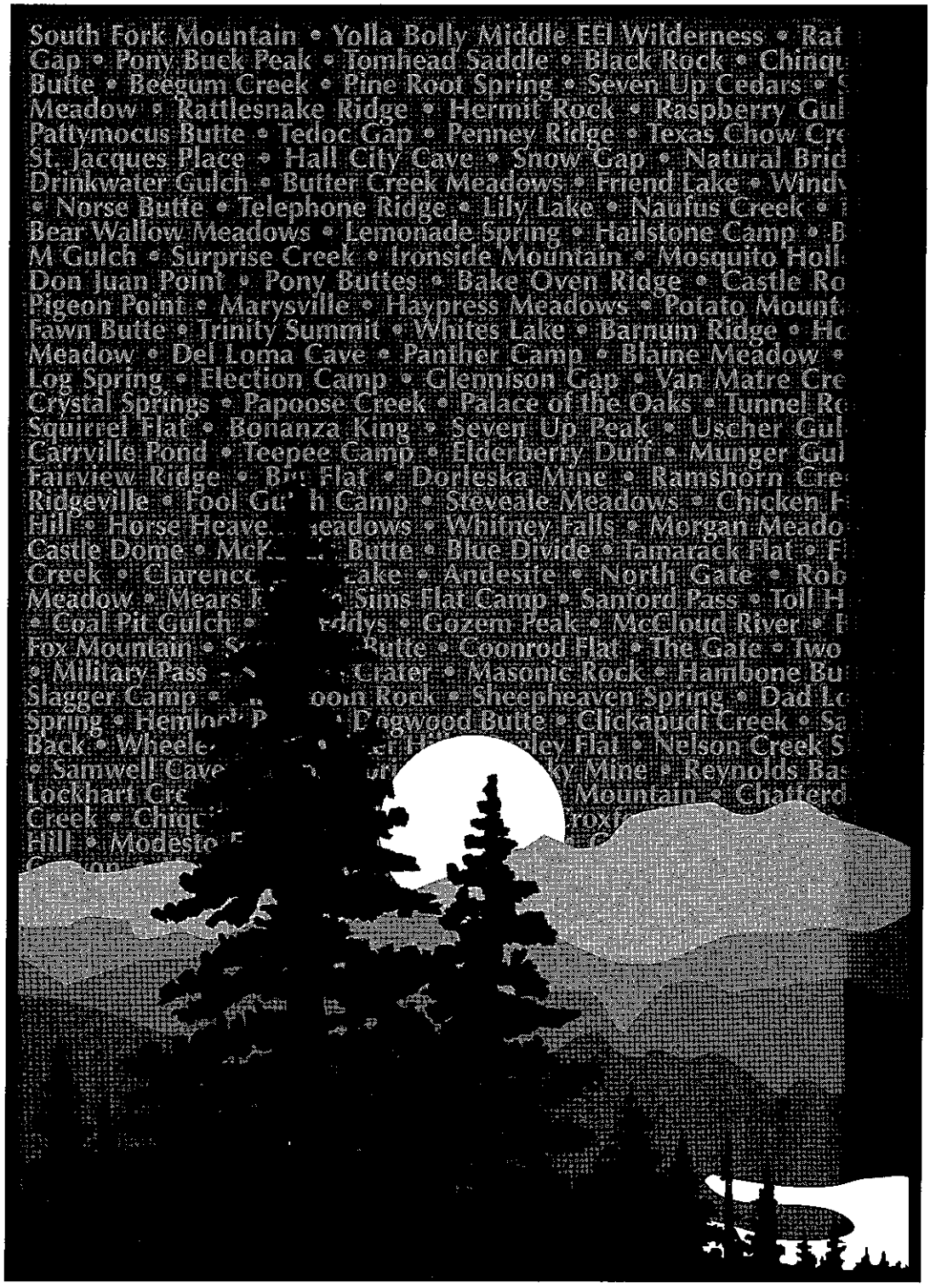
United States Department of Agriculture

Forest Service

Pacific Southwest Region

Final Environmental Impact Statement

Land and Resource Management Plan



FINAL EXTRA COPY

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) c cuments e resu of an analysis c 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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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 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 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 (I50 feet on each side) along permanently flowing non-fish-bearing streams, within I50 feet along constructed ponds and reservoirs, wetlands greater than I acre and wthin 300 feet of lakes and natural ponds, and wthin an average width of 200 feet (I00 feet on each side) along seasonally flowing streams, wetlands less than I 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 activtues 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 (I 00 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 Communty 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-Trinnity National Recreation Area, on Mt Shasta, in the McCloud River area, wthin the proposed Trinnity 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 population centers within the 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 sensitivrty 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 6,5I7 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 Ist 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 Ist 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 habltatwill 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 managementwill be applied on 502,800 acres and minimaltimber harveston 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 ofthe total acres harvested This alternative ranks second in percent of acres clearcut.

Visual Quality Management activties are constrained to such a small portion ofthe 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 faircondrtion, 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 managementwill be applied on 372,700 acres and minimaltimber 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 clearcuttingwill 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 Managementactivities are constrained to such a small portion of the landbase that there is essentially no dfierence between alternatives Visual quality will improve significantly under all alternatives

Wild and Scenic Rivers A total of 1166 miles will be recommended for designation as follows

Wild segments	568 miles
Scenic segments	251 miles
Recreation segments	347 miles

This altemative 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 altematives 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)

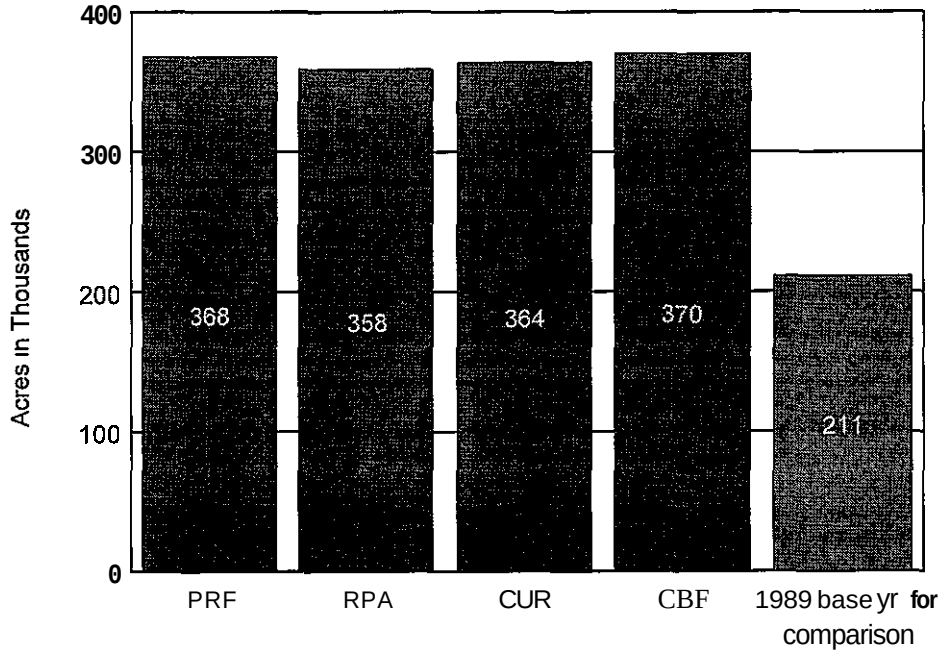


Figure S-2
Water Quality
(Watershed Condition Classes)
(5th Decade - Year 2040)

