information regarding visitor days is completely garbled with conflicting statements

Response: Recreation Visitor Days are anticipated outputs resulting from FORPLAN modeling, using assumptions as described in Appendix B of the Forest Plan An attempt to provide consistent information throughout the EIS and Forest Plan has been accomplished

Comment: There is no management prescription for "primitive" recreation. even though primitive wilderness designation is recognized as a use under multiple use management

How are Recreation Opportunity Spectrum classes assigned?

Response: Within the Recreation Opportunity Spectrum (ROS) classes, Primitive is a defined class Primi-

tive is not a management prescription. ROS classes are defined in the Glossary, Chapter VIII, of the EIS

Comment: We are against "Commercial Use Fees" imposed by the USDA Forest Service Permit and user fees should be required of equestrian wilderness users

Response: The consideration of user fees is beyond the scope of the EIS

Comment: You need to prepare a management plan for the Pacific Crest Trail, and start it immediately

Response: Appendix A of the Forest Plan, Required Resource/Implementation Plans, anticipates the preparation of the Pacific Crest National Scenic Trail (PCT) Development and Operation Plan to be completed during 1996

Comment: How does designation of a scenic byway impact private land management activities affected by the byway?

Response: The Chief of the Forest Service initiated the National Forest Scenic Byways Program in 1988 with the intent to 1) showcase the outstanding scenery of National Forest system lands, 2) to interpret the various management activities of National Forests as well as the cultural and natural values and attractions, and 3) to cultivate partnerships with local communities and organizations to enhance rural economic diversity Private land management activities will not be affected by the designation of a scenic byway

Comment: Recreation S&G 'e' needs to include safety as a reason to exclude mountain bikes from trails

Response: NEPA analysis will provide for compatible and incompatible activities for specific trails

Comment: Recreation S&G 's' should read "encourage the private sector to help provide needed recreation sites, facilities, and services with a development level consistent with the environmental setting and studies performed as part of an EIS or EA"

Response: This Recreation Standard and Guideline has been reworded in the final Forest Plan

Comment: Secure a comprehensive trails plan and program for the National Forest Turn abandoned roads into trails Build foot and horse trails throughout non-wilderness portions of the forest to more evenly distribute recreationists and protect designated wilderness from overuse

Response: Trail maintenance and development plans are developed by the Forest administrative units responsible for trails These plans prioritize current and future trail needs The appropriate level of NEPA documentation is provided for by the responsible administrative unit Public involvement helps to determine trail needs and appropriate uses

Comment: Off-Road-Vehicle Use

Eliminate all OHV uses on National Forests

Any closures on public lands would not be appreciated I would like to see the trails remain open for everyone to visit by foot, horse, ATV, motorcycle, and 4X4 We are interested in working with the Forest Service in keeping the forest maintained and open

Response: The Off Highway Vehicle (OHV) Management Plan map, included with the map package to the Forest Plan and Final EIS, displays Forest OHV policy OHV use restrictions are provided for on the map legend It is expected that OHV use will be modified over time through the ecosystem planning process

Comment: The issue of downhill skiing on Mt Shasta was conveniently not mentioned No mention is made of the existence of the old ski area or the history of the conflict to renew that development Coiiveniently missing also was any discussion of the economic results of downhill ski development to the local area, the increasing public interest in downhill skiing, and the lack of other northern California ski resorts The DEIS/DLRMP simply ignores the whole issue and recommends designation

I am writing to express my deep disappointment with the Shasta-Trinity National Forests complete disregard for the Mount Shasta Ski Area in its draft plan There is nothing shown on the plans' map which would indicate a clear desire by the Forest Service to develop a downhill ski resort on National Forest Service lands in Ski Bowl

The Forest appears to be developing the LMP with the assumption that the Mount Shasta Ski Area will be build, even though the EIS for the proposed MSSA is not complete, and Mount Shastas' eligibility to the National Register of Historic Places has not been fully determined Development to support downhill skiing would have significant adverse environmental consequences on important resources in the region if conducted in an environmentally irresponsible manner

Response: Chapter 3 of the Forest Plan, Summary of the Analysis of the Management Situation, Recreation, discusses the status of the Mount Shasta Ski Area Site-specific environmental analysis and decisions will determine the course of actions associated with the

Mount Shasta Ski Area The Forest Plan and Final EIS respond to programmatic requirements which allow forthe range of alternatives consider.. in the site-specific environmental analysis. but do not provide for preselection of any alternative

Comment: You didn't mention "spelunking" as aform of recreation-a significant activity on our Forest You need to provide for cave monitoring to determine if any environmental changes are occurring Putting any cave name on the map brings undue attention to the caves Caves in high recreation use areas should be managed with low visibility A full inventory of each cave must be considered before a collective or site-specific management plan is made

Caves should be evaluated for significance with appropriate protection under the Forests' Cave Management Plan Caves should be managed primarily for resource protection and secondarily for recreational caving where such activities do not significantly impact the resource Lava tube visitor sites be carefully chosen A public cave safety and awareness program should be developed

Response: Spelunking as an increasing recreational activity is being recognized by the Forest A Recreation Standard and Guideline has been added to the final Forest Plan which provides for the initiation of a "significant caves" listing process

Comment: There needs to be a clarification between stock and equestrian or recreational stock use in your draft plan

Response: Consideration of distinguishing between stock and equestrian, or recreational stock use, would be more appropriately considered during site-specific NEPA analysis

Roadless Areas

Comment: The Mt Eddy further planning area should be designated as wilderness

Response: The Preferred Alternative does not recommend the inclusion of the Mt Eddy Further Planning Area (RARE II - #05229) into the National Wilderness Preservation system *As* described in Chapter IV of the Final EIS, wilderness attributes will be retained on an estimated *90* percent of the Mt Eddy area through allocation to Unroaded, Non-motorized Recreation (Prescription I) and Research Natural Area (Prescription X)

The remaining estimated 10 percent of the Mt Eddy area is allocated to Roaded Recreation (Prescription III) As per the Aquatic Conservation Strategy, provided for by the Presidents' Plan and incorporated into the Final EIS and Final Forest Plan, watershed analysis must be conducted before any management activities may occur within inventoried roadless areas

Comment: Appendix C of the Draft EIS shows both Prescription I and II as applying to the Preferred Alternative How can that be?

Response: Appendix C describes not only how prescriptions I and II, but how all prescriptions in applied to roadless areas, would effect wilderness characteristics

Comment: There is no reason to keep over-the-snow vehicles out of Zone A in the OHV plan Zone A should have the same over-the-snow regulations as Zone C

Response: Most of Zone A are designated wilderness areas, which are included within the National Wilderness Preservation system, where motorized vehicles are prohibited The remaining Zone A areas are locations where motorized travel would be inconsistent with management objectives or resource protection needs

Comment: Why is the Mt Eddy area being considered as a potential ski area when the Mt Shasta EIS eliminated it from consideration?

Response: The Preferred Alternative of the Final Forest Plan and Final EIS provides for the Mt Eddy area being allocated to Unroaded, Non-motorized Recreation (Prescription I) and Research Natural Area (Prescription X), which preclude the development of a ski area

Comment: Preserve all existing roadless areas Recommend all of the Forest's roadless areas be designated wilderness No new roads and no logging should occur in roadless areas All remaining roadless areas should be designated for some level of semi-primitive, non-motorized management

Response: Chapter IV of the Final EIS, Wilderness and Roadless Areas, discusses land allocation effects upon wilderness attributes for the four alternatives considered in detail With implementation of the Preferred Alternative, an estimated 81 percent of the *29* released areas acreage would retain wilderness attributes through allocation to Prescription I (Unroaded, Non-motorized Recreation), II (limited Roaded Motorized Recreation), VII (Threatened, Endangered, and Selected Sensitive Species) and X (Special Area Management) Additionally, as provided for by the President's Plan and incorporated into the Final Forest Plan and Final EIS, no new roads are to be constructed in inventoried roadless areas in key watersheds. and

watershed analysis must be conducted in all non-key watersheds that contain roadless areas before any management activities may occur

Comment: Restrict ORV use to established roads and designated routes, and prohibit their entry into roadless areas

Response: The Off-Highway Vehicle (OHV) Management Plan provided with the map package to the Final EIS and Final Forest Plan provides for OHV uses and restrictions by zone for the Forest Most of the Zone A areas, outside designated wilderness areas, are portions of released roadless areas No motorized travel is permitted within Zone A

Comment: Require an EIS for first project entry into roadless areas. Describe the process used to determine whether or not to do an EIS in released roadless area The impacts of new roads and forest management activities on water quality in released roadless areas should be assessed as specifically as possible

Response: FSH 1909 15, Chapter 20, 20 6, Classes of Actions Requiring EISs includes "Class 3 Proposals that would substantially alter the undeveloped character of an inventoried roadless area of 5,000 acres or more " Proposals for areas smaller in size would require an EIS if the environmental effects were found to be significant

The impacts of new roads and forest management activities on water quality in released roadless areas would be assessed during site-specific NEPA analysis The intensity of analysis is primarily a function of statutory and policy requirements, and project-level issues

Comment: Little consideration had been given to the effect roadless area development would have on the Pacific Crest National Scenic Trail

Response: The preponderance of the Pacific Crest Trail, as it traverses the Forest, crosses Administratively Withdrawn, Congressional Reserve, and Late-Successional Reserve land allocation areas The Pacific Crest Trail is a National Scenic trail authorized and designated by Congress as part of the National Trails System Act of 1968 As per Section 7 (a)(2) of the Act, "[d]evelopment and management of each segment of the National Trails System shall be designed to harmonize with and complement any established multiple-use plans for that specific area in order to insure continued maximum benefits from the land " Site-specific NEPA analysis, and application of the Recreation Standards and Guidelines applicable to the Pacific Crest Trail, as detailed in Chapter 4 of the Final Forest Plan, would provide for sections of the Pacific Crest Trail potentially affected by management activity where it crosses National Forest System lands through land allocations other than Administratively Withdrawn

Comment: The EIS should incorporate the Presidents' Plan management prescriptions for roadless areas

Response: It did The Presidents' Plan provided guidance for inventoried roadless areas within the context of the Aquatic Conservation Strategy Specifically, no new roads are to be constructed within inventoried roadless areas within key watersheds, and watershed analysis must be conducted within non-key watershed inventoried roadless areas prior to implementing management activities The Aquatic Conservation Strategy guidelines have been incorporated in Chapter IV of the Final Forest Plan

Comment: Roadless areas should become the core for a wildlife habitat/wildlife corridor system that focuses on true ecosystem protection, blending commodity extraction with full protection for important wildlife areas

Response: Watershed Analysis and Ecosystem Management planning will provide for and identify wildlife habitat and wildlife corridor needs and analyze how roadless areas contribute toward meeting those needs

Comment: The Shasta-Trinity can now again consider and recommend released roadless areas for inclusion as wilderness as per the California Wilderness Act and National Forest Management Act

Response: The Forest is satisfied that the Final EIS, through analysis of land allocation decisions as they affect wilderness attributes, has provided sufficient opportunity to determine additional wilderness inclusion needs during the current planning period

Special Areas (RNAs and SIAs)

Comment: Only one RNA has been established on the Shasta-Trinity National Forest Alternative CBF identifies thirteen All thirteen areas should be included in the Final Plan It is important to save the last fragments of old-growth vegetation

Response: The Shasta-Trinity evaluated thirteen areas The final plan allocates 8 new RNAs which are identified in Chapter 4 of the FEIS These areas represent the Shasta-Trinity's contribution to the regional allocation of RNAs that reflect a variety of ecosystems/vegetation types to be preserved for research

Comment: A taking implementation should be completed prior to RNA establishment as effects water rights, grazing, and mining claims

Response: The RNA establishment report requires such an assessment as described above

Comment: Smoky Creek RNA is placed back in Matrix in Option 9 This is a serious mistake

Response: Smokey Creek is allocated to RNA in the Forest Plan Preferred Alternative

Comment: There should be a timeline established for the creation/management/study of Special Interest Areas

Response: The Preferred Alternative of the Final EIS proposes the classification of 19 Special Interest Areas As described in Appendix A Required Resource/ Implementation Plans, Special Interest Area Management Plans are proposed to be developed between the years 1995 through 2000

Comment: Cultural sites should be evaluated for their importance as Biological Special Interest Areas

Response: Heritage resource sites which meet the criteria as Special Interest Areas may be considered for classification

Comment: Several biological and cultural interests would be served by some or all of the vernal meadows supporting small to medium population of sensitive plant species *Calochortus longbarbatus* on the eastern edge of the McCloud Ranger District being designated Special Interest Areas

The following additional SIA candidates should be recommended for designation Hall City Cave, Hirz Mountain, Potem Falls, Potter Creek Cave, Tombstone Peak, Tilted Rock Lava, Twin Cakes Basin. and Wells Creek Falls

Table IV-9 lists potential SIA's Del Loma Cave, Hall City Cave, Potter Creek Cave, and Tombstone Peak as being at high risk due to mining/geothermal activities, off highway vehicles. and logging We request these sites be included as recommended SIA's

Response: Twenty two other areas, which may qualify to be classified as Special Interest Areas, will be analyzed for possible classification under the Preferred Alternative Management direction will be provided to evaluate each potential area with implementation of the Preferred Alternative

Comment: It is not clear who will take responsibility to establish and administer SIAs and RNAs

Response: Each established or potential area will be recognized in the Forest Plan They will be recognized as a special management zone (FSM 2124) A special zone plan will set forth the management requirements Planning will be conducted in the same general manner as prescribed for Primitive Areas and Wilderness (FSM 2322) Approval of the plan will also constitute classification of the areas and the plan will so provide The Forest Officer authorized to classify an area (FSM 2360 4) is authorized to approve the plan

Comment We recommend that all SIA's be managed for a VQO of retention, that they be withdrawn from mining, and that proposals for hydroelectric development be recommended for denial to FERC

Prohibit OHV access, grazing, mining, and other harmful activities for Prescription X (Special Areas) Locate high-intensity campgrounds away from Special Areas

Management Plans for recommended SIA's such as Giant Crater Lava Tube System and Natural Fridge should include seasonal monitoring for bats, discouraging visitation during critical periods for bats, and encourage public awareness and conservation of geological features and biota

Response: Chapter 4 of the Final Forest Plan, under Special Areas Management (Prescription X) describes Standards and Guidelines which provide for management of Research Natural Areas and Special Interest Areas Additional measures may be provided for specific RNAs or SIAs during the development of Special Area Management Plans

Timber

Comment: Logging should be eliminated in the National Forests immediately

Response: Timber production is one of the mandates of the federal forests and changing it would require congressional action. which is beyond the scope of this Plan

Comment: Timber harvesting should be eliminated in "wild" areas

Response: Most of the remaining "wild areas on the Forests are protected through Congressionally designated wildernesses or through other designations, such as late-successional reserves The disposition of inventoned roadless areas is discussed in Appendix C of the FEIS

Comment: Defining sawlog products in terms of cubic feet alone is not appropriate

Response: In most cases, timber volume data in the DEIS and Plan are expressed in both cubic and board feet Cubic foot measure is becoming increasingly important and will be the primary unit of measure in the near future

Comment: A timber sale program that is only slightly higher than the annual mortality of 64 2 million board feet is not managing the forest wisely

Response: Timber is only one of many resources which are managed on the national forests In order to meet multiple resource objectives, it is necessary to manage the timber resource at less than the maximum level

Comment: It may not be possible in some areas to "provide a sustained supply of firewood for personal use" due to available land base, environmental constraints, and budgets

Response: Providing a sustained supply of firewood for personal use is a forest goal, or desired condition, in the Plan This means that every attempt should be made to meet this objective, while meeting other resource goals, subject to the standards and guidelines in the Plan This does not mean that we will always be able to meet the demand for firewood

Comment: Under the Preferred Alternative, about 70% of the Forest would be excluded from timber production This does not meet the purpose for which the Forest was established so far as insuring "a continuous supply of timber for the use and necessities of the United States citizens"

Response The Forest was established to provide a continuous, sustained supply of many resources found on the Forests, subject to existing laws and regulations

Comment: Even-aged timber management (i e clearcutting) should be de-emphasized or eliminated and uneven-aged management (i e selection cutting) should be emphasized

Response: Silvicultural systems and their application are discussed in Appendix J of the FEIS This discussion includes ratings of the major systems for various important biological and managerial attributes (pros and cons)

Standards and guidelines pertaining to silvicuitural systems are provided in Chapter 4 in the Plan The silvicultural system selected for a specific area is determined through an interdisciplinary process under an ecosystem management approach A description of when a particular system might be most appropriate is found in Appendix C of the Final Plan. Given the ecological diversrty in the Forests, limiting harvest to any single method is not recommended The use of clearcutting will be considered only when other silivicultural methods will not meet management objectives, which will be minimal

Comment: Specific standards and guidelines for Green Tree Retention (GTR) should be adopted in the Forest Plan

Response: Specific standards and guidelines for GTR from the ROD have been incorporated into the Final Plan Deviations from these standards and guidelines may be considered on a site-specific basis, subject to approval by the Regional Ecosystem Office

Comment: Project level silvicultural analysis should include historical data as much as possible

Response: Under an ecosystem management approach, historical information is one of many factors which will be considered in developing a silvicultural prescription Some of the key items to consider in determining the appropriate silvicultural system for an area is discussed in Appendix C of the Forest Plan

Comment: The Forest Plan needs to show how much non-chargeable volume is expected from sanitation and salvage cutting from late-successional reserves and other areas withdrawn from regulated timber production

Response: Sanitation and salvage cutting from these areas is subject to specific standards and guidelines designed to meet other objectives not related to timber production Therefore, an estimate of timber volume from these areas is not possible The conditions under which sanitation and salvage cutting would be considered are specified in Chapter 4 of the Plan under Late-Successional Reserves

Comment: The Forest should emphasize practices that thin stands and reintroduce very light intensity fire More extensive use of biomass hatvesting should be incorporated into silvicultural treatments to enhance forest health and vigor

Response: Timber stand improvement activities, such as thinnings, and the utilization of excess material for biomass, are emphasized through the goals and objectives, and standards and guidelines, in the Final Plan

Comment: We disagree with the fixed I80 year rotations in the Draft Plan The rotations should vary depending on biological factors and management objectives

Response: In the Final Plan, the rotations will be allowed to vary based on ecosystem analysis This follows the standards and guidelines from the ROD

Comment: Longer rotations (180-250+ years) should be established in order to grow older forests

Response: Rotations apply only to regulated timber lands, such as the Matrix. where growing olderforests is not an objective However, the Matrix includes only about 15-20% of the total area on the Forests Reserves, and other lands withdrawn from regulatedtimber production, occupy 80-85% ofthe Forests Older forests will be maintained in these areas and in 15-40 % of the Matrix and AMA land

Comment: Where rotations need to be calculated, they should be derived from yield tables using mean annual increment in board feet and not merchantable cubic feet and should be 100% of CMAI not 95%

Response: Many factors are considered when establishing rotation age, including biological, economical, managerial. etc Culmination of mean annual increment (CMAI) is only used to establish minimum legal rotations as required by the National Forest Management Act (NFMA) Rotation ages established in the Final Plan are always longer than the minimum requirement due to other land management objectives, such as diversity and wildlife habitat needs

Comment: Lands should be reforested with a diverse mix of plant species native to the area

Response: Specific standards and guidelines for reforestation, includingthe need for a diversity of native plant species, are included in Chapter 4 of the Final Plan

Comment: Natural regeneration should be the preferred method (instead ofartificial regeneration) where the regulation of stocking levels and species composition is easy to achieve

Response: Usually a combination of both artificial and natural regeneration is preferred because natural regeneration is not always reliable However, natural regeneration is appropriate and will be more of a factor in reforestation due to the shift from clearcutting to GTR and selection cutting

Comment: Tilling, as used in site preparation for reforestation, may accelerate soil erosion and damage the watershed

Response: Tilling is used primarily on areas with shallow hardpan soils. such as volcanic soils on the McCloud Flats, tofacilrtate planting Tilling breaks up the hardpan soils and facilitates water penetration, thus reducing potential erosion Soils and Water standards and guidelines in the Final Plan must be followed whenever ground disturbing activities such as tilling are proposed.

