

# Forest Plan

## Table of Contents

### Chapters

Chapter 1	Introduction
Chapter 2	Public Issues
Chapter 3	Summary of the Analysis of the Management Situation
Chapter 4	Management Direction
Chapter 5	Monitoring and Evaluation Requirements

### Appendices

Appendix A	Required Resource/Implementation Plans
Appendix B	Research and Technical Planning Needs
Appendix C	Tentative Ten-Year Timber Sale Program
Appendix D	Timber Data
Appendix E	Water Quality—Best Management Practices
Appendix F	Developed Recreation Sites Acres/ROS Classes
Appendix G	Fish, Wildlife, and Botany
Appendix H	Budgets and their Relationship to the Forest Plan
Appendix I	Timber Land Suitability Criteria
Appendix J	Description of Silvicultural Treatments Used in Timber Management Prescriptions
Appendix K	Road Construction, Maintenance and Use Standards
Appendix L	Description of Management Practices
Appendix M	Fire Management Program
Appendix O	Soil Quality Standards
Appendix P	Sensitive and Endemic Plant List
Appendix Q	Wilderness Opportunity Class Descriptions
Appendix R	Survey and Manage Species

# Forest Plan

## Table of Contents (continued)

<b>CHAPTER 1 - Introduction</b> .....	1-1
A. Purpose of the Forest Plan .....	1-1
B. Relationship of the Forest Plan to Other Plans .....	1-1
C. Plan Implementation Process .....	1-2
D. Forest Plan Amendments and Revisions .....	1-2
E. Plan Organization .....	1-2
F. Appeal Rights .....	1-2
<b>CHAPTER 2 - Public Issues</b> .....	2-1
A. Summary of Public Issues .....	2-1
B. Public Issues .....	2-1
Heritage Resources .....	2-1
Biological Diversity .....	2-1
Facilities .....	2-2
Fire and Fuels .....	2-2
Fisheries/Water .....	2-2
Human and Community Development .....	2-3
Minerals .....	2-3
Range .....	2-3
Recreation .....	2-4
Riparian Areas .....	2-4
Special Areas .....	2-4
Timber .....	2-5
Visual Quality .....	2-6
Wild and Scenic Rivers .....	2-6
Wilderness and Roadless Areas .....	2-7

# Forest Plan

## Table of Contents

(continued)

<b>CHAPTER 3 - Summary of the Analysis of the Management Situation</b> .....	3-1
A. Introduction .....	3-1
B. Existing Situation .....	3-1
C. The Economic Environment .....	3-1
D. The Social Environment .....	3-3
E. Resource Environment .....	3-5
Air Quality .....	3-5
Biological Diversity .....	3-5
Biomass .....	3-6
Botany .....	3-7
Facilities .....	3-7
Fire and Fuels .....	3-8
Fisheries .....	3-8
Forest Pests .....	3-11
Geology .....	3-12
Heritage Resources .....	3-12
Lands .....	3-13
Law Enforcement .....	3-14
Minerals .....	3-14
Range .....	3-14
Recreation .....	3-15
Riparian Areas .....	3-17
Soils .....	3-18
Special Areas .....	3-18
Timber .....	3-19
Visual Quality .....	3-21
Water .....	3-22
Wild and Scenic Rivers .....	3-22
Wilderness and Roadless Areas .....	3-23
Wildlife (General) .....	3-34
Wildlife (TE&S) .....	3-26
F. Production Potential .....	3-28
G. Resource Uses and Development Opportunities .....	3-28

# Forest Plan

## Table of Contents

(continued)

<b>CHAPTER 4 - Management Direction</b> .....	4-1
A. Introduction .....	4-1
B. Forest Goals .....	4-4
C. Forest Objectives .....	4-6
D. Desired Future Condition .....	4-6
E. Forest-Wide Standards and Guidelines (Level 1) .....	4-11
F. Management Prescriptions (Levels 2 and 3) .....	4-31
1. Congressionally Reserved Areas .....	4-33
V. Wilderness Management .....	4-33
2. Late-Successional Reserves .....	4-37
VII. Late-Successional Reserves .....	4-43
3. Administratively Withdrawn Areas .....	4-45
I. Unroaded Non-Motorized Recreation .....	4-45
II. Limited Roaded Motorized Recreation .....	4-46
IV. Roaded, High Density Recreation .....	4-48
X. Special Area Management .....	4-49
XI. Heritage Resource Management .....	4-50
4. Riparian Reserves and Key Watersheds .....	4-53
IX. Riparian Management .....	4-59
5. Matrix Lands .....	4-61
III. Roaded Recreation .....	4-64
VI. Wildlife Habitat Management .....	4-66
VIII. Commercial Wood Products Emphasis .....	4-67
6. Adaptive Management Areas .....	4-69
G. Management Area Direction (Level 4) .....	4-73
1. Porcupine Butte .....	4-75
2. McCloud Flats .....	4-79
3. Mt. Shasta Management Area .....	4-83
4. Forest Wilderness Areas .....	4-87
Chanelulla Wilderness .....	4-89
Mt. Shasta Wilderness .....	4-91

## Forest Plan

### Table of Contents

(continued)

#### **CHAPTER 4 - Management Direction** (continued)

Trinity Alps Wilderness . . . . .	4-93
Yolla Bolly-Middle Eel Wilderness . . . . .	4-97
5. Parks-Eddy . . . . .	4-99
6. Upper Trinity . . . . .	4-103
7. Weaverville/Lewiston . . . . .	4-107
8. National Recreation Area . . . . .	4-111
Shasta Unit . . . . .	4-111
Trinity Unit . . . . .	4-113
9. Slate-Delta . . . . .	4-117
10. McCloud River . . . . .	4-121
11. Pit . . . . .	4-125
12. Nosoni . . . . .	4-129
13. Front . . . . .	4-133
14. New River/North Fork/Canyon Creek . . . . .	4-137
15. Trinity River . . . . .	4-141
16. Corral Bottom . . . . .	4-145
17. Hayfork Creek . . . . .	4-149
18. Hayfork . . . . .	4-153
19. Indian Valley/Rattlesnake . . . . .	4-157
20. South Fork Mountain . . . . .	4-161
21. Wildwood . . . . .	4-165
22. Beegum . . . . .	4-169

#### **CHAPTER 5 - Monitoring and Evaluation Requirements** . . . . . 5-1

A. Introduction . . . . .	5-1
B. Monitoring System . . . . .	5-1
C. Evaluation Reports . . . . .	5-2

The United States Department of Agriculture (USDA) Forest Service is a diverse organization committed to equal opportunity in employment and program delivery. USDA prohibits discrimination on the basis of race, color, national origin, sex, religion, age, disability, political affiliation and familial status. Persons believing they have been discriminated against should contact the Secretary, U.S. Department of Agriculture, Washington, DC 20250, or call 202/720-7327 (voice) or 202/720-1127 (TDD).

Federal Recycling Program  Printed on Recycled Paper

---

## Appendix A

### *Required Resource/ Implementation Plans*

---

# APPENDIX A

## Required Resource / Implementation Plans

---

Name or Type of Plan	Purpose	Target Completion	Responsible Unit
Cave Management Plans (See Supplemental Management Area Direction)	Establish interpretive, scientific study, and public use and safety objectives	1995 - 2000	Recreation / Physical Sciences
Chaparral Management Action Plan	Set priorities and schedules for coordination with CDF in developing management plans for chaparral treatment	1996	Fire / Wildlife / Physical Sciences
Coordinated Resource Management Plan	Monitor management activities for the Lower McCloud River in conjunction with private landowners	1992	McCloud Ranger District
Corridor Plans	Establish visual character and management guidelines within the foreground and interpret significant natural and management activities	1997 - 2006	Recreation
Deer Herd Action Plans for McCloud Flats, Weaverville, Hayfork, Yolla Bolla, and Klamath Deer Herds	Habitat maintenance and enhancement	Ongoing	Wildlife / Department of Fish & Game
Endemic Plant Management Plans	Specific management direction for non-sensitive endemics	1993 - 2000	Biological Sciences
Fire Management Action Plan	Specific management direction for fire	1996	Fire
Fish and Wildlife Management Program	Specific management direction for fish and wildlife	Annually	Fish / Wildlife
Forest Interpretive Plans	Establish plans to interpret natural/cultural resources and management activities	1994 - 1996	Recreation
Forest Land Ownership Adjustment Plan	Guidance and direction for acquisition and disposal of National Forest Lands	Ongoing	Lands
Forest Road Program	Displays current year's program	Annually	Engineering
Forest Transportation Development Plan	Update to conform to the road and trail inventory	Annually	Engineering
Ecological Unit Inventory	Set priorities and procedures for inventorying geologic, soil and vegetation resources	1995 - 2005	Physical Sciences
Grazing Allotment Plans	Establish proper range management	1995 - 2005	Range
Historic Homestead Management Plans	Establish plan to preserve and interpret historic values	1996	Heritage Resources

---

Appendix A - Required Resource/Implementation Plans

Name or Type of Plan	Purpose	Target Completion	Responsible Unit
Historic Lookout Management Plan	Establish plan to manage National Register lookouts	1996	Heritage Resources
Model Steelhead Stream Demonstration Project Plan	Implement a fisheries and watershed restoration program in the South Fork Trinity River Basin	Annual Report	Fisheries and Physical Sciences
Native American Issues & Concerns Inventory & Implementation Plan	Improve relations with local Native American communities	Ongoing	Heritage Resources
Off-Highway Vehicle (OHV) Management Plan	Designate vehicle restrictions and closures	1995 - 2000	Recreation
Pacific Crest National Scenic Trail (PCT) Development and Operation Plan	Specific management direction for the PCT	1996	Recreation
Redband Trout Conservation Strategy	General direction for management of redband trout on the McCloud Ranger District	Ongoing	Fisheries
Research Natural Areas (RNA) Management Plans	Specific management direction for RNAs to conserve research values	1993 - 2003	Biological Sciences / Districts
Special Interest Areas (SIAs)	Specific management direction for SIAs	1995 - 2000	Recreation / Physical Sciences / Biology
Threatened and Endangered (T&E) and Sensitive Species Management Plans & Guides	Implement special habitat and species management direction	Ongoing	Wildlife / Botany
Trinity Reservoir Fisheries Habitat Management Plan	Improve recreational sportfishing opportunities at Trinity Reservoir	Annual Report	Fisheries
Shasta Lake Warm Water Fish Habitat Management Plan	Improve recreational sport fishing at Shasta Lake	Ongoing	Fisheries
Trinity River Restoration Program (Extension)	Implement interagency fisheries, watershed, and wildlife restoration program in the Trinity River Basin	Ongoing	Fish / Wildlife / Physical Sciences
Aquatic Ecological Unit Inventory Plan	Set priorities and procedures for inventorying the Forests' water and riparian resources	Ongoing	Physical Sciences
Watershed Improvement Plan	Set priorities and procedures for watershed and riparian improvement projects	Ongoing	Physical Sciences
Whiskeytown Shasta-Trinity National Recreation Area (NRA) Management Plan	Specific management direction for the NRA	1995	Recreation
Wild and Scenic Rivers Management Plans	Specific management direction for three Wild and Scenic Rivers (New River, North Fork Trinity and Trinity River)	1995 - 1996	Recreation
Wilderness Management Plans (1)	Specific management direction for Chancelulla Wilderness	1995 (Yolla-Bolly-Existing)	Recreation

---

## Appendix B

### *Research and Technical Planning Needs*

---

# APPENDIX B

## Research and Technical Planning Needs

---

### Research Needs

A number of research needs were identified during the development of the Forest Plan. It is anticipated that additional research needs will surface during the monitoring and evaluation phases. Much of this research has already been initiated and will continue to be coordinated by the Pacific Southwest Forest and Range Experiment Station (PSW) and the Pacific Southwest Regional Office (Region 5).

1. Assess and verify current and potential production for fall chinook, coho, and steelhead, within the Trinity River basin, using existing and potential habitats.
2. Obtain a better understanding of the status and trends of aquatic threatened, endangered, and sensitive (T&E&S) species and habitats and their conservation. Develop an integrated approach to aquatic T&E&S management emphasizing ecosystem and biodiversity concepts.
3. Continue research on the social and economic value of recreation, tourism, and visual resources.
4. Conduct research on recreational carrying capacities, especially those capacities relating to water-oriented activities.
5. Conduct periodic assessments of user preference/satisfaction levels.
6. Conduct biological studies to obtain missing information needed to develop Conservation Strategies for sensitive plants. Such research would include studies of distribution, habitat requirements, population dynamics, and responses to management activities. These studies would include information necessary to supplement existing data to assure the continuation of reproducing plants throughout the range of the species.
7. Continue research into the characteristics and dynamics of the black stain root disease on timber stands in the McCloud Flats area.
8. Continue research on the relationships between vegetative disturbance in late-successional forests

and spotted owl habitat. The objective is to attempt to establish more clearly defined thresholds of population viability.

9. Continue research on the effects of logging and road construction on sediment delivery, runoff, and water quality using localized information or other means.
10. Continue research on the long-term effects of periodic timber harvest and reforestation practices on soil productivity.
11. Conduct research to assess the costs and effectiveness of various vegetation management treatment methods.
12. Conduct research to assess the role of fire suppression and fuels management in meeting habitat needs for different species of wildlife.

### Technical Planning Needs

The development of the proposed Forest Plan included construction of a comprehensive resource data base. Despite the size of the data base, several information areas need to be addressed more thoroughly in the next round of Forest planning.

Integrated resource inventories will be conducted, where feasible. These inventories blend physiographic, edaphic, and vegetative attributes into a single ecological type classification system. This product provides an assessment tool for planning and managing a number of resources. Ecological Unit Inventory (EUI) maps and data will be the foundation for Ecosystem Management and the next round of Forest planning. This inventory integrates geology, soils and potential natural vegetation community characteristics to identify ecological types. Physical and biological characteristics are documented and interpretations made for each ecological type. In an ecological approach to resource management, this information is vital for planning land management activities. Interpretations will address multi-resource management considerations such as wildlife habitat conditions, fuel levels, and forage production. For example, data for each ecological type will include information about vegetation structure and composition, plant community succession, productiv-

## Appendix B - Research & Technical Planning Needs

ity, soil erodibility and slope stability hazards. Ecological types are mapped as ecological land units. These units of land occur repeatedly across the landscape in a predictable fashion. These maps can be used for landscape level spatial analyses and planning.

Specific technical planning needs include the following:

1. Identify sensitive Air Quality Related Value (AQRV) indicators for the Class I Yolla Bolly-Middle Eel Wilderness and establish an effective monitoring system in close coordination with the Mendocino National Forest.
2. As funding is available, complete the heritage resource inventory by the Forest and Rangeland Renewable Resources Planning Act (RPA) target date
3. Inventory and evaluate places used by Native Americans for resource, spiritual and other cultural activities. Data will be used to develop implementation plans.
4. Complete a process to maintain the Forest-wide data base and update it periodically.
5. Determine the effects of the fire exclusion policy on wilderness ecosystems as part of wilderness management planning.
6. Complete development of an integrated fisheries/hydrology survey format for use in evaluating aquatic resources within designated ecological units.
7. Obtain additional data on forage production and use, including transitional range use. This information will be incorporated with EUIs, as noted above. Document additional information concerning carrying capacities for each ecological-map unit.
8. Implement the Infrastructure database.
9. Complete an inventory of recreation opportunities within theme areas.
10. Interpretations of non-regenerable forest lands will require further field validation and verification, followed by any needed adjustments in the current data base prior to the next planning cycle. Especially critical is field verification of moisture stress and its role in the regeneration and survival of forest seedlings.
11. Complete the inventory, evaluation, and screening of aquatic, geologic and botanical elements for all identified gaps for the Research Natural Area (RNA) network, prior to the next Plan revision.
12. Inventory and evaluate all Special Interest Areas (SIAs) identified in the proposed Forest Plan.
13. Update existing vegetation maps in those areas where ecosystem management projects are being proposed. In order to serve project planning, this mapping will be performed as a second-order inventory, and it will be coordinated with the EUI.
14. Obtain additional data on visual sensitivity of travel routes.
15. Obtain information on water yield and timing of flow in response to vegetative management.
16. Additional wildlife habitat information will need to be gathered prior to the second round of planning. Many of these needs may be met through EUI vegetation mapping and classification. Highest priorities for additional habitat data will be within those Management Areas where significant vegetational changes are anticipated due to resource activities and in Riparian Reserves.
17. Obtain deer winter range information, as part of the cooperative program of herd management with the California Department of Fish and Game (DFG), prior to the next round of planning.
18. Determine geological terraines favorable for specific types of mineral deposit.
20. Determine the effect of retaining late-successional habitat for wildlife on fire suppression capabilities.
21. Inventory the distribution of miscellaneous products to assist in the development of a Forest-wide miscellaneous products program.

---

Appendix C

*Tentative Ten-Year Timber  
Sale Program*

# APPENDIX C

## Tentative Ten-Year Timber Sale Program

### Reasons for Harvest

**Stands to be Managed Intensively** - Harvests will be carried out for the following purposes:

- To regenerate stands to meet regeneration acreage allocations to provide planned future yields.
- To remove trees with insufficient net growth (selection cutting).
- To salvage dead and dying trees.
- To reduce stocking where trees are excess to desired basal area stocking (thinning).
- To meet local and national demand for wood fiber.

**Stands to be Managed for Special Emphasis** - Timber yields are obtained as a result of the management of other resource objectives such as landscape or wildlife management objectives. All timber-harvest systems may be used to achieve these objectives.