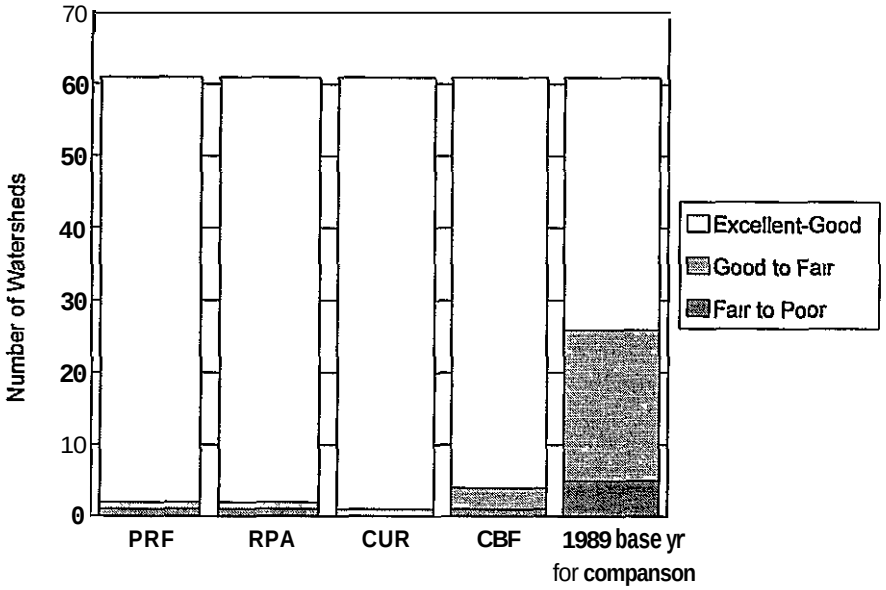


Figure S-3
Community Stability
(County Receipts)
(Average Annual for 1st Decade)

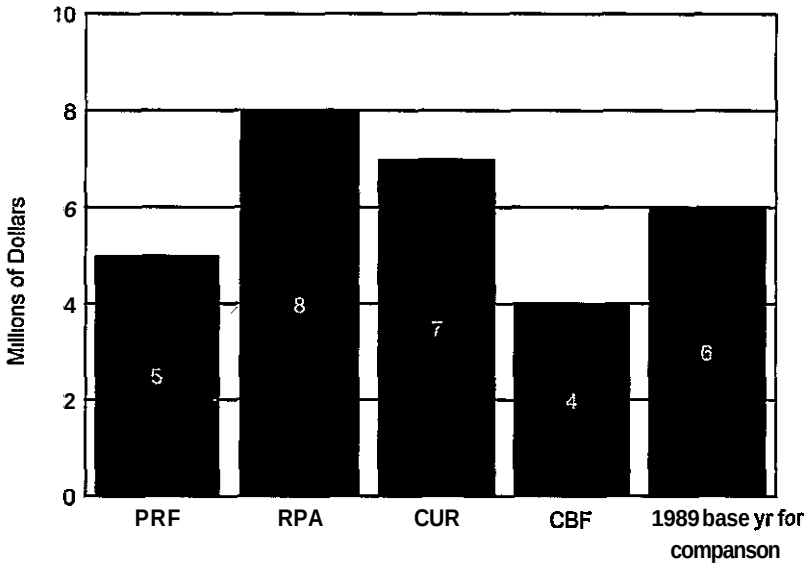


Figure S-4
Community Stability
(Employment)
(Average Annual for Ist Decade)

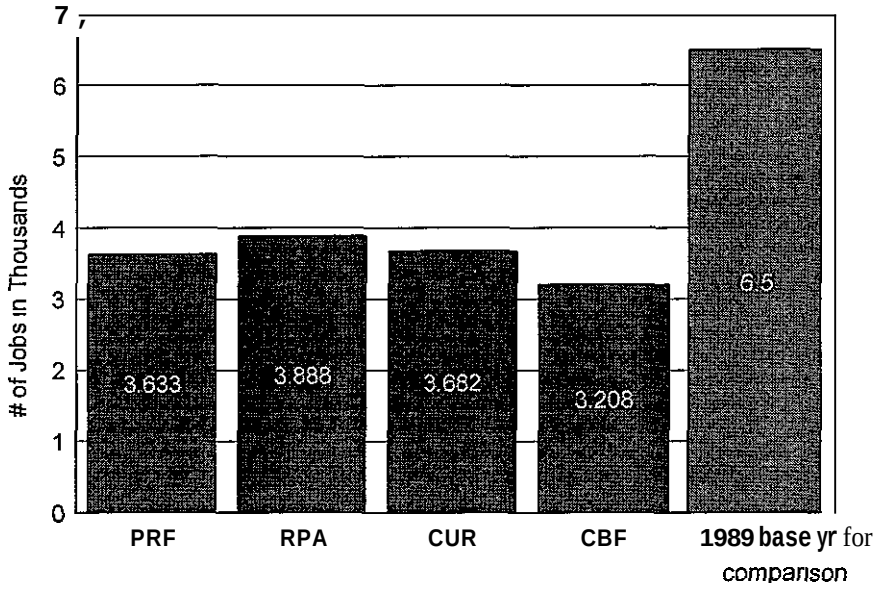


Figure S-5
Timber Harvest level
(Average Annual for the Ist Decade)

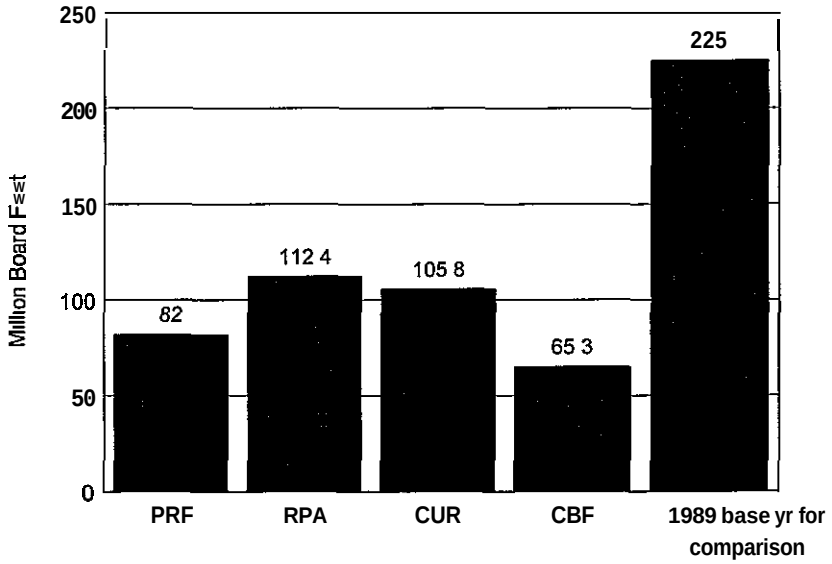


Figure S-6
Timber Harvest level
(Suitable land Base by Timber Intensity)

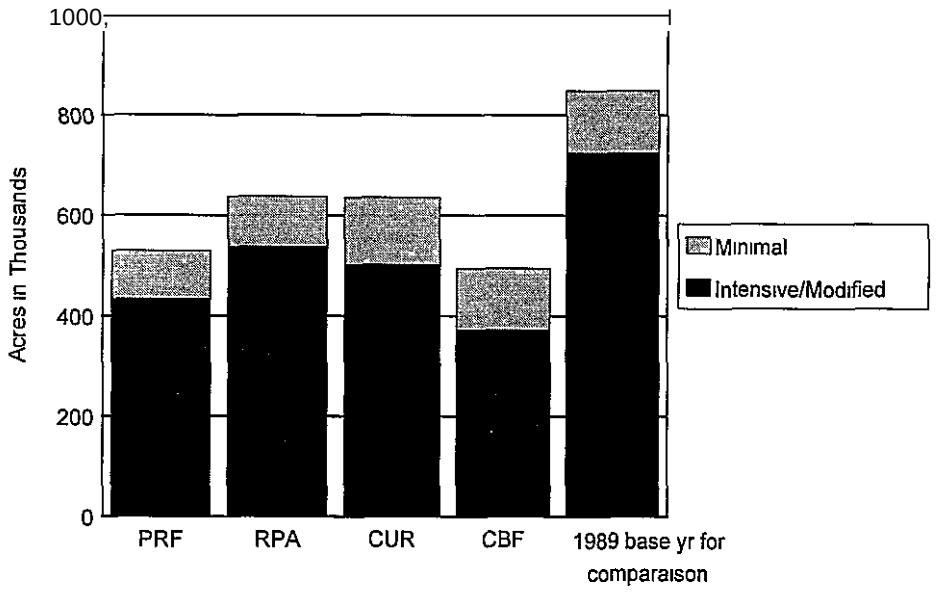


Figure S-7
Clearcutting (Acres Harvested)
(Ist Decade - Ten Years from Present)