Comment: There is no discussion of what will be done *to* reforest understocked and non-stocked lands, and lands with inappropriate species

Response: The regeneration of understocked and non-stocked lands is emphasized in the Final Plan Standards and guidelines in the Plan address this issue Site specific analyses conducted through ecosystem planning will address issues such as appropriate species

Comment: What monitoring and reporting process is planned to assess reforestation success or failure, especially where natural regeneration is planned?

Response: The Monitoring Action Plan (Chapter 5 of the Final Plan) includes a monitoring item *to* determine if reforestation *efforts* are meeting the Forest standards and guidelines This includes both artificial and natural regeneration methods

Comment: The use of any site preparation method for reforestation purposes should be determined through a site specific analysis

Response: Standard and guideline #201 in the Final Plan has been revised to include all site preparation methods, not just terracing

Comment: Lands identified as suitable for timber production contain many cutover areas with no standing timber inventory I think you have over estimated your timber resource and your allowable cut (ASQ) should be reduced until you have made a new field inventory of your timber resource

Response: The timber inventory was revised and updated in 1990 to include recently cutover areas and the ASQ was adjusted accordingly Ecological Unit Inventories (EUI) have been conducted over much of the suitable timber land base over the last four to five years that will provide up-to-date timber inventory information for ecosystem planning under the Plan

Comment: The ASQ projected in the Draft Plan is predicated on a proposed annual budget of $43 2 million dollars Realistically, the Forest is not likely to receive the necessary budget from Congress and, therefore, the ASQ will not be as stated in the Plan

Response: Budgets, and how they might affect outputs in the Forest Plan, are discussed in Appendix H of the Final Plan The ASQ represents the volume the Forests are capable of producing However, the actual volume sold in any given year is determined by a number of facton, including the budget Therefore, reduced budgets could result in less outputs, such as volume sold

Comment: Volume from salvage and thinnings should count towards the ASQ

Response: All timber volume sold within the Matrix and AMA is included in the ASQ. including salvage and thinnings Since timber production is not a planned, scheduled output in reserves and other withdrawn areas, any salvage or thinning volume removed does not count towards the ASQ

Comment: Forest regulation should be on a separate watershed basis

Response: Forest regulation is determined on a Forest basis, according to applicable laws and regulations In order to assure that individual watersheds are not overcut, measures such as watershed analysis are implemented at the ecosystem planning level

Comment: Key watersheds should not be included in the timber base for ASQ calculations until a watershed analysis has occurred The ASQ calculated from these watersheds should be non-interchangeable with the ASQ from other areas

Response: The ASQ from Key Watersheds is an estimate based on the best information available at this time The ASQ will be modified if watershed analysis/ecosystem analysis/project planning results in a different ASQ level

Comment: The ASQ needs to be revised when unplanned events occur, such as catastrophic fire, and cuttings are made to recover mortality

Response: The ASQ is expressed as an average annual volume for the 10 year period of the Plan Volume sold in any one year of the Plan may be higher or lower than the ASQ According to the Monitoring Action Plan (Chapter 5 of the Forest Plan), the ASQ would be monitored and any significant deviations from the ASQ could result in a Plan Amendment revising the ASQ

Comment: Volume harvested from unsuitable timber lands should not be scheduled However, this volume should be estimated

Response: The volume from unsuitable lands is difficult to estimate due to a variety of unknown factors Any estimate would be totally subjective and not very reliable However, the ROD estimates that an additional 10 percent (of the ASQ) may be available from these lands

Comment: If the Forest is implementing ecologically sound management principles, how can you pre-establish an ASQ of 87 MMBF? Why does the ASQ increase in decades 4 and 5?

Response: The ASQ only establishes the capability of the Forests, subject to all applicable laws and environmental regulations It is not a target or a goal The ASQ is subject to change through Plan Amendments based on site-specific ecosystem analyses

The ASQ is projected to increase in later decades due to expected yields from plantation thinnings

Comment: Volume from thinnings of over-stocked stands should result in a substantially higher ASQ

Response: Volumes from thinnings of merchantable sized trees (over 10 inches DBH) in the Matrix and AMA are already included in the ASQ Volume from smaller material is not presently included in the ASQ, due to unpredictable market condrtions and economic uncertainty However, this smaller material could be included in the ASQ at a later date if market conditions change.

Comment: The ASQ should be higher, closer to the long-term sustained yield (LTSY)

Response: The LTSY level is the highest sustainable yield in a perfectly regulated forest, where a uniform distribution of size and age classes of timber exists Due to unplanned events, beyond the control of the Forest Service, this condition is never reached, at least not for a long time Currently, a very uneven distribution of size/age classes exists on the Forests, which results in a lower ASQ The ASQ will increase in the future as this distribution becomes more uniform

Comment: No further old-growth forests should be considered for cutting under any circumstances Excessive emphasis on preservation and retention of old growth reduces the opportunities to improve forest health and reduce the risk of loss to fire, insects, and disease

Response: Most of the forests considered to be old-growth are included in the late-successional reserves or other areas withdrawn from timber production Any proposed silvicultural treatment inside these areas would be subject to review to ensure that the treatment is beneficial to the creation of late-successional forest conditions. Both salvage and thinning treatments may be considered in reserves

Comment: Sanitation and salvage cutting should be discontinued, particularly within wilderness areas, riparian reserves, roadless areas, and wild and scenic river areas

Salvage and utilization of tree mortality from both routine and catastrophic causes should be emphasized

Response: Sanitation and salvage cutting is guided by the Standards and Guidelines for a particular area and subject to site specific NEPA analyses consistent with ecosystem management planning

Comment: Salvage should not include live trees

Response: Salvage cutting is designed to remove only dead and down trees killed by fire, insects, disease, wind damage, or other events It is often very difficult to determine if a tree is dead or alive and, occasionally, live trees are inadvertently removed in a salvage operation However, guidelines are available for most tree species to assist in this determination and the removal of live trees is not prevalent in salvage operations

Comment: Survey all cutover areas from the past decades to assess regrowth

Response: Regenerated stands will be inventoried for stocking and growth as part of the Monitoring Action Plan (Chapter 5 of the Final Plan)

Comment: How much of the existing old growth supply would be removed under the Forest Plan?

Response: An estimated 210,000 acres of old-growth are currently found on the Forests Approximately 85-90% of these acres are within reserves or other areas withdrawn from timber production The remaining old-growth within the Matrix lands may be removed only after meeting the standards and guidelines set forth for the area

Comment: Table D-2 in the Draft Plan indicates that replacement stands will be averaging about 65-70 cf/ac/yr This is not consistent with Table D-3 which indicates a net growth of about 45 cf/ac/yr

Response: Table D-3 is the predicted actual growth, as determined by FORPLAN modelling, while Table **D-2** is the potential growth estimated in the timber yield tables used in FORPLAN This apparent discrepancy is clarified in the Final Plan

Comment: While the DEIS acknowledges that below cost timber sales have been extremely rare in the past, with the amount of additional work mandated under the President's Plan, the potential for below cost sales becomes a very real possibility

Response: Under an ecosystem management approach that considers multiple resource values, timber sales represent only one of these values that continues to have a place in the broad spectrum of management practices and tools available to implement sound ecosystem management Timber sales can be an efficient and effective means of achieving not only silvicultural goals, but other, nontimber resource management goals In these cases, timber sales may occur, even though the value of the timber does not exceed the cost of the entire ecosystem management project

The Forest has traditionally been funded and evaluated based on its ability to economically sell timber Current planning approaches generate additional costs attributable to management of the intangible or difficult-to-quantify values that are equally important components of the ecosystem Managing ecosystems strictly for a positive return would limit opportunities to maximize the intangible benefits of nonquantifiable resource values, resource protection, and provision of overall ecosystem management

These factors will be considered when evaluating the below-cost question in the future

Comment: There should be an alternative displaying the full potential production of wood products, which will be socially necessary to keep pace with a growing nation None of the alternatives considers this approach

Response: The RPA Alternatives primary objective would be to provide products and services at levels expected to help satisfy current and future demands stated in the 1990 RPA program

Visual Resource

Comment: The Public is concerned about Visual Quality for the entire land base, not just scenic highways There is an objection to visual corridors with near natural appearance in the foreground and middleground and the suggestion that the background will not be protected

Response: Management for visual quality, a resource that is based on individual perception rather that biological science, is based on the concept that visuals will be emphasized in areas most likely to be viewed This plan is based on ecosystem management which is modified for visuals in areas that are visually sensitive These areas are listed in the Forest-wide Standards and Guidelines and identified by those areas allocated to Prescription III Even though according to the VQOs there could be many acres of Maximum Modification and/or Modification, actual acres will not meet those levels because of final Plan land allocations and ecosystem related Standards and Guidelines preclude that level of disturbance It is expected that visuals will be well protected across the landscape by 1) the Visual Quality Objectives, 2) the allocations to LSR, Riparian Reserve, Administratively Withdrawn

Areas, and Congressional Reserves which restrict the amount and kinds of land management activities that can occur, and 3) the restrictions within AMA and Matrix which limit the amount and kinds of activities that can occur as compared to past practices

Comment: Wood production should be a subordinate activity and multi-resource management with recreation and visual quality should be emphasized on the Mt Shasta Ranger District. Diller Canyon and other sensitive view areas from Mt Shasta are proposed for visual modification

Response: Wood fiber production in the Mt. Shasta area is subordinate to other resource/ecosystem management goals due to the land allocations and standards and guidelines Most of the Mt Shasta Ranger District that is not allocated to Congressional Reserve, Late-Successional Reserve, Administrative Withdrawn areas, or Riparian Reserves is in Matrix/Prescription III which emphasizes visuals

Comment: There will be serious impacts to visual quality in the South Fork of the Trinity River, Black Rock Lake, and Pettijohn Basin.

Response: Serious impacts will not occur to visuals in the above referenced areas due to 1) the South Fork is bounded by LSR and Key Watershed/Matrix and areas harvested will be in accordance with Key Watershed/ Matrix Standards and Guidelines which restrict the intensity of vegetation management, and 2) Black Rock Lake and Pettijohn Basin are in the Wilderness and have LSR to the north and Key Watershed to the west

Comment: The Plan should have more goals for the visual resource Areas not meeting VQOs should be actively rehabilitated

Response: Goals for visual resource management are found in Chapter 4 of the Plan under Forest-wide goals and are further refined by the Forest-wide Standards and Guidelines As part of watershed/ecosystem planning, areas in need of visual rehabilitation will be identified and integrated ecosystem management projects could be proposed that would in part rehabilitate visually degraded areas

Comment: There is a need to better understand the methodology of how VQOs are established The Draft EIS is weak on visual quality analysis and could violate NFMA. The Desired Future Condition should be in two components, desired landscape character and desired scenic character

Response: The methodology of how VQOs were established is described in Chapter III of the FEIS According to policy VQOs were established according to the accepted methodology and meet the requirements of NFMA The adopted VQOs constitute a description of the desired visual condition for visual quality

Comment: Are there 0 acres of Visual Condition Class VI Are not geometric clearcuts, roads, and landings unacceptable scenic conditions

Response: The above mentioned practices would not necessarily be unacceptable under any VQO They would likely be unacceptable under retention or partial retention but would likely be acceptable, if properly done, under modification and maximum modification

Comment: Identical VQOs for all alternatives, how can this be?

Response: This was and error and has been corrected in the Final EIS

Watershed

Comment: The DEIS does not adequately address the cumulative effects of over harvesting The DEIS uses existing conditions, which are degraded as the only benchmark upon which to compare alternatives The DEIS assumes that Standards and Guidelines assure no extreme environmental consequences would occur, but BMPs do not equate with compliance with the Clean Air Act How does the Plan address cumulative offsite watershed effects Describe how the Forest will implement the "far share" policy for cumulative effects The cumulative effects analysis does not adequately address sediment load that is in place on ephemeral and intermittent streams

Response: The Cumulative Watershed Effects Analysis (CWE) in the FEIS does evaluate all past activities and their effect on water quality Existing condition is used as a benchmark for comparative purposes only, to indicate trends away from a situation we can relate to. It is the most logical condition to compare change to Standards and Guidelines, in conjunction with BMPs are the mechanism for forest and land management activities to be in compliance with Section 103 of the Clean Water Act BMPs are certified for effectiveness by the State Water Quality Control Board Off site cumulative effects are addressed in Appendix H Through the process *of* Watershed Analysis, we will evaluate the conditions on all lands and make recommendations to the land managers, public and private We do not intend to pursue harvesting or managing for our "far share" if that will lead to potential cumulative effects and/or water quality degradation Detailed

analysis of sediment loads in drainages is addressed at more specific levels, such as watershed analysis This issue is too specific to address at the Forest Plan level

Comment: The DEIS should explain how watershed improvement will total 300 acres while water yield will decrease by 12- 17 thousand acre feet Timing of water yield runoffs is important

Response: Water yield is calculated for the plan based on average annual precipitation and runoff Changes in water yield occur when there are changes in the average values of components that enter into the water yield model Decreases in water yield are forecast because, compared to the 1989 base year, there will be more vegetation (less timber harvest) in the decade to come More Vegetation means more evaporation and transpiration of incoming precipitation and therefore, less water available to occur as runoff Twelve to 17 thousand acre feet is a very small amount compared to the average runoff of over 4 million acre feet

Comment: In 1990 there were 7 class 3 watersheds and in 1993 there were 5 What is the basis for the change? There seems to be a problem with the criteria developed to evaluate watershed condition Why are the rivers. fish, and riparian areas in such poor condition?

Response: The decrease in number of watersheds considered to be in condition class 3 has decreased due to the natural recovery of the watersheds through time There has been lower disturbance levels from timber harvest activities over the past 6 years, which has allowed some recovery for certain watersheds The general condition of the river systems are relatively good Where degraded, a variety of causes are responsible including the effects of the 1964 flood The decrease in fish population levels is partially due to habitat impacts, but also decreased water flows from 7 years of drought, poaching, and commercial harvest of the ocean

Comment: Private land activities must play a role The FEIS should provide processes that will result in cooperative conservation strategies with neighboring landowners The Forest Service should delay activities in mixed ownership until a Coordinated Resource Management Plan (CRMP) is in place

Response: We work closely with adjacent landowners in mixed ownership watersheds, and believe that more cooperative efforts are needed We will seek CRMPs as appropriate, and if other landowners are interested

Comment: What plan measures have been developed to implement the watershed and water quality requirements of fish habitat

Response: The adoption of the Aquatic Conservation Strategy which includes Key Watersheds and BMPs work together to meet the water quality requirements of fish

Comment: Assurance that you will meet State water quality guidelines is not adequate What happens if you don't? The DEIS fails to consider compliance with the California Porter-Cologne Act and the water quality control plan for the North Coast Basin What about site specific compliance?

Response: Site specific compliance will be accounted for with the site-specific plan and NEPA documentation. not at the Forest Plan level We will meet water quality guidelines for non-point source pollutants by implementation of BMPs The North Coast Board certified our BMPs Not meeting water quality objectives on a site specific basis is under the authority of the Regional Boards. as always

Comment: The 1995 tentative timber sale program list includes Prospect, Wilcox, and Black Rock, all in Class 3 watersheds

Response: The list has been adjusted in the FEIS The list. as always, is tentative and actual sales in class 3 watersheds would only occur after much analysis and there would be assurances that the disturbance would not adversely impact an already degraded watershed

Comment: The Siskiyou County Farm Bureau is concerned with types of planning that extend to private lands They are opposed to such processes that purport to be binding on non-participants without legal authority and proper provision for due process It's alright to describe areas where non-federal activities are important, but do not assume that State regulations completely ineffective

Response: All direction in the FEIS and Plan applies to National Forest Land only The forest is always willing to cooperate with willing partners to implement ecosystem management across the landscape, regardless of ownership We do not assume that state regulations are ineffective, but cannot count on them when determining the National Forest share of allocations for healthy, functioning ecosystems

Comment: The FEIS should explain the Watershed Improvement Needs Inventory (WIN) and discuss how it would be used under the President's Plan Standards and Guidelines should include scheduling watershed improvement projects based on WIN and specified priorities

Response: The WIN inventory referred to is available for review How it will be used under the President's

Plan has not been determined to date Scheduling of site specific watershed improvement projects will be done at the watershed scale, not the LMP scale

Comment: The Shasta-Trinity is using outdated methodology This places the forest in jeopardy of insufficient data to reach its conclusions Without the inclusion of a sediment model and coefficients capable of looking at things besides silvicultural activities, this model will not suffice to meet the intent of the Clean Water Act

Response: The methodology used is appropriate for this level of planning, and is only meant to raise "red" flags about what watersheds may have problems which may require additional analysis such as watershed analysis Sediment models are no more accurate than management models if their coefficients are not locally calibrated over a representative time period Sediment models and coefficients developed in other areas have no basis for reality in Northern California It remains a long term goal to have a quantitative sediment yield model for the Forest However, no such model exists today The model utilized on the forest is capable of evaluating other disturbances besides silvicultural activities, such as wildfires We believe that Cumulative Watershed Effects Analysis, performed at the watershed level, will meet the intent of the Clean Water Act if it is specific to local conditions and processes

Comment: Watershed analysis needs to be expanded to accurately forecast cumulative effects of widely scattered projects over time within a watershed, such as the South Fork of the Trinity River Watershed analysis needs to be defined at the forest level Watershed analysis needs to be expanded to all rivers, not just the highlighted key watersheds Non-anadromous fisheries should be ccnsidered key watersheds (McCloud River, etc)

Response: This scale of analysis is really basin or sub-basin analysis, and will be done Watershed analysis will eventually be done for all watersheds on the Forest

Comment: In Appendix H-I the location of impacts relative to hazardous areas was not even considered The reliance on Threshold of Concern (TOC) is partially unfounded

Response: We did not consider the location of impact relative to hazardous areas at the Forest Plan scale It is critical to do this but at the watershed/project planning scale. TOC is a very good tool at the LMP scale of analysis to stratify out watersheds which may have a cumulative effect risk This helps direct project or watershed analysis to more closely evaluate the issue

Comment: Watershed restoration should be the focus of the Forest Service Don't look to restoration as a means to allow existing timber harvest practices to continue The Plan doesn't give adequate priority or dollar values to correcting past mistakes (road building), which will continue to degrade instream conditions

Response: Watershed restoration is a major focus of this Plan and other activities will be planned consistent with watershed needs, especially in Key Watersheds Watershed restoration will be the major focus within Key Watersheds

Comment: Independent hydrologic analysis of the South Fork of the Trinity River shows that it is beyond the TOC and will be for many years. Prescriptions and Management area Direction should be adopted for the entire area which prohibit disturbance and restore watershed values protect every watershed which sustain salmon and steelhead fish

Response: The value of the South Fork of the Trinity River and three other watersheds was recognized by their designation as Key Watersheds Emphasis within these watersheds is on the salmon and steelhead stocks, protection of their habitat, and restoration of the watershed as a whole

Comment: There should be a network of Key Watersheds and they should be off limit to extractive management The Plan is deficient in documenting how Key Watersheds are defined French Creek, South Fork of the Trinity, Lower Hayfork Creek, and the McCloud River should be Key Watersheds The Plan will fail because they do not focus on linkages between up slope and up stream management and down stream responses

Response: This Plan has a large network of watersheds which are off-limits to management, RNAs and Wildernesses Key Watersheds as defined by the President's Plan comprise nearly 500,000 acres of the forest LSRs, while not off-limits to management, have severely restricted management options This plan requires Watershed Analysis which will determine the linkages alluded to

Comment: Provide maximum protection for riparian zones, perennial and ephemeral/intermittent streams Prohibit logging and roads 300 feet from perennial streams Use full Scientific Analysis Team Guidelines rather than the proposed forest Standards and Guidelines

The provisions are arbitrary, why are the requirements the same for California as the Olympic Peninsula?