### Harvest Priority

Priorities for timber harvest follow the linear program solution (FORPLAN) for the plan alternative. Two types of harvest are recognized:

**Regeneration Harvest** - intended to carry the Forests toward a regulated condition.

**Intermediate Cuttings** - intended to maintain stocking for optimum net growth of young stands or to capture mortality in older stands.

Regeneration is the means by which productivity can be increased and regulation approached. The understocked and poorly-growing strata should receive first consideration. The FORPLAN harvest schedule for the plan alternative shows the timber strata of highest priority for the plan decade.

Intermediate harvests for stocking control should be scheduled whenever the opportunity arises.

**Table C-I** shows the tentative priorities for harvest by stratum as interpreted from the FORPLAN Harvest

**Table C-I**  
**Tentative Priority for Harvest - Decade 1995-2004**  
**Shasta-Trinity National Forests**

Type of Harvest	Timber Stratum	Priority	Total Acres (Decade)
<b>Even-aged Regeneration (Green Tree Retention*)</b>	M4G	2	2,800
	M3P	1	6,300
	M3G	2	10,400
	R3G	2	400
	R3P	1	100
<b>Uneven-Aged Regeneration (Selection Cutting)</b>	All	1-2	15,000
<b>Intermediate Thinning</b>	M2G	2	20,000 **
	M3G	1	150,000 **
<b>Sanitation-Salvage</b>	All	1-2	Not Specified

\* Includes shelterwood cuts.

\*\* Represents total accessible acreage of stratum. This total acreage represents the candidate acres to be examined to find those that will produce an intermediate harvest.

Report. Priorities are graded from 1 to 2 with priority 2 the lowest for entry.

## Silvicultural Systems

A silvicultural prescription will be written for each stand to be treated. The silvicultural system to be used will be determined through site-specific analysis of each stand. This will be based on land management objectives, environmental considerations, stand and site conditions, and economic considerations. Some of the key items to consider in determining the appropriate silvicultural system are as follows:

### Managerial

- Land Management Objectives - e.g., optimize timber production vs. other resource objectives.
- Environmental Considerations
  - Water                      Recreation
  - Air                              Fisheries
  - Visuals                      Sensitive Vegetation
  - Wildlife                      Heritage Resources
- Desired Future Stand Condition

### Biological/Physical

- Existing Stand Conditions
  - Stocking                      Stand Growth
  - Age                              Competing Vegetation
  - Pests                              Understory (releasability)
  - Species
- Topography
- Genetics
- Soils (regenerability, productivity)

### Economic/Social

- Social Attitudes
- Transportation/Logging Systems (including landings and skid trails)
- Economics/Costs
- Manpower

Both even-aged and uneven-aged systems will be considered, when appropriate. The following criteria should be used as a guide for identifying the situations where the different silvicultural systems might be most appropriate.

## Selection Harvest

- land management objectives restrict large openings or a continuous tree cover is desired (i.e. visual retention areas, riparian zones);
- land management objectives emphasize resource values other than timber growth and yield (i.e., key wildlife habitat);
- stands which display an uneven or mixed size structure (three or more distinct size/age classes);
- stands which have adequate stocking levels in the various size/age classes, including a manageable component of sapling and pole-size trees which are of crop tree quality;
- younger stands which are relatively vigorous and free of insect and disease problems (i.e. dwarf mistletoe and root diseases);
- stands on slopes less than about 40 percent (tractor loggable);
- stands where the tree species are not highly susceptible to logging damage;
- stands where the majority of the tree species are highly to moderately tolerant to shade;
- stands with relatively few shade tolerant hardwoods;
- stands where repeated entries do not create significant soil compaction problems.

## Thinning Harvest

- objective is to grow larger trees, faster;
- objective is to maintain stand vigor/growth;
- stands which are overstocked (too many trees per acre);
- stands which are young (immature);
- stands which are healthy and vigorous;
- species which are not highly susceptible to logging damage;
- all slopes, but limited to fewer entries on slopes over 40 percent;
- stands with adequate merchantable harvest volume (economical).

## Shelterwood Seed Step

- other resource considerations preclude other harvest methods;

- suitable seed/shelter trees are present in the stand;
- no significant insect/disease problems;
- windfirm;
- cone-bearing;
- stands within the red fir type;
- all slopes;
- stands on harsh sites (all species).

**Shelterwood Overstory Removal**

- two-storied stands;
- stands with scattered, merchantable overstory which can be removed without significant damage to the understory;
- stands with adequate, manageable understory stocking (healthy and relatively insect/disease free);
- all slopes, but limited on slopes over 40 percent due to economics.

**Clearcut Harvest**

- area has low sensitivity to other resource issues;
- single-storied stands;
- stands which are understocked (especially on steep slopes);
- stands with little or no manageable understory;
- stands with high incidence of insects and/or disease;
- stands with high mortality due to catastrophic events (fire, windstorms, etc.);
- species that are intolerant to shade;
- all slopes;
- areas which are regenerable/plantable.

**Green Tree Retention**

- stands with an adequate number of large, live trees suitable for wildlife purposes;
- leave trees will not substantially interfere with the management of the newly regenerated stand;
- all slopes, but limited on slopes over 40 percent due to economics.

**Timber Management Controls**

Regulation is the organization and control of the Forests' growing stock to achieve a sustained yield of wood products over time. The Forests' goal is to approach regulation through scheduled regeneration harvests over a period of time called the "conversion period". Two methods of control are commonly employed during this conversion period:

**Area Control** - This method is generally associated with even-aged silviculture. It provides for harvesting and regenerating areas of equal productivity. The expected result at the end of the conversion period is an equal distribution of age classes. **Table C-2** shows the area controls for the Plan period.

**Table C-2  
Vegetation Management Practices  
(Annual Average Acreage in First Decade  
for Suitable Lands)**

Practice	Acres
<b>Regeneration Harvest:</b>	
Clearcut	0
Green Tree Retention*	2,000
Selection	1,500
<b>Intermediate Harvest:</b>	
Commercial Thinning	2,000
Salvage/Sanitation	930
<b>Timber Stand Improvement</b>	5,300
<b>Reforestation (natural and artificial)</b>	3,500
* Includes shelterwood cuts	

**Volume Control** - This method can be applied to even-aged or uneven-aged management schemes. It provides for somewhat equal yields over the conversion period based on present and predicted stand volumes. **Table C-3** shows the volume controls for the Plan period.

Implementation of the timber management portion of the Plan requires maintaining a degree of control over both volume and area to achieve optimum yields both during the conversion period and thereafter.

The Allowable Sale Quantity (ASQ) is established as the maximum harvest for the Forests for the Plan period. The scheduled, chargeable volume offered in any given year may exceed, or fall short of, the aver-

**Table C-3**  
**Allowable Sale Quantity (ASQ) and Timber Sale Program Quantity**  
**(Annual Average Volume for the First Decade)**

Harvest Method	ASQ*			
	Sawtimber		Other Products	
	MMCF	MMBF	MMCF	MMBF
<b>Regeneration Harvest:</b>				
Clearcut			0	0
Green Tree Retention**	5.7	38.0	0	0
Selection	4.2	28.0	0	0
<b>Intermediate Harvest:</b>				
Commercial Thinning	1.8	12.0	0	0
Salvage/Sanitation (stand maintenance)	0.6	4.0	0	0
<b>Total ASQ</b>	<b>12.3</b>	<b>82.0</b>	<b>0</b>	<b>0</b>

\* Includes only chargeable scheduled volumes from suitable lands

\*\* Includes shelterwood cuts

MMCF = Million Cubic Feet; MMBF = Million Board Feet

age annual ASQ, but the decade scheduled volume must be in compliance. This scheduled volume is based on inventory data and growth and yield projections from the suitable, regulated timber land base. Additional non-chargeable volume may be obtained from unsuitable timber lands, primarily from salvage/sanitation cutting, but is not part of the ASQ. This non-chargeable volume may, or may not, be offered for sale in any given year, depending on the availability and demand for this material, and the availability of funding to prepare sales.

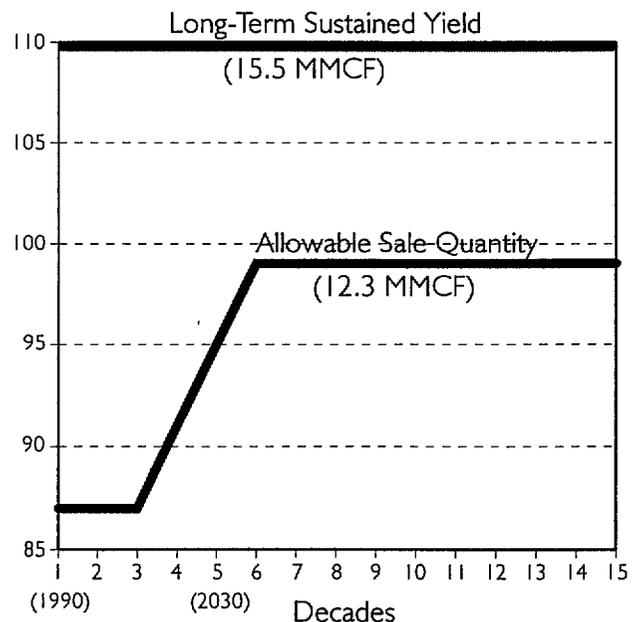
**Figure C-1** shows the relationship of the ASQ to the long-term sustained yield.

The volume and acre controls may have to be adjusted to reflect changing conditions over the Plan period, such as:

- changes in the timber land base (resulting from new planning evaluations or land status changes);
- inability to meet volume or acre goals due to inadequate financing and/or personnel;
- irresolvable restrictions on regeneration and stand maintenance methods (such as brush control);
- failure to meet restocking time limits or accomplish regenerated stand maintenance;
- inventory changes resulting from catastrophic damage such as fire or insect and disease attack;

- consistent and significant differences between the current Forest timber inventory and new compartment or stand examination data;
- changes in the projected clearcut/shelterwood/green tree retention/selection regeneration

**Figure C-1**  
**Long-Term Sustained Yield and**  
**Allowable Sale Quantity**  
 (Million Cubic Feet)



Appendix C - Tentative Ten-Year Timber Sale Program

acreage ratios resulting from prescriptions based on intensive on-the-ground examinations that consider site specific conditions and factors;

- consistent trends in per-acre volume yields that differ from the predicted yields.

**Tentative Ten Year Timber Sale Action Plan**

It is difficult to prepare a firm timber sale program with much reliability, especially for periods much longer than about 5 years. This is due to a number of factors.

The ecosystem planning process for an individual sale normally takes at least 3 years to complete, from the

time the inventory and analysis is initiated until the sale is finally sold. This process will identify specific vegetative treatment needs and any timber harvest opportunities. Also, harvest levels in the first few years of the program are tied to current program budget levels. Therefore, the first 5 years of the program, and particularly the first 2 or 3 years, are largely in response to the existing timber management plan for the Forests and current projected budget levels.

The following is the proposed timber sale program showing the estimated annual timber volume planned to be sold by Management Area. These figures are tentative and subject to change based on site-specific analyses.

MA	Volume/Year (MMBF)	MA	Volume/Year (MMBF)
1	15.9	12	1.0
2	20.7	13	0.1
3	5.3	14	0.7
4	0	15	2.0
5	2.0	16	0.8
6	4.9	17	0.9
7	2.3	18	6.7
8	0	19	7.2
9	2.3	20	1.8
10	0.8	21	3.1
11	0.9	22	2.0

---

# Appendix D

## *Timber Data*

---

# APPENDIX D

## Timber Data

---

Appendix D displays some of the more important data related to the management of the timber resource.

**Table D-1** shows the land classification for timber. Land classification is determined in accordance with the timber suitability criteria set forth in 36 Code of Federal Regulations (CFR) 219.14. Suitable lands constitute the land base for determining the allowable sale quantity (ASQ).

**Table D-2** shows the area, volume, growth and age for each timber condition class (strata) on the suitable lands on the Forests.

**Table D-3** shows the present and future conditions of the timber on the Forests. The data is based on existing inventories and reflects the current condition of the Forests. The data for the future Forest is based primarily on planning model (FORPLAN) outputs for the last decade of the planning horizon (160 years in the future) to reflect the expected future condition of the Forests under the Forest Plan.

**Table D-4** shows acres by timber productivity class. Productivity is based on the potential growth of natural stands.

**Table D-1**  
**Land Classification for Timber**  
**(M Acres in Decade I)**  
**Shasta-Trinity National Forests**

	Shasta Forest	Trinity Forest	Total - Both Forests
1. Non-forested Land (includes water)	85	35	120
2. Forested Land	983	1,018	2,001
3. Forested Land Currently Withdrawn from Timber Production*	135	315	450
4. Forested Land Not Capable of Producing Industrial Wood	173	156	329
5. Forested Land Physically Unsuitable			
• Irreversible Damage to Soils, Watersheds or Productivity Likely to Occur	23	67	90
• Unregenerable within 5 Years of Final Harvest	29	25	54
6. Inadequate Information to Project Responses	0	0	0
7. Tentatively Suitable Timber Base (Item 2 minus Items 3, 4, 5, and 6)	623	455	1,078
8. Not Suitable for Timber under the Forest Plan**	323	180	503
9. <b>Total Unsuitable Acres</b> (Items 3, 4, 5, 6, and 8)	683	743	1,426
10. <b>Total Suitable Acres</b> (Item 2 minus 9)	300	275	575
<b>11. TOTAL National Forest Acres (Items 1 and 2)</b>	<b>1,068</b>	<b>1,053</b>	<b>2,121</b>

\* Areas withdrawn by an Act of Congress, the Secretary of Agriculture, or the Chief of the Forest Service.

\*\* Lands identified as not appropriate for timber production due to (1) assignment to other resource uses to meet Forest Plan objectives; (2) management requirements; or (3) not being cost efficient in meeting Forest Plan objectives over the planning horizon.

M = Thousand acres

**Table D-2  
Timber Condition Classes**

Condition Class		Area Suitable for Timber Production (M Acres) <sup>1</sup>		Average Conifer Volume per Acre (MBF) <sup>2</sup>		Estimated Total Volume (MMBF) <sup>3</sup>		Average Basal Area Weighted Age (Conifers)		Current Annual Growth (CF/AC/YR) <sup>4</sup>		Potential Mean Annual Growth of Replacement Stands (CF/AC/YR)	
		Shasta	Trinity	Shasta	Trinity	Shasta	Trinity	Shasta	Trinity	Shasta	Trinity	Shasta	Trinity
<b>Timber Strata<sup>5</sup></b>		<b>Shasta</b>	<b>Trinity</b>	<b>Shasta</b>	<b>Trinity</b>	<b>Shasta</b>	<b>Trinity</b>	<b>Shasta</b>	<b>Trinity</b>	<b>Shasta</b>	<b>Trinity</b>	<b>Shasta</b>	<b>Trinity</b>
Mixed Conifer	M2G	5.6	13.9	17.1	22.4	95.8	311.4	150	90	17	58	79	52
	M2P	5.3	6.1	4.6	8.2	24.4	50.0	100	140	11	14	79	52
	M3G	66.8	83.2	29.1	28.9	1,943.9	2,404.5	180	180	47	40	79	52
	M3P <sup>6</sup>	101.5	78.8	10.7	16.8	1,086.1	1,323.8	80	120	30	34	79	52
	M4G	9.1	26.9	29.1	28.9	264.8	777.4	180	180				
Douglas-fir	D3G	-	0.4	-	35.7	-	14.3	-	160	-	68	-	104
	D3P	-	0.5	-	15.1	-	7.6	-	160	-	30	-	104
	D4G	-	0.8	-	48.0	-	38.4	-	290	-	50	-	104
Ponderosa and Jeffrey Pine	P3P	7.2	-	7.5	-	54.0	-	100	-	22	-	52	-
Red Fir	R2N	3.4	-	6.9	-	23.5	-	150	-	9	-	83	-
	R3G	14.6	-	33.8	-	493.5	-	290	-	38	-	83	-
	R3P <sup>6</sup>	7.7	-	9.7	-	74.7	-	190	-	17	-	83	-
	R4G	0.4	-	33.8	-	13.5							
Lodgepole Pine	LPX	6.1	-	9.8	-	59.8	-	80	-	26	-	37	-
Plantations	PL	48.3	43.4	0.0	0.0	0.0	0.0	0-30	0-30	unestimated	unes- timated	79	52
<b>TOTAL</b>		<b>276</b>	<b>254</b>			<b>4,133</b>	<b>4,927</b>						

**Abbreviated Terms and Meanings:**

- 1 M = thousand  
 2 MBF = thousand board feet  
 3 MMBF = million board feet  
 4 CF/AC/YR = cubic feet/acre/year

- 5 **Size classes** (crown diameter):  
 2 = pole-size timber (6-12 feet)  
 3 = small sawtimber (13-24 feet)  
 4 = medium/large sawtimber (25+ feet)  
**Density classes:**  
 G = good stocking (40-100 percent)  
 P = poor stocking (10-40 percent)  
 N & X = all density classes  
 6 These strata include size class 3 and 4

**Table D-3  
Present and Future Forest Conditions**

	Unit of Measure	Suitable Land
<b>Present Forest<sup>1</sup></b>		
Growing Stock	MMCF <sup>2</sup>	1,358
	MMBF	9,060
Live Cull	MMCF	61
	MMBF	202
Salvable Dead	MMCF	6
	MMBF	41
Annual Net Growth	MMCF	21
	MMBF	140
Annual Mortality	MMCF	9
	MMBF	62
<b>Future Forest<sup>3</sup></b>		
Growing Stock	MMCF	2,082 <sup>4</sup>
Annual Net Growth	MMCF	24
Rotation Age	Years	120 <sup>4</sup>

<sup>1</sup> Data Source: Summary reports for the Forest Timber Inventory, Shasta and Trinity National Forests, dated March 30, 1982. Volumes include trees 11+ inches dbh (diameter-at-breast height) to a utilized top.