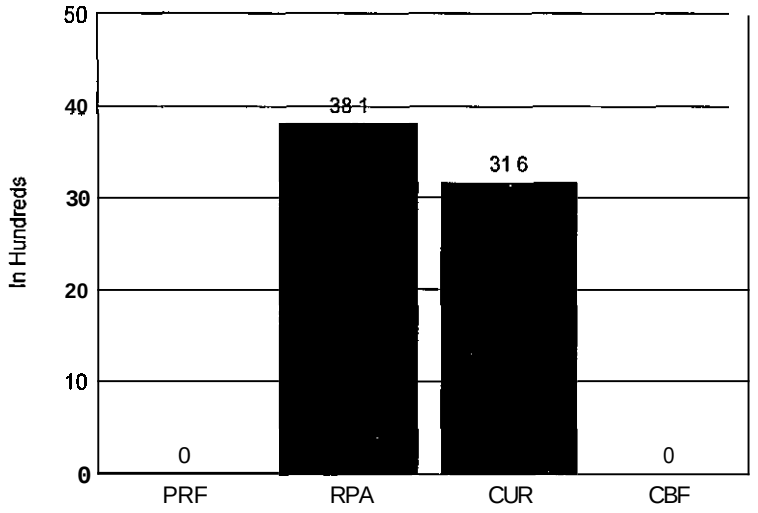


Figure S-8
Wild and Scenic Rivers
(Rivers Re commended for Designation)

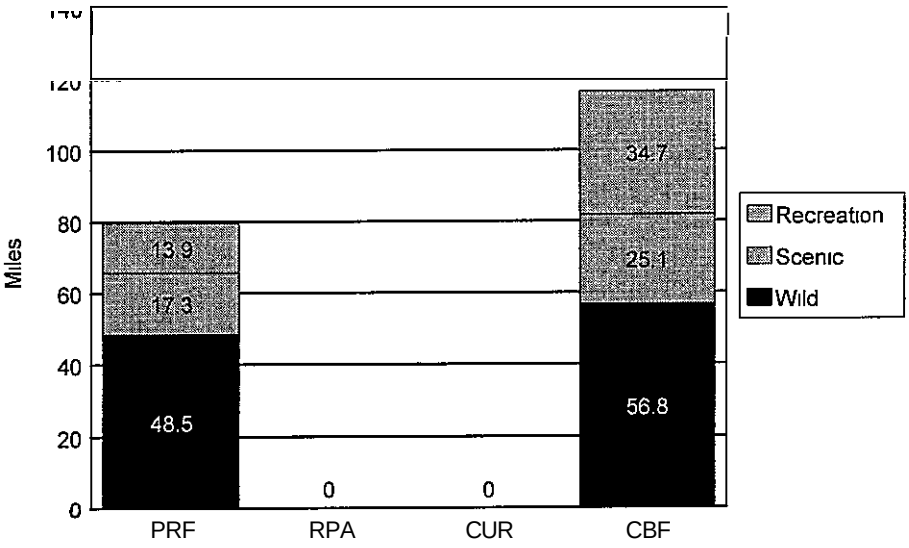
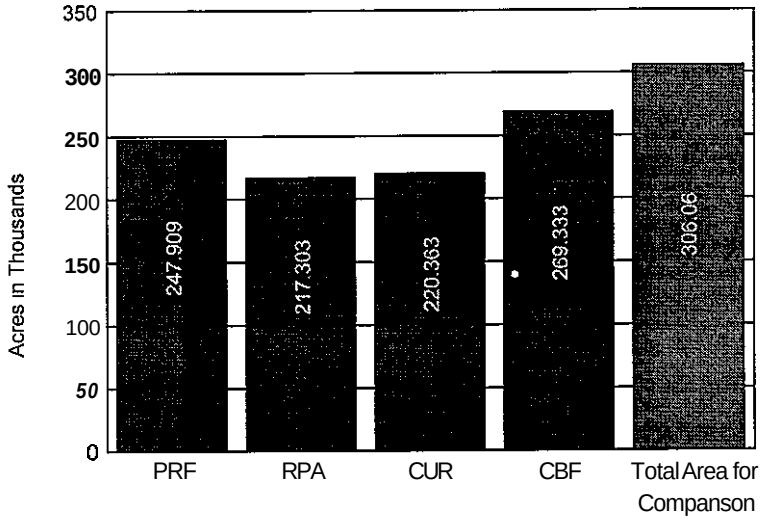


Figure S-9
Roadless Areas
(Released Roadless Areas to Remain Undeveloped)



Chapter

Purpose and Need

Chapter Contents

Chapter I - Purpose and Need

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, I990 A 120-day comment penod was provided During the public comment penod, the northern spotted owl was listed (on June 22, I990), as "threatened" throughout its range, which includes the Shasta-Tnnity National Forests This listing was under-taken by the USDI Fish and Wildlife Service (F&WS) in accordance with the Endangered Species Act of I973, as amended Subsequently, on September 30, 1990, exist-ing 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 (I) 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 is-suance of the Shasta-Trinity National Forests' I990 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 es-tablishment of habitat conservation areas (HCAs) which were not (and could not be) addressed by the I990 documents. Therefore, those documents were withdrawn

In October of I993 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 Sup-plemental EIS for the Late Successional Related Species within the range of the northern Spotted Owl) was released in July, I993 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 I3, I993

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 ap-proach 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 Scien-tific 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 I974 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 I974 (RPA) RPA was amended by the National Forest Management Act of I976 (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

I 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

I 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 suitability 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

I 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

I 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

I 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 specific to smaller scale analysis. Similarly, the Forest Plan is tiered to the Pacific 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

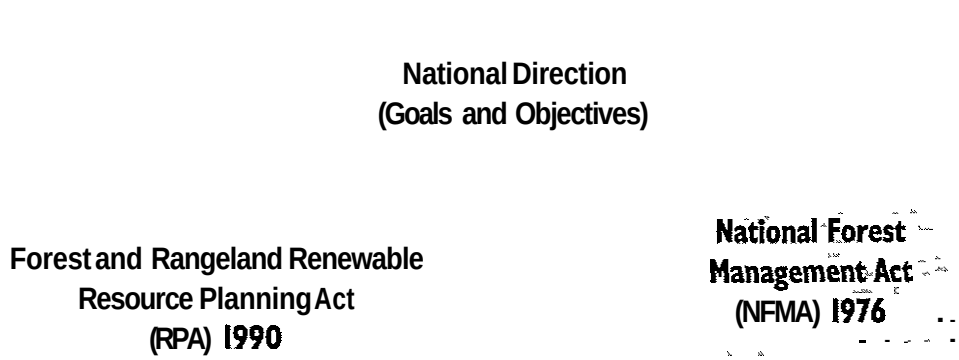
I I monitoring and evaluation

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



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 altematives.

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.