Response: The Forest Plan defines interim riparian reserve widths as follows 300 feet on each side or two site potential trees for fish bearing streams. 150

feet on each side or one site potential tree for non-fish bearing perennial streams, 100 feet for intermittent. ephemeral, and wet areas (see Chapter 4 of the Plan for a complete description of Riparian Reserves and their S&Gs) Unstable areas are also protected Watershed Analysis is the vehicle to specifically study terrestrial and aquatic processes where recommendations are made to modify riparian widths if appropriate Watershed Analysis will evaluate local processes and set riparian widths based on local conditions

Comment: With the vast number of species of fish and wildlife present on this forest it seems that they should take a closer look at maintaining the viability of these versus trying to increase commodity extraction through timber harvest, etc

Response: The allocations, standards and guidelines, and analysis processes adopted by this plan are aimed at allowing extractive activities only when they are consistent with ecosystem objectives and associated species viability

Comment: Alternatives that prohibit logging where fish habitat has been impacted from Sedimentation and roading should be considered Key watershed lands should not be within the timber base

Response: A key component of the President's Plan is the Aquatic Conservation Strategy (ACS) The ACS was developed to restore and maintain the ecological health of watersheds and aquatic ecosystems The ACS has been incorporated into the Forest Plan and EIS, as detailed in Chapter 4 of the Forest Plan

Wild and Scenic Rivers

Comment: Include the following rivers in our National scenic rivers system as Wild and Scenic Beegum, Canyon, Hayfork, McCloud, Squaw Valley Creek, Sacramento River, North Fork of the Trinity River, South Fork of the Trinity River, Virgin Creek

Response: The Preferred Alternative recommends all or portions of 6 of the eleven study rivers They include Beegum Creek, Canyon Creek, Hayfork Creek, North Fork of the Trinity River, South Fork of the Trinity River and Virgin Creek The McCloud River and Squaw Valley Creek are not recommended and are being managed under a CRMP that intends to protect the rivers at the same level as W&S classification would. The Sacramento River below Box Canyon is not recommended because it is 85% in private ownership The upper portions of the Sacramento River are not recommended because they do not meet suitability criteria

Comment: The Forest has failed to comply with regional direction requiring a "comprehensive, forestwide assessment" of potential Wild & Scenic Rivers, despite previous public comments

Response: The Forest has followed Washington office and Regional office direction for considering potential Wild and Scenic Rivers As per FSH 1909 12, the Land and Resource Management Planning Handbook (WO Amendment 1909 12-92-1), Chapter 8 14-Wild and Scenic River Studies Included in the Land Management Planning Process, "Forest planning must address all rivers designated by Congress for study, in the Nationwide River Inventory, or identified as a potential wild and scenic river by a National Forest, wholly or partially on National Forest System lands. Treatment may vary, but except as noted in this section, the planning teams should evaluate each river to verify that it meets the eligibility criteria specified in sections 1(b) and 2(b) of the Wild and Scenic Rivers Act Document the finding of eligibility or noneligibility and the river's potential classification in the forest plan" Supplemental Regional direction in 1990 providing for further Wild and Scenic river considerations was assessed by the Forest, and it was determined that additional analysis would not change Forest Wild and Scenic River recommendations

Wildlife

Comment: The FEIS and Forest Plan should provide for levels of snags and down woody debris. and hardwoods needed by wildlife especially within land allocations where timber harvest is planned

Response: The Forest Plan provides for snags, and course woody debris. including green trees to provide a source of replacement Standards and guidelines in the Final EIS and Plan have been adjusted to incorporate the requirements from the ROD Where timber harvest is permitted snags are managed to provide at least a 40 percent population level of cavity dweller species Retention of green trees in the amounts required by the Plan should provide adequate numbers for recruitment of snags Land allocations withdrawn or reserved from timber harvest will provide for higher levels The Plan provides for retention of hardwood types and hardwoods occurring in conifer types, (1) timber harvest is not planned within hardwood types, (2) timber harvest is not planned on 75 percent of the Forests, and (3) hardwoods are retained within areas where timber harvest is planned consistent with ecosystem management, determined at the ecosystem planning/ project planning level

Comment: The Plan should provide standards and guidelines to protect declining habitats associated with old growth, including dispersal

Response: About 75 percent of the Forests are reserved from planned timber harvest The amount of land in late seral stage/old-growth habitat will increase underthis plan. The Plan providesfor old-growth habitats and related species and their dispersal through specific land allocations and standards and guidelines. As required by the ROD a network of Late-Successional Reserves (LSRs) is established that emphasizes "old-growth and later seral stage forest ecosystems on about 25 percent ofthe Forests Activities within LSRs are restrictedto those that will maintain or benefit old-growth ecosystems. Asystem of Riparian Reserves provides for a network of corridors dissecting about 34 percent of lands within Matrix and AMA lands These riparian corridors provide connectivity between Late-Successional Reservesand provideterrestrial dispersal

Comment: The proposed Forest Plan and DEIS does not adequately provide for early seral stage habitats

Response: Habitats for early seral species will be provided for by management activities within Matrix and AMA areas Additional early seral stage habitat occur within other land allocations as a result of natural disturbances such as fire, disease, blowdown, and silvicultural activities associated with development of late-successional habitat Additionally, Forest-wide standards and guidelines require retention of a minimum 5 percent per seral stage

Comment: Reintroduce Roosevelt Elk on the Shasta-Trinity National Forests

Response: A goal of this Forest Plan is to take advantage of management opportunities to maintain and/or increase populations of game species including elk Forest standards and guidelines specify coordination with other agencies, such as CDFG, and the public when considering introductions and reintroductions or wildlife species Supplemental management direction specific to the Trinity Alps Wilderness and Yolla Bolly-Middle Eel Wilderness directs the Forest to assess the opportunity to reintroduce Roosevelt elk in cooperation with the CDFG Any decision to implement the reintroduction of Roosevelt elk will be made in a site specific environment assessment at the project level

Comment: The Forest Plan should provide for protection of raptors from accidental electrocution from high voltage power lines

Response: The Plan provides standards and guidelines to minimize accidental electrocution of raptors by specifying that newly constructed overhead power lines meet safe design standards.

Comment: Request that the shasta salamander be listed as a management indicator species.

Response: Shasta salamander is listed in the Wildlife Species Assemblages as a Management Indicator, Table G-3 of the FEIS

Comment: The Plan should provide protection of cliffs, taluses, caves and rock outcrops and associated species

Response: Forest standards and guidelines provide direction to protect cliffs, taluses, caves and rock outcrops The Plan directs management ofthese areas to protect their existing micro environments and viability of dependent animal and plant species, and nearby water sources to perpetuate natural cave processes Additionally, the Plan incorporates standards and guidelines from the ROD that provide protection for caves, mines, and abandoned wooden bridges and buildings that are used as roost sites for bats.

Comment: Is one of the goals of the Forest Service to provide for recovery of Threatened, Endangered and Sensitive (TES) species The Forest Plan should provide protection for Federally and State listed TES including the northern goshawk

Response: The Forest Plan provides specific standards and guidelines for protection of TES species in Forest Standards and Guidelines and in Land Allocations and Management Prescriptions, particularly Prescription VII, Late-Successional Reserves and Threatened, Endangered and Selected Sensitive Species In addition, the Forest Service will continue to comply with recovery plans prepared by the U S Fish and Wildlife Service (USFWS) as directed by the Federal Endangered Species Act (ESA), and consult with USFWS in accordance with Section 7 of ESA

Comment: Will implementation schedules, such as the "Shasta-Trinity National Forests - Wildlife, Fish, TES, Botany - Five Year Program Strategy" be consistentwith the Forest Plan?

Response: Planned projects scheduled for implementation must be consistent with or otherwise amend the Forest Plan prior to implementation

Comment: The 50-11-40 rule is not in the President's Plan, but is a standard and guideline in your DEIS What standard and guideline will apply to Matrix lands, and what effect will this have on late seral dependent species and communities

Response: In lieu of the 50-11-40 rule, the President's Plan concluded that Riparian Reserves, green tree retention, and Administratively Withdrawn Areas would contribute to the dispersal of late-successional associated species in the Matrix Standards and Guidelines applicable within the Matrix are detailed in Chapter 4

of the Forest Plan

Wilderness

Comment: Provide for large buffer zones around all designated wilderness areas to rehabilitate these zones for eventual inclusion into expanded wilderness areas

Response: AS stated in Chapter 4 of the Forest Plan, "[t]he overall management philosophy of the Shasta-Trinity National Forests is to realize integrated multiple resource land management in the context of Ecosystem Management This goal is to be achieved through the implementation of an environmental agenda that has three major facets

Preservation – the protection of unique landscapes and their wild and scenic characteristics for the indefinite future

Biodiversity--at all ecosystem scales, the maintenance of a rich diversity of plants, fish, and wildlife

Sustainable Development for People--providing high quality recreational experiences. a long-term sustained yield of timber, forage and other resource products, and services consumed by society This last facet will be compatible wrth the Preservation and Biodiversity goals "

Comment: Remove all structures and garbage from wilderness areas

Response: Wilderness Standards and Guidelines and Supplemental Management Direction provides for the development of Wilderness Management Plans Within these plans, considerations of the historical/cultural significance of structures may be properly addressed The removal of garbage is an on-going process conducted by Forest visitors and Wilderness Rangers

Comment: To consider present wilderness designations adequate given the striking population increases in the state is both naive and short-sighted

Response: As discussed in Chapter 3 of the Forest Plan, under Wilderness and Roadless Areas, "[p]ublic demand for the existing wildernesses, as measured through recreation use, is low to moderate Projected demand for wilderness and roadless recreation opportunities is expected to increase significantly in the next five decades The 1989 RPA document An Analysis of the Outdoor Recreation and Wilderness Situation in the United States 1989-2040' projects increases in wilderness demand, based on projected future demand for activities commonly occurring in Wildernesses. Day hiking is projected to increase 193 percent, backpacking 155 percent, general outdoor photography 105 percent, and wildlife observation and photography 74 percent "

Chapter IV of the Final EIS, Wilderness and Roadless Areas, discusses land allocation effects upon wilderness attributes for the four alternatives considered in detail With implementation of the Preferred Alternative, an estimated 81 percent of the 29 released areas acreage would retain wilderness attributes through allocation to Prescriptions I (Unroaded, Non-Motorized Recreation), II (Limited Roaded Motorized Recreation), VII (Threatened, Endangered and Selected Sensitive Species) and X (Special Area Management) Additionally, as provided for by the President's Plan and incorporated into the Final Forest Plan and Final EIS, no new roads are to be constructed in inventoried roadless areas in key watersheds, and watershed analysis must be conducted in all non-key watersheds that contain roadless areas before any management activities may occur For these reasons, no new wilderness designations were proposed during this planning period

Comment: Eliminate private land ownership in designated wilderness areas

Response: The Land Adjustment Guide map, included as part of the map package with the Final Forest Plan and Final EIS, displays lands of a high priority to acquire Private parcels within designated wilderness areas are lands of a high priority to acquire, based upon the "willing seller-willing buyer" concept

Comment: The Wilderness Act is to be implemented with respect for preexisting rights and historic use This includes water use rights secured by stock watering and preference right through established use of customary range

Response: AS per Sec 4 (d)(4)(2) of the Wilderness Act (1964), "the grazing of livestock, where established prior to the effective date of this Act. shall be permitted to continue subject to such reasonable regulations as are deemed necessary by the Secretary of Agriculture " There are currently nine livestock grazing allotments within, or partially within, the Trinity Alps Wilderness Livestock grazing on these allotments is a continuation of use that predates the establishment of the Trinity Alps Wilderness

Comment: Add wolverine to 16 Modify 19 to use signing in primitive and pristine opportunity classes only where it is necessary for safety and to protect wilderness values In 22 add use photo points and other monitoring methods to measure resource inputs and determine when the impacts exceed pre established limits and mitigate

Response: The Standards and Guidelines addressing Wilderness Management apply to Prescription V areas The suggested changes to Wilderness standards and guidelines are more appropriately addressed during site-specific analysis, as in the development of specific wilderness management plans

Comment: Reduce maximum group size to 12 individuals, and no more than 8 head of stock

Response: Site-specific issues such as this are more appropriately considered in the development of individual wilderness management plans

Comment: Take steps to patrol/outlaw the use of automatic weapons in the wilderness

Response: The lawful use of firearms within designated National Wilderness Preservation Areas is not specifically prohibited, so long as the use is consistent with applicable Federal, State, and Local laws and regulations concerning firearms and firearm use

Comment: Do not charge user fees for wilderness.

Response: The recommendation of user fees is outside the scope of this Final EIS and Final Forest Plan

Comment: Designate Mendocino National Forest as the administrator of the Yolla Bolly-Middle Eel Wilderness, and other National Forests coordinating their YBME activities through Mendicino

Response: The Mendocino National Forest is currently taking the lead in developing a Wilderness Management Plan for the Yolla Bolly-Middle Eel Wilderness Currently, there are no plans to change the administrative responsibility for the Yolla Bolly-Middle Eel to any single administrative unit of the National Forests

Copies of letters from Government and/or agencies follow:

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Affairs
600 Harrison Street, Suite 515
San Francisco California 94107 1376

IN REPLY REFER TO

ER 93/834

January 10, 1994

Steve Pitch, Forest supervisor
Shasta-Trinity National Forests
2400 Washington Avenue
Redding, California 96001

Dear Mr. Fltch

The Department of the Interior (Department) has reviewed the Draft Environmental Impact Statement (DEIS) tor the Shasta-Trinity National Forest (STNF) Land and Resource Management Plan, Humbolt, Modoc, Shasta, Siskiyou, Tehama, and Trinity Counties, California The following Comments are provided for your consideration when preparing the final documents

Fish and Wildlife Resources

The increased emphasis for managing large contiguous reserves of late seral timber Stands has led to decadence, multiple canopy layers, and increased amounts of coarse woody debris. Coupled with poor access and a history of fire suppression, the resulting conditions may have increased the probability Of stand-replacing fires.

The Department recommends that the Shasta-Trinity National Forest Land and Resource Management Plan (STNF) increase the use of prescribed natural fire or mechanical treatments to achieve **a** range of natural variability Of structure and vegetative types which would benefit wildlife while reducing the likelihood of catastrophic events.

The Department also recommends that the STNF conduct surveys for Federal category 2 candidate species The STNF should determine their Status and distribution, and develop standards and guidelines for their protection The Fish and Wildlife Service (FWS) is available to provide guidance to the STNF on survey protocol, methods, and data Interpretation.

wild and scenic Rivers

As stated in prior reviews of this draft plan, the National Park service (NPS) supports the Preferred Alternative proposal because it extends the existing 1981 Wild and Scenic River designation on the North Fork and South Fork Trinity Rivers to their respective headwaters In addition, the proposed designation of Virgin and Hayfork Creeks would further enhance the existing designation

We continue to urge the designation of both the upper Sacramento and MCCloud Rivers as wild and Scenic rivers. As Appendix F of the DEIS indicates, the Upper Sacramento River has long been recognized as a potential addition to the National Wild and Scenic Rivers System, and the McCloud River also has values which highly qualify it for inclusion

The draft plan for the STNF does not delineate management corridors and prescriptions for the existing designated rivers. In reviewing the draft plan for the Klamath National Forest, the NPS finds that delineation Of management corridors and **prescriptions** for the **existing** designated rivers have been incorporated.

The Department realizes that **a** separate plan already has been completed for the South Fork Trinity River. However, It seems logical to incorporate the south Fork Trinity River plan, the management corridor delineation, and prescriptions for the remaining designated rivers into the current draft plan for the STNF. rather than letting the plans lapse for completion at some indeterminate future time.

whenever these plans are completed, the Department recommends that the existing "recreational" classifications be checked to determine if some of these plans might now qualify as "scenic" based on the 1982 National Wild and scenic Rivers: Guidelines for Eligibility, Classification, and Management of River Areas. The 1981 designation was based on the 1970 version of these guidelines Which contained more sterngent requirements for the **"scenic"** classifications.

Forest Pests

The Preferred Alternative presents strategies to manage forest pests. If all herbicide applications are conducted under Vegetation Management Plan guidelines, this should be clearly stated. The Department further recommends that thrs discussion include the following: 1) timing and methods of herbicide applications; 2) effects on sensitive plant populations; 3) proposed mitigation Strategies. if adverse effects are possible.

The Department has concerns that aerial applications, at certain herbicide concentrations, could potentially contaminate Surface waters and adversely affect fish, wildlife, and other biota unless provisions are made to protect the health of these resources.

Biomass

The DEIS discussion Of biomass is inadequate, and needs expansion. The Department recommends defining biomass, as the term is used in forestry. Briefly describe the role of biomass in undisturbed forest ecology and discuss how the loss of biomass over time may affect the forest environment How much biomass degradation is considered acceptable, and how is this determined'

Does existing timber policy encourage energy production from biomass at lumber mills? Is this practice sustainable?

Timber

Please explain further the decision to designate 4/5 of the timber base for "Intensive timber management " Please describe possible alternatives to clear-cutting

Soils

The Department recommends that each project delineate how soils productivity standards will be met If soil erosion is expected, and livestock grazing allowed, for example, what system is in place to monitor these effects and mitigate appropriately?

LRMP and the owl Plan

The impact of the draft President's Plan on the Preferred Alternative is unclear A detailed analysis Of the Plan should be added to the DEIS to support the proposed changes.

Minerals

Minerals development plans must weigh the perceived benefits of any prospecting operation against the costs to the environment. Prospecting has impacts on the environment, minerals development should therefore offer a reasonable mitigation plan. For example, would the economic benefit of cyanide heap leaching justify its cost to the environment" Are there alternatives that would not result in an unacceptable release of toxic metal byproducts onto public lands?