<sup>2</sup> MMCF/MMBF = million cubic feet/million board feet.

<sup>3</sup> Data Source: FORPLAN (a linear programming model) run PRF, November 18, 1992, for the 16th period (160 years in the future).

<sup>4</sup> Average rotation age for regenerated stands.

**Table D-4  
Timber Productivity Classification**

Potential Growth (Cubic ft/acre/year)	Suitable Lands (M acres)*
Less than 20	0
20-49	24
50-84	334
85-119	133
120+	39
<b>TOTAL</b>	<b>530</b>

\* M acres = thousand acres

---

## Appendix E

### *Water Quality – Best Management Practices*

---

# APPENDIX E

## Water Quality — Best Management Practices

---

### Introduction

The Forest Service water quality maintenance and improvement measures, called Best Management Practices (BMPs), were developed in compliance with Section 208 of the Federal Clean Water Act, PL92-500, as amended. After a lengthy development and public review process from 1977 to 1979, the practices developed by the Forest Service were certified by the State Water Resources Control Board and approved by the Environmental Protection Agency (EPA).

The signing of a 1981 Management Agency Agreement (MAA) resulted in the formal designation of the Forest Service as the water quality management agency for the public domain lands it administers. The BMPs are the measures the State and Federal water quality regulatory agencies expect the Forest Service to implement to meet water quality objectives and to maintain and improve water quality.

There are currently 99 practices documented, 96 of which are certified and approved as BMPs. The three remaining practices are still being improved before referral to the State and EPA for certification and approval. In a like manner, work continues on developing new management practices and evaluating the effectiveness of the existing BMPs.

Due to the dynamic nature of management practice development and refinement, the original Forest Service publication documenting BMPs is continually being updated. The current publication reference is: WATER QUALITY MANAGEMENT FOR NATIONAL FOREST SYSTEM LANDS IN CALIFORNIA, U.S. Forest Service, Pacific Southwest Region publication, 1979. This publication is hereby incorporated by reference into this document. Work is underway to republish the updated version of this text as a Soil and Water Conservation Handbook.

Water quality management is administered on National Forest lands through the continued implementation of BMPs and through the guidance of a 1981 MAA with the State of California Water Resources Control Board.

### Implementation Process

Forest Plans are broad level planning documents that encompass the entire Forest and a multitude of different management activities. Because of the physical-biological diversity of any given National Forest (different soils, vegetation, slopes, presence of surface water, etc.) and the mixture of activities that can occur on various portions of the Forest, site specific methods and techniques for implementing the BMPs are not identified at the Forest planning level. For each individual project that is initiated to implement the Forest Plan, a separate site specific environmental assessment is conducted. The appropriate BMPs necessary to protect or improve water quality and the methods and techniques of implementing the BMPs are identified at the time of this onsite, project specific assessment. In this manner, the methods and techniques can be tailored to fit the specific physical-biological environment as well as the proposed project activities. There are commonly many methods available for implementing a BMP, and not all are applicable to every site. An example is BMP 2.7 Control of Road Drainage. This BMP dictates that roads will be correctly drained to disperse water runoff to minimize the erosive effects of concentrated water.

There are many ways to drain a road correctly, e.g., outslope the road surface, install water bars, install French Drains, inslope the road surface, install culverts, etc. It is during the onsite environmental assessment of a specific road construction project proposal that the appropriate method or combination of methods to correctly drain the road are identified.

After the methods and techniques of implementing the appropriate BMPs are identified, they are discussed by the project interdisciplinary team. As a result of discussions, the appropriate mix of implementation methods and techniques is selected and incorporated into the environmental document as required mitigation measures. These mitigation measures are then carried forward into project plans and implementation documents, e.g., contract language, design specifications, etc., to assure they are part of the project work accomplished. Implementation on the ground is assured by the Forest Service official responsible for onsite administration of the project. Supervisory quality

control of BMP implementation is attained through review of environmental assessments and contracts, field reviews of projects, and monitoring the quality of the water in the project area when warranted.

### Monitoring Process

In 1992, the Region initiated the Best Management Practice Evaluation Program (BMPEP) to provide a feedback loop of monitoring results to track BMP use and effectiveness and improve BMPs when found necessary. Specifically the purpose of the BMPEP is to generate and analyze data to: a) assess the efficacy of the Region's water quality program, and b) identify program shortcomings and initiate corrective actions. The program assesses both the implementation of BMPs and their effectiveness. Evaluating implementation and effectiveness of BMPs in attaining water quality goals and objectives is key to the continued success of the Region's Water Quality Management program in that it will:

Serve as an agency quality control mechanism to determine how well BMPs are being applied and how well the practices protect water quality.

Serve as the feedback loop for the Region's water quality management program to identify:

- a) those BMPs that are in need of revision or improvement;
- b) those practices that need to be developed; and
- c) those water quality standards, goals and objectives that need to be revised and/or developed.

Fulfill Forest Land and Resource Management Planning water quality monitoring commitments.

Develop a record of performance that demonstrates the ability to control nonpoint source pollution on NFS lands in the PSW Region.

Completion of BMP implementation and effectiveness evaluations is also expected to identify validation monitoring and evaluation needs that would be accomplished through subsequent administrative studies or research.

### The Best Management Practices

There are 99 practices identified in eight different resource categories. They are as follows:

#### Timber

Practice No.

- 1.1 Timber Sale Planning Process
- 1.2 Timber Harvest Unit Design
- 1.3 Use of Erosion Hazard Rating for Timber Harvest Unit Design
- 1.4 Use of Sale Area Maps for Designating Water Quality Protection Needs
- 1.5 Limiting Operating Period of Timber Sale Activities
- 1.6 Protection of Unstable Areas
- 1.7 Prescribing the Size and Shape of Clearcuts
- 1.8 Riparian Management Zone Designation
- 1.9 Determining Tractor Loggable Ground
- 1.10 Tractor Skidding Design
- 1.11 Suspended Log Yarding in Timber Harvesting
- 1.12 Log Landing Location
- 1.13 Erosion Prevention and Control Measures During Timber Sale Operations
- 1.14 Special Erosion Prevention Measures on Disturbed Land
- 1.15 Revegetation of Areas Disturbed by Harvest Activities
- 1.16 Log Landing Erosion Prevention and Control
- 1.17 Erosion Control on Skid Trails
- 1.18 Meadow Protection During Timber Harvesting
- 1.19 Streamcourse Protection
- 1.20 Erosion Control Structure Maintenance
- 1.21 Acceptance of Timber Sale Erosion Control Measures Before Sale Closure
- 1.22 Slash Treatment in Sensitive Areas
- 1.23 Five-Year Reforestation Requirement
- 1.24 Non-recurring "C" Provision that can be used for Water Quality Protection
- 1.25 Modification of the Timber Sale Contract

#### Road and Building Site Construction

Practice No.

- 2.1 General Guidelines for the Location and Design of Roads
- 2.2 Erosion Control Plan
- 2.3 Timing of Construction Activities
- 2.4 Road Slope Stabilization (Preventative Practice)

## Appendix E - Water Quality—Best Management Practices

- 2.5 Road Slope Stabilization (Administrative Practice)
- 2.6 Dispersion of Subsurface Drainage from Cut and Fill Slopes
- 2.7 Control of Road Drainage
- 2.8 Constraints Related to Pioneer Road Construction
- 2.9 Timely Erosion Control Measures on Incomplete Road and Streamcrossing Projects
- 2.10 Construction of Stable Embankments
- 2.11 Minimization of Sidecast Material
- 2.12 Servicing and Refueling Equipment
- 2.13 Control of Construction in Riparian Management Zones
- 2.14 Controlling In-channel Excavation
- 2.15 Diversion of Flows Around Construction Sites
- 2.16 Stream crossings on Temporary Roads
- 2.17 Bridge and Culvert Installation
- 2.18 Regulation of Riparian Gravel Borrow Areas
- 2.19 Disposal of Right-of-Way and Roadside Debris
- 2.20 Specifying Riprap Composition
- 2.21 Water Source Development Consistent with Water Quality Protection
- 2.22 Maintenance of Roads
- 2.23 Road Surface Treatment to Prevent Loss of Materials
- 2.24 Traffic Control During Wet Periods
- 2.25 Snow Removal Controls to Avoid Resource Damage
- 2.26 Obliteration of Temporary Roads
- 2.27 Restoration of Borrow Pits and Quarries
- 2.28 Surface Erosion Control at Facility Sites

### Mining

Practice No.

- \*3.1 Administering Terms of the U.S. Mining Laws (Act of May 10, 1872) for Mineral Exploration and Extraction on National Forest system lands
- 3.2 Administering Terms of BLM Issued Permits or Leases for Mineral Exploration and Extraction on National Forest system lands
- 3.3 Administering Common Variety Mineral Removal Permits

### Recreation

Practice No.

- 4.1 Sampling and Surveillance of Designated Swimming Sites
- 4.2 On-Site Interdisciplinary Sanitary Surveys Will be Conducted to Augment the Sampling of Swimming Waters

- 4.3 Provide Safe Drinking Water Supplies
- 4.4 Documentation of Water Quality Data
- 4.5 Control of Sanitation Facilities
- 4.6 Control of Refuse Disposal
- 4.7 Assuring that Organizational Camps Have Proper Sanitation and Water Supply Facilities
- 4.8 Water Quality Monitoring Off-highway Vehicle Use According to a Developed Plan
- 4.9 Sanitation at Hydrants and Faucets Within Developed Recreation Sites
- 4.10 Protection of Water Quality Within Developed and Dispersed Recreation Areas
- 4.11 Location of Pack and Riding Stock Facilities in Wilderness, Primitive, and Wilderness Study Areas

### Vegetative Manipulation

Practice No.

- 5.1 Seed Drilling on the Contour
- 5.2 Slope Limitations for Tractor Operation
- 5.3 Tractor Operation Excluded from Wetlands and Meadows
- 5.4 Revegetation of Surface Disturbed Areas
- \*5.5 Tractor Windrowing on the Contour
- 5.6 Soil Moisture Limitations for Tractor Operation
- 5.7 Contour Disking
- 5.8 Pesticide Use Planning Process
- 5.9 Apply Pesticide According to Label and EPA Registration Directions
- 5.10 Pesticide Application Monitoring and Evaluation
- 5.11 Pesticide Spill Contingency Planning
- 5.12 Cleaning and Disposal of Pesticide Containers and Equipment
- 5.13 Untreated Buffer Strips for Riparian Area and Riparian Management Zone (RMZ) Protection During Pesticide Spraying

### Fire Suppression and Fuels Management

Practice No.

- 6.1 Fire and Fuel Management Activities
- 6.2 Consideration of Water Quality in Formulating Fire Prescriptions
- 6.3 Protection of Water Quality from Prescribed Burning Effects
- 6.4 Minimizing Watershed Damage from Fire Suppression Efforts
- 6.5 Repair or Stabilization of Fire Suppression Related Watershed Damage
- 6.6 Emergency Rehabilitation of Watersheds Following Wildfires

**Watershed Management**

Practice No.

- 7.1 Watershed Restoration
- 7.2 Conduct Floodplain Hazard Analysis and Evaluation
- 7.3 Protection of Wetlands
- 7.4 Oil and Hazardous Substance Spill Contingency Plan
- 7.5 Control of Activities Under Special Use Permit
- 7.6 Water Quality Monitoring
- 7.7 Management by Closure to Use (Seasonal, Temporary, and Permanent)
- \*7.8 Cumulative Off-Site Watershed Effects

**Grazing**

Practice No.

- 8.1 Range Analysis, Allotment Management Plan, Grazing Permit System, and Permittee Operating Plan
- 8.2 Controlling Livestock Numbers and Season of Use
- 8.3 Controlling Livestock Distribution Within Allotments
- 8.4 Range Land Improvements

\* These are the three practices that have not been recommended for certification and approval as BMPs at this time

---

Appendix F

*Developed Recreation Sites  
Acres/ROS Classes*

---

# APPENDIX F

## Developed Recreation Sites Acres/Recreation Opportunity Spectrum Classes

---

*Shasta-Trinity National Forests:*

<b>Number of Recreation Sites</b>		<b>Acres</b>	
81	Forest Service Campgrounds	726	(1,355 camping units)
20	Forest Service Picnic Areas	61	
5	Observation/Interpretive Sites	20	
14	Parking Areas for Boating	67	
3	Swimming Sites	6	
73	Forest Service Trailheads	94	
2	Special Use Rifle Ranges	9	
1	Organization Camp	10	
6	Recreation Residence Tracts	68	
20	Resorts/Marinas	219	
8	Other Special Use Sites	26	

<b>ROS Class</b>	<b>Acres</b>
R	620
RN	571
SPM	83
SPNM	10
<b>Total</b>	<b>1,284</b>

**Abbreviations:**

<b>R</b>	Rural
<b>RN</b>	Roaded Natural
<b>ROS</b>	Recreation Opportunity Spectrum
<b>SPM</b>	Semi-primitive Motorized Recreation
<b>SPNM</b>	Semi-primitive Non-motorized Recreation

## Big Bar Ranger District

Number of Recreation Sites		Acres	
9	Forest Service Campgrounds	39	(110 camping units)
2	Forest Service Picnic Areas	4	
12	Forest Service Trailheads	16	

ROS Class	Acres
RN	59
<b>Total</b>	<b>59</b>

Recreation Site	Acres	ROS Class
Big Bar	1	RN
Big Flat	2	RN
Burnt Ranch	7	RN
Cedar Flat Picnic Area	3	RN
Denny	5	RN
Hayden Flat	8	RN
Hobo Gulch	5	RN
Pigeon Point	3	RN
Ripstein	5	RN
Skunk Point Group Campground	3	RN
Whites Bar Picnic Area	1	RN
<b>Trailheads</b>		
Bear Gulch	1	RN
Big East Fork Canyon Creek	1	RN
Big French Creek	1	RN
Canyon Creek	1	RN
East Fork New River	2	RN
Green Mountain	1	RN
Hobo Gulch	2	RN
Jim Jam	1	RN
Manzanita Ridge	1	RN
Treloar	1	RN
Virgin Creek	3	RN
Waldorf Crossing	1	RN

## Hayfork Ranger District

Number of Recreation Sites		Acres	
5	Forest Service Campgrounds	38	(60 camping units)
2	Forest Service Picnic Areas	4	
1	Recreation Residence Tract	7	
9	Forest Service Trailheads	9	

ROS Class	Acres
R	7
RN	49
SPM	2
<b>Total</b>	<b>58</b>

Recreation Site	Acres	ROS Class
Big Slide	3	RN
Forest Glen	4	RN
Hell Gate	4	RN
Little Rock Picnic Area	3	RN
Natural Bridge Picnic Area	1	SPM
Philpot	2	RN
Scotts Flat	25	RN
<b>Special Uses</b>		
Forest Glen Recreation Residence Tract	7	R
<b>Trailheads</b>		
Bear Creek	1	RN
Big Slide	1	RN
Chanchellula	1	SPM
Lower South Fork	1	RN
Marble Caves	1	RN
Natural Bridge	1	RN
Smokey Creek	1	RN
Trinity River National Recreation Trail (NRT)	1	RN
Winton Flat	1	RN

## McCloud Ranger District

Number of Recreation Sites		Acres
8	Forest Service Campgrounds	93 (89 camping units)
6	Forest Service Picnic Areas	33
2	Observation/Interpretive Sites	8
1	Parking Area for Boating	2
2	Forest Service Trailheads	2
2	Special Use Rifle Ranges	9

ROS Class	Acres
R	16
RN	127
SPM	2
<b>Total</b>	<b>145</b>

Recreation Site	Acres	ROS Class
Ah-Di-Na	30	RN
Algoma	5	RN
Bigelow Bridge	4	RN
Camp 4	6	RN
Cattle Camp	7	RN
Cattle Camp Picnic Area	3	RN
Fowlers Camp	20	RN
Harris Springs	7	RN
Lake McCloud Ramp	2	R
Lakin Dam	4	RN
Lower Falls Picnic Area	5	R
Middle Falls	2	SPM
Nitwit Camp	6	RN
Skunk Hollow	6	RN
Trout Creek Meadow	12	RN
Upper Falls	6	RN
Upper Falls Picnic Area	9	R
<b>Special Uses</b>		
Black Powder Range	5	RN
Rifle Range	4	RN
<b>Trailheads</b>		
Brewer	1	RN
Clear Creek	1	RN

**Mt. Shasta Ranger District**

<b>Number of Recreation Sites</b>		<b>Acres</b>	
6	Forest Service Campgrounds	43	(49 camping units)
1	Forest Service Picnic Area	3	
1	Observation/Interpretive Site	3	
1	Organization Camp	10	
20	Forest Service Trailheads	32	

<b>ROS Class</b>	<b>Acres</b>
RN	81
SPNM	10
<b>Total</b>	<b>91</b>

<b>Recreation Site</b>	<b>Acres</b>	<b>ROS Class</b>
Castle Lake	3	RN
Castle Lake Picnic Area	3	RN
Everitt Vista	3	RN
Gumboot	10	RN
McBride Springs	5	RN
Panther Meadows	5	RN
Sims Flat	10	RN
Toad Lake	10	SPNM

**Special Uses**

Scott Camp Creek Organization Camp	10	RN
------------------------------------	----	----