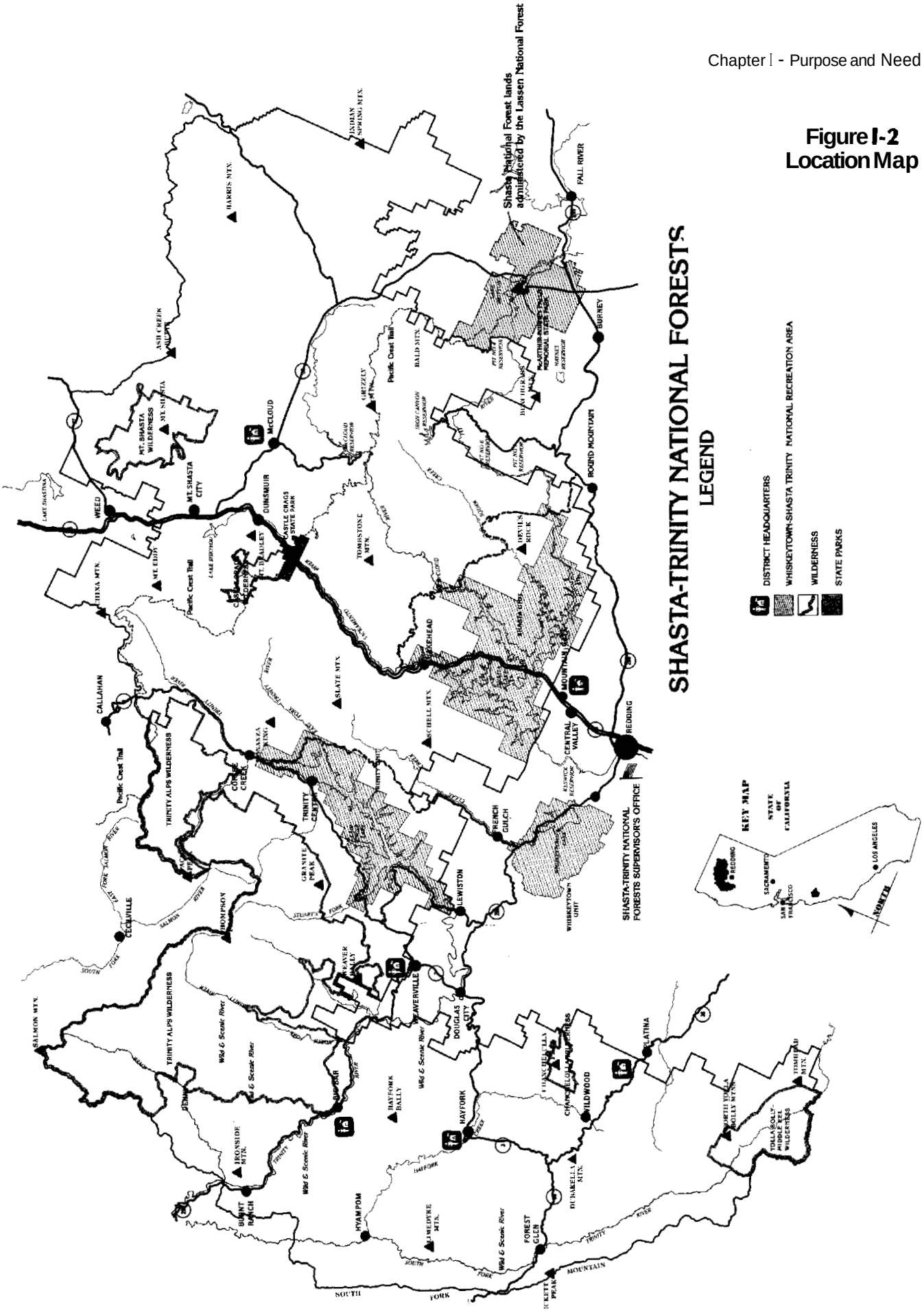


Figure I-2
Location Map

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 biodiversrty (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 bumingbe used as a way to reduce fuel hazards, prepare sites for reforestation, and improve wildlife habitat?

'rescribed buming 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-** Howshould liwstockgrazing be managedto 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, oster public use and enjoyment of areas wth scenic, iistorical, 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 I98 I 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 years. 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 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 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

Chapter Contents

Chapter II - Alternatives Including the Preferred Alternative

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 I2 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 necessarily 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 I0 MMBF per year in the Ist decade for timber outputs but timber outputs would reduce to 3 I9 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 1990 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 neasurably 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 (I) 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 with 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 1st decade, which equates to a decrease of 78 percent from FLW in the 1st 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-I** reflect the habtat capabilrty, 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 Ist 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 Ist 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 Ist 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 Ist 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 suitable 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 a comparison 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 benefit 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**	**H20**	**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
- H20 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 (MFUDs)									
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 (MAMs)									
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 (MRVDs)									
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) 256									
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-1
(Continued)

Activity / Resource	BENCHMARK* 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-1
(Continued)

Activity / Resource	BENCHMARK* FLW	H2O	MKV	MLV	MMR	RGN	TBD	TBR	WLN
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

	ALTERNATIVE				
Activity /Resource	**CEE**	**CEF**	**PFO**	**LBU**	**12c**
Economics					
Present Net value (PNV) MM$ - 150 years	8,777	8.691	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	691	691	691	691	691
Decade 2	691	691	691	691	691
Decade 3	691	691	691	691	691
Decade 4	691	691	691	691	691
Decade 5	691	691	691	691	691
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 112
(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}	228	224	162	112	103
Million Board Feet {MMBF}	1520	1494	1081	747	687
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 (1 989) 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

(1) **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-Tnnrty 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 greaterthan 24 inches dbh and greater than 20 feet high

(4) **Diversity of Plant and Animal Communities.** Diver*sity* 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 MlRs 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 quallty 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 lrttle 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 flexibiltty), 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 modlfied 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 conifer 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 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 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 addition to MMRs and MIRs These requirements are not applied to benchmarks or the Constrained Economic Efficiency (CEE) Alternative FMRs are applied to all other alternatives and include the following

(1) **Whiskeytown-Shasta-Trinity National Recreation Area (NRA).** The Shasta and Trinity 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 quality 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 quality

(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 prescription 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 **14** 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 quality and fisheries habitat

Forest Standards and Guidelines (Common to All Alternatives)

More than **200** Forest-wide Standards and Guidelines (S&Gs) are detailed in Chapter **4** of the Draft Forest Plan that was issued with the Draft Environmental Impact Statement These Standards and Guidelines apply to alternatives RPA, CUR, and CBF Standards and Guidelines for alternative PRF are found in Chapter 4 of the accompanying Final Forest Plan Management direction is presented for each of the resources, support functions, and areas of special concern on the Shasta-Trinity National Forests. The S&Gs provide the resource protection measures that will be used when implementing project activities Used in conjunction with the management practices for each Management Prescription (described later), they provide the means to mitigate or minimize adverse 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

Specal 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

Riparian 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 Prescriptions is their associated standards and guidelines. A complete listing and more definitive descriptions of prescriptions 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 prescriptions Wherever this occurs, the most restrictive prescriptions, as to the type of management activities that may take place, prevail For example, a Research Natural Area (Prescription 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 prescriptions 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