Non-mineral resources should also be addressed. For example, would the development of iron in the Shasta Unit of the NRA adversely affect the scenic value of the area? Would there be an irreversible negative impact on the area economy or on the intrinsic Value of the land itself?

SPECIFIC COMMENTS

Page 4-4. Goshawks The Goshawk management guidlines on nest stand size and distribution are inadequate to provide for the long term habitat needs of the species The guidelines, as outlined in the Management Plan and Draft Environmental Impact Statement, should be improved in the final documents Because management of single, static nest territories may involve territories Which remain unoccupied over the life of the planning period, the strategy of applying silvicultural methods that will provide suitable nest sites, past-fledgling family areas, and foraging territory characteristics on a landscape basis is a preferred management strategy. The northern goshawk management stategies recommended in the Southwest Region (reference. USDA 1992) should be followed

Page 4-6 Wildlife The management of wildlife habitat on the STNF Should include provisions for a range of natural variability in habitat conditons over the forest landscape. These provisions should be discussed in the final documents.

Page 4-11 Natural Op[illegible] Decades of fire suppression probably has allowed the [illegible] of trees and Shrubs. This encroachment has probably [illegible] in reducing the number and size of natural openings The final document; Should provide provisions for enhancing and reclaiming natural openings on the STNF.

Page 4-12 Botany (Plants), Item G The STNF'S sensitive species list should be reviewed and updated annually. We suggest contacting the FWS and other knowledgeable agencies, organizations, academics, and individuals for input.

naps and Cartography

The location maps provided are useful to the reader. However, a single-sided format is preferred.

Thank you for the opportunity to comment.

Sincerely,

Patricia Sanderson Port
Regional Environmental Officer

cc:
Director, Office of Environmental Policy and Compliance
w/original incoming
Regional Director, NPS. WR
Regional Director, FWS, Portland

Reference

USDA, Forest Service. 1992 Management recommendations for the Northern Goshawk in the Southwestern United States. Rocky Mountain Forest and Range Experiment Station, Fort Collins Colorado, General Technical Report RM-217, 90p

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Affairs
600 Harrison Street, Suite 515
San Francisco, California 94107-1376

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:

ER 93/834 January 11, 1994

Steve Pitch, Forest supervisor
shasta-Trinity National Forests
2400 Washington Avenue
Redding, California 96001

Dear nr. Fitch:

After further review, the Department wishes to Correct and add additional information to our letter dated January 10, 1994.

Timber

The Department recognizes that 4/5 of the timber base is designated for yields above 70%, but that only about 5% of the timber land base will be clearcut. we Suggest, however, that plans to clcarcnt slopes exceeding 40% he carefully Considered and fully evaluated in the FEIS. The risk of a dramatic mass wasting event and subsequent soil loss could greatly outweigh potential benefits.

Many regions in the Forest designated for timber management are adjacent to Threatened and Endangered habitat. what guidelines are in place to ensure that potentially destructive timber practices do not impact this protected wildlife? Are safeguards in place to prevent clearcutting rrght up to the border of spotted ow1 habitat?

Additionally, we have concerns about taking Of Threatened and Endangered habitat. In many areas, such as Management Area 9, slivers of land designated for T&E preservation are directly adjacent to areas of timber harvest.

The Department also recommends that the Forest explore all opportunities to reduce that visual impacts of even-aged management. We suggest you carefully consider reducing the number of acres clearout, reducing the size of clearcut openings, and increasing the number of standing trees after a harvest.

Perhaps opportunities to expand uneven-aged management could be expanded. As Stated in the DEIS, this may be an excellent opportunity to try out hitherto under-utilized management practices.

Thank you for the opportunity to make these corrections and expand our letter of January 10, 1994. If you have any questions, please Contact this office directly.

Sincerely,

Patricia Sanderson Port
Regional Environmental Officer

cc:
Director, Office of Environmental Policy and Compliance
w/original incoming
Regional Director, NPS, WR
Regional Director, FWS, Portland

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, Ca 94105.3901

January 6, 1994

Steve Fitch, Forest Supervisor
Shasta-Trinity National Forests
Attn. Land Management Planning
2400 Washington Avenue
Redding, CA 96001

Dear Mr Fltch.

The Environmental Protection Agency (EPA) has reviewed the Draft Environmental Impact Statement (DEIS) for the proposed Shasta-Trinity National Forests Land and Resource Management Plan (LRMP). Our review is provided pursuant to the National Environmental Policy Act (NEPA) [42 USC 4231 et seq l, Council on Environmental Quality (CEQ) regulations [40 CFR Parts 1500-1508] and Section 309 of the Clean Air Act.

The LRMP/DEIS contains four management alternatives Which have a different mix of resource activities and which display specific practices and management direction. The LRMP also proposes standards and guidelines that Forest projects must meet and tentatively establishes monitoring plans

President Clinton's forest plan for the management of old growth forest-related species will apply to the Shasta-Trinity National Forests The President's Plan identifies a preferred alternative, Alternative 9 - which is described in detail in Forest Ecosystem Management: An Ecological, Economic and Social Assessment (FEMAT Report) Because the shasta-Trinity National Forests must ultimately adhere to the direction set out in the President's Plan, our review of this DEIS was conducted in keeping With provisions set Out in both the FEMAT report and the Forest service's Draft Supplemental EIS on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted owl (Spotted owl Draft SEIS). Due to the fact that the Shasta-Trinity National Forests must adhere to the direction set aut in the President's Plan, review of the LRMPs has necessitated concurrent review of the FEMAT Report and the Spotted owl Draft SEIS

we agree that completion and use of this LRMP in managing the forests is Preferable to the uncertainty in management that has occurred without such a plan in place. The efforts that you have expended to Prepare this Plan and assess the environmental impacts of that plan are commended by EPA. However, as mentioned in our letter of December 7, 1993 to Ms Kathy Clement, We believe there has not been an opportunity for the public to comprehensively view the proposal to manacle the shasta Trinity National Forests In fact, we generally found that our review of this DEIS was complicated by not having a comprehensive document which consolidates and discusses the measures that Would be accomplished In undertaking the management of the Forest. This is due in large Dart to the decision to postpone publication of the Spotted owl Final SEIS. We urge the Forest Service to provide an expanded opportunity for the public to become involved and to comment on the Shasta-Trinity National Forests LRMP and relevant related documents. We believe such and action could significantly prevent further delays caused by public confusion and uncertainty

Based on our overall review, we have assigned the DEIS a rating of EC-2 (Environmental concerns - Insufficient Information). We have assigned the EC-2 rating because of the difficulty we experienced in reviewing the 3 relevant documents and the lack of analysis, in general, regarding environmental consequences and monitoring and because of the lack of specific discussion of air quality, biodiversity and mineral management. This EC-2 Rating is further defined in the attached "Summary Of the EPA Rating System." Our detailed Comments are enclosed:

We appreciate the opportunity to review and provide comments on the DEIS. Please send two copies of future environmental documentation to this office at the same time it is officially filed With our Washington, D.C office. If you have any questions, please feel free to contact me at (415) 744-1574. or have your staff contact Edward Yates at (415) 744-1571.

Sincerely.

Joanne Geselbracht
for David J. Farrel, chief
Environmental Review Section
Office of Federal Activities

Enclosure
MI# 000647 Shastrin LMP

cc. Ronald E. Stewart, USFS, San Francisco
Jack Glpsman, USDA, Office of General counsel (S.F.)
CA Dept. of Fish and Game, Region 1, Redding
RWCQB, Region 5, Redding
APCD, North Coast Region, Yreka

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SUMMARY OF RATING DEFINITIONS AND FOLLOW-UP ACTION

Environmental Impact of the Action

LO-Lack of Objections

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal

EC-Environmental Concerns

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact EPA would like to work with the lead agency to reduce these impacts

EO Environmental Objections

The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative) EPA intends to work with the lead agency to reduce these impacts

EU-Environmentally Unsatisfactory

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of environmental quality public health or welfare EPA intends to work with the lead agency to reduce these impacts If the potential unsatisfactory impacts are not corrected at the final EIS stage this proposal will be recommend for referral to the Council on Environmental Quality (CEQ)

Adequacy of the Impact Statement

Category 1-Adequate

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action No further analysis or data collection is necessary but the reviewer may suggest the addition of clarifying language or information

Category 2-Insufficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS which could reduce the environmental impacts of the action The identified additional information data analyses or discussion should be included in the final EIS

Category 3-Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action or the EPA reviewer has identified new reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS which should be analyzed in order to reduce the potentially significant environmental impacts EPA believes that the identified additional information data analyses or discussions are of such a magnitude that they should have full public review at a draft stage EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS On the basis of the potential significant impacts involved this proposal could be a candidate for referral to the CEQ

*From EPA Manual 1640 "Policy and Procedures for the Review of Federal Actions Impacting the Environment "

General Comments

1 Alternatives A5 the alternatives section "is the heart of the environmental impact statement" [40 C.F.R. § 1502 14], we recommend that the EIS describe how the President's Plan will be implemented at the Forest level. The EIS should include specific information regarding what the President's Plan will require in Shasta-Trinity National Forests (Shasta-Trinity) in regard to management area direction, land allocations (including specrfic boundaries of administratively withdrawn areas), standards and guidelines and key watershed delineations and guidelines.

We suggest that the environmentally preferable alternative be clearly identified. In the DEIS, It appears that Alternative CBF, Citizens for Better Forestry, may be such an alternative. Also, we believe It is important to recognize the role disease, pests, fire, and natural processes have In a dynamic forest ecosystem The EIS should demonstrate how such concepts can be incorporated and used in the preferred alternative.

2 Envrronmental Consequences. The DEIS focuses on a comparison of alternatives as opposed to presenting detailed impact analysis for each alternative. More specific details on specific adverse impacts (e.g. sediment production) should be presented in the EIS. Such impact assessment is a requirement of NEPA and would also allow the reviewer to better gauge the different degree of environmental impacts of each alternative and allow far a more helpful discussion of mitigation plans. For Instance, the discussion of air quality on p. IV-7 DEIS, should not just State that the Preferred Alternative is environmentally superior to the Current Alternative, but Should also attempt to gauge the actual impacts of prescribed burning in the Preferred Alternative as well.

Another example of not listing environmental consequences occurs when the DEIS treats existing conditions - which are degraded conditions - as the only benchmark upon which to compare alternatives. On p. 11-40 of the DEIS it states that water quality would be improved by use of BMPs The EIS should describe the existing conditions as well as the degraded state of watercourses that could occur even where BMPs are used as mitigation measures.

Also, the DEIS appears to be based on the assumption that the Standards and Guidelines assure that no extreme environmental consequences would Occur. But a listing of plans to implement BMPs, for example, does not equate with compliance with the Clean Water Act. The EIS should set out specific mitigation measures that can be assessed by the public and followed as appropriate in project actions

3. Future Forest Planning. The President's Plan calls for the formation of numerous committees and working groups for the forest planning process. we recommend that the EIS explain this process so that other agencies, citizen groups and other interested members of the public can understand the planning process and determine where they can participate. Also, EPA recommends that the EIS clarify the stages and decision paints where NEPA documents will be drafted. For example, will the Forest Service be drafting an Environmental Assessment or Environmental Impact Statement for decisions on adjusting riparian reserves (upward or downward) under the President's Plan?

While forest planning documents generally need to include large amounts Of industry and timber management related terminology, the Shasta-Trinity Plan and DEIS vocabulary is especially technical. Terms such as "indirect habitat manipulation," "wildlife assemblages" and "vegetative treatments' are often not clear to those unfamiliar with such)argon we recommend using terms that are more clear, especially where they are not included in the glossary

4 Cumulative Impact Assessment Cumulative impact assessment must be carried aut for all federal activities at the Forest Plan level (Tenakee Springs v Clouah, 915 F. 2 1308, 1312 (9th Cir. 19901] and for all federal and non-federal activities at the project stage [Resources Ltd. v Robertson, NO 92-35047 (9th Cir. 11/3/93)] ALSO, where biological corridors run through adlacent timber sales, the cumulative Impacts of the adjacent timber sales and roads must be assessed in one document [see Marble Mountain Audubon Society v Rice 914 F.2d 179 (9th Cir 1990]. Given the frequent checkerboarding of state, private and federal lands, the cumulative effect of federal and non-federal activities in Northern California can also be substantial EPA encourages the Forest Service to use the Forest Plan to assess the cumulative Impacts of all federal and non-federal activities (e g. lagging on private and state lands) and establish procedures for assuring non-federal activities are considered in regard to species viability, riparian habitat. watershed Conditions, etc.

Air Quality

1 PSDs. The EIS should identify Prevention of Significant Deterloration Class I Areas (I e , wilderness areas, National Parks, e.g. Trinity Alps and Yolla Bolly Wilderness), which receive special protection for partrculates, Sulfuric Oxide (SO_2), Nitrous Oxide (NO,)

2. Particulate Matter The EIS should more fully discuss particulate matter (PM_{10}) that could be produced by direct

emissions from prescribed burning, construction, vehicles (tire wear, exhaust, brake wear) and reentrained road dust (AP-42 factors for road dust) and the EIS Should develop general forest wide measures to mitigate these emissions.

On p 3-5 of the Plan, it states that less burning will be emphasized The EIS should explain how this will be done The only method mentioned is removal of biomass. This method, however, may have impacts an biodiversity. Also, we recommend that the EIS present a chart that shows the historical averages and future particulate estimates in a manner similar to that done in the burning and air quality effects chart in Table 4.2 in the Mendocino LRMP (p. IV-18).

3 Conformity The EIS should provide a detailed discussion on the status of air quality planning for the area and indicate if there is an approved air quality implementation plan. The EIS Should describe and discuss potential impacts to air quality. The EIS should also discuss how the action would meet conformity requirements of §176(c) of the Clean Air Act. We recommend that the Forest Service consult and coordiante with the Siskiyou county Air Pollution Control District to ensure the proposed action conforms with existing efforts to maintain ani improve air quality.

4 Monitoring. There is insufficient information on monitoring and mitigation For Instance, p 4-11 of the Plan mention only four very general concepts as the standards that will be relied upon for air quality P 5-4 of the Plan also savs that variability in standards whrch would require corrective action will be determined With the local APCD The EIS, however, should set out applicable standards, especially if any inconsistencies (e g., variability) exist [40 CFR 1506 2]

Water Quality

1 BMPs. The DEIS and Plan rely heavily on Best Management Practices (BMPs) to ensure protection of Water quality and beneficial uses. Problems with implementation Of BMPs on Other Forests indicates the importance of monitoring BMP implementation The EIS should discuss the monitoring measures which ensure that required BMPs are adequately implemented. For example, discussion an p. 4-21 to 22 of the Plan discusses BMPs for protection of water quality yet does not mention any specific monitoring programs for BMP implementation nor are there any references under Chapter 5 (Monitoring) Of the Plan other than "field review identifies mitigation measures missing from any project" (p 5-12)

It should be noted that implementation of BMPs does not constitute compliance with water quality standards per se. In the event that a Forest project, undertaken with or without appropriate BMPs, create; a water quality problem or causes a standards violation, the State and Regional Boards retain the authority to carry out their responsibilities for management of environmental Quality In addition, the EIS should identify procedures for instituting corrective measures should BMPs be determined to be failing to protect water quality. For further assistance on non-point source pollution prevention, see Guidance Specifying Management Measures For source; of Nonpoint Pollution in Coastal Waters, EPA, January 1993. Also, please note that the EPA Water Quality Handbook has a revised, 1993 edition.

2. Roads/Facilities. The EIS should describe the process which will be used to determine whether environmental assessments or EISs will be required for road construction and reconstruction in previously designated roadless areas. The EIS Should indicate the management prescriptions for roadless areas on the forest under the President's Plan Under Alternative 9 for Instance, no new roads would be Constructed in roadless areas in Key Watersheds in order to protect high quality habitats. In addition, watershed analyses Would be required in all non-Key Watersheds which contain roadless areas before any management activities could occur within those areas (spotted Owl DEIS, p B-79) The Shasta-Trinity EIS should discuss how these restrictions would affect forest management and should include a map outlining the Juxtaposition of roadless areas with reserves and matrix areas. EPA recommends that the impacts of the new roads and forest management activities on water quality be assessed as specifically as is possible.

While the Plan does include some general standards and Guidelines far Road Management (4-14), the DEIS contains little information regarding how adverse effects an beneficial uses will be measured or assessed. Also, on p IV-16 of the EIS it is stated that little arterial road construction would be anticipated under any alternatives yet road construction ranges from 28 to 40 acres. The EIS does not mention what is perhaps more important, where those roads will be. The EIS should more clearly describe road reconstructlan, its locations and possible impacts. We recommend that the EIS include more specific information on how impacts from road construction (especially stream crossings) will be measured in regard to turbidity and suspended sediments.

3 Mining The DEIS/Plan contains little discussion on the management of mining activities or potential adverse impacts of mining on water quality and beneficial uses. For example, are the Trinity, and MCCloUd Rivers presently being dredged for gold? Although mining activities could seriously affect beneficial uses, particularly salmonid spawning, the potential impacts of

these activities are not discussed The EIS/Plan should discuss the water quality impacts from projected mining activities. In particular, the EIS Should describe and discuss the impacts of the President's Plan on mineral entry and leasing on the Forest and indicate whether any late-successional or riparian reserve areas on the Forest are withdrawn from mineral entry or leasing.

The Monitoring Program On p. 5-11 of the Plan says that "non-compliance with operating plans" will be used to establish further evaluation or corrective action regarding mining Impacts. The EIS Should set out how non-compliance will be determined. Is there adequate staff for observation and monitoring of conditions in operating permits? The EIS Should set out the monitoring system for these activities. Are small scale suction-dredging activities subject to environmental analysis and what analysis is necessary' We recommend that small scale mining operations in the river or in watersheds be assessed in the proper NEPA documentation for their cumulative impacts.

4. Restoration In Aquatic Areas. EPA commends the Forest Service for its commitment to an aggressive watershed restoration program. On p. 4-41 Of the Plan there are goals listed for riparian management zones and 4-21 lists specific guidelines which are clear and well-described (e g. 18j and 18k). EPA recommends that this Section include discussion of priorities, methodologies, timetables and budget estimates for restoration. Certain Standards and Guidelines, however, should be more specific, such as 18b and 18c. Also, the EIS should explain the Watershed Improvement Needs inventory (WIN) and discuss how it would be used under the President's Plan Standards and guidelines in the LRMP should include scheduling watershed improvement projects based on the WIN and specified priorities.

The Spotted Owl Draft SEIS States that modification of grazing Practices would occur under Alternative 9, Particularly In the Riparian Reserves and that the modification would have consequences for individual permittees (p. 3&4-115). The EIS should describe how range management would be adjusted to meet the Aquatic Conservation Strategy objectives under the President's Plan.

The EIS should explain how watershed improvement will total 300 acres while water yield will decrease by 12 to 17 million acre feet. (DEIS, P. 11-45).

vegetation Management

1. Biodiversity/Connectivity. Connectivity corridors are briefly discussed on p 4-12 of the Plan Yet there is little discussion of the needs, location or size requirements of the corridors. We recommend that the EIS discuss these corridors in

more depth, including the relationship between corridors passing through both matrix areas and non-federal lands.