**Trailheads**

Black Butte	1	RN
Black Lava	1	RN
Bolam Creek	1	RN
Bunny Flat	3	RN
Castle Crags	1	RN
Castle Lake	2	RN
Deadfall Meadow	1	RN
Dobkins	1	RN
Grey Butte	3	RN
Grey Rock Lake Road	1	RN
Gumboot	2	RN
Horse Camp-Sand Flat	2	RN
North Gate Road	1	RN
Old Ski Bowl	5	RN
Parks Creek	2	RN
Picyune	1	RN
Sisson Callahan	1	RN
Soda Creek	1	RN
Toad Lake	1	RN
Whitney Creek Road	1	RN

## Shasta Lake Ranger District

Number of Recreation Sites		Acres	
20	Forest Service Campgrounds	138	(421 camping units)
3	Forest Service Picnic Areas	2	
6	Parking Areas for Boating	32	
3	Forest Service Trailheads	3	
13	Resorts	186	
5	Recreation Residence Tracts	61	
8	Other Special Use Sites	26	

ROS Class	Acres
R	336
RN	87
SPM	25
<b>Total</b>	<b>448</b>

Recreation Site	Acres	ROS Class
Antlers	18	R
Antlers Ramp	8	R
Arbuckle Flat	4	SPM
Bailey Cove	10	R
Bailey Cove Ramp	3	R
Centimudi Boat Ramp	6	R
Deadlun	5	SPM
Dekkas Rock	5	RN
Ellery Creek	8	RN
Fishermans Point Picnic Area	2	R
Gooseneck Cove	4	SPM
Greens Creek	6	SPM
Gregory Creek	8	RN
Hirz Bay	5	R
Hirz Bay Group Campground	4	R
Hirz Bay Ramp	5	R
Jones Valley (Both Loops)	10	RN
Jones Valley Boat Ramp	5	R
Lakeshore East	7	RN
Madrone	6	SPM
McCloud Bridge	4	RN
Moore Creek	4	RN
Nelson Point	3	RN
Oak Grove	15	RN
Packers Bay Boat Ramp	5	R
Pine Point	3	RN
Ski Island	9	RN

**Shasta Lake Ranger District (Continued)**

<b>Recreation Site</b>	<b>Acres</b>	<b>ROS Class</b>
<b><u>Special Uses</u></b>		
Antlers Resort	4	R
Antlers Trailer Resort	25	R
Bridge Bay Resort	40	R
Campbell Creek Recreation Residence Tract	14	R
Didallas No. 1 Recreation Residence Tract	1	RN
Didallas No. 2 Recreation Residence Tract	2	RN
Digger Bay Marina	5	R
Doney Creek Yacht Club	1	R
Jones Valley Resort	5	R
Kamloops	5	RN
Lakeshore Resort	3	R
Lakeshore Villa Dock	1	R
Lakeside Woods Yacht Club	1	R
Lakeview Resort	2	R
O'Brien Holiday Harbor	64	R
Packers Bay Marina	1	R
Salt Creek Recreation Residence Tract	27	R
Shasta Caverns	10	R
Shasta Lake Trailer Park	9	R
Shasta Lake Yacht Club	5	R
Shasta Marina	18	R
Silverthorn Resort	6	R
Silverthorn Tract	17	R
Sugarloaf Cottages Dock	2	R
Sugarloaf Marina	4	R
Tsadi Docks	1	R
<b><u>Trailheads</u></b>		
Pacific Crest Trail (PCT) Peavine	1	RN
PCT Rock Creek	1	RN
Waters Gulch-Packers Bay	1	RN

## Weaverville Ranger District

Number of Recreation Sites		Acres	
27	Forest Service Campgrounds	355	(584 camping units)
5	Forest Service Picnic Areas	13	
2	Observation/Interpretive Sites	2	
7	Parking Areas for Boating	33	
3	Swimming Sites	6	
23	Forest Service Trailheads	27	
7	Resorts	33	

ROS Class	Acres
R	261
RN	145
SPM	50
<b>Total</b>	<b>456</b>

Recreation Site	Acres	ROS Class
Ackerman	20	R
Alpine View	25	R
Bowerman Barn	2	RN
Bowerman Boat Ramp	10	R
Bridge Camp	6	SPM
Bushytail Group Campground	13	RN
Captains Point	1	SPM
Clark Springs Picnic Area	3	R
Clear Creek	7	SPM
Cooper Gulch	6	RN
Eagle Creek	10	RN
East Weaver	5	R
Fawn Group Campground	20	RN
Fairview Boat Ramp	1	R
Goldfield	4	SPM
Hayward Beach	3	R
Hayward Flat	98	R
Horse Flat	12	SPM
Jackass Spring	7	SPM
Mariners Roost	3	SPM
Mary Smith	8	RN
Minersville	11	RN
Osprey Visitor Center	1	RN
Pine Cove Boat Ramp	4	R
Preacher Meadow	6	RN
Ridgeville	6	SPM
Ridgeville Island	2	SPM
Rush Creek	25	RN
Scott Mountain	4	RN
Stoney Creek Group Campground	3	R
Stoney Creek Swim Area	4	R
Stoney Point	11	R

**Weaverville Ranger District (Continued)**

<b>Recreation Site</b>	<b>Acres</b>	<b>ROS Class</b>
Stuart Fork Boat Ramp	1	R
Tanbark Picnic Area	3	R
Tannery	37	R
Tannery Beach	3	R
Trinity Center Boat Ramp	3	RN
Trinity River	3	RN
Trinity Visitor Center	3	RN
Tunnel Rock	2	RN
<b><u>Special Uses</u></b>		
Cedar Stock Resort	7	R
Estrellita Marina	2	R
Pine Cove Marina	2	R
Pinewood Cove Resort	10	R
Recreation Plus Resort	8	R
Trinity Alps Marina	3	RN
Wyntoon Resort	1	R
<b><u>Trailheads</u></b>		
Adams Lake	1	RN
Bear Creek	1	RN
Billy's Peak	1	RN
Boulder Creek	1	RN
Boulder Lakes	2	RN
Eagle Creek	1	RN
East Fork Coffee Creek	1	RN
East Weaver Lake	1	RN
Granite Peak	1	RN
Lake Eleanor	1	RN
Long Canyon	1	RN
North Fork Coffee Creek	1	RN
North Fork Swift Creek	1	RN
Packers Peak	1	RN
Ripple Creek	1	RN
Rush Creek Lake	1	RN
South Fork Coffee Creek	1	RN
Stonewall Pass	2	RN
Stuart Fork	2	SPM
Sugarpine	1	RN
Swift Creek	2	RN
Tangle Blue	1	RN
Union Creek	1	RN

## Yolla Bolla Ranger District

Number of Recreation Sites		Acres	
6	Forest Service Campgrounds	20	(42 camping units)
1	Forest Service Picnic Area	2	
4	Forest Service Trailheads	5	

ROS Class	Acres
RN	23
SPM	4
<b>Total</b>	<b>27</b>

Recreation Site	Acres	ROS Class
Basin Gulch	9	RN
Beegum Gorge	1	SPM
Deerlick Springs	6	RN
Gemmill Gulch Picnic Area	2	RN
North Fork Beegum	1	SPM
Tomhead Saddle	2	SPM
White Rock	1	RN
<b>Trailheads</b>		
Rat Trap Gap	1	RN
Stuart Gap	1	RN
Tomhead	2	RN
West Low Gap	1	RN

---

## Appendix G

### *Fish, Wildlife, and Botany*

---

# APPENDIX G

## Introduction to Models

---

Habitat Capability Models are considered as guides for wildlife species populations. As each population or nest site is unique, managers should assess the health of the individual(s), then apply the models accordingly\*. Among the models, the northern goshawk and western pond turtle have been updated with current literature and guidelines. The other models have been reviewed and edited to reflect information from the Wildlife Habitat Relational program (WHR), Habitat Suitability Index models and other Habitat Capability models.

Home ranges vary with the abundance of suitable habitat available to a reproductive pair or single individual. As a result, home ranges, and nest territories were not documented in the models. Instead the size of these areas should be determined by the biologist, based on

the amount, distribution and condition of suitable habitat. Current and professional literature results, professional opinions, and habitat models should be used in concert to assist the biologist in the decision.

\* First, the manager can use a model to determine the existing level of habitat suitability for an area, based on a species model. Then, the health of the population or nest site for that species can be assessed. For unhealthy populations or low reproductive nest sites, limiting factors can be determined and then managed to increase the suitability of the habitat. For healthy populations, it would be of interest to the Forest to know at what level they are existing, to determine the accuracy of the models.

### List of Tables

Table G-1: .....	Bald Eagle Habitat Capability Model
Table G-2: .....	Black Bear Habitat Capability Model
Table G-3: .....	Deleted
Table G-4: .....	Fisher Habitat Capability Model
Table G-5: .....	Northern Goshawk Habitat Capability Model
Table G-6: .....	Western Gray Squirrel Habitat Capability Model
Table G-7: .....	Deleted
Table G-8: .....	Mule Deer Habitat Capability Model
Table G-9: .....	Peregrine Falcon Habitat Capability Model
Table G-10: .....	Pileated Woodpecker Habitat Capability Model
Table G-11: .....	Pine Marten Habitat Capability Model
Table G-12: .....	Spotted Owl Habitat Capability Model
Table G-13: .....	Northwestern Pond Turtle Habitat Capability Model

**Table G-1**  
**Bald Eagle Habitat Capability Model**  
*Haliaeetus leucocephalus*  
 Life Form 12  
 Species Status - Federal Endangered

<b>Season: Spring &amp; Summer</b>	<b>High</b>	<b>Moderate</b>	<b>Low</b>
<b>Habitat: Variable</b>	<b>(Preferred)</b>	<b>(Required)</b>	<b>(Marginal)</b>
<b>Vegetation Types and Seral Stages</b>	Ponderosa pine 4a; mixed conifer 4a; eastside pine 4a	Red fir 4a; lodgepole pine 3a; ponderosa pine 4b; mixed conifer 4b; mixed evergreen 4a, 4b	Red fir 4b, 4c; lodgepole pine 4a, 4b, 4c; eastside pine 4c; mixed conifer 4c; mixed evergreen 4c
<b>Nest Tree</b>	Dominant ponderosa pine, Jeffrey pine or sugar pine; >38" diameter at breast height (dbh); large limbs, open crown	Dominant ponderosa pine, Jeffrey pine or sugar pine; 28"-38" dbh; large limbs, open crown	Other tree species
<b>Pilot Trees</b>	2-3 snags or spike top trees/acre within 1/4 mile of the nest, 1 snag/acre of which is >24" and >80' tall	2-3 snags or spike top trees or open canopy live trees/acre within 1/4 mile of the nest, 1 snag/acre of which is >16" dbh and >80' tall	<2 snags/acre 16" dbh, 20'-80' tall
<b>Distance to Food Supply From Nest</b>	<1/2 mile	1/2 - 1 mile	>1 mile
<b>Food Supply</b>	Abundant supply of cold and warmwater fish and/or waterfowl		Trout as sole food source
<b>Nest Territory</b>	Size dependent upon literature review and the suitability, distribution and amount of available habitat		
<b>Disturbance</b>	No disturbance within the primary zone from January 1 to August 15		

**Table G-1  
Bald Eagle Habitat Capability Model  
(Continued)**

<b>Season: Winter</b>	<b>High</b>	<b>Moderate</b>	<b>Low</b>
<b>Habitat: Variable</b>	<b>(Preferred)</b>	<b>(Required)</b>	<b>(Marginal)</b>
<b>Vegetation Types</b>	Ponderosa pine; mixed conifer; eastside pine; Douglas-fir; mixed evergreen	Lodgepole pine; black oak; gray pine-oak; riparian; Oregon oak; red fir	Other vegetation types
<b>Seral Stages</b>	4a, 4b, 4c-older	3a, 3b, 3c	3a, 3b, 3c
<b>Roost Trees (night)</b>	Dense stands of conifer (4b, 4c, 4c-older); roost trees are higher than the surrounding canopy or on the edge of forest openings where flight paths are unrestricted	Open stands of conifer (4a), oaks, or juniper with large limbs	Only deciduous trees are available
<b>Perches (day)</b>	Dominant trees (live or snags) with an open crown and stout limbs	Perch trees available	In areas where waterfowl is the main food supply, perch trees are desirable but not necessary
<b>Distance to Food Supply From Roosting Trees</b>	< 10 miles	10-12 miles	> 12 miles
<b>Food Supply</b>	Waterfowl and/or cold and warmwater fish. Opportunistically feeds on road kills and other carrion. Trout as sole food source		
<b>Disturbance</b>	No disturbance within the primary zone from January to August 15th		

**Table G-2.**  
**Black Bear Habitat Capability Model**

*Ursus americanus*

Life Form 15

Species Status - Harvest

<b>Season:</b> <b>Year-round</b>	<b>High</b>	<b>Moderate</b>	<b>Low</b>
<b>Habitat:</b> <b>Variable</b>	<b>(Preferred)</b>	<b>(Required)</b>	<b>(Marginal)</b>
<b>Vegetation Types</b> <b>(within 2 square miles)</b>	Interspersion of these habitat types: conifer, riparian, oak woodland, mast or berry-producing brush fields (especially manzanita).		
	All types	3 of 4 types	2 of 4 types
<b>Seral Stage</b> <b>(Conifers)</b>	3b, 3c, 4b, 4c, with 1 and 2	3a, 4a with 1 and 2	1 and 2
<b>Dead and Down</b> <b>Woody Material</b> <b>(various stages of decay)</b>	>45 tons/acre	30-45 tons/acre	<30 tons/acre
	Equivalent to >24 logs/acre, 10' long at the largest available diameter	Equivalent to 16-24 logs/acre, 10' long at the largest available diameter	Equivalent to <16 logs/acre, 10' long at the largest available diameter
<b>Oaks</b> <b>(basal area)</b>	>40 square feet/acre	30-40 square feet/acre	<30 square feet/acre
	Half of the requirement will be met with oaks over 14" dbh. The remainder will be met with smaller size classes serving as replacements for the larger size classes.		
<b>Brush Fields</b> <b>(or brushy inclusions)</b>	Mast or berry-producing shrubs or trees including manzanita, tanoak, hazelnut, dogwood and others	Mast or berry-producing shrubs or trees including manzanita and some other species	Mast or berry-producing shrubs or trees excluding manzanita
<b>Den Sites</b>	A combination of these denning sites: >48" dbh tree with scarface, talus slopes, caves or mine shafts, large hollow logs.		
	>25 sites/square mile	10-25 sites/square mile	<10 sites/square mile
<b>Distance to Free Water</b> <b>From Foraging Areas</b>	<.25 mile to open water	.25-.5 mile to open water	>.5 mile to open water
<b>Riparian Habitats</b>	Required for cooling, seasonal foods, escape, security cover, and travel corridors.		
<b>Food Supply</b>	Acorns, berries, fruits, nuts or terrestrial invertebrates. Plants high in protein and low in cellulose.		
<b>Territory Size</b>	Size dependent upon literature review and the suitability, distribution and amount of available habitat.		
<b>Road Density</b> <b>(open)</b>	Determined on a site by site basis		

**Table G-4**  
**Fisher Habitat Capability Model**

***Martes pennanti***

Life Form 14

Species Status - Sensitive

<b>Season:</b> <b>Year-round</b>	<b>High</b>	<b>Moderate</b>	<b>Low</b>
<b>Habitat:</b> <b>Variable</b>	<b>(Preferred)</b>	<b>(Required)</b>	<b>(Marginal)</b>
<b>Vegetation Types</b>	Mixed conifer, Ponderosa pine, Douglas-fir, Red fir, Jeffrey pine, Lodgepole pine, Subalpine conifer, Eastside pine with interspersions of Montane Hardwood Conifer or Montane Riparian	Same as preferred	Same as preferred, plus hardwoods
<b>Seral Stage</b>	3c, 4c	3b, 4b	4a (if adjacent to denser stands)
<b>Tree Canopy Diversity</b>	4 or more stories with shrubs	3 stories with shrubs	two storied with shrubs
<b>Percent of Overstory Comprised of Deciduous Species</b>	10-50 percent	< 10 & 50-75 percent	>75 percent
<b>Riparian</b>	Used as travel corridors and for foraging		
<b>Distance from Closed Canopy Habitat</b>	< 1/4 mile	< 1/2 mile	1/2-to 1 mile
<b>Size of Travel Corridors</b>	>600'	300'-600'	<300'
<b>Snag Size</b>	>36" dbh	24"-36" dbh	<24" dbh
<b>Snag Density/Acre</b>	4-7	2-4	<2
<b>Dead and Down Woody Material (various stages of decay)</b>	> 10 tons per acre >6 logs/acre over 10' long at largest available diameter	5-10 tons per acre 2-6 logs/acre over 10' long at largest available diameter	<5 tons per acre 2 logs/acre over 10' long at largest available diameter
<b>Nest Sites Type and/or Characteristic</b>	Hollow logs and snags; 30 to 40 inches in diameter		
<b>Food Supply</b>	Small and medium mammals		
<b>Territory Size</b>	Size dependent upon literature review and the suitability, distribution and amount of available habitat		
<b>Road Density</b>	Determined on a site by site basis		