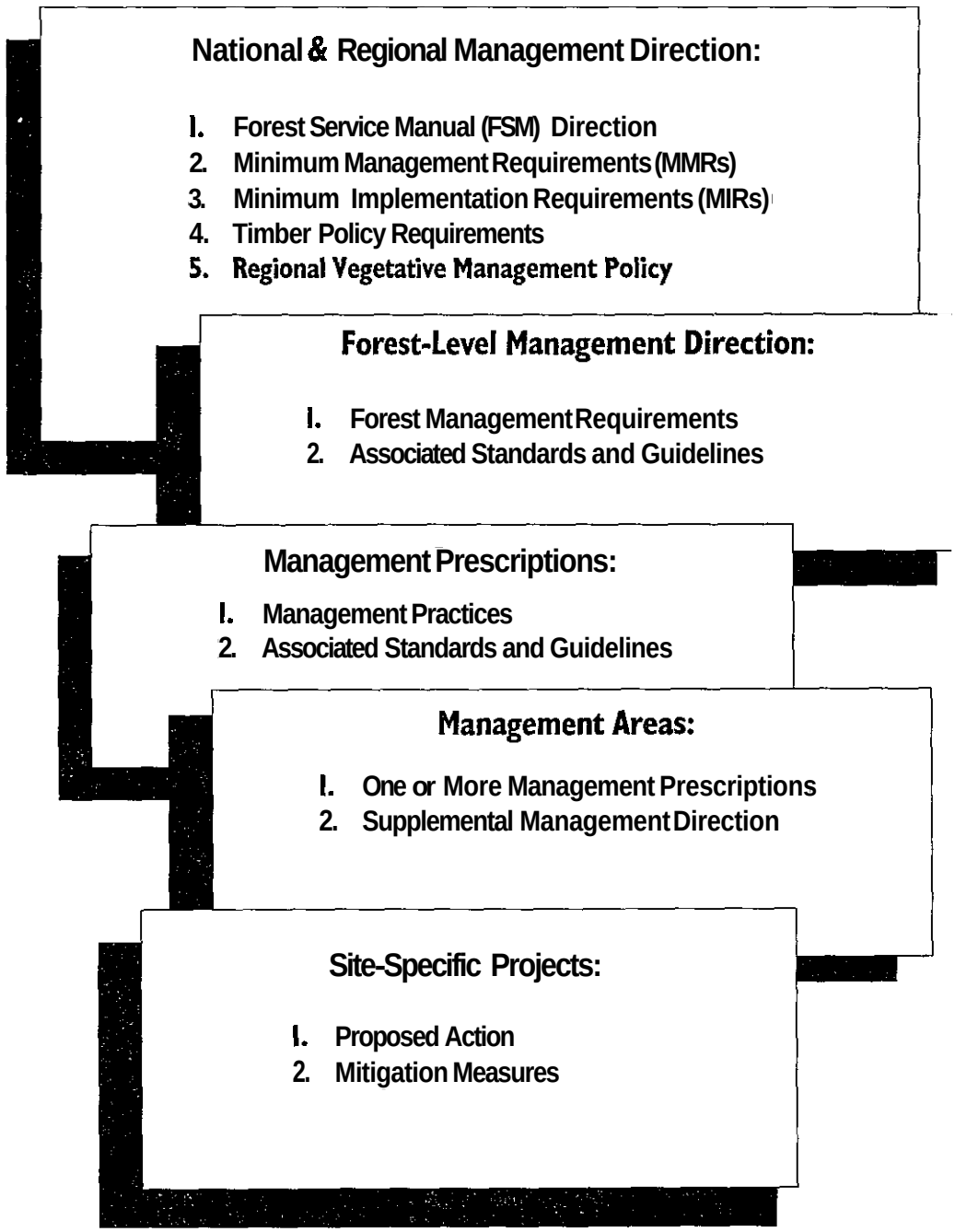


Table II-3
Summary of Management Prescriptions for the Shasta-Trinity National Forests

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 1364 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 opportunities 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 ofwood fiber products from producbve forest lands Iimber 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 I 40 years and averaging about I I0 years, depending on site and species Vegetative manipulabon would provlde habitat for those wIdlfe 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 Tnnity 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 limtted 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 natural ROS activities Trails Construct/maintain in harmony with roaded natural 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 restricted, prospecting access could be restricted	Mineral activity not affected, timely reclamation emphasized, in national recreation areas, no new locations are permitted 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
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 Natural (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 Qualty 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 prescripon 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 wildltfe 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 matenal to meet wildltfe needs
Minerals	Mineral activity not affected, timely reclamation emphasized	Locatable mineral activity prohibited subject to valid existing nghts. mineral matenal 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 mantenance of wilderness characterisbcs	Establish proper use standards for livestock consistent with wildltfe needs, give preference to wildltfe in major conflict areas
Recreation. Off-Highway Vehicles (OHV)	Open to OHV use on designated trails and areas rated suttable for OHV use Use restncted in major recreabon and wildlfe areas	Closed to OHV use, except for emergency purposes	Open to OHV use on designated trails and areas rated suttable for OHV use Use restncted in major recreation and wildlfe areas
Recreation: Rec Opportunity Spectrum (ROS)	Rural (R)	Primitive (P). SPNM	Roaded Natural (RN)
Timber	No harvest, removal limited to dead, dying or high nsk trees	No harvest	Pnmanly modlfied management, uneven-aged and/or minimal manaeement
Visual Quality	Management activities around developed recreation stes will meet retenbon (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 nvers if located within wilderness	Not applicable
Wildlife	Manage existing management indicator species (MIS) habttats to prowde for species which are tolerable to high human activity or disturbance–facton	Allow animal and plant populations to cycle naturally w th little active management by humans	Manage to enhance habttats 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. ot 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 ripanan 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. RN 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 npanan 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 nver comdors
Wildlife	Manage T&E species to achieve recovery goals, manage sensitive species to prevent listing	Mai iab 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 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 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 'rogram, increased interpretation and enhancement of Prescription XI (Heritage Resources Management) areas vill 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-owned facilrties **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 burned 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 redband 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 facility 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 availability 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 activities 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 Informationfrom 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 rnitial ecosystem management prionty 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 I percent ofthe sultable acres beingtreated inthe Ist decade About 6 6 percent ofthe sultable acres will be regenerated inthe 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 n 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 specrfic 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 benefit 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 1	2	3	4	5
Economics							
Total Budget (MM$)	40		41 8	44 I	45 6	47 2	49 7
Total Cost (MM$)	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	I		I	I	I	I	I
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
limber-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 I	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	45 I	451	451	45 I
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)	69 I	457	69 I	69 I	69 I	69 I	69 I
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	5 3
Wilderness (MM RVDs)	13		0 14	0 16	0 19	0 22	0 25
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 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 II-6
(Continued)

Resource Element	'Base 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							
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
OHV = Off-Highway Vehicle
RVDs = Recreation Visitor Days
TE&S = Threatened, Endangered & Sensitive
WUDs = Wildlife User Days
MMBF = Million Board Feet
AMs = Animal Months
MMCF = Million Cubic Feet

	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 productivty

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 Northern 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 infavorofagency-ownedfacilities **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 oftheir 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 ofthe 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 ofcost-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 reducedt o 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 improvementwilloccurforanadromousfish inthe 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 1, 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 1 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 1 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) Iilted 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 1124 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 modrfied 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 Regenera-:ion 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 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
Intensity Class 3	774		330	330	330	330	330
Intensity Class4	850	-	451	451	451	451	451
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	1947	1,947	1,947	1,947	1,947
Anadromous Fish							
Commercial (M Pounds)	691	457	691	691	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'* I	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		169	169	169	177	186
Allowable Sale Quantity (MMBF)	184		1124	1124	1124	1180	1239
Long Term Sustained Yield (MMCF)			205	205	205	205	205
Long Term Sustained Meld (MMBF)			1367	1367	1367	1367	1367
Reforestation (Acres)	9.400		4.700	4,700	4,700	4,700	4.700
Iimber 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** 1	DECADE 1	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. I	128. I	128 I	128 I
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 (MWUDs)							
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 Wilderness.