The EIS should provide. (1) a description of the the President's Plan "Ecosystem" approach to land management and how this will affect corridors in Shasta-Trinity and (2) the location and size of the Corridors. Further, the EIS should describe potential mechanisms to improve linkages and connectivity between refugia Include a discussion of the role of non-reserved areas (matrix) in providing potential connectivity and the type of monitoring and evaluation which will be implemented to ensure connectivity that is retained.

The explanation of natural cycling on p 10-8 of the Plan is well presented but the section as on p. II-35 of the DEIS seems to address "biological diversity" only in the context of seral stage diversity of marketable conifers. The EIS Should expand this analysis to discuss biological diversity of species and habitat Also, mitigation measures regarding wildlife need to be discussed more fully. While Appendix G of the DEIS and the Standards and Guidelines at pp. 4-11, 4-26 do set out some general programs for wildlife management and provide species lists, the EIS does not analyze the specific impacts that could occur because Of road building and logging While site specific impacts cannot be measured here, the EIS, as a programmatic level document should set out the type of impacts and the specific measures that can be used to mitigate the impacts of activities

In general, the EIS is an opportune document in which to set out how Shasta-Trinity will improve the availability of information on the status and distribution of biodiversity and the techniques for managing and restoring it (see Integrating Biodiversity Considerations Into Environmental Impact Analysis under NEPA, CEQ, January, 1993

2 Land Allocations It is not clear from the maps or the text 1) which areas are administratively withdrawn and 2) whether these areas are permanently withdrawn or whether their Status can be changed so that they may be logged in the future The EIS should clarify these points.

3 Timber Management The President's Plan incorporates an ecosystem approach to forest planning. EPA recommends that the EIS apply this approach to the alternatives that will be assessed for Shasta Trinity This type of approach also applies to those areas outside of the established reserves. The DEIS has little information regarding whether late seral and old growth stands Outside the reserves will be maintained and managed for maintenance of biological diversity we suggest that the EIS describe how these old growth Stands will be managed, whether they will be part of the 180 year rotation, whether they will be

thinned, or whether there will be efforts to manage these Stands in their natural state.

further, the EIS should describe the contribution of stand maintenance, salvage sales and sanitation harvests to the estimated Allowable Sale Quantity. If possible, indicate the potential acreage on non-CASA (capable, available, suitable and appropriate) lands which would potentially be treated with the above management practices.

All of the Standards and Guidelines under Timber (p 4-22) are oriented at regeneration and timber stand improvement. There are no specific measures for mitigating impacts to fish and wildlife except for # 20(b)(4) regarding habitat objectives. The Timber, Biodiversity and Wildlife sections should be reexamined on a broader Scale to incorporate and refer to those actions in the other sections which are related.

4. Pesticides. The DEIS at p. 11-21 references the Forest Service FEIS for Vegetation Management (VM EIS) During the period from 1986 to 1989, EPA corresponded with the Forest Service on the VM EIS and earlier associated NEPA documents. We noted then that these documents did not address the effects Of the cumulative impacts Of herbicide use an water quality and beneficial uses (including aquatic, riparian and fisheries resources) that could result from herbicide application in several areas Within the same watershed or that could result from successive sprayings over several years in a given watershed. EPA reiterates its request the Forest Service prepare documentation for each vegetation management EIS which Should include description Of the process for assessing cumulative Impacts resulting from herbicide use, use of watershed-wide analyses, specific guidelines for herbicide use based on environmental considerations, and specific information on the Best Management Practices related to herbicide use.

On pp. 11-15, 11-24 of the Plan, the description of the consequences of the PRF alternative only list the positive consequences of the use of pesticides Nan-point source pollution from pesticide application and mitigation measures to reduce this pollution Should be assessed in the EIS. Mitigation measures Should be explained specifically enough so that there is a basis far review For Instance, mitigation measures for sensitive watercourses or those that are adversely affected by other projects should be assessed

Department of Energy
Western Area Power Administration
Sacramento Area Office
1825 Bell Street Suite 105
Sacramento California 95825

JAN 6 1994

Mr Steve Filch
Forest Supervisor
Shasta-Trinity National Forests
2400 Washington Avenue
Redding, CA 96001

Dear Mr Fitch

This letter Contains the comments of the Sacramento Area Office of the Western Area Power Administration (Western) on the Shasta-Trinity National Forests Proposed Forest Land and Resource Management Plan and accompanying Draft Environmental Impact Statement

Within the Shasta-Trinity National Forest. Western maintains a small number of low voltage distribution power lines associated with the station service far hydroelectric generation plants and many miles of high voltage (230- to 500-kV) interregional power transmission lines Our extensive facilities within the Shasta-Trinity area. as well as our long history of cooperative relations managing these facilities in harmony with Forest Service goals give us reason to comment on potential changes in operating conditions that may affect Western's future ability to carry out its mission, such as with the adoption of a new Land and Resource Management Plan

As drafted, the Plan recognizes the ongoing economic value of hydroelectric generation and electric power transmission facilities, as well as the possibility that there may be need to expand such facilities in the future (see Forest Goal 20 on page 4-5 of the Plan, and Environmental Consequence? Chapter IV - Lands, Transportation and Utility Corridors on page IV-28 of the EIS) Although the standards and guidelines in the Plan and mitigation measures in the EIS do not appear to preclude future electric facility construction except in Wilderness Areas, Western is concerned that the standards not be interpreted to preclude future electric facility expansion outside Wilderness Areas when social and economic benefits outweigh the anticipated adverse environmental conseq[illegible] of such facility [illegible]truction New corridors may be necessary t[illegible] maintain reliability of the [illegible]al intert[illegible] transmission lines Western is also c[illegible] that as facilities reach sc[illegible]duled dates for re-licensing, the public economic investment in those facilities must be protected and allowed to continue in place without relocation or undergrounding

As an example, Forest Standards and Guidelines 12 b (Lands--Special Uses) on page 4-16 of the Plan reads

"b. Bury new telephone lines and new or reconstructed power lines less than 35 KV, unless (1) Visual Quality Objectives (VQOs) can be met without burying; (2) geologic conditions make burying infeasible; and (3) burying would produce greater long-term site disturbance "

Western is concerned that existing overhead power lines in this voltage category be subject to maintenance and relicensing without meeting the criteria applicable to new projects.

Forest Standards and Guidelines 12 i 1) and 2) (Lands--Transportation and Utility Corridors) on page 4-18 of the blan rea6 as follows:

i. (1) "Establish transportation and utility corridors as needed to accommodate existing and planned facilities. Future rights-of-way would be confined to existing corridors unless there are overriding economic or environmental concerns

(2) Major power transmission lines, from the north and south, would be confined to an eastern corridor within or in close proximity to existing intertie lines."

Western's concern with this standard relates to reliability Intertie electric power transmission lines carry a substantial portion of the power used in different regions of California and the Pacific Northwest. If there is damage or loss of power transmission capabilitvover an intertie. backup facilities can be over-stressed with blackouts possible. If two intert es are cascading blackouts could cause power loss in large segments of the Western United States. Accordingly, prudence dictates that intertes should not be const in close proximity, so as to avoid the possibility of a natural or man disaster (such as a forest fire or plane crash) affecting two interties at the Same time increased reliance on the interregional transmission and exchange of power has changed the requirements for high voltage transmission line sighting. Common mode failure in a corridor affecting two interties at the same time poses potential for extremely high economic losses, and this potential must be considered in Corridor selection.

Thank you for this opportunity to comment on the Plan and EIS. Please contact Earl Nelson, Environmental Planning Coordinator, at 649-4529 for further information or clarification

Sincerely,

James C Feeder

James C Feeder
Area Manager

235 #2

WALLY HERGER
2d DISTRICT CALIFORNIA
PLEASE REPLY TO:
☐ WASHINGTON OFFICE:
2433 RAYBURN HOUSE OFFICE BUILDING
(202) 225-3076
DISTRICT OFFICES:
☐ 55 INDEPENDENCE CIRCLE, SUITE 104
CHICO, CA 95926
(916) 893-8363
☐ 410 NEWDING [illegible] SUITE 115
(916) 223-5898

COMMITTEE ON
WAYS AND MEANS
COMMITTEE ON
THE BUDGET

Congress of the United States
House of Representatives
Washington, DC 20515-0502

January 5, 1994

Mr. Steve Fitch
Forest Supervisor
USDA Forest Service
Shasta-Trinity National Forests
2400 Washington Avenue
Reddlng, California 96001

Dear Steve-

A number of my constituents residing in the area surrounding the Shasta-Trinity National Forest have contacted me regarding their strong opposition to its draft management plan I Share many of their Concerns and would like to go on record by highlighting Several

As it is currently Written, the plan fails to provide the biodiversity that it claims Far too many areas have been placed into reserves Under the plan, 85 percent of the area forests will be left unmanaged Only 15 percent of the remaining forests may be available for timber management

Given the region's high susceptibility to fire. disease. and insecticide due to its warm, dry climate, an overwhelming majority of the people affected by this plan believe it places far too much of the forest in "reserve" areas A reduction in reserves and an increase in forest management will create a healthier forest

Of these occurrences. fire is the most likely When it occurs in an old-growth, unmanaged stand of California timber, it will Often proceed in an uncontrollable fashion By leaving this old growth forest in reserve status. we will be dooming the very wildlife habitat this plan intends to protect

The Shasta-Trinity National Forest must be protected against the likelihood of wildfire The development of shaded fuel breaks, strips of intense thinning strategically located throughout the old growth, and access roads within the old growth reserves are the two most effective ways to accomplish this Unfortunately, the Current plan prohibits these two vitally important mechanisms from occurring By not allowing fuel breaks

or access roads, fire fighters will be able to reach the scene promptly and many acres of our most pristine forest land will be tragically lost

Finally, under the provisions of Option 9 which have been incorporated Into the Shasta-Trinity Land Management Plan, the plan will be managed by a group Of scientists, many of whom have never visited or spent any significant amount of time in this area I urge you to improve the scientific quality of this group by including local Citizens, scientists, Forest Service employees, and others with direct knowledge of local conditions

While I have barely scratched the surface Of the problems that many of my constituents have with this plan, I waited you to be aware of these specific problems and the suggested resolutions for them I hope you will seriously look at all the comments from local residents who have concerns with the high percentage of land held in reserve

Thank you for your consideration of this Important matter I look forward to hearing from you at your earliest possible convenience

Sincerely,

WALLY HERGER
Member of Congress

WH/bb

235

WALLY HERGER
2D DISTRICT CALIFORNIA

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COMMITTEE ON
WAYS AND MEANS

COMMITTEE ON
THE BUDGET

Congress of the United States
House of Representatives
Washington, DC 20515-0502

January 5, 1994

Mr. Steve Fitch
Forest supervisor
USDA Forest Service
Shasta-Trinity National Forests
2400 Washington Avenue
Redding, California 96001

Dear Steve

I am writing to express my deep disappointment with the Shasta-Trinity National Forest's complete disregard for the Mount Shasta Ski Area in its draft plan. Since the comment period for this Plan ends at the end of this week, I would like to state some specific reservations on the plan as it applies to the issue of skiing on Mount Shasta.

As YOU are well aware, the Forest Service has consrstently supported the creation of a downhill ski resort at the Ski Bowl on Mount Shasta. In 1984, when Congress designated the Mount Shasta Wilderness, it specifically excluded Ski Bowl, Shastarama Point, Sun Bowl, Powder Bowl, and Giddy-Giddy Gulch from the Wrlderness to allow for the development of downhill skiing. In addition, the Wilderness boundary was dropped down into Avalanche Gulch to include Shasta Alpine Lodge (Horse Camp) and to accommodate in Wilderness the most popular climbing routes to the peak.

Throughout the 1980's, the Forest service clearly made It a top priority to reintroduce downhill skiing in Ski Bowl through the development of a moderate sized ski resort in Ski Bowl. From 1986 to the present, all documentation has confirmed the Forest Service's desire to have Mount Shasta Ski Area, Inc develop the ski resort on National Forest Service lands

After reviewing the Preferred Alternative, I was surprised to find that the zoning language for Mount Shasta runs counter to the Forest Service's previous commitments to develop the Mount Shasta Ski Area. In particular, the upper portion of the Ski Bowl, all of Powder Bowl and Sun Bowl, and also Giddy-Giddy Gulch are zoned "Unroaded Non-Motorized Recreation." This section of the plan is inconsistent with the original plans of the Forest

Service to build a ski area because such an area would require motorized snow cats and ski lifts as well as requiring narrow, low impact service roads.

In addition, there is nothing shown on the plan's map whrch would indicate a clear desire by the Forest Service to develop a downhill ski resort on National Forest Service lands in Ski Bowl.

With the closure of downhrll ski facilities at Mount Lassen, Mount Shasta Ski Park is currently the only ski resort in northern California Clearly, the development of the Ski Bowl for downhrll skiing would go a long way toward meeting the growing demand in our area for this fine recreational Sport It is unbelievable to me that the Shasta-Trinity Management Plan baoks away from the Forest Service's historically strong commitment for developing this important capacity I hope you will reexamine this serious error in the plan and amend it accordingly

Thank you for your assistance in this matter I look forward to hearing from you at your earliest possible convenience.

Sincerely,

WALLY HERGER
Member of Congress

WH/bb

000188

The Resources Agency

Pete Wilson
Governor

Douglas P Wheeler
Secretary

of California

California Conservation Corps • Department of Boating & Waterways • Department of Conservation
Department of Fish & Game • Department of Forestry & Fire Protection • Department of Parks & Recreation • Department of Water Resources

January 4, 1994

USDA, Forest Service
ATTN: Forest Plan, Shasta-Trinity National Forests
2400 Washington Avenue
Redding, California 96001

Dear Mr. Fitch:

The State has reviewed the Proposed Forest Land and Resource Management Plan, and Draft Environmental Impact statement for shasta-Trinity National Forest, in Shasta, Siskiyou, Tehama, and Trinity Counties, submitted through the Office of Planning and Research.

We coordinated review of this document with the Air Resources, central Valley Regional Water Quality Control, and State water Resources Control Boards: the State Lands Commission; and the Departments of Conservation, Fish and Game, Forestry and Fire Protection, Transportation, and Water Resources.

None of the above-listed reviewers has provided a comment regarding this document. Consequently, the State will have no comments or recommendations to offer.

Thank you far providing an opportunity to review this project.

Smcerely,

Nodell a Gayon

for William G. Shafroth
Assistant secretary.
Land and Coastal Resources

cc: Office of Planning and Research
1400 Tenth Street
Sacramento, CA 95814
(SCH 93104005)

The Resources Building Sacramento, CA 95814 (916) 653 5656 FAX (916) 653-8102

California Coastal Commission • California Tahoe Conservancy • Colorado River Board of California
Energy Resources Conservation & Development Commission • San Francisco Bay Conservation & Development Commission
State Coastal Conservancy • State Lands Commission • State Reclamation Board

STATE OF CALIFORNIA—THE RESOURCES AGENCY

PETE WILSON, Governor

DEPARTMENT OF FORESTRY A FIRE PROTECTION
P O Box 944246
SACRAMENTO CA 94244 2460
(916) 227-2654
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SP4

JAN 6 1994

Mr Steve Fltch
Forest Supervisor
Shasta-Trinity National Forests
2400 Washington Avenue
Redding, California 96001

Dear Mr. Fltch:

Please frnd enclosed comments by the California Department of Forestry and Fire Protection (CDF) on the Land and Resource Manaaement Plans and the associated Draft Environmental Impact statements for the Six Rivers, Klamath, Shasta-Trinity, and Mendocino National Forests. Since bath state and federal polrcy initiatives consider northwestern California as a region, this doc t a the cumulative t of ll forest lans within the regional ntext but a draws is between individual forests n merited

CDF is vitally interested in the impacts of these plans on the environment and economy of northwestern California, on CDF's ability to fulfill fire protection and resource management mandates, and on the conduct of future state-federal-resource planning efforts The Department is committed to providing rigorous, substantive, and constructive comments.

CDF has several analyses in progress and will provide their results before the forest; finalize the EISs. Additional analysis of impacts across the region will require longer term commitments by CDF, the Forest Service and others Therefore, we identify institutional needs that must be addressed to accomplish long-term forest planning and management.

Mr Steve Fltch
JAN 6 1994
Page Two

The Department finds that an on-gang dialogue between the Department, the Region V of the Forest Service, and individual forests constitutes an important means of implementing the Agreement on Biological Diversity of which both CDF and the Forest Service are signataries. Cooperation on the afore-mentioned analyses could significantly improve the final plans and EISs to address CDF and st service ncerns. We come your comments these al and look forward to aborati between Forest ic and the Department.

Sincerely,

Richard A. Wilson
Director

cbc

Attachment

California Department of Forestry
and Fire Protection

A
Review of
the Pour Northern Forest Plans

6 January 1994

The mission of the Department of Forestry and Fire Protection (CDF) is to protect and enhance the range. forest and watershed resources in the State of California The action of the largest single landowner in northwestern California, the United States Forest service, has numerous impacts on these resources In a recent review of option 9 (An Evaluation of Option 9 of the Federal Forest Plan as it Relates to Northwestern California) CDF developed an analytical framework with which to assess the contribution of proposed actions and policy to ecosystem integrity and sustainable economic development. This document applies that framework to the National Forest Land Management Plans (LMPs) Of the six Rivers, Klamath, Shasta-Trinity and Mendocino National Forests (NFs) to determine the cumulative impact of these four Plans on the resources and people Of northwestern California.

THE IMPACT OF THE PLANS ON THE RESOURCE SYSTEHS OF THE REGION: WILL THEY ACHIEVE ECOSYSTEM MANAGEMENT AND PROTECTION?

Forestry issues have changed significantly since the original scoping period of the Plans. These changes cloud the relevance of the plans to the current situation in northwestern California. The extent of this problem varies across the four Forests Both the Six Rivers NF and the Klamath NF LMPS respond better to current Concerns The Klamath NF LMP recognizes biodiversity as a critical issue and uses more advanced analytical approaches. The Six Rivers NF LMP aims toward the establishment of adaptive management on the Forest However, the Mendocino NF scoped issues fifteen years ago and has consequently produced a Plan that addresses Individual commodity values Wlth little integration under the ecosystem paradigm. The Shasta-Trinity NF LMP does not reflect the change in *issues* even though those changes form the basis for ongoing and planned activities within the National Forest For example. on the Hayfork Ranger District, the Forest has organized a grass-roots effort to

evaluate ecosystem management and define appropriate desired future conditions, though the LMP does not use those concepts.

While two of the LMPs (the Six Rivers NF and the Klamath NF) have elements related to ecosystem management, the two remaining Forests (the Mendocino NF and Shasta-Trinity NF) do not adequately address this paradigm. The measures of environmental consequences employed In all the DEISs to evaluate different alternatives include some pertinent to ecosystems but are, by and large, individual resource, economic or social concerns poorly related to ecological integrity Thus, at a most fundamental level, the Plans fail to establish benchmarks for ecosystem integrity and health. In the absence of these benchmarks, it is Unclear if the desired future conditions of the Plans are consistent with ecosystem integrity The impacts of the preferred alternatives on the integrity of the ecosystems of northwestern California remain therefore unanalyzed.