**Table G-5**  
**Northern Goshawk Habitat Capability Model**

*Accipiter gentilis*

Life Form 11  
Species Status - Sensitive

Season: Year-round	High	Moderate	Low
Habitat: Variable	(Preferred)	(Required)	(Marginal)
<b>Vegetation Types</b>	Douglas-fir, ponderosa pine, mixed conifer, Jeffrey pine, red fir	Riparian, aspen, lodgepole pine, black oak	Other vegetation types
<b>Seral Stages</b>	4b, 4c, 5	3b, 3c	2, 3a, 4a
<b>Pattern</b>	3 Seral Stages including at least one 4b, 4c, or 4c-older	3 Seral Stages including at least one 3b, 3c, 4a or older	<3 Seral Stages including at least one 3a or older
<b>Stand Structure</b>	<i>Forage Stand 60% habitat mosaic with: Nest Stand 40% habitat mosaic with:</i>		
	>60 percent overstory, 20 percent brush or small trees; 2 openings = 1/10 acre	40-60 percent overstory, 20-30 percent brush or small trees; 1 opening = 1/10 acre	30-40 percent overstory, 30 percent brush or small trees; no opening
<b>Remaining 60% of Nest Stand Structure:</b>	Dense mature forest, no openings, 60%+ canopy closure		
<b>Slope</b>	0-25 percent	25-35 percent	35-50 percent
<b>Distance to Nearest Opening from Nest Stand</b>	< 1/4 mile	1/4 to 1 mile	> 1 mile
<b>Number of Openings Within Nest Stand (0.1 acre or smaller)</b>	>2	1	none
<b>Distance Between Suitable Nest Stands</b>	1/10 - 1/2 mile	1/2 - 2 miles	>2 miles
<b>Number of Nest Stands Per Territory</b>	>2 highly suitable	1 highly suitable 1 moderately suitable	1 moderately suitable 1 marginally suitable
<b>Disturbance</b>	No disturbance within primary zone from February 1 - August 15		
<b>Food Supply</b>	Medium to large birds or small mammals		
<b>Distance to Free Water</b>	< 1/4 mile	1/4 - 1 mile	1 - 3 miles
<b>Foraging and Nest Stand Size</b>	Size dependent upon literature review and the suitability, distribution and amount of available habitat		

**Table G-6**  
**Western Gray Squirrel Habitat Capability Model**

*Sciurus griseus*

Life Form 10

Species Status - Harvest (small game)

<b>Season: Year-round</b>	<b>High</b>	<b>Moderate</b>	<b>Low</b>
<b>Habitat: Variable</b>	<b>(Preferred)</b>	<b>(Required)</b>	<b>(Marginal)</b>
<b>Vegetation Types</b>	Gray or Eastside pine, mixed conifer, oak woodland, riparian, hardwood-conifer	Gray or Eastside pine, mixed conifer, oak woodland, riparian, hardwood-conifer	Mixed conifer
<b>Seral Stage</b>	4a, 4b, 4c	3a, 3b, 3c	3a
<b>Oaks (basal area)</b>	>20 square feet/acre	10-20 square feet/acre	10 square feet/acre
<b>Dead and Down</b>	10 tons/acre (4+ logs 24" diameter, 10' long)	5-10 tons/acre (3-4 logs ≥20" diameter, 10' long)	5 tons/acre plus 1-3 logs ≥20" diameter, 10' long
<b>Den Sites (trees per acre)</b>	2-5 trees 18" dbh with 4 cavities at 15 feet or higher	2-5 trees 15"-18" dbh with 2-4 cavities at 15 feet or higher	1-2 trees 15" dbh with 2-4 cavities at 15 feet or lower
<b>Food Supply</b>	Fungus, acorns, pine/fir cones, forbs, grasses and seeds - in order of importance		

**Table G-8**  
**Mule Deer Habitat Capability Model**

***Odocoileus hemionus***

Life Form 5  
Species Status - Harvest

<b>Season: Spring and Summer</b>	<b>High</b>	<b>Moderate</b>	<b>Low</b>
<b>Habitat: Variable</b>	<b>(Preferred)</b>	<b>(Required)</b>	<b>(Marginal)</b>
<b>Vegetation Types</b>	Interspersion of these habitat types: Conifers, hardwoods, riparian, grassland, chaparral		
<b>Seral Stages</b>	Cover: 3b, 3c, 4b, 4c	Foraging: 1, 2, 3a, 4a	
<b>Aspect (spring)</b>	S 180°	SE to SW 135° - 225°	Remainder
<b>Ratio of Forage to Cover</b>	50:50	20:80 to 75:25	Remainder
<b>Fawning Areas</b>	Meadows and riparian areas associated with brush and conifers		
<b>Distance to Free water From Foraging or Bedding Area</b>	< 1/2 mile	1/2 to 1 mile	1 - 2 miles
<b>Distance to Forage from Cover</b>	< 450 feet	450 - 600 feet	600 - 750 feet
<b>Season: fall</b>			
<b>Vegetation Types</b>	Interspersion of these habitat types: Grassland, hardwoods, chaparral, mixed conifer		
<b>Seral Stages</b>	Cover: 3b, 3c or 4b, 4c	Foraging: 1, 2, 3a, 4a	
<b>Aspect (fall)</b>	N 0°	NE to ESE 45° to 110° WSW to NW 250° to 315°	Remainder
<b>Ratio of Forage to Cover</b>	50:50	20:80 to 75:25	Remainder
<b>Distance to Free Water From Foraging or Bedding Area</b>	< 1/2 mile	1/2 to 1 mile	> 1 mile
<b>Distance to Forage from Cover</b>	240'	240' - 600'	600' - 750'
<b>Oaks (basal area)</b>	> 20 square feet/acre	10 - 20 square feet/acre	10 square feet/acre
Half of the requirement will be met with oaks over 14" dbh. The remainder will be met with smaller size classes serving as replacements for the larger size classes.			
<b>Road Density</b>	Determined on a site by site basis		

**Table G-9**  
**Peregrine Falcon Habitat Capability Model**

***Falco Peregrinus***

Life Form 4

Species Status - Federal Endangered

<b>Season:</b> <b>Year-round</b>	<b>High</b>	<b>Moderate</b>	<b>Low</b>
<b>Habitat:</b> <b>Variable</b>	<b>(Preferred)</b>	<b>(Required)</b>	<b>(Marginal)</b>
<b>Vegetation Types</b>	Riparian, wet meadow, lacustrine, riverine (i.e., habitats which support healthy bird populations)		
<b>Seral Stages</b>	Occurs in all types and seral stages when within range of suitable nesting cliffs as described below.		
<b>Nest Site: Cliffs</b>			
Elevation	<4,000'	4,000' - 8,000'	>8,000'
Cliff Conditions	Vertical faces 75 - 300 feet high with abundant ledges at least 10 square feet, providing a commanding view		Vertical faces <75 feet high with ledges at least 10 square feet
Cliff Aspect at Elevations >4,000'	SE - SW 135° - 225°	NE - SE and SW - NW 45°-135° and 225°-315°	NW - NE 315° - 45°
<b>Distance to Major Water Body from Nest Site</b>	<1/2 mile	1/2 - 1 mile	> 1 mile
<b>Prey Base</b>	Abundant and available avian prey within 6 miles of nesting site. Common prey species are band-tailed pigeon, rock dove, mourning dove, common flicker, jays, starlings, robin, western meadowlark, acorn woodpeckers, red-winged blackbird, cedar waxwing (listed in order of importance).		
<b>Disturbance</b>	No disturbance within primary zone from February 1 to August 15		

**Table G-10**  
**Pileated Woodpecker Habitat Capability Model**

***Dryocopus pileatus***

Life Form 13

Species Status - Special Interest

<b>Season:</b> <b>Year-round</b>	<b>High</b>	<b>Moderate</b>	<b>Low</b>
<b>Habitat:</b> <b>Variable</b>	<b>(Preferred)</b>	<b>(Required)</b>	<b>(Marginal)</b>
<b>Vegetation Types</b>	Montane hardwood-conifer, red fir, Douglas-fir, ponderosa pine, mixed conifer with hardwood (black oak, madrone)	Ponderosa pine, mixed conifer with or without hardwood (black oak, madrone), riparian, lodgepole pine	Subalpine conifer, Valley foothill hardwood, gray pine, Jeffrey pine
<b>Seral Stage</b>			
Nest-Roost	4c, 4c-older	4b	4a, 4b, 4c
Forage	4b, 4c	3b, 3c, 4b	3a, 4a
<b>Nest Sites (type and/or characteristic)</b>	Snag; live tree (aspen and hardwood only)	Dead portion of live tree	Live tree (except hardwoods)
<b>Nest and Roost Tree Dimensions</b>	>30" dbh; >80' high, broken top	24"-30" dbh; 40'-80' high; top intact	20"-24" dbh; 35'-40' high; top intact
<b>Nest and Roost Tree Condition</b>	No bark; no decay (hard)	No bark; moderate decay (moderately hard)	Bark present; advanced decay (soft)
<b>Snag Distribution within Home Range</b>	8 snags/acre; 20" dbh (3 snags 30" dbh)	3-8 snags/acre; 20" dbh (2 snags >24" dbh)	3 snags/acre; 15"-20" dbh
<b>Suitable Nest Site acres (snags 25" dbh)</b>	>0.15	0.1 to 0.15	<0.1
<b>Dead and Down</b>	>20 tons >8 logs over 10' long of largest available diameter	10-20 tons 6-8 logs over 10' of largest available diameter	<10 tons 4-6 logs over 10' of largest available diameter
<b>Distance to Riparian Vegetation</b>	< 1/2 miles	1/2 - 2 miles	2 miles
<b>Riparian Vegetation</b>	>40' tall	20' - 40' tall	10' - 20' tall
<b>Food Supply</b>	Terrestrial insects		
<b>Forage Sites (down logs, snags, live trees)</b>	>25" dbh	18" - 25" dbh	<18" dbh
<b>Distance to Free Water</b>	450 feet	>450 feet	
<b>Home Range</b>	Size dependent upon literature review and the suitability, distribution and amount of available habitat		

**Table G-II**  
**Pine Marten Habitat Capability Model**

***Martes americana***

Life Form 14  
 Species Status - Sensitive

<b>Season:</b> <b>Winter</b>	<b>High</b>	<b>Moderate</b>	<b>Low</b>
<b>Habitat:</b> <b>Variable</b>	<b>(Preferred)</b>	<b>(Required)</b>	<b>(Marginal)</b>
<b>Vegetation Types and Seral Stages</b>	Red fir 4b, 4c; lodgepole pine 3b, 4b; subalpine 4b; riparian 1, 3a, 3b, 3c; wet meadow 1, 2	Red fir 3b, 3c, 4a; lodgepole pine 3a, 3c, 4a, 4c; mixed conifer 4b, 4c; subalpine 4a, 4c	Red fir 3a; mixed conifer 3a, 3b, 3c, 4a; subalpine 3a, 3b, 3c
<b>Vegetation Pattern</b>	Pure red fir, lodgepole pine with herbaceous understory; forest/meadow riparian edge	Pure lodgepole pine, subalpine or mixed conifer	Pure riparian, or riparian/meadow
<b>Dead and Down</b>	>35 tons/acre >20 logs/acre, largest available diameter, 10' long	5-35 tons/acre 2.5-20 logs/acre, largest available diameter, 10' long	5 tons/acre <2.5 logs/acre
<b>Stump Densities</b>	>20 stumps/acre	2.5-20 stumps/acre	<2.5 stumps/acre
<b>Snag Density/Acre</b>	>3 snags/acre (> 15" dbh, 1 snag >27" dbh)	1.5 to 2.5 snags/acre (> 15" dbh)(0.5 snag >27" dbh)	<1.5 snags/acre
<b>Meadow Condition (Vegetative Production within Forest or at Forest/Riparian edge)</b>	> 1,350 pounds/acre	700-1,350 pounds/acre	<700 pounds/acre
<b>Den Sites</b>	Logs, snags, stumps, caves or talus		
<b>Distance to Water, Meadow or Riparian From Foraging Area</b>	< 1/4 mile	1/4 to 1/2 mile	> 1/2 mile
<b>Food Supply</b>	Small to Medium mammals		
<b>Elevation</b>	5,000 - 8,000 feet	4,000 - 5,000 feet 8,000 - 9,000 feet	<4,000 feet >9,000 feet
<b>Home Range</b>	Size dependent upon literature review and the suitability, distribution and amount of available habitat		

**Table G-12**  
**Spotted Owl Habitat Capability Model**  
*Strix occidentalis*

Life Form 14  
 Species Status - Federal Threatened

<b>Season: Year-round</b>	<b>High</b>	<b>Moderate</b>	<b>Low</b>
<b>Habitat: Variable</b>	<b>(Preferred)</b>	<b>(Required)</b>	<b>(Marginal)</b>
<b>Vegetation Types</b>	Mixed conifer, coast range montane, sierra montane	Mixed conifer, coast range montane, sierra montane	Mixed conifer, coast range montane, sierra montane plus white fir, red fir.
<b>Seral Stage</b>	4c, 4c-older	4c	3b, 3c, 4b
<b>Nest Stand Structure (Suitable Habitat)</b>	Multi-layered stands, total canopy closure >80 percent with decadence. Overstory should be >40" dbh and >40 percent canopy closure	Two or more layered stands, a total canopy closure of >70 percent with decadence. Overstory should be >21" dbh and >40 percent canopy closure	Single layer stand, total canopy closure >40 percent; moderate to low decadence
<b>Nest Stand Size</b>	Size dependent upon literature review and the suitability, distribution and amount of available habitat.		
<b>Home Range (Suitable Habitat)</b>	Size dependent upon literature review and the suitability, distribution and amount of available habitat		
<b>Home Range</b>	Size dependent upon literature review and the suitability, distribution and amount of available habitat		
<b>Nest Tree (Snags)</b>	>2.5 per acre >40" dbh	1.5 - 2.5 per acre 24"-40" dbh	1.5 per acre <24" dbh
<b>Distance to Water From Nest Site</b>	< 1/4 mile	1/4 - 1/2 mile	1/2 - 1+ mile
<b>Slope</b>	>50%	25% - 50%	<25%
<b>Aspect</b>	NW - NE 315° - 45°	E - W 90° - 270°	SE - SW 135° - 225°
<b>Dead/Down</b>	>20 tons >8 logs over 10' long of largest available diameter	10-20 tons 6-8 logs over 10' of largest available diameter	<5-10 tons 4-6 logs over 10' of largest available diameter
<b>Food Requirement</b>	Small Mammals		
<b>Disturbance</b>	No disturbance in Primary Zone from February 1 to August 15		

**Table G-13**  
**Northwestern Pond Turtle Habitat Capability Model**

*Clemmys marmorata marmorata*

Life Form 3  
 Species Status - Sensitive

<b>Season: Summer (Nesting Site)</b>	<b>High</b>	<b>Moderate</b>	<b>Low</b>
<b>Habitat: Upland</b>	<b>(Preferred)</b>	<b>(Required)</b>	<b>(Marginal)</b>
<b>Vegetation Types for Nesting</b>	Grass/openings, AGS, PGS, dry meadow	VFH, VHC stands with grassy openings	Coniferous Forest with grassy openings
<b>Seral stages for openings</b>	1, 2a	1, 2a	1, 2a
<b>Soil Type</b>	Compact soil with significant clay/silt content	Compact soil with moderate clay/silt content	Compact soil with low clay/silt content
<b>Slope</b>	0° - 25°	25° - 45°	>45°
<b>Aspect</b>	South facing	South-west facing	Any bearing
<b>Canopy (trees/shrubs)</b>	0% - 10%	10% - 20%	20% - 40%
<b>Distance from Water to Nest Site</b>	Known distances are 3 - 402 meters, with the majority of nests occurring outside the flood plain, where stream scour does not occur and predation from riparian species is reduced.		
<b>Canopy Cover Along Travel Corridors</b>	0% - 100% used, though turtles know to bury into soil or hide under rock and shrubs when travelling in open areas with little canopy. Therefore, areas with more canopy cover may reduce predation.		
<b>Vegetation Density of Travel Corridors</b>	Turtles can traverse through very dense vegetation		
<b>Season: Spring - Fall</b>	<b>High</b>	<b>Moderate</b>	<b>Low</b>
<b>Habitat: Aquatic</b>	<b>(Preferred)</b>	<b>(Required)</b>	<b>(Marginal)</b>
<b>Aquatic Habitat</b>	Slow moving, exposed bodies of water with basking areas and food requirements		
<b>Aquatic Habitat Types</b>	Vernal pools and intermittent streams with nearby permanent water body	Permanent or intermittent streams, permanent pools, or vernal pools	Manmade bodies of water, canals, artificial ponds, sloughs, sewage treatment ponds, etc.
<b>Aquatic Cover</b>	Continuous 75% - 100%	Broken 25% - 75%	Limited <25%
<b>Definition of Types of Cover</b>	Areas mostly inaccessible to predators; turtles able to reach air without exposing themselves	Area mostly inaccessible to predators; turtles exposed when surfacing for air	Cover accessible to predators or turtle not completely hidden; turtle exposed when surfacing for air
<b>Hauling Out Sites for Hatchlings</b>	Hatchlings are poor swimmers and need secured down logs, plants, debris, algae mats and vegetation mats as rest areas		

**Table G-13 (continued)**  
**Northwestern Pond Turtle Habitat Capability Model**

***Clemmys marmorata marmorata***

Life Form 3

Species Status - Sensitive

<b>Season:</b> <b>Spring - Fall</b>	<b>High</b>	<b>Moderate</b>	<b>Low</b>
<b>Habitat:</b> <b>Aquatic</b>	<b>(Preferred)</b>	<b>(Required)</b>	<b>(Marginal)</b>
<b>Aquatic Cover for Hatchlings</b>	Emergent vegetation, small instream branches and small downed snags		
<b>Basking Sites</b>	Secure rocks, logs, planks or instream dead/down woody material, emergent vegetation. Access slope: 0% - 70%; minimal diameter for adults is 4", for Hatchlings, 3cm.		
<b>Basking Site Characteristics</b>	Textured, complex, secured site structures (e.g., bark of Douglas-fir)	Moderate texture secured site (e.g., bark of an oak)	No to light texture unsecured sites (e.g., the bark of alders, madrone)
<b>Food Supply</b>	Adults: Aquatic invertebrates and carrion Hatchlings: Necton		
<b>Water Temperature</b>	This is site dependent; degree of temperature fluctuation tolerated outside of a site's normal temperature regime is approximately 5°. Turtles acclimate to a site's temperature regime and any drastic change is detrimental to a population.		
<b>Main Predators</b>	Native or exotic large predatory fish (e.g., Bass); Bullfrogs and Raccoons		
<b>Desired Presence of Exotics</b>	Eliminated (100%)	Severely reduced (50%-100%)	Moderately Reduced to untouched (<50%)
<b>Impacts of Native Species</b>	Minimal	Moderate	Heavy
<b>Season:</b> <b>Fall - Winter (Hibernation)</b>	<b>High</b>	<b>Moderate</b>	<b>Low</b>
<b>Habitat:</b> <b>Varied</b>	<b>(Preferred)</b>	<b>(Required)</b>	<b>(Marginal)</b>
<b>Vegetation Types</b>	DFR, PPN, VFC, VFH		
<b>Seral Stages</b>	All		
<b>Place of Hibernation</b>	Turtles prefer to bury from 4" to several feet in the duff layer. They will also burrow under moss, logs, rocks and shrubs.		
<b>Disturbance (suggested)</b>	No disturbance within Primary zone or Travel Corridors		
	Year-round	February 1 - October 15	February 1 - August 15

---

## Appendix H

### *Budgets and their Relationship to the Forest Plan*

---

# APPENDIX H

## Budgets and their Relationship to the Forest Plan

---

The purpose of this appendix is to explain the Shasta-Trinity National Forests' (STNF) funding process and the relation between funding levels and implementation of the Forest Plan. The appendix explains: (1) the Federal budget process; (2) the STNF budget and management priorities; (3) supplemental sources of funding; and (4) monitoring of results.