** 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 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 altemative 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. Altemative 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** N o 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-I0** 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 I20 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 Trnnrty 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 (greaterthan 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** 1	DECADE 1	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 1	58 1	58 7	61 6
Facilities							
Transportation							
Trail Construction/Reconstruction (miles)	0/1		2/2	2/2	2/2	2/2	2R
Road Construction (miles)	63		23	11	11	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	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							
Fire and Fuels							
Total Fuel Treatment (acres)	6,300		7,080	7,140	7.160	7.180	7.180
Fire-Related Treatment	1,500		1,500	1,500	1.500	1,500	1,500
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			15,000	15,000	15,000	15.000	15,000
Intensty Class 1	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	1,350		7,260	7,260	7,260	7,260	7,260
Fish							
Inland Fish Other Than T&E							
(M Pounds)	1,424	1,794	1,557	1557	1,639	1,734	1,734
Anadromous Fish							
Commercial (M Pounds)	69 1	457	69 1	69 1	69 1	69 1	69 1
Sport (M Pounds)	163	142	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		159	159	159	16.7	17.5
Allowable Sale Quantity (MMBF)	184		1058	105.8	f058	111	116 6
Long Term Sustained Yield (MMCFJ	-		191	191	191	t9 1	191
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	Base Year** 1989	'90 RPA Goals**	DECADE 1	2	3	4	5
Timber (Continued)							
Wood Products Other Than Sawtumber							
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	72	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 it Id

Abbreviated Terms and Meanings for this Table

M=Thousand MM=Million MMBF=Million Board Feet MCF=Million Cubic Feet
OHV = Off-Highway Vehicle AM = Annual Month
RVDs = Recreation Visitor Days
TE&S = Threatened, Endangered & Sensitive
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 buming 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 Forexample, aredfirgrowing 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 ortogether. 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 Signrficant 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 for trail 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 Flammabilrty 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 with 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 with the protection of other resource uses

Fifty percent of the dispersed recreation sites 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 productivity 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 with 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 inner gorges (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 addtion, 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 sites, 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 dioritic 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:** (I) 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- I 1-40 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:** (I) *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 burns on steep grounds. (2) Eliminate burns in riparian management areas.
	Livestock grazing: Include temporary and permanent exclusion from riparian 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 II-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 (i e ,Wildernesses and 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 Trinrty 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 carned 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 prescriptionthan in other areas ofthe 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 ofthese 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 diametertrees 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 ofthe 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 a threatened 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 wildernesses, 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 designation.

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

On the remaining areas of the Forests, forest management activities will be evident. 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 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, with less habitat 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'.	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 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
Intensity Class 3	774		330	330	330	330	330
Intensity Class 4	850		451	451	451	451	451
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	1,713	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 quality 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	Specal 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

land 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 wlthin 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 argely dependent upon the number of acres harvested Therefore, Alternatives RPA and CUR, with high harvest evels, 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 dative 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, prescribed burning and fuelbreak maintenance and construction, and wildfire activities, such as presuppression planning and direct suppression actions Fuels

Table 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 heritage resource areas within wilderness

** Acreage includes both suitable and unsuitable timber lands

*** All riparian areas would be managed according to this prescription. Acreages are estimates and would be approximately the same in all alternatives. Acres do not include riparian 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 alternatives 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 a given alternative **Table 11-15** presents a visual compan son 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

Practices to 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 activrtes 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	1 1,622
			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 Burned 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 [MAMs])	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	53	53	50	50	50
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	112.4	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	11,260
			5	5,300	7,100	7,800	6,200	8,300

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
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 (MAcre 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								
All 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 (MWUDs)								
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-Motonzed(SPNM)	170.500	103.340	98,642	4 19,630
	Semi-Primitive Motonzed (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-Motonzed	1.123	748	620	2,195
	Semi-Primme Motonzed	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**	221	**47 2**
	Existing Recreation	45 0	45 0	45 0	45 0
	Recommended Recreation	13.9	0.0	QQ	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 pnmarily a function of the following (1) the amount of area allocated to wilderness and semi-pnmltive 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 addltional 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 sultable acres Those alternatives wlth more suitable lands generally display a higher beginning inventory than alternatives wlth less suitable land

The ending inventory volumes are a reflection of the suitable acres, the ending age class distribution, and the management intensty 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 sutable 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 intensty In most cases, the differences in LTSY vary directly wlth 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 with a higher proportion of suitable land in the higher yield category, such as Alternative RPA, will generate more yields than an alternative with a greater amount of sutable land in the reduced yield categories, such as in Alternative CBF

Regeneration Harvest Acres - The regeneration harvest acres generally vary directly with 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 suitable 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 primarily to past land adjustments (exchanges) and the allocation of tentatively suitable timber land to non-timber prescriptions This includes semi-primitive non-motorized recreation areas, the Shasta Unit 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 primary difference between the ASQ and the potential yield is due to a reduction in the suitable timber land base Also. the potential yield includes 96 8 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 II-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 activities

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 comparing 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 II-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 comparison of the past 15 year average

Table II-18
Timber Resource Management Information

	ALTERNATIVE*				
	Benchmark MMR**	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 years). The maximum ASQ reached during the planning horizon is shown as percent of LTSY.

Table II-18
(Continued)

DATA FROM EXISTING SHASTA-TRINITY TIMBER MANAGEMENT PLAN - 1975 (Amended)			
Potential Yield	Shasta Working Circle =	142.7	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 additional 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) additional miles of streams. Alternative CBF will add 116.6 miles. **Figure II-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 alternatives 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 identified under the California Wilderness Act for "further planning," will be proposed for wilderness designation. Therefore, an additional 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 condition. Overall, Alternative CBF will retain the most roadless acres in a natural 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 habitat to support all species on the Forests at or above viable population levels. The distribution and variety of wildlife habitat will vary by alternative but will be maintained in all alternatives.

Accountability for management indicator 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 wildlife species in all alternatives.

In the 1st 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 I6 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

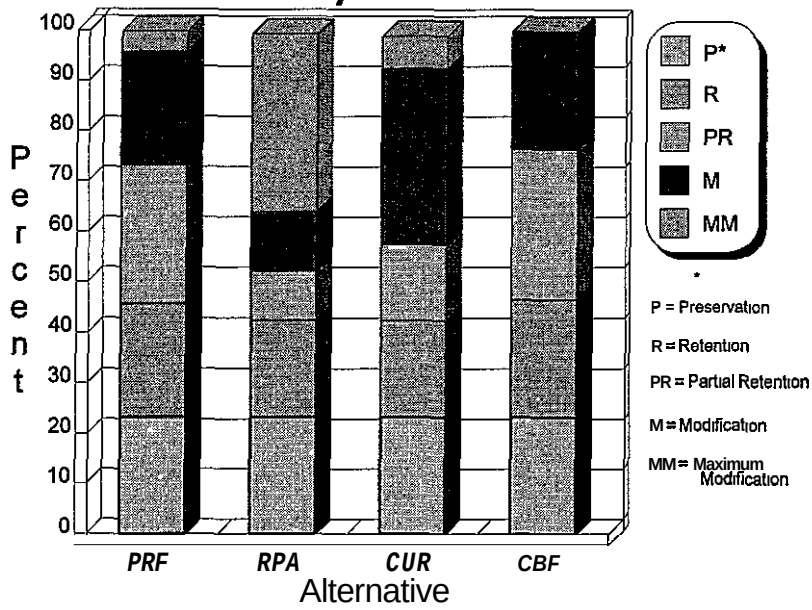
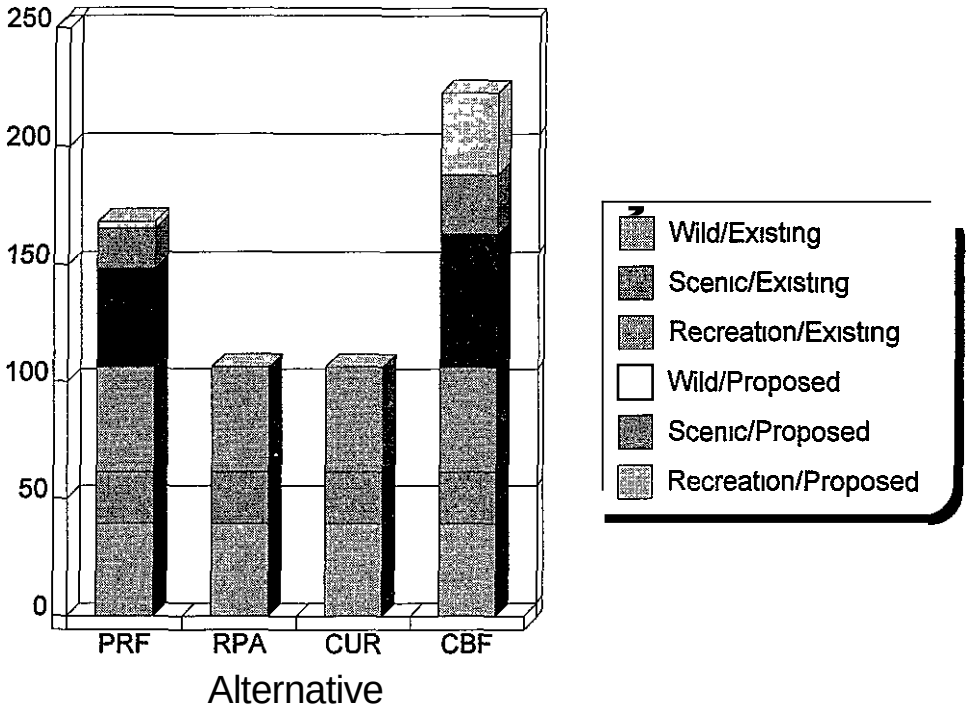