Certain Plans employed some of the concepts usually associated With ecosystem management desired future conditions, range of natural variability, adaptive management and consideration Of adlacent lands For the Klamath NF, teams With representation from a range of interests, including private landowners, developed the alternatives examined in the DEIS The Forest also Consulted specialists to define issues and key indicators of social impact and biological diversity across ownership boundaries The Plan's. desired future condition statements refer to individual management areas and provide mare useful management guidance than Condition Statements that refer to the entire Forest. Finally, the Forest established a policy to mimic the landscape patterns created by natural disturbance regimes

The Six Rivers NF used a vocabulary similar but not as developed as that of the Klamath NF The Forest recognized the need to mimic natural processes and disturbance rates, and similarly established desired future condition statements for management areas The avowed strategy of the preferred alternative is to use active adaptive management to test different methods of achieving ecosystem management.

Neither the Shasta-Trinity NF nor the Mendocino NF addressed ecosystem management The vocabulary of ecosystem management is generally absent in both plans, though the Shasta-Trinity NF does establish desired future condrtions far management areas certain Ranger Districts on the Shasta-Trinity NF have begun to embrace ecosystem management as seen In their commitment to public education and outreach, but nonetheless the governing document of the Forest lags far behind and therefore cannot guide operations The Mendocino NF uses individual species as indicators rather than overall ecosystem conditions to guide

management. The Plan does not consider such issues as biological diversity, connectivity of habitats, or ecosystem management.

Most DEISs indicates that the Plans will induce more harvest on adjacent private lands but do not adequately assess the Cumulative impact an the entire landscape It is at least plausible that the four plans will together lead to a regional landscape With a very pronounced Contrast between private and public lands, with neither emulating pre-management conditions. This cumulative effect may not be Optimal for either biological or social values in northwestern California.

CDF recognizes that existing law forces management to respond to a few select species While the Six Rivers and the Klamath NFS have taken the first step toward ecosystem management in this constrained environment, the Shasta-Trinity and the Mendocino NFs lag far behind in adopting components of ecosystem management

Even assuming that the desired future conditions are congruent with ecosystem integrity, the Plans do not clearly show how standards and guidelines will lead to desired future conditions. The management area direction is not sufficiently Precise to project the location and nature of management activities Therefore their Ultimate impact on ecosystem conditions is Unknown. Without such a projection methodology, the public Cannot be certain that the Plan directs management in a manner consistent with the Plan's objectives far management areas

The development of this analysis is central to any realistic ecosystem planning In theory, if the Forest establishes desired future condition statements sufficient to ensure ecological Integrity, then the public might well be indifferent to the means employed by the Forest to achieve those conditions. With a good understanding of ecosystem structure and function, Forest Staff could devise management activities with a high probability of achieving the desired future condition A well-designed monitoring program that quantified performance would detect a posteriori deviations from the desired future conditions and in many ways replace the a priori regulatory or consultation processes employed currently Given, however, the current poor understanding of how management affects future conditions, and how those conditions contribute to ecological integrity, prudence requires that the link between management, that Proximate objective and ultimate goals be clearly demonstrated As managers and scientists gain more experience with managing ecosystems, assessment and monitoring methodologies improve, and public renews its trust of resource managers, this requirement may be further relaxed

The Plans do not portray existing ecosystem conditions in sufficient detail to determine if proposed management will move the system toward or away from the desired future condition. Analysis of the impacts of management requires a starting point of current ecosystem composition, structure and pattern.

Several additional factors hamper the projection Of management Impacts on ecosystem conditions. First, the Addendum attached to each DEIS fails to clarify the relationship between the zoning proposed in the Plans and that of Option 9. The essence of each Plan is a zoning scheme with management guidance for each Zone. Since Option 9 will Change that zoning to an unknown extent, the true impact of management is unpredictable. Second, the Plans do not analyze the role of both fire and frre management in structuring ecosystems. Preliminary analysis by CDF with PROBACRE Indicates a strong likelihood that stand-replacement fires in reserve areas are sufficiently common that they swamp the influence of the reserve itself on the extent of late successional forest In a similar manner, Without a quantitative analysis of the effects of fire suppression and Prescribed frre on ecosystem structure and function, the Plans cannot integrate these major programs into ecosystem management Finally, in most cases the Plans consider ecological Impacts primarily on federal lands even though the Plans induce chanses on adjacent ownerships The appropriate reference environment for ecological analysis should encompass all lands affected, even if they fall outside the federal land base. This larger reference area is particularly important for terrestrial and aquatic species whose range extends beyond the National Forests, for landscape patterns important for biodiversity, and for water and air quality

While the Plans mention diversity, they appear to underestimate the technical requirements of the concept. Since the Plans do not portray current ecosystem conditions, they do not confront the difficulties of distinguishing appropriate habitat types and structure classes needed to characterize responses to disturbance Beyond that, the Plans do not consrstently integrate diversity into forest management. The Klamath NF LMP discusses ecosystem health in terms of the diversity of forest structure classes. However, timber and silviculture elements consider forest health in terms of young actively growing conifer trees, a small subset of all structural classes Similarly. thinning operatrons for the enhancement of late successional forest may greatly limit the extent of the early seral stage brush component of the forest ecosystem

The Plans affect the management actions of prlvate land owners in ways not recognized in the DEISs. Reductions in salvage

on NF land may put trees on adjacent prlvate lands at risk CDF Resource Management staff have already noticed a significant increase in harvesting above historic levels on prlvate lands Many marginal areas that would not have been considered for harvest in the past are now being lagged The reduction In available timber supply from public lands has already been blamed for significant increases in timber and lumber prices. In the last two years, the price of Douglas-fir logs has doubled in areas around the Six Rivers NF. The high prices have led to a record number of harvests without Timber Harvest Plans under a three acre exemption in the California Forest Practices Program Each of these impacts has potential repercussions for ecological Integrity

The Plans may significantly affect the incidence and severity of fire, and the fire protection capabilities within the region. The severe decline in the timber programs on the Forests will have a number of negative effects First, the loss of tlmber staff will reduce trained personnel during fire season Since 1988 the Mendocino NF has reduced staffing in all Programs for 260 to 200 persons More staff reductions will result from consolidating Districts and forests and will reduce the labor pool for both federal and mutual aid fires for Instance, on the six Rivers NF, the reductions in the timber program may eliminate up to 12 Incident Command support staff and 20 Type 2 handcrew members Because of these reductions, CDF expects an increase in its participation on federal fires with no reciprocal help on state fires Second, the loss of timber revenues will reduce the funds available to remediate fire hazards created by previous harvests, the recent drought and associated insect kills Third, the decline in harvest will reduce the prlvate sector heavy equipment capacity that has historically been used under Contract during flre season Fourth, road closures or reduced maintenance will lengthen response times and reduce the effectiveness of initial attack Fire size will increase alond with resource losses and suppression costs

In addition, changes in suppression strategies an NF land will affect CDF's operations First, when CDF responds under mutual aid It will face the additional challenge of adapting its tactics to fit the modified suppression prescriptions on certain areas on the Forests Beyond that, the modified suppression strategy will change the level of protection on private in-holdings which are state responsibility but protected by the Forest Private landowner desires for full suppression and the equal protection policy of the Board of Forestry may conflict with the service provided by the Forests

once again, the Plans consider fire suppression as a stand-alone activity and usually do not specify fire management policy in a manner analogous to land management standards and

guidelines. Yet the continued separate analysls of resource management and fire suppression ignores the very basic observation that both are components of ecosystem management. Ideally, the Plans would specify standards and guidelines for fire and fuels management for all management areas. In order to assess the impact of these Standards and guidelines on ecosystem Integrity, the Plans should project the cumulative effect of all management activities on the condition of the ecosystem.

The Plans do not specify how they can be altered in the event of large catastrophic fires. USFS personnel on the Shasta-Trinity NF indicate that a regional or provincial review group would need to approve any deviations from option 9 guidelines. Thus the Plans are severely limited as adaptive management tools In a region where catastrophic fires are certain to occur

Limited resources may preclude adequate Plan Implementation. Recent history shows a persistent decline in the human and financial resources committed to NF management. The scarcity of funds has severely limited monitoring in the past, and is clearly insufficient for the intensity of monitoring proposed in the Plans Thus without a drastic shift in funding priorities, the Plans may never lead to effective adaptive management.

Even though CDF is continually assured that funding for fire management will be maintained or Increased. it appears unlikely that given the loss of timber revenues the federal government Wlll Continue to subsidize NF forestry for the decades needed to achieve true ecosystem management unless the Forests Can convert into revenue the non-timber values that are driving forest policy, the move to ecosystem management wlll always be at risk

THE IMPACT OF THE PLANS ON LOCAL AND REGIONAL ECONOMIES:
IS THE ANALYSIS ADEQUATE?

Realistic sale quantities will probably be lower than those specified in Option 9 and carried over into the four Forest plans. In the near term particularly, a number of factors not addressed in the four Forest plans are highly likely to reduce timber outputs below those specified in the plans. These factors include

the constraints of watershed analyses and other Optlon 9 planning and operation requirements, Some of which have not yet been developed at the operational level.

completion of surveys for listed species such as the northern spotted owl and marbled murrelet which may take up to two years and require extensive Consultation Wlth the Frsh and Wildlife Service:

difficulties inherent in catching up with shifting program priorities,

losses of personnel and decreases in funding, resulting in fewer personnel and other resources to process timber sales,

Implementation of Option 9 will reduce the Shasta-Trinity NF Preferred Alternative harvest level by almost 30%, from 87 MMBF/year to 60 MMBF/yr. It is doubtful that even this sharply reduced harvest level can be met within 3 to 5 years. Local Forest service personnel indicate that the likely target far 1994 is around 30 MMBF for the entire Shasta-Trinity NF.

Under the President's Option 9 strategy and the respective DEIS, harvest on the Six Rivers NF would be cut by 55 percent, from the 45 MMBF/year proposed in the original Forest Preferred Alternative to the 20 MMBF/year under the current DEIS. This change represents a reduction of 86 percent from the annual average Sale quantities of the last decade.

For the Klamath NF, CDF staff expect that the most optimistic output will be 50 MMBF/year instead of a projected 60 MMBF/year.

On the Mendocino NF, the harvest level will be 12 MMBF/year under the Option 9 adjustments, as compared to the 22.5 MMBF/year proposed in the original Forest plan preferred alternative This reduction represents a 47 percent decrease.

These harvest levels are below all of the studied alternatives Within the Land and Resource Management Plan DEISs for these Forests.

There are several additional current Issues that may further reduce the available timber harvest. These include the listing of salmonrd species as threatened or endangered, the designation Of Critical habitat for the marbled murrelet, and potential management concerns regarding the marten and fisher.

Given these realities, the reductions in timber harvest volume likely to result from option 9 are greater than anticipated in the DEISs, calling into question the accuracy of the DEISs' economic impact assessments. Further, the DEISs do not fully address state and County administrative costs associated with changes in private land management and federal fire protection capabilities.

The economic impacts (and Concomitant social impacts) to forest communities will be much more severe In reality than the picture painted in the four Forests' DEISs. The EISs for Option 9 and individual LMPs should reflect the economic and social cumulative impacts of the drastic reductions an USFS harvesting that have occurred over the past decade.

Budget reductions are occurring throughout the National Forest System. Budget reductions may shift costs for flre protection and road maintenance to state and local governments The Forest Service will have increasing difficulty In fulfilling its responsibilities under cooperative road agreements with local governments and Others.

Impacts to CDF will result for at least two reasons First, decreased Forest Service timber harvest levels are likely to result in increased harvesting on private lands. Such a shift will increase the workload of CDF's resource management program. Further, an imbalance may result In mutual aid relationships as CDF responds to more incidents on federal lands due to reduced Forest Service staffing and resources

RECOMMENDATIONS FOR IMPROVED PLANNING, ADMINISTRATION AND IMPLEMENTATION

Additional information on ecosystem conditions is needed to advance ecosystem planning. More information on existing and desired forest conditions is needed to fully develop plans Information on private forest lands must be considered, including existing conditions and projected biological and economic effects of National Forest policies on those lands. The State of California, the Forest Service, and others must provide Incentives and benefits to ensure the cooperation of private landowners in this effort These may include inexpensive or free access to data and analytrcal tools, training in data analysis, and data development.

Collaborative efforts must be established to access and analyze existing data More cooperative efforts must be made by State and federal agencies, and local government to use existing analytical tools such as PROBACRE, the California Fire Economic Simulator (CFES), and the National Fire Management Analysis system (NFMAS) to model fire at regional levels across ownership boundaries More In-depth analyses should be done to predict the changes In suppression Capabilities under projected personnel reductions by the Forest Serive and prlvate industry These models should be improved and integrated With other Spatial information to allow their use in evaluating the effects of fire on forest structure

Efforts to compile data, develop data standards, and establish Geographic Information Systems should be identified and integrated Projects currently underway include the Federal Forest Plan's Inter-organization Resource Informatron Coordinating Council IIRICC), Humboldt State University and the USFWS Ecosystem Restoration Office, and the University of California and the Trinity Bioregion Group

CDF has developed particular expertise in the representation of ecosystem conditions in geographic information systems and the development of analytical tools to support ecosystem management A collaborative effort would lead to substantive, rigorous and constructive comments that could Significantly improve the Plans' likelihood of contributing to ecosystem integrity and sustainable economic development Of northwestern California

Planning should take advantage of local and regional groups established to foster Stewardship of watersheds and natural resources. Goal development, management planning. and

data Collection and analysis must include private Industry, local landowners and the public Groups such as the Trinity Bioregion Group, the Shasta-Tehama Forest Work Group, the Redwood Coast Watershed Alliance and others have been established to promote stewardship of local forest communities These groups include members from a range of interests dedicated to identifying local goals for sustainable forest and watershed systems and to developing strategies to achieve these goals

These groups should be involved in planning, Implementation, monitoring and evaluation of National Forest Plans. These groups may be particularly valuable in exploring emerging land use pressures, management opportunities, and innovative management practices

Adequate resources must be provided and appropriate processes establrshed to ensure adaptive management planning. Adaptive management will provide the flexibility to adapt management to contingencies such as fire, disease and other unforeseen disturbances that compromise the desired forest conditions The establishment of trust and the provision of adequate data are critical to this process

The Forest Service should consider incentives for public participation in the planning process, the role of public interest groups or contractors for monitoring, and access to information and analysis

Adaptive Management Areas should represent the full range of biological diversity present in the region Analyses beyond the initial ones developed by CDF should be done across the region. The establishment of AMAs should also take advantage of local management or economic opportunities. and local recommendations on management alternatives Standards and practices should be evaluated by interagency/public groups on an on-going basis.

Funding and personnel must be ensured for the collection, analysls and dissemination of monitoring data The availability of this information is critical to adaptive planning and management

Additional interagency cooperation will be needed to ensure adaptive ecosystem management. Federal and state agencies must resolve existing policy and regulatory conflicts that impede ecosystem management

Air quality regulations may impede prescribed burning Critical to achieving desired forest conditions and to minimizing wildfire risks Cooperative research, analysls and management

efforts with the Air Resources Board and local Air Quality Management Districts may be needed to identify acceptable management practices and efficient permitting processes.

Cooperation between the USFWS and the State in implementing and evaluating the effects of the 4(d) rule on the northern sported owl nd th t at large e needed These age ould coope s or any f rulemaking efforts t ensure adequate m ses nit

In summary, additional efforts are needed to make the LMPs consistent with current federal policy, to adequate assess the Impacts of those plans on ecosystems, and to implement ecosystem management in general. The plans vary in their efforts to describe desired forest conditions and the means for achieving them The plans must include information on private lands and a full evaluation of the biological and economic effects of federal activities on those lands.

Ecosystem management planning will require a level Of Information, analysis, monitoring and administration whlch can only be achieved through increased cooperation With the State and the public CDF emphasizes three areas of analysis that must be done to fully evaluate the effect of the LMPs:

the impact of fire and fire manaaement on ecosystem conditions,
the effect of management prescriptions on forest conditions Within management areas and across landscapes.
the effect of public policy on private management decisions and the cumulative economic and biological impacts in various regions.

CDF is prepared to select several areas to demonstrate these types of analyses and to develop additional analytical tools or applications, as needed We would like to work closely with the Forest Service and other groups to accomplish this

STATE OF CALIFORNIA—THE RESOURCES AGENCY PETE WILSON Governor

DEPARTMENT OF FISH AND GAME
601 LOCUST STREET
REDDING CA 96001
(916) 225-2300

December 23, 1993

RECEIVED
DEC 28 1993
Shasta Trinity Natl. Forest

Mr Steven Fltch, Forest Supervisor
Shasta-Trinity National Forest
2400 Washington Avenue
Redding, California 96001

Dear Mr. Fltch

SCH 93104005 - Draft Envrronmental Impact statement (DEIS] and Land and Resource Management Plan (LMP), Shasta-Trinity National Forest (STNF)

The Department of Fish and Game (DFG) has reviewed the subject LMP and DEIS. The LMP identifies the preferred alternative for managing lands and resources within the STNF For the most part, this LMP incorporates the changes outlined in President Clinton's proposed forest plan (Option 9) of the Report of the Forest Ecosystem Management Assessment Team (FEMAT). The LMP itself is a broadly based collection of forestwide management goals and objectives for the next 10 to 15 years.

option 9 envisions the development of ecosystem management, rather than the commodity output type of forest management common in the past. Although the addendum found in the DEIS indicates that the LMP Closely complies wlth Option 9 direction, standards and guidelines as well as outputs presented in the draft LMP indicate that the LMP is Still output oriented The final LMF should provide the framework for developing and implementing ecosystem management

Because not all of the changes to the preferred alternative of the LMP that are brought about by Option 9 of the FEMAT report are evident in the LMP, we are concerned that review of this document may well be a review of alternatives and analysls that cannot be implemented We have previously indicated our concern wlth the process of reviewing a draft document that has a major part of its direction set by another document that has yet to be finalized. Further, it has been our experience that it is not very efficient to comment on a draft document and then await and respond to a final document Without communicating during the development of the final dacument Because of that experience, we are very concerned that the process we are currently involved in will be even more ineffective. For that reason we feel it is very important that the US Forest Service (USFS) Contact appropriate departmental units during (not after) the development of final LMPS so that issues and concerns can be dealt with prior to the issuance of a final document

We would like to compliment the STNF Staff. The DFG has reviewed numerous forest plans and we have found this LMP to be progressive. well done and one of the best we have seen. It le with this in mind that we have included what we hope are constructive ideas that we can pursue together to help provide resolutions to various issues of concern.

If you have any questions regarding these comments, please contact Mr. Don Koch at (916) 225-2305.

Sincerely,

Richard L. Elliott

Richard L. Elliott
Regional Manager

cc: Mr. Don Koch
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GENERAL COMMENTS

Issue - Key Watersheds

Comment - Regardless of what changes, if any, are made to the President's forest plan preferred alternative (Option 9), we believe It imperative that all objectives, standards, guidelines, and components Proposed for the Aquatic Conservation Strategy be retained. Specifically, we endorse provisions for riparian reserves on all fish bearing streams, nonfish bearing streams, and intermittent Streams, and the establishment of Key Watersheds. These Key Watersheds are necessary to reverse the serious decline of anadromous salmonids and to begin recovery of Salmonid habitats degraded by past management practices.