### THE BUDGET PROCESS

The Federal budget process is lengthy, spanning two years, and complex. The STNF's proposed budget is combined with the proposed budgets of all other administrative units to form the Forest Service's proposed budget. This is incorporated into the Department of Agriculture's proposed budget which then becomes part of the President's budget (Office of Management and Budget). After conferee action in the Legislative Branch and compromises to gain Presidential approval, the budget becomes law. The process reverses as funds are allocated downward through administrative levels (Department of Agriculture, Forest Service Chief's Office, Regional Offices) until, finally, the budget becomes reality at the Forest level two years later. The budget is usually amended every step of the way and, thus, can be quite different from what was originally proposed by the Forest. **Figure H-1** shows the Forests' evolutionary budget process to and from Congress.

The role of the Forest Plan in this process is to identify a program level for the Secretary of Agriculture, Congress, and the public, which utilizes the identified resource capabilities and maximizes net benefits to the public. Congress retains the ultimate decision-making power over the budget, not just in total, but also over a variety of individual budget line items such as timber sales, recreation operations, wildlife management, etc., on a nation-wide basis. The Land and Resource Management Plan program level is typically higher than actual budget levels since it is based on full utilization of resource capability and full service concepts. For this reason, and because of the budget process outlined above, it is probable that the actual STNF's budget would never match the budget shown in the Plan. Therefore, it is necessary to measure budgetary performance in implementing the Plan in terms of meeting minimum requirements of the standards and guidelines.

### STNF BUDGET AND MANAGEMENT PRIORITIES

The proposed budget of the Forest Plan would increase by 17 percent when compared to the 1989 average budget. Increases in the budget are recommended for fire, wildlife, recreation and water. These additional dollars are necessary to more adequately control fires, protect and manage wildlife, maintain and enhance recreational opportunities, and protect water quality. (See **Figure H-2**.)

Decreases in the budget are proposed for roads. The majority of the STNF is already roaded and fewer roads will be needed in the future. The Forest Plan provides adequate funding to complete all new roads by the 5th decade and to maintain existing roads.

Timber funding has been reduced to reflect the reduction in the volume harvested in order to provide for management of the northern spotted owl. The remaining acres would require more intensive preparation to satisfy more stringent regulations and to provide for more elaborate cutting prescriptions required under uneven-aged management. Unit costs reflect these requirements.

Should Congress continue to fund resource programs separately as in the past, or provide inadequate overall funding, adjustments would be required in planned output levels and the rate at which some provisions of the Plan would be implemented. For example, should allocated funds to the STNF's for timber sale preparation and administration decrease below the current level, the sale targets in the Plan would have to be decreased. If funds for recreation construction projects stay at the current level, most of the planned campground and trail construction projects would not be completed in the coming decade.

While output levels listed in the Plan are tied to budget levels, output targets are only one aspect of the Plan. The Plan establishes clear management policy and practices for the Forests. This includes the minimum management requirements (MMRs), minimum implementation requirements (MIRs), Forest goals and policy, standards and guidelines (see Chapter II of the EIS and Chapter 4 of the Forest Plan). In addition,

## Appendix H - Budgets & Their Relationship to the Plan

the Plan establishes activities that are appropriate throughout the Forests (See Management Prescriptions and Management Area Direction.). For example, areas designated for semi-primitive non-motorized recreation would not be accessed by new, permanent roads or scheduled for timber harvesting, while other areas would be managed primarily for timber production. The Forest goals and policies and land allocations are budget-independent. They would be adhered to no matter what budget level is appropriated in the yearly funding process.

Some of the Plan's management direction is budget-dependent, as described above. This applies not only to commodity production and recreation development, but to watershed rehabilitation and wildlife habitat enhancement as well. In no case, however, would MMRs, MIRs and management standards and guidelines be violated in order to meet production goals. For example, the Plan requires that in riparian areas preference be given to protection of riparian-dependent resources. This standard cannot be relaxed to increase timber harvesting or grazing.

In addition, under the National Environmental Policy Act (NEPA), an environmental analysis is prepared for every project that may affect the Forests' resources. If such an analysis shows that a project cannot be accomplished without violating the Forests' standards and guidelines, the project would be modified or not done at all.

### **SUPPLEMENTAL SOURCES OF FUNDING**

The budget the Congress gives to the Forest Service authorizes it to spend appropriated and trust funds. However, while the budget is paramount in order to carry out National Forest activities, it is not the only factor that allows a Forest to get work done. Forests also receive money and services from other sources. These other sources are becoming increasingly important.

Cooperators aid greatly in accomplishing needed work. Historically, a range of between one and two million dollars has been provided by others to do "co-

op" work. Each year, significant amounts of road maintenance, boat ramp maintenance, and wildlife habitat improvements are accomplished with money deposited by cooperators and supplemented by Forest Service funds. Some of these require matching Forest Service funds and accomplishing specific cooperator goals which are compatible with Forest Service management objectives. Another class of cooperative work is that which is performed by the Forest Service and billed back to cooperators for reimbursement. Reimbursements for work performed also added significantly to some program areas. For example, in 1989 the following projects were funded in this way:

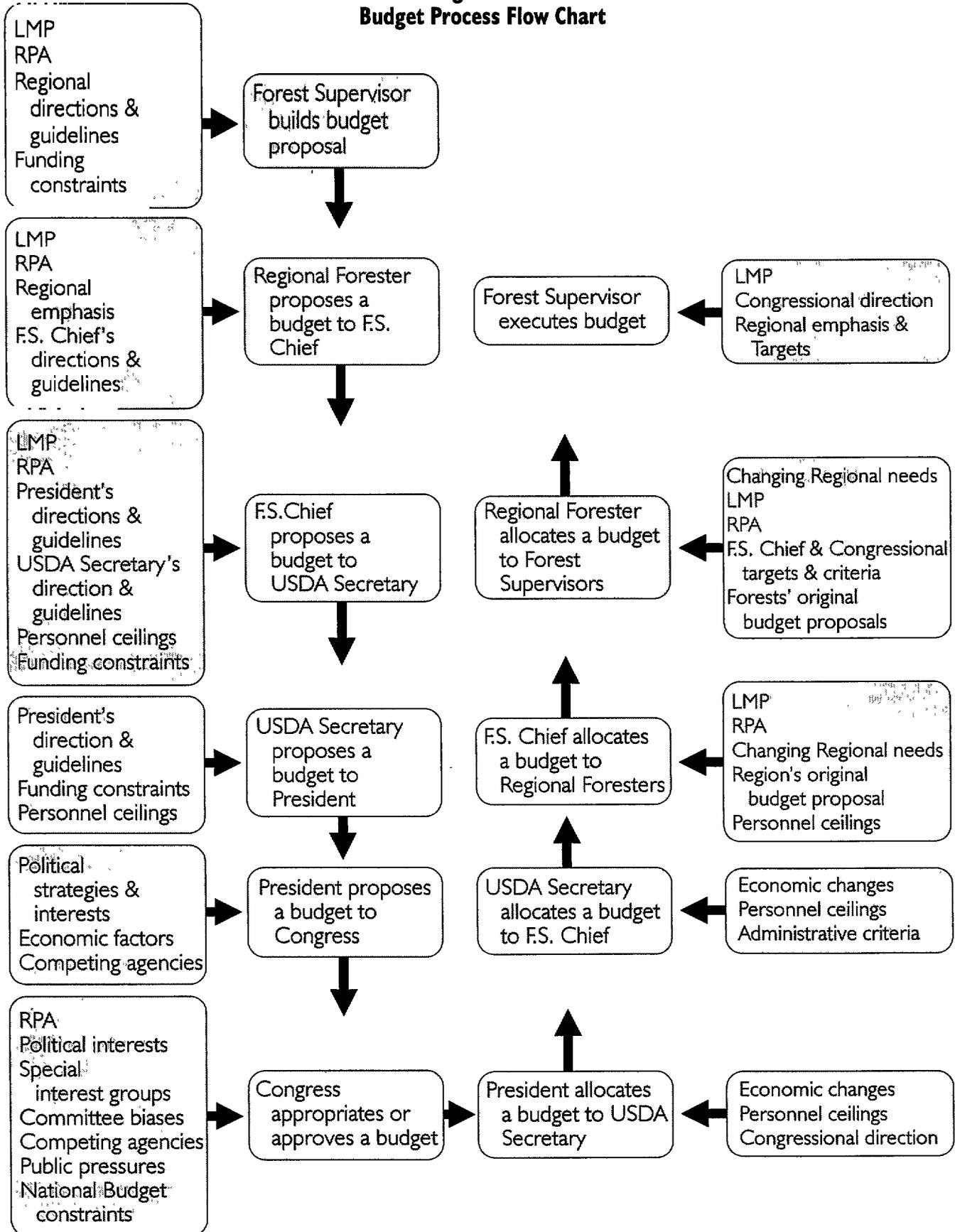
<u>Project</u>	<u>Amount</u>
Trinity River Basin	\$635,000
Shasta Dam Off-Highway Vehicle (OHV) Phase I	\$50,000
Shasta Dam OHV Phase II	\$50,000

As a continuing effort, Forests' personnel are investigating ways to improve efficiency and productivity by looking at all available programs, to be funded through the Federal treasury or from other sources, in an attempt to accomplish more with the resources available.

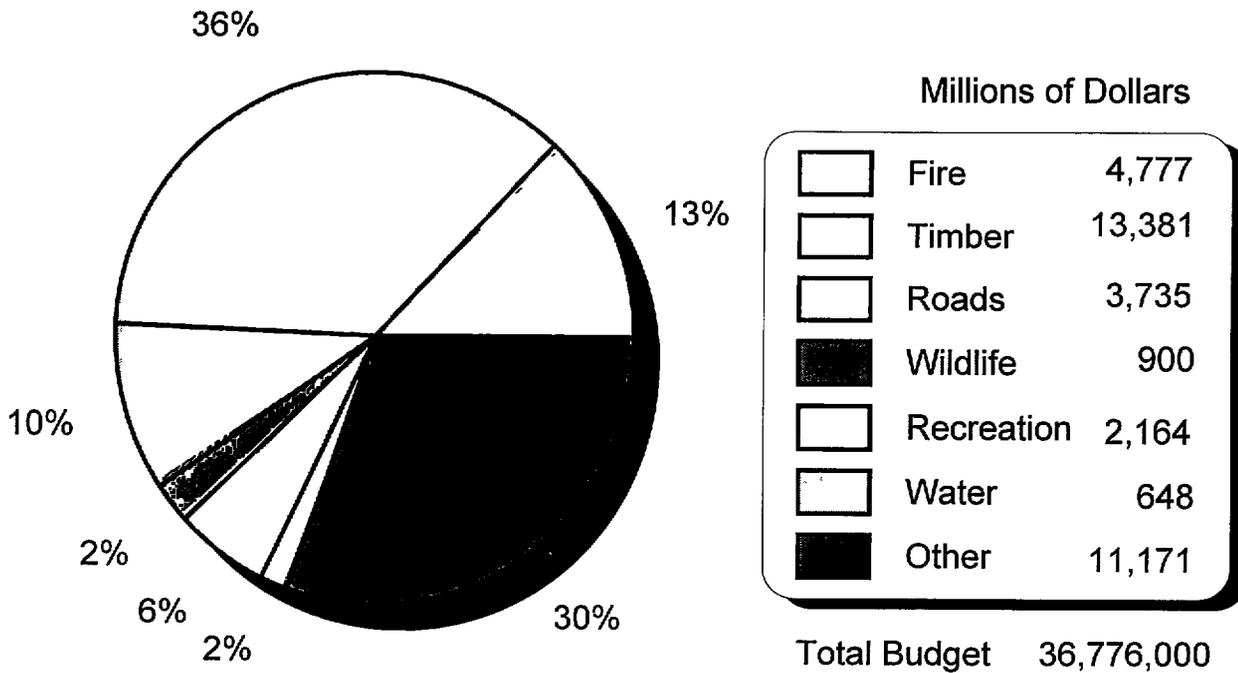
### **MONITORING**

The Forest Plan includes a section on monitoring which keeps track of the goals set during the planning period (see Chapter 5). If the Forests vary to a large extent from accomplishing the objectives set in the Plan, a Plan amendment or revision may be required. The reasons for not meeting specific targets can be many, lack of funding being only one of them. Environmental factors, such as weather, major fires, and project level environmental analysis can have significant impacts. Since objectives are expressed in average annual terms for a ten year period, accomplishment levels at less than the annual average would not automatically trigger a Plan amendment. The allowed variability for each monitoring item is shown in the Monitoring Plan. If Forest activities fall outside of the allowed variability, then a Plan amendment or revision could be required.

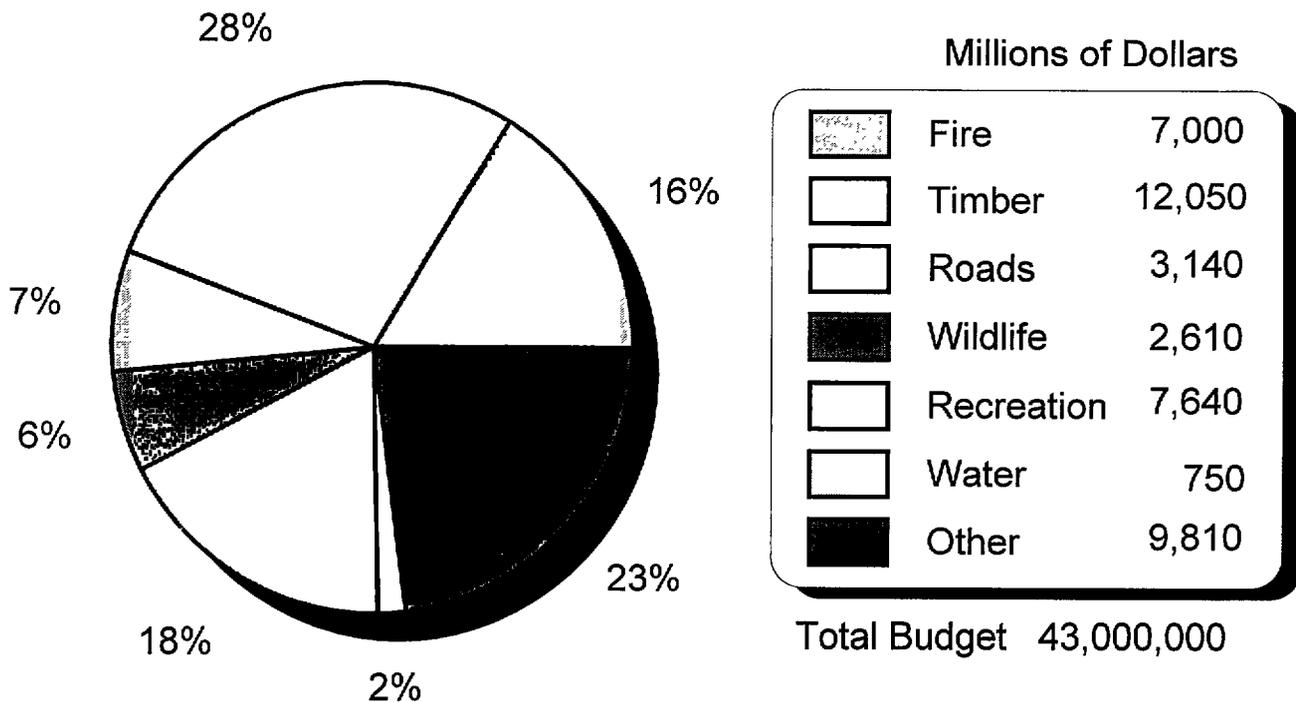
**Figure H-I**  
**Budget Process Flow Chart**



**Figure H - 2**  
**Historical and Planned Budgets**  
**Percent of Total 1989 Budget**



**Forest Plan 1st Decade Average**



---

# Appendix I

## *Timber Land Suitability Criteria*

# APPENDIX I

## Timber Land Suitability Criteria

Lands which are considered as tentatively suitable for timber production will be determined in accordance with the National Forest Management Act (NFMA) regulations (36 Code of Federal Regulations [CFR] 219.14). This determination must be made before timber harvesting can be done. Timber suitability is to be determined by site-specific analysis using the following criteria and procedures:

### Forest Land Withdrawn From Timber Production.

Lands designated by the Congress, the Secretary of Agriculture, or the Chief of the Forest Service, for purposes that preclude timber production, are classified as unsuitable. Examples are Congressionally designated Wildernesses and classified Research Natural Areas (RNAs). On the Shasta-Trinity National Forests, the following lands are withdrawn from timber production:

- Castle Crags Wilderness;
- Chancelulla Wilderness;
- Mt. Shasta Wilderness;
- Trinity Alps Wilderness;
- Yolla Bolly-Middle Eel Wilderness; and the
- Shasta Mud Flow RNA.