Figure II-3
Wild and Scenic Rivers by Alternative



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 benefits 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 I million for Alternative CBF to a increase of $I 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 I 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 US Government.

2. Returns to the *US 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 erther 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	6 5	6 6	6 4	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 benefit 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 benefit 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 sltes as unsuitable; (2) managmgtheforegroundof the Trinity Unrt of the NRA as minimal timber. and (3) managing the middlegroundof the Trinity Unit, 100 foot intermittent npanan 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 opportunlties through recreational development and expansion However, they will find decreased timber production over average levels of the past 15 years Resource Amenty 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 primanly 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 wlth recreational demand

Alternative RPA *(1990* RPA Program Emphasis)

PNV = $8.469 million, Change in PNV = -$223 million

Net Cash Flow (Decade 5) = $ I2 million

PNV is reduced from Alternative CEF because of a reduced timber base Additional constraints include more restrictive ripanan 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 beneft long-time residents by providing employment opportunrties and county receipts Employment opportunrties 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 yean Recreationists and Resource Amenty Emphasis Category residents may find the environmental impacts, particularly improved visual quality and more older over-mature habtat on sutable land, consistent wlth 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 I989 timber harvest situation but legal requirements for compliance wlth the T&E species law will result in County income and employment significantly lower than I989 levels This alternative has the second highest PNV of all alternatives When compared to Altemative RPA, the pnmary negative effect on PNV is the recreation program (lowest of all altematives) Timber harvest levels are 7.4 MMBF less than Alternative RPA due primanly to reduced harvest levels relating to addrtional allocations for bitterbrush (deer habitat) and visual resource protection

Timber yields will benefit long-time residents by providing employment opportunrties 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 lea than average levels of the past 15 yean Recreationists and Resource Amenity Emphasis Category residents may find the environmental impacts, particularly improved visual quality and more older overmature habrtaton surtable land, consistentwiththeirvalues and beliefs

Alternative PRF (Preferred Alternative)

PNV = $8,22 I million, Change in PNV = -$47 I million

Net Cash Flow (Decade 5) = $-6 million

When compared to Alternative CUR, addltional constraints were added to this altemative that had negative effects on PNV

The number of acres available for timber harvest activities did not decrease signlficantly but the intensty of treatments allowed did This reduction in intensty occurred due to the use of green tree retention (GTR) as the pnmary form of regeneration treatment as compared with more traditional clearcut treatments GTR is described in the Management Prescription section under Matnx 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 I	-778	2,930	-2,526
Visual Corridor constraint							
CEE		2, I I 9	-1,748	81 I	-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 I	

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	I38	176	I I4
Viable Population, Diversity, T&E Riparian Constraints Balance Due to Overlap		See Text for Discussion							
MMR	PNV with MMRs	970	1,496	I83	282	439	51	176	76
Visual Corridor Constraint									
CEE	Common Forest Constraints	945	1,496	I83	274	425	49	176	76
CEF	=CEE with Common Forest Constraints	945	I,496	I83	274	425	49	I76	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 include 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)

	PNV		Discount Costs		Discount Benefits	
I.D. Code		Change'		Change*		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	

	Discount Benefits by Resource				Discount Casts by Category			
I.D. Code	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 M e r .

*** 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	PNV - MM$	MM$/Year Decades 1/5	Total Personal Income (MM$/Year)	Direct and Indirect Employment (M Persons/Year)
	Community Effects (Public Issue #7)			
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

	PNV - MM$	1st Decade ASQ (MMBF/Year)	Old Growth After 5th Decade (M Acres*)	Timber Management (M Acres**)
	Timber Effects (Public Issue #16)			
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 timber lands

Abbreviated 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 ource	l of Risk of adverse s on sites compared with c nt conditions	Moderate potential r sk f st d stu ba based o acres of timbe manageme	High potential nsk of st dstu ba e l on c es of tu t er management	High potential nsk of site disturbance based on acres of timber management	Lowest potential nsk of site d stu t e 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. etherdirectlyor indirectly, are dependent on the timber/ wood fiber industry.	Major impact on social groups such as long-bme residents whose jobs, either 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 I	.75	75	.75	75
	Decade 5	I.2	I.I	.69	I.2
	Dispersed (MM RVDs)				
	Decade I	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 p i n t in time. This would include openings in the forest canopy fc th purj : regenerating new stands	About 25% of the total forest acres will have fairly Intensive timber management activity of some land at some p i n t in time This will include openin g s n the forest canopy for the purpose of re e new st	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 f r he purpos ɔl regenerating totally new stands	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 ca y i the urp c ege t new anc
		Some large trees will be left in most of the openings These openings will average about 10-12 acres in s with the largest openings b ng t ut 20 acre.	Most of the openings v ll b le cut on t f ste e slop and fl groun 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	Most of the openings will be clearcuts, on both steep slopes and flat ground Large trees will b ft in some of the openings These openings will average about 15 to 20 acres in size	Some large trees will be left. Op ng will normally not exceed 20 acres in size. On flatter slopes, openings will be smaller, but more frequent, whe e 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 years about 11% 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 5200 acres per year In 5 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 nvers and semi-pnmtbve areas will be more natural appeanngthan CUR or RPA.	The landscape semng along wild and scenic nvers and semi-primitive areas will receive the least protecbon of **all** alternatives	The landscape setting along wild and scenic nvers and semi-primitive areas will be more natural appeanngthan PRF or CBF	The landscape semng along wild and scenic nvers 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 wldemess attnbutes ofthe 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 wildemess attnbutes ofthe Mt Eddy further planning area will be slightly diminished due to resource management activities on a small amount of the area	Wldemess attnbutes will be maintained for existing areas The wilderness attributes of the Mt Eddy further planning area will also be maintained.
		About 81% of the 29 rek 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 roa ss ;' age v il remain undeveloped	About 88% of the 29 released roadless ' age w ill 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 (j	210	210	72	210
	Bald E r d 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 compabble with ripanan values The goal stated in the Plan is to prowde 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 Alternabves PRF and CBF. The Riparian S&Gs would affect how grazing is managed in all ripanan areas and wildernesses			
Issue #10					
How should livestock grazing be managed to minimize degradation of npanan areas?	AMs	8,300	10,00	8,300	8,300
		Resolution of grazing conflicts within ripanan areas would be emphasized by incorporating the Riparian S&Gs into all alternatives (see Chapter 4, Plan, Management Prescnpbon 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 recreabon facilities and opportunities to meet increasing demand?	None	Program direction for each alternabve prescribes the degree of opportunities prowded for water-oriented recreabon 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 Alternabves PRF and RPA prowde the most opportunities, Alternatives CUR and CBF prowde slightly less			