Issue - Monitoring

Comment - The monitoring program presented in chapter five of the LMP is intended to "determine how well the Forest Plan objectives are being met and how closely standards and guidelines are being followed" (Page 5-1) Forest goals are to provide "Integrated multiple resource land management in the context of ecosystem management" (page 4-4). Monitoring, then, becomes one of the most crucial aspects Of the management of the STNF because It develops the databases needed to inventory and assess ecological condition. The FEMAT report (chapter 8) provides some direction and definition of ecosystem management and the application of that management on the STNF. Further, the FEMAT report identifies the need for a monitoring system to be objective driven and that it needs to be considerably more than a list of things to do. An effective monitoring program should also result in the development of local or regional data that can be integrated into a common regional database that will have Utility beyond the Site at which it was developed The FEMAT report (page VIII-21) recommends "The federal agencies through the interagency coordination effort, should develop a multiorganizational resource monitorlng system. Standards and guidelines that address design and quality control should be included. The agencies should strive to ensure activities are adequately funded and that organizational roles and responsibilities are clearly identified".

a m[illegible] tl t is presented in the LMP fails c meet [illegible] [u]irements preser t[illegible] in [illegible]e FEMAT report. [illegible] r t [illegible] [illegible]d delines sh[illegible] but fail to, provide [illegible] t for a [illegible] program [illegible] fail to develop regional databases For the most part the monitorlng program is a list of things to do which is largely focused on project scale activities and will not provide needed information or be sensitive enough to determine responses of ecological systems which are needed to facilitate ecosystem management.

Recommendation - If ecosystem management is going to be implemented on the STNF, the monitoring program needs to be responsive to the needs of that management. Forestwide, and where necessary, prescription specific standards and guidelines need to develop direction for the development of databases as well as the implementation of a monitoring program that will truly determine the responses of ecological systems to management programs.

Existing technology such as geological information system (GIS) applications to determine ecological conditions over large areas are relatively easily applied and provide a great deal of information. This same technology can be used to conduct change detections and develop a more sensitive monitoring program than is currently proposed. That same technology can start to develop the type Of databases envisioned in the FEMAT report as Well as monitor responses to management actions.

The DFG has utilized this technology and we are encouraged by its utility both as a monitorlng and planning tool as well as a database. We would be Interested in cooperatrvely applying this technology over the STNF as well as participating in the development of definitions of ecological conditions along with determination of variables to be measured.

COMMENTS RELATING TO TERRESTRIAL RESOURCES

Issue - Grazing

Some riparian habitats on the STNF are degraded and in need of restoration. Past land management activities have been inconsistent in the application of riparian area management (Summary of the Analysis of Management Situation, page 3-16). Some of this degradation has resulted from overuse by livestock. Livestock use should be reduced or eliminated on those allotments where riparian systems are being adversely impacted by grazing.

The STNF LMP predicts average annual Outputs by decade for the preferred alternative (Table 4-2. page 4-9) to maintain existing levels of animal months *(AM)*. The DFG believes this output is rnconsistent With the need to restore riparian ecosystems.

Comment - The DFG supports the standards and guidelines for range management if the annual monitoring of a grazing allotment indicates that riparian condition goals have not been met and grazing practices are adjusted to eliminate the adverse impacts.

Average annual outputs by decade (Table 4-2, page 4-9) show no significant changes in thousand animal unit months (AUM) over five decades that would accommodate the Standards and guidelines

to protect riparian environments. Furthermore, the monitoring AM's will be measured yearly but reported only each five years for selected allotments only.

Outputs of AM's for the next five decades have been predicted. Option 9, figure VIII-2, page 7, illustrates the future process where issues are resolved and then commodity outputs are calculated based on the need to resolve resource issues.

Recommendation - We recommend that all range allotments and affected riparian areas be monitored to Identify problem areas Livestock use of these allotments should be eliminated or reduced until the problems are resolved. We concur that areas determined to be in adequate condition can be monitored and reported less frequently than on an annual basis However, we recommend that degraded allotments be monitored and reported on an annual basis.

Issue - Biomass

Observations on the STNF and adlacent forests indicate that biomass projects, particularly those involving precommercial thinning, often result in large continuous blocks of land that lack diversity These Stands lack both cover and vertical structure and, in some cases, dead and down woody material, snags and old trees. The DFG has Concluded that these projects result in adverse impacts to a wide variety of wildlife species.

Comments - Biomass thinning of forest stands may have numerous consequences. In many areas, it appears that the lack Of soil disturbance (because of the use of rubber tired equipment) Wlll preclude the regeneration of Shrubs This observed lack of regeneration may also result from the failure to adequately open the canopy. The lack of structural diversity in the form Of a shrub layer results in a significant reduction in the habitat capability of the stand A wildlife habitats relationship (WHR) analysis of a mired conifer habitat on the STNF indicates that 55 species have a secondary life requisite dependency on a shrub layer in the stand. Eleven species cannot utilize the stand without the shrub layer. Standards and guidelines deal Wlth snags. dead and down and hardwoods There appears to be no standard/guideline for vertical structure, particularly a Shrub layer.

In chapter 3 - Summary of Analysis of the Management Situation under Timber on page 3-18, the LMP indicates that about 34.000 acres are in need of release and an additional 22,000 acres need thinning. It is anticipated that much of these acres will be treated using biomass thinning.

comments on page 4-12 under Biomass, item b. indicate that removal of only material that is in excess of that required to meet the standards for soil quality and wildlife diversity and natural fire regimes will occur. The DFG supports this standard/guideline

We believe there is a need for additional standards for biomass projects.

Recommendation - The DFG recommends that an additional standard/guideline be developed to allow for the retantlon of areas within biomass projects that provide a shrub layer or a secondary tree layer This would provide nest, feeding and escape cover for numerous species. In addition, we recommend that the potential for opening the canopy in selected areas be evaluated This may allow the natural regeneration of shrubs in prescribed areas Scattered throughout a project We suggest that prescribe burning be tried in selected areas to test the feasibility of generating Shrubs following biomass thinning

The DFG would be happy to work with STNF personnel to explore these Ideas.

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component of biodiversity and importance to deer and other early seral stage species.

Comment - Considerable evidence exists to support the conclusion that plant succession throughout much of the western United States of America (USA) is favoring conifers (primarily second growth stands) at the expense of early seral stage habitats with a young Shrub layer (Longhurst, et al. 1976, Gruell 1983 and Gruell 1986) This trend is largely due to increased fire suppression and modification of silvicultural practices.

The Wildlife Habitat Relationship Program (WHR) indicates that 56 species of Wildlife have a secondary life requisite level far habitats containing a Shrub layer element in sapling Stage habitats of mixed conifer on the STNF A secondary life requisite means that the species requires the element (shrub layer) but another element can be Substituted Eleven species are totally dependent on Shrubs in early seral mixed conifer habitats (WHR).

Deer populations (and probably Other early seral dependent species) Continue to decline on the STNF Photographic and empirical evidence indicate that this decline is due largely to loss of habitat quality and quantity. primarily on high elevation summer deer ranges Longhurst (1976) found this to be the primary cause of the deer decline occurring in California. Specifically, this loss of habitat is believed to be related to the lack of regeneration of young, preferred shrubs, in conifer

dominated habitat, primarily those in the genus Ceanothus. This loss of regeneration is due to the long-term reduction in fire and to a lesser degree the conversion of brush fields to conifers.

The LMP predicts a Stable deer population over the next five decades but indicates a probable reduction in early seral species due to increases in old-growth habitats.

Table 4-2 on page 4-10 of the LMP predicts a stable deer population for the STNF through five decades On page 6 of the Addendum in the DEIS it is stated "because reserved area (late seral habitat management areas) increases hy 5 to 20 percent on individual National Forests, there would be a corresponding reduction in early seral stages over time This may decrease species populations which use these habitats".

The above comments are contradictory.

The LMP does not describe how the ongoing decline in deer habitat will be addressed. There is no specific direction to manage critical summer deer habitat by providing kev shrub species in young age classes on timber producing soils Over time.

On page 4-11 Forest Standards and Guidelines, 2. d, Natural openings provides for "natural openings equal to or greater than 1 acre" for wildlife. These may or may not provide conditions suitable for producing needed shrub component and may not be in the appropriate locations. In addition, this standard/guideline excludes the McCloud Flats, one of California's largest deer summer range complexes. Failure to provide deer forage areas on large deer producing areas like the McCloud Flats will result in continuing deer declines an the STNF.

Prescription 6, wildlife Habitat Management, appears to provide Some general flexibility to allow management of key summer deer habitat components by modifying timber management and defer the control of competing vegetation, e.g., browse and forbs. However, in most management areas, critical summer ranges exist in significant acreages in areas designated for prescriptions not conducive to managing for early seral habitats. The following management areas contain significant acres of summer deer hahitat that will require specific management designed to create forage areas.

Manaaement Area	Percent Area in Prescriptions 16 and #9
1) Porcupine Butte	38.5
21 McCloUd Flats	10.5
3) Mount Shasta	2.5
4) Trinity Alps	0

Management Area	Percent Area in Prescriptions #6 and #9
51 Yolla Bolly-Middle Eel	0
6) Parks-Eddy	7.6
7) Upper Trinity	17.9
8) Slate-Delta	26 2
9) McCloud River	1.3
10) Pit	2.0
111 Corral Bottom	11.8
12) Hayfork	26.3
13) Indian Valley-Rattlesnake	5.9
14) Wildwood	6.0
15) Beegum	31.5

Note - the above percentages were calculated using both Prescription 6 and 9 acreages. Prescription 9, riparian management, is considered beneficial to early seral specles including deer.

Each of the above management areas contain considerable Summer deer habitat. The prescriptions that appear to allow for the long-term management of early seral habitats with a young sbruh component (Prescription 6 and possibly 9) have been established on a relatively small portion of these units. It appears, however, that other management prescriptions, such as roaded recreation, may allow for the management of shrubs.

Deer summer range areas may or may not be located within management prescription areas that will allow for their maintenance and or enhancement. An example is the McCloud Flats Management Area, perhaps the largest summer deer complex in California. Many of the critical deer fawning areas in this management area are proposed for Manaaement Prescription 8 which limits the ability to specifically manage for the production of young shrub habitats.

Recommendation - ne recommend that the DPG and USFS develop a cooperative management plan that identifies critical summer fawning habitats on the STNF. Much of this can be done wlth existing data. Presently ongoing Landsat Imagery/GIS analysis can be used to help identify critical habitats. Data gaps can be filled with cooperative projects between the STNF and the DFG.

Following the critical habitat identification process, it is recommended that prescriptions in each management area having significant deer summer fawning habitats be modified, where necessary, to allow for the production and maintenance of strategically located foraging habitats, while providing for other necessary deer habitat components. The Cooperative

management plan would attempt to identify innovative ways to provide the necessary habitat components Without Significantly compromising the primary management direction.

This action is particularly important given that less early seral habitat will occur on public lands due to the increase in acreage reserved for timber management.

Issue - Fire and Fuels Manaaement.

Historically, fire has played a key role in the evolution of forest ecosystems and ultimately many of the forest plants and wildlife.

Martin and Sapsis (1991) assessed early fire regimes and conclude that fire occurred in diverse reg[illegible]l for continuum in environmental characteristics that [illegible]romot[illegible] di[illegible] biota. They further conclude that modern [illegible]ntrol[illegible]s attempted to remove fires from wildland; Instead the result has been a grass distortion in frre regimes removing most low and intermediate intensity fires and increasing the proportion of large fires, thus reducing "pyrodiversity" which in turn reduces biodiversity.

The paradox Of the STNF LMP is that its primary direction is toward "ecosystem management" and biodiversity while there appears to be no effective direction in the LMP to accommodate naturally occurring fires that will be necessary to maintain either the ecosystem or the desired diversity.

For example, the disposition of Issue #5, Fires and Fuels on page 2-2 of the LMP, indicates that standards and guidelines will emphasize utilization of activity fuels over prescribed burning Fuel treatments would emphasize biomass utilization and firewood availability In other words, the resolution to the issue appears to be one of fire prevention through the "management" of fuels rather than allowing fire to naturally reduce fuel loads, and thus promote biodiversity There is, however, no evidence that mechanical manipulation can effectively replace the powerful and important ecological effects of fire

Biomass utilization is described as providing a "benefit" by reducing the "loss" from wildfires and "increase wildlife and range browse". Preliminary studies of biomassed areas on adjacent forests indicate that shrub regeneration following thinning of dense conifer Stands is very limited and that in fact adequate wildlife Cover is lacking in biomassed areas and the probability of fire in these stands is likely to be greatly reduced, thus precluding shrub rejuvenation.

In the Management Direction section of the LMP on Page 4-4 under Fire and Fuels, direction proposes to: 10) return fire to its natural role in the ecosystem; and 11) achieve a balance of fire suppression capability and fuels management investments that are cost effective and able to meet resource objectives and protection responsibilities. Again, these may be conflicting directions. Fire's natural role was largely uncontrolled and unregulated. Direction number 11 above appears to attempt to prevent fires through suppression and fuels management.

Page 4-8, Table 4-2 predicts that 1,500 acres per year per decade will receive fire-related treatment and expected acres per year per decade of wildfires are 11,000 acres. Assuming 12,500 acres burned, approximately .006 percent of the 2.1 million-acre forest would burn per year. Martin and Sapsis (1991) used various fire history studies to estimate that prehistoric fires in California, excluding the southern desert, burned between 5.6 and 13 million acres per year, a rate as much as 2,200 times greater than predicted for the STNF during the next 50 years. While this rate is obviously not desirable under today's conditions, it points out the utter futility of a plan goal of 'restoring fire to its natural role in the ecosystem'. These authors also provided evidence that a broad diversity between fire periods allows for plants of widely different regeneration requirements to propagate. In contrast, regimes with a narrow range but long period between fires would tend to exclude those plants with a short life and short propagule endurance. Thus it would appear that the predicted fire regime for the STNF Cannot result in the maintenance of natural biodiversity.

Under standards and guidelines, Chapter 4, page 4-15, #8. a through g., all items provide for fire suppression and fire prevention through fuels management. These directions, while perhaps necessary. preclude "management of natural ecosystems" and "maintenance Of biodiversity"

The relatively low level of fire predicted to occur In the STNF over the next 50 years will not allow the "natural ecosystem" to function, nor can natural diversity be maintained. The need to protect the STNF lands from damaging fires is obvious, therefore creating the dilemma of how to manage on an ecosystem basis

Recommendation - Although this is a difficult issue to resolve, we are relatively Certain that the solution is not to try to "mimic" the role of fire With mechanical fuel management designed to prevent wildfire The complex and necessary processes of fire cannot be duplicated by simple mechanical clearing. Martin and Sapsis (1991) concede that we cannot return to natural fire regimes and that we need fire suppression now more than ever. The authors recommend a new policy on fire management that addressee the extent and role of fires In each vegetative type

followed by a plan and Strategy to meet that role. It makes no biological sense to have the same policy for all vegetative types. They recommend a combination of fuels management and aggressive prescribed fire with the long-term goal of more safely and frequently introducing prescribed fire into the routine management of the STNF systems.

The DFG Supports this concept and recommends that the STNF LMP significantly change its direction from attempting to eliminate the natural occurrence of fire by using fire and fuels management in combination to "prepare the forest for a more natural and beneficial fire regime". Without such an approach, we do not believe the goal of maintaining biodiversity can be achieved.

Issue - Range.

Standards and guidelines item 15c, page 4-19, states the "Management of forage resources for big game would take preference Over livestock use an designated elk and deer winter range."

Comment - Big game as well as other wildlife species should take preference over livestock on all federally owned lands Wildlife is part of the ecosystem, not a competitor. No Winter ranges have been designated in this plan.

Recommendation - Deer winter ranges, holding areas and summer ranges within management prescriptions 11, 111, VI and VIII should be mapped and special management prescriptions developed to provide protection for critical habitat components Within these areas

Using existing information, map deer and elk Winter ranges and holding areas. Manage hardwood and understory Components in these areas to provide for maximum forage potential for deer and elk. Hardwoods Within holding areas should be managed for 30 square feet basal area or more. Understory vegetation should be managed for maximum forage and adequate cover

Issue - Threatened, Endangered and Selected Sensitive Species.

Recommendation - The DFG recommends that the following additions and clarifications be included in the final LMP and EIS: (1) the list of representative species (page 3-23, Riparian Wildlife Assemblage) Should include the yellow-breasted chat, a California species of Special Concern. (2) The Hardwood Wildlife Assemblage list of representative species should include the gray squirrel. (3) The Chaparral Wildlife Assemblage list should include the blue-gray gnatcatcher, a Species of Special concern. (4) page 3-24, 2nd column, paragraph 5, some discussion of why the other sensitive species are not being addressed would be appropriate.

(5) page 4-1, site-specific projects, the last sentence should include the Statement "and with the California DFG where State-listed species are involved " (6) page 4-11, natural openings, this paragraph needs clarification with regard to what will be maintained. how long it will be maintained and the creation of new openings (7) page 4-12, sensitive and endemic plants, paragraph d, requires submission of Natural Diversity Data Base (NDDB) forma for sensitive plant occurrences. The Same wording Should be provided for sensitive animals as well. Conservation strategies Should be developed as per paragraph f for sensitive animals. (8) "Unnatural lass" (page 4-37. standards and guidelines, paragraph 8, Should be defined as it seems incongruous to call a loss from insects in a wilderness unnatural. (9) The responsible units for Cave Management Plans (page A-1, Appendix A) should include wildlife and the DFG to evaluate management effects on sensitive wildlife species such as bats and salamanders.

COMMENTS RELATING TO AQUATIC RESOURCES

Issue - Key watersheds.

Comment - The LMP implies only anadromous drainages can be considered key watersheds and recommends nine such areas but no resident fish waters. However, the President's DSEIS States such watersheds can also include resident fish species habitat, especially for stacks at risk (DSEIS, page 8-79).

Summer steelhead and spring chinook salmon will benefit from Management Prescription VII Which encompasses much of the New River and South Fork Trinity River drainage because timber management on very Steep or very unstable Slopes near these rivers will be substantially reduced Additional protection wlll be afforded these Streams under "key" watershed management proposals which include eliminating or stabilizing failing logging roads.

Recommendation - We suggest three key watersheds: (1) the Upper MCCloud River Drainage, including all tributaries, especially those containing redband trout. This is the only drainage containing Upper MCCloud River redband trout, a yet undescribed subspecies within the rainbow trout series (Oncharhynchus). This sensitive subspecies has become depleted and is considered worthy of listing by some researchers. Designation of this drainage as a Tier 1 key watershed would provide refugial conditions for this subspecies, facilitating population recovery and enhancement. (2) The Lower McCloud River Drainage The upper 10.5 miles of the Lower McCloud River is a State designated wild trout water. The Lower Mccloud at one time Supported California's only known population of bull trout, a State endangered species. Designation of this watershed as a Tier 1 key watershed would both protect the wild trout fishery and help recover the bull

trout. (3) Lower Squaw Valley creek. This stream is a major tributary of the Mccloud River and flows through the West Girard (formerly) Rare II area. Designation as a Tier II key watershed would protect the water quality of this important area. All three of these watersheds are within the boundaries Of the Mccloud River Coordinated Resource Management Plan (MRCRMP) process or objectives. Logging and road construction practice restrictions designated in the MRCRMP (LMP, Appendix N, page 26), especially as they apply to riparian zones, shall he Of a standard at least as protective as that found in the LMP (they presently are weaker).