### Forest Land Incapable of Producing Industrial Wood.

Lands that are non-productive or not capable of producing crops of industrial wood are classified as unsuitable for timber production. On the Shasta-Trinity Forests, lands which are incapable of producing an average of at least 20 cubic feet per acre per year are included (Dunning Site Class VI - see below). Tree species which are not being utilized or not expected to be (within the next 10 years) constitute a primary criterion for assigning lands to this category. Forest types such as digger pine, live oak, and pinyon-juniper fall into this classification.

<b>Dunning Site Class</b>	
<b>Site Class</b>	<b>Mean Annual Growth Cubic Feet/Acre</b>
I	120+
II	85-119
III	50-84
IV	50-84
V	20-49
VI	<20

**Physically Unsuitable Forest Land.** Forest lands which are physically unsuitable for timber production are lands where technology is not available to ensure timber production without irreversible damage to soils productivity or watershed conditions. In addition, there is no reasonable assurance that these lands can be adequately restocked within five years after harvest. Economic efficiency is not a factor in determining physical suitability. On the Shasta-Trinity Forests, the following criteria are to be used to determine physical suitability:

*Irreversible Resource Damage.* Extremely unstable lands, including active landslides and inner gorge areas, are classified as unsuitable.

*Non-Regenerable Lands.* The following lands are considered unsuitable:

Slope - continuous slopes greater than 80 percent;

Water Table - high water table and wet soil areas, where water is within two feet of the surface year-round;

Nutrient-Chemical Balance - areas of moderate serpentine Mineralogy or pumaceous mineralogy where pH is less than or equal to 4.5;

Rock Fragments - areas where coarse rock fragments greater than 2 inches in diameter, within 12 inches of the soil surface, make up more than 60 percent of the soil profile and where the available water-holding capacity (AWC) is less than 1.9 inches;

Moisture Stress - areas where the AWC is less than or equal to 1.3 inches and the Dunning Site Class equals IV or V.

Lands which are considered to be suitable but are very difficult to regenerate by artificial means will be classified as suitable, but not for clearcutting. Natural regeneration will normally be relied upon to reforest these areas.

The process used in developing the criteria for determining timber land suitability is found in Forest Service Handbook 2409.13, Timber Resource Planning Handbook. An interdisciplinary process, with public involvement, was used on the Forests. Monitoring will determine the need for any necessary changes in these suitability criteria.

---

## Appendix J

### *Description of Silvicultural Treatments Used in Timber Management Prescriptions*

---

# APPENDIX J

## Description of Silvicultural Treatments Used In Timber Management Prescriptions

---

### Site Preparation Options

**Broadcast Burn.** This treatment includes burning debris, brush, and trees in place after construction of firelines. It includes spot or jackpot burning where no mechanical piling is involved. On moderate and low regenerability sites having southerly aspects spring burning is recommended.

**Brush Rake.** Brush rake attachments are mounted on crawler tractors that pile or windrow brush and/or slash to a "free of dirt" standard. Such operations will grub the root crown of sprouting vegetation. This method will be used on slopes less than 40 percent.

**Desiccate and Burn.** This treatment includes herbicide spraying followed by burning or mechanical crushing followed by burning. It is used to increase the proportion of dead fuels to insure complete burns.

**Disking.** Disking will be used primarily on sites east of the Sacramento River Drainage. The disk will be pulled by crawler tractor over brush less than 3 feet high. Disking will be done in 2 treatments separated by one month to allow for drying. Disking must be done the summer before spring planting. Disking is limited to slopes less than 20 percent. This treatment is limited to areas which are free of debris over 10 inches in diameter and free of rocks over 24 inches in diameter.

**Fell and Burn.** This treatment includes the felling of residual trees and brush followed by broadcast burning. It is used where standing vegetation would make burning difficult and/or where additional dead fuels are needed for complete burning. Work is generally done by hand.

**Herbicides.** This treatment can be initiated after burning to suppress regrowth of competing vegetation or it can be applied without burning. Herbicides are applied before planting for plantation establishment. Two methods are available:

*Aerial.* This involves application by aircraft, usually helicopters.

*Ground.* Application is by any method traveling on the surface of the ground.

**Lop and Scatter.** This treatment includes the cutting, lopping, and scattering of residual vegetation to provide planters access to planting spots. No burning is involved.

**Masticators.** The Hydroax, Shar, and Tomahawk masticators can be used on slopes equal to or less than 30 percent. When using this method, the vegetation and debris is chopped. This treatment is not generally followed by burning. It is not recommended for use with sprouting species.

**Scalp.** This treatment includes hand scalping of undesirable grass, rock, soil, debris, or ash from the immediate planting area. It is most often used on steep slopes where only scattered portions of the planting areas need treatment or mechanical methods are not environmentally or economically feasible.

**Subtilling.** This treatment is used on areas with shallow hardpans, such as volcanic soils on the McCloud and Mt. Shasta Districts. Soil is plowed to about an 18-inch depth to break up hardpans and facilitate planting; it is also called ripping.

**Terracing.** This treatment is used on slopes between 20 and 60 percent to cut below the root system of competing sprouting species where herbicides or mechanical means are not practical. It is also used to remove inhibiting surface soil layer (pumice rock) on grounds steeper than those which can be handled by V-plow or where volcanic areas are involved. Terracing is also used on harsh sites to improve the soil structure, soil moisture holding capacity, and the seeding environment.

**V-Plow.** The V-plow can be used for very low brush and grass areas such as rabbit brush, sagebrush, scrub manzanita, and grass. Areas treated with V-plow can be planted immediately after treatment. The V-plow removes the top 4 to 18 inches of soil from the planting site but is not good on rocky soils where rocks greater than 24 inches in diameter exist. The V-plow is not suited for shallow soil areas. This treatment can be used on slopes that are equal to or less than 20 percent. In actual practice the V-plow is used primarily on the east edge of the Mt. Shasta District and on the McCloud District.

## Competing Vegetation—Explanations and Assumptions

Control of competing vegetation can be broken into three categories:

**Site Preparation.** Treatments are applied before planting to suppress regrowth of the root systems of competing vegetation. This is necessary for conifer seedlings to become established during their first growing season.

**Plantation Release.** Under this option treatments are applied after planting. Two variations of this option are used:

*Release for Establishment.* Treatments are aimed at reducing root competition from competing vegetation to increase the availability of moisture and nutrients to insure that planted seedlings can become established. This option is usually performed within three years of planting.

*Release for Growth.* Treatments are applied to established plantation to increase the growth rate of the planted trees by reducing shade from competing vegetation. Root competition is reduced as well. This treatment is usually done between the 3-8 years after planting.

Vegetative control for plantation establishment and/or growth is usually necessary where grass or persistent leafed, sprouting brush and/or trees are found under nonstocked or sparsely stocked conifer stands (i.e., conifer crown closures which are less than 40 percent).

## REFORESTATION OPTIONS

**Bare Root Planting.** This method is used primarily because of the economics of purchasing stock. It is the best option to use on high to moderate regenerability sites.

**Containerized Seedlings.** These are generally used in hard-to-plant areas or special circumstances. Two methods are available:

Regular containerized seedlings are used primarily when planting pine on rocky sites or where brush and stumps prohibit use of Hoedad-planting tool.

“Super cells” type are employed on low regenerability sites for planting large true fir and Douglas-fir stock.

**Natural Regeneration.** These treatments include two methods:

*Copice.* This involves regeneration of sprouting hardwood species, plus Pacific yew.

*Natural Seeding.* This method is used primarily on low sites for true firs, lodgepole pine, and knobcone pine to supplement artificial regeneration.

## Seedling Protection Options

**Domestic Livestock Control.** Horses, sheep, and cattle are controlled through fencing or other means.

**Herbicide Ground Applications.** Used to control gophers by eliminating preferred gopher feed plants. It is not necessary on ground steeper than 40 percent slopes.

**Insecticide Application.** The insecticide is placed on or around seedlings to protect them from insect damage. It most commonly involves the use of baited meal or sprays for grasshopper control.

**Pheromone Treatment.** This treatment involves application and insect attraction used primarily for pine tip moth control in plantations. It may work well for other insects as well.

**Rodenticide Bait.** The bait is placed in underground burrows to control pocket gophers. Both mechanical burrow builders and hand baiting are used.

**Shade.** This method is employed to control microclimates at or near soil surfaces to reduce maximum temperatures or stress. It is primarily useful on southerly aspects for true firs and Douglas-fir. Two methods of shade control are feasible:

*Artificial Shade.* This involves the placement of off-site shading materials, such as shade cards made of treated cardboard.

*Natural Shade.* This method uses shading material found on the site, such as stumps and slash.

**Tube.** This (Vexar) is a device to protect seedlings against stem or top damage by animals.

## Release Options (Vegetative Management)

**Disking.** Tractor pulled plows or disks turn the soils; they are employed on sites that are equal to or less than 20 percent.

**Hand Tools.** Cutting or grubbing brush by saws, axes, hoes, etc. This treatment method is most effective when used for release for establishment of plantations with nonsprouting hardwood and brush, and for release for growth of established plantations for all species of competition except perennial grasses.

**Herbicide Release.** Three methods are involved:

*Aerial Application.* This method primarily employs helicopters but fixed wing aircraft may also be used.

*Boom Spray.* A tractor mounted spray rig is employed using lateral booms.

*Hand Application.* This is herbicide use where brush is less than 50 percent crown closure and less than 6 feet high. Several methods are employed: stem injection; mistblower; "Hudson" sprayers; high pressure hoses from control pumping units; hand application of herbicide pellets; and cut stump.

**Other Mechanical Methods.** Self-propelled machines cut, chop, or crush the competing vegetation on slopes equal to or less than 40 percent.

## Precommercial Thinning or Weeding

**Chemical.** This involves hand injection of undesirable trees.

**Christmas Tree Cutting.** This is a treatment used in true firs and Douglas-fir only. Leave trees or cut trees, whichever is the lesser, will be marked before cutting. On trees removed for Christmas tree use, the cut is made below the lowest living branch.

**Hand Tools.** Hand operated cutting tools, such as chainsaws, handsaws, pruners, hoes, etc., are used to remove unwanted trees.

**Other Mechanical Methods.** This includes self-propelled machines which disk, plow, chop, crush, or cut the unwanted trees. This method is usually employed in areas with less than 40 percent slope. All treatments are usually followed by hand or chemical treatments to cut unwanted trees immediately adjacent to crop trees.

## Intermediate Harvest Options

**Commercial Thinnings.** Commercial thinning entries will normally be not less than 20 years apart. This is done in younger stands prior to regeneration cutting or final harvest. Normally, one to two thinning entries will be scheduled in a stand, depending on slope, site, and species.

**Sanitation/Salvage.** Older dead, down, dying, and high risk trees, which are not expected to survive, are removed prior to the final regeneration cut. May involve one or more entries.

**No Treatment.** A plantation is allowed to grow to final harvest with no cuttings beyond the precommercial thinnings.

## Final Harvest Options

**Clearcutting.** This can be done in the form of patch, strip, or group cutting and is usually followed immediately by artificial reforestation (planting).

**Green Tree Retention.** This practice involves the retention of an average of six live trees per acre that exceed the average diameter of the stand. The trees are retained through the life of the new, regenerated stand, primarily for wildlife and aesthetic purposes.

**Selection.** Includes both single-tree and group selection systems. Regeneration and intermediate cuttings are usually done in one operation, with entries occurring about every 10 to 15 years. Reforestation can be done either artificially or naturally. This treatment is most commonly employed in areas where timber production is not the primary objective.

**Shelterwood.** This treatment includes preparatory step and/or seed step, and the final overstory removal step. Planting usually takes place under the seed trees immediately after the seed step. Overstory removal is initiated as soon as shade is no longer needed for seedling establishment, which is approximately 10 years or less after the seed cut. The use of seed step as a sole means of reforestation without planting is rarely done. The treatment is most commonly employed on sites containing true fir and Douglas-fir on southerly aspects with moderate to low regenerability sites.

---

## Appendix K

### *Road Construction, Maintenance and Use Standards*

---

# APPENDIX K

## Road Construction, Maintenance and Use Standards

---

### Functional Road Classifications

**Forest Arterial Roads.** These roads provide service to large land areas and usually connect with public highways or other Forest arterial roads to form an integrated network of primary travel routes. The location and standards of these roads are usually determined by a demand for maximum mobility and travel efficiency rather than a specific resource-management service. They are usually double lane, developed and operated for long-term land and resource management purposes and constant service. Forest arterial roads are normally Maintenance Level 3, 4, and 5.

**Forest Collector Roads.** These roads serve smaller land areas and are usually connected to a Forest arterial road or public highway. They collect traffic from Forest local roads or terminal facilities. The location and standards for these roads are influenced by long-term multi-resource service needs and travel efficiency. Forest collector roads may be operated for either constant or intermittent service, depending on land use and resource management objectives for the area served by the facility. Forest collector roads are normally Maintenance Level 2, 3, or 4.

Arterial and collector roads usually have standards commensurate with the level of use and mix of traffic types, (i.e., logging and recreation vehicles.)

**Forest Local Roads.** These roads connect terminal facilities with Forest arterial or collector roads or public highways. The location and standard of these roads is usually determined by factors required to serve a specific resource activity, rather than travel efficiency. Forest local roads may be developed and operated for constant or intermittent service. They are usually single lane and are designed to fit the ground with the least impact. Forest local roads are normally Maintenance Level 1, 2, or 3.

Local roads, outside of developed recreation sites, will usually be designed and constructed according to the following guidelines:

Single lane, 12-14 feet wide, outsloped;  
native surface;  
50 feet minimum radius curves;  
turnouts where topography allows;  
permanent drainage structures in stream crossings;  
5-10 mile per hour travel speed.

Within developed recreation sites roads may be single or double lane, usually surfaced or dust abated, and maintained to Level 3, 4, or 5.

### Road Maintenance Levels

The distinction between maintenance levels is not always sharply defined. Some criteria may overlap two or more different maintenance levels. Assignment at specific maintenance levels should be based on the criteria that best fits the management objectives for the road. Some road management objectives, such as for an interior campground road, may not be compatible with some of the following criteria. In these situations, the desired level of user comfort and convenience should be used as the overriding criteria to determine the maintenance level.

#### Maintenance levels are defined as follows:

**Level 1.** This level is assigned to intermittent service roads during the time that management direction requires the road be closed or otherwise blocked to traffic. Basic custodial maintenance is performed to protect the road investment and to keep damage to adjacent resources to an acceptable level. Drainage facilities and runoff patterns are maintained.

Roads receiving Level 1 maintenance may be of any type, class, or construction standard and may be managed at any other maintenance level when management direction requires that they be open for traffic. However, while roads are maintained at Level 1, they are closed or blocked to traffic.

Roads assigned maintenance levels 2-5 may be constant service roads or intermittent service roads during the time they are open to traffic.

## Appendix K - Road Use Standards

**Level 2.** This level is assigned when management direction requires that the road be open for limited passage of traffic. Traffic is normally minor and usually consists of one or a combination of administrative, permitted, dispersed recreation, or other specialized uses. Log haul may occur at this level.

Roads in this maintenance level are normally characterized as single lane, rough facilities intended for use by high clearance vehicles. Passenger car traffic is not a consideration.

**Level 3.** This level is assigned when management direction requires the road to be open and maintained for safe passenger car travel. Traffic volumes are minor to moderate; however, user comfort and convenience is not considered a priority.

Roads at this maintenance level are normally characterized as low speed, single lane with turnouts and spot surfacing. Some roads may be fully surfaced with either native or processed material. The functional classification of these roads is normally local or collector.

**Level 4.** This level is assigned where management direction requires the road to provide a moderate degree of user comfort and convenience at moderate travel speeds. Traffic volumes are normally sufficient to require a double lane aggregate surfaced road. Some roads may be single lane and some may be paved and/or dust abated. The functional classification of these roads is normally collector or arterial.

**Level 5.** This level is assigned where management direction requires the road to provide a high degree of user comfort and convenience. These roads are normally double lane, paved facilities. Some may be aggregate surfaced and dust abated. Functional classification of these roads is normally arterial.

The relationship between maintenance levels is shown in **Table K-1**.