Table 11-28
Disposition of Public Issues

Public Issue	Output or Effect to be Measured (I 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 I	635 8	495 4
	Ist 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 visual 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
Disposition of Public Issues

Public Issue	Output or Effect to be Measured (1st decade unless otherwise noted)	ALTERNATIVE 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 Wilderness 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

Chapter Contents

Chapter III - Affected Environment

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 penod 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 a five-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 within the Forests' area of primary economic impact These effects may be direct in nature such as Federal employment associated with the Forests Direct effects may also be in the form of private employment necessary to support Federally solicited goods and services In addition, 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 within 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 industries is displayed in **Table III-2** This table displays statistics for those counties located within the Primary Economic Impact Area and the State of California Information for the year 1985 and 1991 is displayed to aid in identifying generalized employment trends Comparisons of employment levels in similar industries can also be made within the counties listed and the State of California

A review of **Table III-2** reveals several trends All areas displayed have experienced a decrease in total employment within the lumber and wood manufacturing industry as well as the transportation and utilities and agriculture, forestry, and fisheries groups Increases in employment within 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 within 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 with 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 within 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	9.1	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	16.0	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	26.8	21.9	21.9	19.5	24.0	14.3	17.2	23.2	23.2
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)	(10.9)	(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)	(15.2)	(17.6)	(29.5)	(35.3)	(12.8)	(13.7)
Total Employment	--100%--		--100%--		--100%--		--100%--		--100%--	
Total Employment in 1,000s	39.4	52.9	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 industnes 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 classfied 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 descnbed as seasonal in nature and include many positions within agriculture, construction, and the lumber and wood products industnes

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 III-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 III-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 National 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 wtthin 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

D The Social Environment

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 wtthin 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

Individuals wthin 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 identrties, 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	< I	0	435	100
Shasta	57	38	1340	91 I	I 0	7	36	25	26	I 8	I	I	1470	100
Tehama	5 I	103	430	867	2	5	8	I 7	3	7	< I	0	496	100
Trinity	4	**33**	I I 9	910	I	**4**	6	45	I	.8	0	0	13 I	100

Source: Califomia State Census Data Center, Apnl 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 nterests" (Lee 1990)

Recreationists. The Forests are also important to another arge, diverse group of people visitors and recreationists who do not live in the primary area of influence Many ive 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 ire often effective at lobbying for specific environmental ssues

Native Americans. Native Americans include American ndians, 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 provide for 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 harvesting versus 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

The Resource Environment

E

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 throughprescribed 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, exhaustfromvehicle and machinery use, and dustgeneration 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 ofthe 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 lowertemperatures, wetterfuels, 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 plumesfar above the ayer of atmosphere that comes in contact with the surface 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 industrialsources 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 pollutionfrom 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 asamended in 1977 42 U S C 7801) and in 1990 Because ofthis, manage-

ment of the air quality in this area requires identification of air quality related values (AQRV) by measunng senstive indicators of those values. Visibility, flo, a 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 buming is foreseen In the future. more slash will be left after timber harvesting to maintain soil quallty 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 (nonlivingi 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)

Related to 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

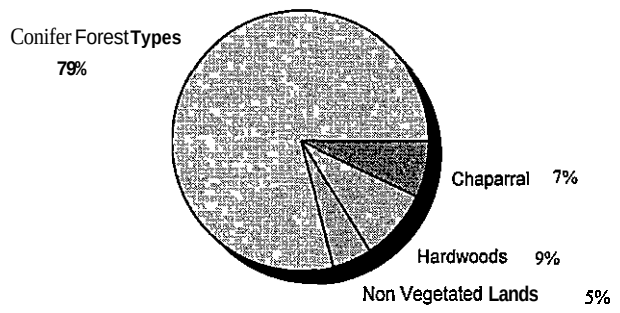
management are not discussed further, because they have little or no affect on naturally occurring diversty

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 fremonti*), 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*)

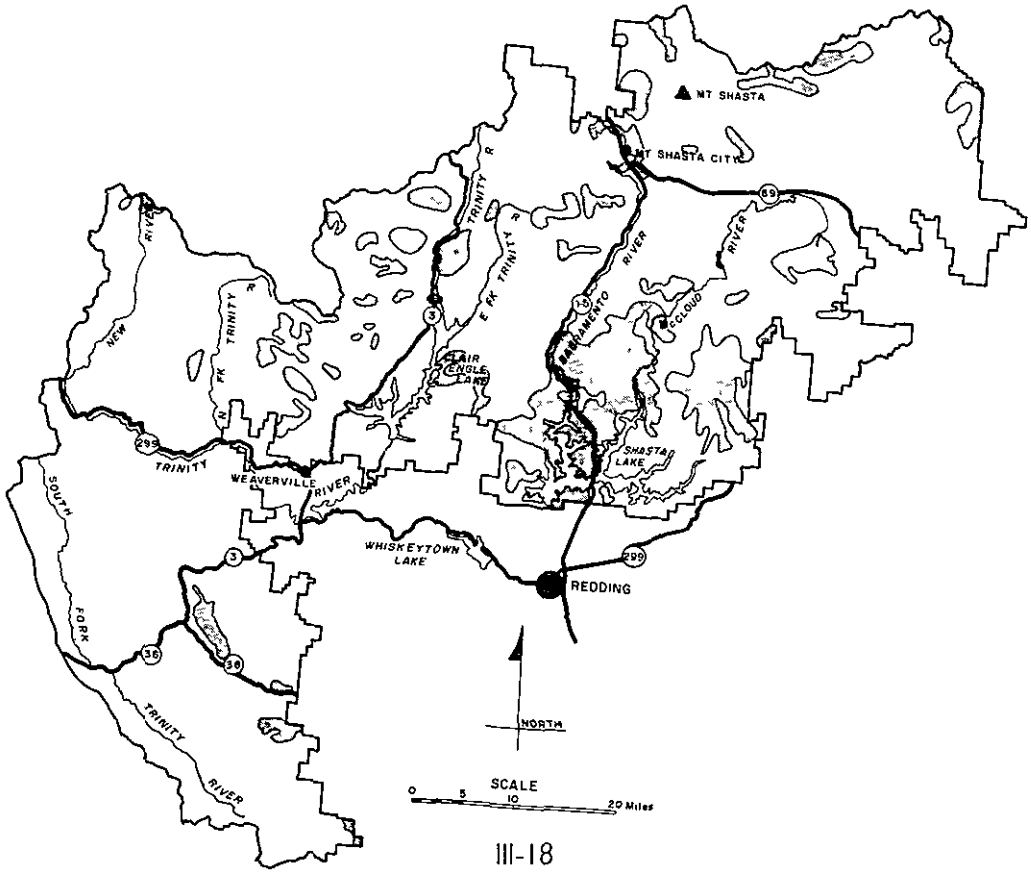
Bitterbrush is one of the more important browse or brush species for deer on the Shasta side Bitterbrush grows on about 100,000 acres in stands by rtself or for mixed wlth other vegetation types Most of this bitterbrush grows on deer summer range in the McCloud Flats area or on summer and/or winter range 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-l)**

Evenness

Evenness of plant and animal communities can be approximated by the proportion of each vegetation type on the Forests **Figure III-l** 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 parameter that affect its range and location

About 2 10,000 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 rhis 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 precommercial 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 for tirewood 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