This activity should be given priority over instream habitat improvement structures since the value of such structures to fisheries has been frequently negated by sedimentation from failing roads.

Issue - Late successional reserves

Comment - Option 9 provides a network of late successional reserves where only minimal watershed disturbance would be permitted on reserve lands.

Recommendation - Proposed reserves would a150 provide significant protection for the following· (1) McCloud River downstream from MCCloUd Reservoir, a blue ribbon wild trout and "catch and release" Water. (2) Hawkins Creek, a tributary to the McCloUd River providing an important source of cold, high-quality water and rainbow trout recruitment. (3) Squaw Valley Creek, the largest tributary to the Mccloud River and special regulation water. (4) The Pit River between Pit 4 Dam and Pit 4 Powerhouse. a trophy rainbow trout Stream and designated "catch and release" water.

Issue - Trinity River Basin salmonid Population

Comment - The statement regarding salmonid populations in the Trinity River Basin (page 3-9, Fisheries, paragraph 7) is misleading in that It gives the impression that salmon and steelhead populations in the Trinity River Basin are increasing when actually they are not

Recommendation - Modify this statement to accurately present the trend in salmonid populations in the Trinity River Basin.

Issue - Effect of Cantara incident on wild trout gene pool.

Comment - The wild trout gene pool of the Sacramento River was not completely eliminated by the Cantara incident (page 3-11, Fisheries, paragraph 1). That part of the wild trout population

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that existed upstream from the spill site was not affected hy the chemical. The progeny from these survivors are expected to repopulate the entire river over a period of years.

Recommendation - Modify this paragraph to reflect the fact that the progeny from trout not affected by the spill are expected to eventually repopulate the river.

Issue - Wild ana scenic rivers.

Comment - The DFG supports the recommendations included in the pref rred alternative for 62 miles of additional wild and scenic rivers.

Recommendation - Since existing wilderness designation already provides a high degree of protection, river reaches outside existing designated wilderness Should be given priority for designation.

Issue - State designated "wild Trout" and "Catch and Release" waters.

Comment - We were pleased with the proposal for Management Prescription VII IMP VII [threatened and endangered [T&E] and late seral stage management]) for lands along such prime trout fishing streams as the McCloud River below McCloud River Reservoir, its largest tributary, Squaw Valley Creek, and the Plt River between Pit 4 Dam and Pit 4 Powerhouse. The proposed designation will provide a high degree of watershed protection and maintain high visual quality levels for anglers and other recreationists using the waterways.

Recommendation - If boundary modifications should be proposed In the future for areas managed under MP VII, we urge that canyon slopes along the Pit River, McCloud River and Squaw Valley Creek be maintained in late successional forest reserve status.

Issue - Fish kills at Shasta Lake.

Comment - The Statement concerning fish kills at Shasta Lake (page 4-147, desired future condition, paragraph 3) and recovery of tributary streams from acid mine waste is not correct. While considerable progress has been made toward eliminating the problem, fish kills still occur in the West Squaw (Little Squaw) Creek inlet.

Recommendation - Modify this Statement to reflect that fish kills from acid mine waste is a current problem in the West Squaw Creek inlet.

EDITORIAL COMMENTS

Issue - Dolly Varden/Dolly Varden Trout.

Comment - The names "Dolly Varden" and "Dolly Varden Trout" (Appendix N, Pages 17, 19) should be changed to "bull trout".

Issue - Item 11. page 4-144

Comment - Item 11 appears to be a needless repetition of item 6.

COMMENTS ON THE DEIS

Issue - Fire and fuels.

Comment - Page 111-24 of the DEIS in the Botany Section indicates that about 20 percent of the sensitive plants on the STNF rely on wildfire or other disturbance for maintenance. There are undoubtedly numerous Other plants, not listed a5 Sensitive that also evolved under diverse fire regimes. While the DEIS indicates the need to manage sensitive plants to provide disturbance, where necessary, it does not adequately discuss the long-term consequences of near total fire suppression on biodiversity.

Page IV-17, Section 7 Fire and Fuels in the DEIS, describes effects of wildfire and fuels management. The section focuses on the effects of fire both positive and negative but does not discuss the more critical effects of long-term exclusion of fire from most of the STNF. Such effects are incredibly profound and have not adequately been dealt with either in the STNF LMP or the DEIS

Issue - State-listed species.

Comment - The willow flycatcher (page G-4, Table G-2 - birds) is a State-threatened species. The McCloud River redband trout (Table G-2 - fishes) is also a State-listed species.

Issue - Inland warmwater fish (page 111-37, paragraphs 1, 2).

comment - Alabama Spotted bass should also be mentioned Since they are now more important in the catch than smallmouth and largemouth bass combined. Spotted bass were introduced in the early 1980's and are believed to be a reason for the decline in smallmouth bass and they may also be affecting largemouth bass abundance as well.

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Issue - Habitat Improvement (page III-38, paragraph 4).

Comment - We agree that there is no evidence to indicate that installed structures are effective in increasing anadromous fish numbers. It is possible that this is because the structures only affect one element - cover, which is not as much a limiting factor to fish productivity as excessive sediment, which usually has long-term adverse impacts on the entire stream ecosystem, following watershed disturbances, such as logging and road building.

Issue - Bull trout (page 111-42. paragraph 3).

Comment - The bull trout disappeared from the MCCloud River soon after the construction of McCloud Dam. ThlS project resulted In reduced flows and consequently a significantly warmer temperature pattern than before. This environmental change may be the primary reason for the extinction of the bull trout. Under natural environmental conditions, bull trout coexisted with brown trout and squawfish and they existed for many years in the absence of chinook salmon.

Issue - Habitat improvements (page IV-19. paragraphs 6, 71.

Comment - We are concerned that there is a significant risk of damage to anadromous fish producing streams inherent in construction activities in and near streams. There have been Instances where well intentioned efforts to improve fish habitat actually resulted in negative impacts. Plans for artlflclal habitat improvement structures should be evaluated and developed in coordination with the DFG prior to implementation to avord potential adverse impacts to stream ecosystems.

Issue - Range (page IV-33, paragraph 6).

Comment - We are in agreement with the stated plan to phase out grazing in wilderness areas under the PRF and CBF alternatives but note that this plan is not mentioned in the Management Prescriptions or in the Management Area Directions of the STNF LMP.

Issue - Redband trout.

Comment - There is inconsistency between the Statement that the redband trout is categorized as sensitive (LMP, page 3-10) and is no longer classified as a sensitive fish species (DEIS, page III-80).

The subject table (Table V-10, page 3, 4-98) notes that redband trout in the McCloud River were not considered for special management because of "Insufficient information on ecology.' A considerable amount of data has been collected on Mccloud River redband trout ecology by the DFG.

Recommendation - Make categorization as a sensitive species consistent in both documents. The column headed by "limited distribution on Federal lands" (Table V-10) should be marked since most of the habitat occupied by these fish is privately owned.

MEMBERS,
Clancy Outra ..... Dist 1
Ivan Young ..... Dist 2
Roger Zwanziger ..... Dist 3
James Claridge ..... Dist 4
George Thackeray ..... Dist 5

Board of Supervisors
of
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CLERK
Lisa Chandler
Phone 916 842-8081

December 8, 1993

Mr. Steven Fitch, Forest Supervisor
Shasta-Trinity National Forest
2800 Washington Avenue
Reddlng, California 96001

Dear Mr. Fitch.

Subject, Draft Environmental Impact Statement and Land and Management Resource Plan for the Klamath National Forest/Shasta-Trinity National Forest

The County of Siskiyou, as a vitally affected agency and representative Of broad interests both throughout and adlacent to the National Forest, offers the following Comments on the above-referenced Draft Environmental Impact Statement and Land and Resource Management Plan

1 The Plan, consistent With option 9, requires 180 year rotations. As we have previously discussed, the county disagrees Wlth the proposed 180 year rotations Clearly, there are areas within the forests that 180 year rotations are neither necessary nor desirable Further, it appears this 180 year rotation applies regardless of species or stand condition. It is believed the biologic, hydrologic and geographic data should be the driving forces in setting rotations

2 Treatments within late seral reserves are limited to stands less than 80 years in age. This absolute limit is counter-productive for a number of reasons

a. Not all designated stands are of high sight condition. Remedial work within designated stands would enhance the development of old growth characteristics.

b. Due to the poor condition of many of the designated stands, these areas are at risk for catastrophic fires.

c. By allowing some treatments appropriate for old growth

characteristic development, there will be additional funding available to support local communities. Other forest programs which would support bio-diversity and appropriate ecosystem management could also be funded.

Recommendation. The plan should add language which would allow upon demonstration of complying With specific criteria the habitat improvement Within stands in excess of 80 years of age.

3. The County has previously recognized the need of fire as a manaaement tool and has commented about the lack of recognition of fire in the option 9 directive If the use of fire is allowed at the forest level in conjunction With the Option 9 directives, no further action is necessary. However, if there is any doubt, language should be added to this forest plan Which clarifies the ability to use fire as an appropriate management tool.

4. The use of adaptive management areas (AMA) is an example how flexible management can provide for new and different solutions to old problems. This willingness to provide for creative management Should be extended to all areas of the forest, Including the riparian reserves to allow true problem solving and increased forest productivity.

5. There appears to be an outstanding question of adequacy of funding in order to accomplish even the broad goals as set forth in these plans If forest revenues continue at their depressed level, it is questionable whether the funding necessary to implement these plans will be available. clearly, there must be an economic commitment to the management of these lands consistent with these plans or the planning effort will never be implemented.

In closing, we would like to restate our belief that our forests are dynamic resources, which must be subject to dynamic management. Inflexible planning and management practices Create undesirable results. As a dynamic resource, we must manage the forest within the forests' capacity to accomplish the end results desired without becoming enslaved by a regulatory process.

Your consideration of our concerns is respectfully requested.

Yours truly,
Siskiyou County Board of Supervisors

Ivan Young, Chairman

Board of Supervisors
COUNTY OF TEHAMA

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District 2 - Shirley M Mareth
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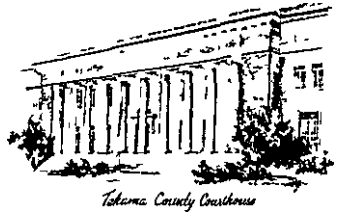
District 4 - JoAnn Landingham
District 5 - Kathleen Rowen



Richard Robinson
Administrative Assistant
to the Board of Supervisors

January 4, 1994

Mr Steve Fitch, Forest Supervisor
Shasta-Trinity National Forests
2400 Washington Avenue
Redding, CA 96001

RE: Draft Environmental Impact Statement (DEIS)
Land and Resource management Plan.
Shasta-Trinity National Forests 1993

Dear Mr Fitch

We appreciate the time your staff members, Mr Steve Clauson and Mr Robert Ramirez, have spent with the Tehama County Board of Supervisors in delivering the DEIS documents and for their enlightening presentation. Thank you for this opportunity to respond.

Clearly, the management plans far national forests in Northern California must be consistent with, and even reflective of, President Clinton's Option 9 (or Alternative 9) plan, released in July of 1993 for purposes of habitat management in old growth forests Key components include ecosystem management approach to forest plan implementation, protection and enhancement of late-successional vegetation and old growth reserves, protection of riparian areas. maintenance and enhancement of habitats for threatened, endangered and sensitive species. overall Scenic quality. and land allocations to prohibit or severely reduce harvest and timing

The Hay Preferred Alternative (Hay 93PRF) approximates some modifications to Option 9 which are highly necessary to demonstrate to this body thnr there is a true recognition and appreciation of Northern California's diverse forest ecosystem as being very different from those of the Pacific Northwest The centralized oversight proposed in the overlay of Option 9 presents a rigid and inflexible standard for management in Chat categorical policies and practices based upon Washington and Oregon's old growth forests and habitat cannot be imposed upon Northern California forests and bioregions This presents a serious conflict with desired practices of adaptive management, which this body supports

Adaptive management practices are based on current societal and scientific information, centrally recognize the role of people and economies in ecosystems, and create a viable model for federal. state. and local agencies to work together to determine successful plans of action The goals of old growth restoration. riparian management and protection, vegetation management, and watershed analysis and management are fine and honorable if (and only if) they are accurately diagnostic, appropriately prescriptive, socially acceptable in local society, and effective

We would very much prefer that the DEIS would state criteria, desired outcomes, and measurable management goals for the purpose of partnership with local agencies and "sensus-based working groups to ensure the success of the management plan and a

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responsiveness to local environments and economies Although the prospect may present bureaucratic difficulties, which we appreciate, true adaptive management will reduce risks and allow for the correction of errors through an active and continuing cycle of planning. implementation, monitoring. and adjustment Local data and participation are essential The rigidity and inflexibility of centralized agency management is clearly problematic in these times Witness the confusion, frustration, and negative response of local entities included in the broad-brush prescriptives of Option 9, given the great variations in bioregions from the Pacific Northwest to the four Northern California forests. We would strongly support a decentralization of management agencies and the implementation of provincial management processes and the inclusion of local data inventories, based on Scientifically sound and uniform nerhodology. allowing information and appropriate prescriptions for future biological and landscape management to be accessed and exchanged between resource management agencies A trunk cable line extension from Sacramento to the affected Northern California forest areas would greatly improve our collaborative capabilities.

We wish to register a negative response to the following specific elements of Option 9 precedence over any DEIS alternatives, again supporting the need for more localized and realistic management alternatives.

---Singular riparian standards for reserves (buffers), inconsistent with the dramatic differences in each watershed,

---Singular standards far treatments within late seral reserves, regardless of sites or conditions:

---*Severe* restrictions in land allocations which prevent adaptive management techniques, monitoring, and any resource usage of 85% of foresr lands, absent evidence of scientific analysis for this formula,

---Potential for unmanageable forest fires due to "hands-off" management policy for California stands. Closure of access roads and lack of fuel breaks should be addressed,

---Baseline data relating to economic and societal impacts do not address long-term and cumulative effects of timber management decisions,

---Implementation of 180 year rotation age for tree harvest, rather than the Hay 93 PRF recommended 70-160 year rotation directly conflicts with sound resource management with no apparent justification,

---Loss in harvest levels resulting in loss of direct and indirect timber jobs. loss in timber receipts and revenue to schools and local governments, related loss in sales tax revenue, and increased public costs associated with increased public assistance, economic recovery initiatives, and demand for job retraining must be recognized as seriously impacting local economies. and therefore considered in management decisions.

We members of the Tehama County Board of Supervisors look forward to working together with your agency to enhance the future of resources, biodiversity, and economic recovery in Northern California We recognize the need for greater public interest, education, and involvement by citizens within this county to achieve true adaptive management strategies, and we are willing to lead in that effort

We perceive much of the spirit of President Clinton's Option 9 plan, as well as the spirit

of the May 93 PRF. to be cooperation between federal, state, and local agencies and working groups Lo achieve our resource goals. We are hopeful these comments will be considered in your decisions, and that local data and expertise will be fully utilized as we move forward into final documents and implementation

Respectfully submitted,

JoAnn Landingham

JoAnn Landingham
Chairman

/bgm

cc: Hon Vic Fazio
Secretary of the Interior Bruce Babbitt
Shasta Tehama Bioregional Council
Tehama County Planning Department
Tehama County Farm Bureau
Tehama County Cattleman's Association

TRINITY COUNTY
BOARD OF SUPERVISORS
P O Drawer 1258 (916) 623 1217
WEAVERVILLE. CALIFORNIA 96093
Barbara M Rhodes, Clerk
Donald E Benedetti, Administrative Officer

December 22. 1993

Mr Steven Fitch. Forest Supervisor
Shasta-Trinity National Forest
2400 Washington Ave
Redding, CA 96001

Re. Comments on Draft Land Management Plan

Dear Steven.

At our regular meeting of December 21. 1993, the Trinity County Beard of Supervisors agreed that re are unable to submit any meaningful Comments on the draft plane when eo much depends on the implementation of Option 9 and particularly the management parameters for the AMA's

We are. obviously. greatly concerned about how these LMP's will ultimately affect the management activities of the USFS in the forests Of Trinity County. however. at this time Ye ere not interested in holding up the process. We are well aware Of the long arduous process involved in getting a forest plan adopted and all of the problems presented when there is no plan in place

We would request that Trinity County be notified when any amendments or modifications of the draft plene are made as the details of Option 9 become more clear. and would retain our right to comment on these amendments or any pert of the plan as appropriate end necessary

Thank you for the opportunity to comment and please keep us informed as the process slowly moves forward.

Sincerely.

TRINITY COUNTY BOARD OF SUPERVISORS

By Matthew Leffler
Matthew Leffler, Chairman

OFF-HIGHWRY MOTOR VEHICLE RECREATION
(916) 653-8244

A DIVISION OF DEPARTMENT OF PARKS AND RECREATION

JAN 6 1994

Mr Steve Fitch, Forest Supervisor
Shasta-Trinity National Forest
2400 Washington Avenue
Willows, California 95988

Dear Mr Fitch

Comments on the Shasta-Trinity National Forest Draft Land Management Plan and EIS

Road access and motorized trail access needs to be given key consideration in the implementation of the plan The economic benefit of recreational access needs to viewed as an asset, particularly in the light of the trend to reduced resource based economic activities such as timber harvesting, domestic livestock grazing, and mining The indication in the plan that roads will be closed if they are not fulfilling their anginal intended purpose is unacceptable in this context, because it means timber and mining mads could no longer be used for hunting. fishing, wilderness trail heads. viewing scenery, four-wheeling etc ,etc The plan points to an economic plan, and preserving and maintaining existing recreational access routes is a key to any such plan

Roads and motorized trails should only be closed if there is a well-justified reason to do so, not for the mere sake of closing roads Priority should be given to closing mads where significant unmitigatable environmental impacts are occurring Roads that are not well used but are in little conflict with environmental values should be a low priority for closure In some eases a road or motorized trail may be of great recreational significance, while at the same time be in conflict to a significant degree to some resource value In these instances it may require a higher level of mitigation, but resource conflicts should not automatically be resolved by closing the road

Continued public involvement and informing the public before a decision is made to close any established route of travel is a necessity The final plan should explicitly provide for this need

Finally, it is difficult to comment on this draft plan and Environmental Impact Statement (EIS). because it so subject to change based on the Final President's Plan It cannot be said this draft plan and EIS contains sufficient information to adequately define the preferred alternative The Final President's Plan by admission would become the preferred alternative, thus the true preferred alternative has not yet been presented to the public for comment as required under current law, policy. regulation. and practice

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Thank you for the opportunity to comment on your plan. and please contact Lowell Landowski at (916) 653-9596 if you have any questions about these comments

Sincerely,

Gerald I Johns n
Acting Deputy Director
Off-Highway Motor Vehicle Recreation

GPO 683-09 9/11022