**Table K-2** defines traffic service levels as used in these documents.

**TABLE K-1**  
**Road Maintenance Levels**

(This table is a general guide to help define road maintenance levels)

**MAINTENANCE LEVEL**

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
In accordance with Land Management objectives, provide for the protection of investment, environment, adjacent resources, and user safety.					
<b>Operational Status</b>	Intermittent Service-Closed Status	Constant Service or Intermittent Service - Open Status (some users may be restricted under 36 Code of Federal Regulations [CFR]261.50).			
<b>Traffic Type</b>	Closed N/A	Administratively permitted, dispersed recreation, specialized, commercial haul.	All National Forest traffic general use, commercial haul.		
<b>Vehicle Type</b>	Closed N/A	High clearance, pick-up, 4x4, etc.	All types - passenger cars to large commercial trucks.		
<b>Traffic Volume</b>	Closed N/A	Traffic volume generally increases with maintenance level.			
<b>Surface Type</b>	All types	Native aggregate	Native aggregate, Bituminous	Aggregate, Bituminous	Bituminous
<b>Travel Speed</b>	Closed N/A	Travel speed generally increases with maintenance level.			
<b>User Comfort &amp; Convenience</b>	Closed N/A	Degree of user comfort and convenience increases with maintenance level.			

**TABLE K-2**  
**Traffic Service Levels**

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
<b>Flow</b>	Free flowing with adequate passing facilities.	Congested during heavy traffic such as during peak logging or recreation activities.	Interrupted by limited passing facilities, or slowed by the road condition.	Flow is slow or may be blocked by an activity. Two way traffic is difficult and may require backing to pass.
<b>Volumes</b>	Uncontrolled; will accommodate the expected traffic volumes.	Occasionally controlled during heavy use periods.	Erratic; frequently controlled as the capacity is reached.	Intermittent and usually controlled. Volume is limited to that associated with the single purpose.
<b>Vehicle Types</b>	Mixed; includes the critical vehicle and all vehicles normally found on public roads.	Mixed; includes the critical vehicle and all vehicles normally found on public roads.	Controlled mix; accommodates all vehicle types including the critical vehicle. Some use may be controlled to minimize conflicts between vehicle types.	Single use; not designed for mixed traffic. Some vehicles may not be able to negotiate. Concurrent use between commercial and other traffic is restricted.
<b>Critical Vehicle</b>	Clearances are adequate to allow free travel. Overload permits are required.	Traffic controls needed where clearances are marginal. Overload permits are required.	Special provisions may be needed. Some vehicles will have difficulty negotiating some segments.	Some vehicles may not be able to negotiate. Loads may have to be off-loaded and walked in.
<b>Safety</b>	Safety features are a part of the design.	High priority in design. Some protection is accomplished by traffic management.	Most protection is provided by traffic management.	The need for protection is minimized by low speeds and strict traffic controls.
<b>Traffic Management</b>	Normally limited to regulatory, warning, and guide signs and permits.	Employed to reduce traffic volume and conflicts.	Traffic controls are frequently needed during periods of high use by the dominant resource activity.	Used to discourage or prohibit traffic other than that associated with the single purpose.
<b>User Costs</b>	Minimize; transportation efficiency is important.	Generally higher than "A" because of slower speeds and increased delays.	Not important; efficiency of travel may be traded for lower construction costs.	Not considered.
<b>Alignment</b>	Design speed is the predominant factor within feasible topographic limitations.	Influenced more strongly by topography than by speed and efficiency.	Generally dictated by topographic features and environmental factors. Design speeds are generally low.	Dictated by topography, environmental factors, and the design and critical vehicle limitations. Speed is not important.
<b>Road Surface</b>	Stable and smooth with little or no dust, considering the normal season of use.	Stable for the predominant traffic for the normal use season. Periodic dust control for heavy use or environmental reasons. Smoothness is commensurate with the design speed.	May not be stable under all traffic or weather conditions during the normal use season. Surface rutting, roughness, and dust may be present, but controlled for environmental or investment protection.	Rough and irregular. Travel with low clearance vehicles is difficult. Stable during dry conditions. Rutting and dusting controlled only for soil and water protection.

---

Appendix L

*Description of Management Practices*

---

# APPENDIX L

## Descriptions of Management Practices

---

### Heritage Resource Management

#### Archaeological and Historical Sites

This practice includes protection and enhancement of cultural resources, including physical protection, patrol, law enforcement, signing, and review of permit applications for excavation and research. This management practice also involves the preparation of cultural/historical sites for public interpretation.

#### Native American Sacred Places

This practice includes identification and protection of places of traditional value to Native Americans, specifically those having religious or sacred significance. Consultation with Native Americans is mandatory (Public Law 95-341), and mitigation is not normally possible.

#### Facilities

#### Road Construction and Reconstruction

Preconstruction functions such as road reconnaissance and route analysis, road location, road surveys, road design, and field review are included under this practice. Engineering construction activities include road staking and inspection. Road system inventory and road management activities are also included.

This category also includes arterial, collector, and local road construction/reconstruction as well as timber purchaser road construction and reconstruction, bridge and major culvert preconstruction, and specific construction tasks.

#### Trail Construction and Reconstruction

This practice includes trail and trailhead preconstruction functions such as reconnaissance, location and selection, survey and design, and field review. Trail construction, reconstruction, construction inspection, and the building of trail structures are also included under this practice.

Trail systems inventory and planning and trail system management are also included.

### Fire and Fuels

#### Fire Management

This practice includes all fire management activities with the exception of fuels management. Included are fire management planning and analysis, fire prevention, fire detection, primary/initial attack forces, secondary attack forces, fire reinforcements, forest fire support and facilitating services, initial attack fire suppression action, and escaped fire suppression.

#### Fuels Reduction and Management

This practice consists of fuels treatment resulting from activities such as timber sales, road construction, etc., and the treatment of prior activity (timber sales, roads, etc.) fuels. In these cases treatment was not accomplished or is unsatisfactory under existing standards.

Fuels treatment may be accomplished by:

- Prescribed Fire (broadcast burn, pile and burn, etc.);
- Rearrangement (crushing, shredding, diking, etc.);
- Removal (yarding unmerchantable material [YUM], piling, salvage sales, free use permits etc.); and
- Biomass Utilization (energy generation, especially commercial).

Natural fuels will be treated by either prescribed fire, rearrangement, or removal when they present a serious threat.

The use of fuelbreaks, in lieu of or in combination with fuel treatment, will be used to break up large areas of continuous fuel or unsatisfactory fuel conditions. A fuelbreak is a strip of land one to five chains wide, and is usually located on a major ridge where vegetation has been

modified to control wildfires. Fuelbreaks may be constructed by machine or hand using prescribed fire, removal, rearrangement or combinations thereof.

Maintenance of areas, including fuelbreaks that have previously received fuel treatment, may be done by burning, removal, rearrangement or spraying.

### **Vegetation Treatment by Burning**

Vegetation (i.e., chaparral) will be treated by burning for timber stand improvement, wildlife habitat improvement, range improvement, etc.

## **Fisheries**

### **Coldwater Fishery Habitat Management**

This management practice includes:

1. installing in-stream structures (boulders, gabion and boulder weirs, half logs, log and crib deflectors, etc.) to modify channel morphology and increase suitable fish habitat;
2. fencing streamside areas and planting riparian vegetation to increase streambank cover and canopy over the stream;
3. removing fine sediments from spawning gravels;
4. stabilizing landslide toes to reduce fine sediment delivery to stream channels; and
5. modifying or removing barriers to migrating spawning fish, particularly for anadromous fish species. This objective will be accomplished in lakes by planting or protecting riparian vegetation to minimize sedimentation, controlling human access, and regulating water levels to increase suitable living space.

### **Fisheries Habitat Management - Sensitive Fish**

#### **Summer Steelhead**

1. Management practices recognized as specific to Coldwater Fishery Habitat Management also apply to this description.

2. Summer steelhead populations entering different tributaries will be recognized as discrete, unique, and wild.
3. Summer steelhead populations will be managed recognizing the standards prescribed in the 1986 Region 5 Forest Service edition of the "Summer Steelhead Management Direction." These guidelines are currently being updated by the California Department of Fish and Game (DFG).
4. During project level planning, insure that other resource objectives are consistent with the management of wild populations of summer steelhead.
5. Conduct annual snorkeling surveys in Canyon Creek, the North Fork Trinity River and the South Fork Trinity River to assess the number of summer steelhead adults holding in these tributaries.
6. Continue to evaluate the South Fork Trinity River with the DFG to better determine and understand the relationships between habitat suitability and fish productivity.
7. Given the progressive, but slow recovery process of the anadromous fish habitat within the South Fork Trinity River, the Forest Service will not attempt to manage fish habitat toward historical population levels. Rather, the river habitat will be managed in a manner more conducive to a reduced production potential level.
8. Encourage recreational sportfishing of summer steelhead populations when it will not compromise the viability of a population or conflict with DFG harvest management policies and regulations.
9. Evaluate the best methods available to identify spawning tributaries preferred by summer steelhead within the South Fork Trinity River. Also identify and measure habitat characteristics selected by summer steelhead spawners.
10. Inventory tributaries within the South Fork Trinity River to identify opportunities for Interim Artificial Propagation (IAP).
11. Implement IAP operations only after completion of the criteria selection (screening) process as established by the Trinity River Restoration Program (TRRP) and final approval by DFG.

## Warmwater Fishery Habitat Management

This management practice includes:

1. installation of fish attractors/artificial reef structures;
2. seeding and planting of flood-tolerant and/or drought resistant vegetation in reservoir drawdown zones;
3. nutrient enrichment of select coves;
4. construction of sub-impoundment(s) to increase recruitment of desirable fish species to the parent reservoir;
5. installation of wave-attenuating floating breakwaters to reduce turbidity and improve spawning conditions;
6. assistance to private groups with the monitoring of rearing cages;
7. encouraging the management of water levels by the Bureau of Reclamation to reflect the lifecycle needs of black bass species.

## Integrated Pest Management

This practice deals with the regulation of pest populations to minimize their effects on management objectives in an ecologically sound manner. It consists of a decision-making process and action alternatives.

The decision-making process considers the ecology of the host and its pests throughout the rotation of the Forests. It also considers management objectives and economic values of the resource, coupled with monitoring data on pest populations and environmental factors, that favor their increase. These data are required to decide for or against action to reduce excessive losses to the resource.

Action alternatives may be oriented toward prevention of losses or they may be in direct response to chronic or catastrophic losses. One or more approaches may be used. These approaches emphasize retention of natural systems and include cultural, mechanical, biological, regulatory, and chemical tactics. A no-action alternative may also be appropriate.

Integrated pest management is a dynamic process. It includes monitoring to measure accomplishments, identification of knowledge gaps that interfere with sound decision making, and implementation of new knowledge to continuously update and increase the effectiveness of the system.

## Minerals Development

### Surface (Locatable Minerals\*)

Placer mining or open-pit mining are the standard methods for extracting shallow-depth ores. Placer mining involves the washing of loose alluvium containing minerals such as gold, tin, and tungsten. Open-pit mining is normally used for lower grade ores such as limestone, pumice stone, asbestos, and diatomaceous earth. A waste site and access road are standard operation features.

With either of these methods, the ground surface is normally disturbed. The amount of ground disturbance will vary between 2 and 20 acres, depending on the amount of ore removed and the nature of the operation.

The most common form of mineral extraction on the Shasta-Trinity National Forests is dredging. Little or no surface disturbance generally occurs with this method of mining. Operations must be authorized.

### Subsurface (Locatable Minerals\*)

Vertical shafts or horizontal adits are the standard methods for reaching deep deposits; however, the horizontal adit is preferable. A mine plant, waste site, and access road are normal operation features.

\*In the Whiskeytown-Shasta-Trinity National Recreation Area (NRA) these minerals are leaseable, and leases are under the authority of the Bureau of Land Management (BLM).

### Geothermal (Leaseable Minerals)

The U.S. Department of Interior (USDI), through the BLM, has sole authority to issue leases on National Forest lands, and the BLM is responsible for administering these leases. Forest Service responsibility is outlined in a Memorandum of Understanding with the BLM which deals with protection of surface resources through the National Environmental Policy Act (NEPA) process.

The first major phase in geothermal development is exploratory drilling. Site preparation for drilling includes road construction, drill pad construction, and sump construction. Roads are designed to carry heavy loads year-round. The drill pad is an area leveled and cleared of vegetation. The sump is designed to contain fluids. The drill pad and sump require a surface area of between 1 and 3 acres.

If a power plant is constructed, it must be located within 1 mile of the geothermal wells. A typical power plant site occupies from 3 to 5 acres. The steam is transported from the wells to the plant via above ground pipes, normally 20 inches in diameter. The power plant consists of a turbine, steam condenser, and cooling towers. Transmission lines are normally on towers and occupy a right-of-way area of 18 acres per mile (150 feet wide).

### **Oil and Gas (Leaseable Minerals)**

The Forest Service has sole authority to issue and administer leases on National Forest lands. Forest Service responsibility is outlined in the On-Shore Oil and Gas Act of 1987.

Exploration is the major phase in oil and gas development. An exploration well entails all of the effects of deep well drilling operations. A pad is excavated and a derrick is erected, and there may be road construction. Usually a mud sump is built.

When oil or gas is discovered, a well is developed and transportation facilities are constructed. Buried pipelines are the most common method of transportation to a central collection point. Usually when oil or gas is discovered, a field is developed. Spacing for production wells is usually 40 acres for oil and 160 to 640 acres for gas. Thus, at 40 acre spacing one section of land could have 16 wells and assorted roads and at 160 acres 4 wells per section. Most fields range from 1,000 to several thousand acres.

### **Range**

#### **Livestock Grazing**

This practice provides domestic livestock grazing at current carrying-capacities on primary and secondary ranges. Three levels of management intensity or alternative management strategies are involved:

**Strategy B.** - Livestock numbers are controlled so that use is within the apparent grazing capacity. Improve-

ments are minimal, and they are constructed only when needed to protect and maintain the range resource. The unit of measure is animal months (AMs), and they are affected by the level of management applied.

**Strategy C.** - The amount of forage available to livestock is fully utilized. Cost-effective management systems and techniques, including fencing and water development, are designed and applied to obtain relatively uniform livestock distribution, use of forage, and maintenance of plant vigor. AMs are affected by the level of management practiced.

**Strategy D.** - Production and utilization are optimized based on the amount of forage available for livestock use. Cultural practices such as brush control, type conversion, or seeding may be combined with fencing and water systems. The number of AMs is directly affected by the level of management applied.

### **Recreation**

#### **Roaded Natural Recreation**

This practice includes activities applied to an area which is characterized by predominantly natural appearing environments with moderate evidences of the sights and sounds of humans. Interaction between users may be low to moderate, with evidence of other users prevalent. Visual Resource Management (VRM) activities may visually dominate the original landscape. However, alterations of vegetation and land form must borrow from naturally established form, line, color, or texture.

Off-highway vehicle (OHV) travel is permitted on roads, trails, and areas rated suitable for OHV use. This includes rivers or sections of outstandingly remarkable rivers that are readily accessible by road or railroad and that may have some development along shorelines, or may have undergone some impoundment or diversion in the past. Recreation Rivers within the Wild and Scenic Rivers System will be managed to protect or enhance the values that caused them to be designated as Recreation Rivers. Visual Quality Objectives (VQOs) include Retention (R), Partial Retention (PR), and Modification (M).

#### **Rural Recreation**

This practice includes activities applied to an area which is characterized by a substantially modified natural environment. Sights and sounds of humans are readily evident, and interaction between users is often moderate to high.

Facilities are designed for use by a large number of people. VRM activities of vegetation and landform may dominate the landscape in the foreground and middleground. However, alterations must remain visually subordinate as viewed in the background. OHV travel is permitted in areas rated suitable for OHV use. VQOs include M and Maximum Modification (MM).

### **Semi-Primitive Non-Motorized Recreation**

This practice includes activities applied to an area which is characterized by a predominantly natural or natural appearing environment of a moderate to large size. Interaction between users is low, but there is often evidence of other users. VRM activities are not usually evident. Wild Rivers within the Wild and Scenic Rivers System, and rivers or sections of outstandingly remarkable rivers free of impoundments and generally inaccessible except by trail, will be managed to protect or enhance the values which caused them to be designated as Wild Rivers. No motorized travel is permitted. VQOs include R and PR.

### **Semi-Primitive Motorized Recreation**

This practice includes activities applied to an area which is characterized by a predominantly natural or natural appearing environment of a moderate to large size. Concentration of users is low, but there is often evidence of other users. VRM activities are visually subordinate to the natural landscape. Scenic Rivers within the Wild and Scenic Rivers System and rivers or sections of rivers that are free of impoundments, with shorelines largely undeveloped but accessible in places by roads, will be managed to protect or enhance the values which caused them to be designated as Scenic Rivers. OHV motorized travel is permitted on roads and trails during summer months and in winter on areas rated suitable for winter OHV use. VQOs include R and PR.

### **Developed Site Management**

This practice includes activities applied to an area where landform and vegetation are substantially modified to accommodate intensive occupancy use. Included are structural facilities for public use and enjoyment, including but not limited to water and sanitation systems, pedestrian and vehicular circulation systems, and other user facilities. Also included are developed recreation areas and downhill skiing. VQOs of foreground and middleground areas, as seen from designated developed recreation sites, include R and PR.

## **Riparian Areas**

### **Streamside and Wetlands Management**

This practice applies to the management of areas adjacent to streams and wetlands for the protection of the riparian environment, water quality, and stream courses. Areas to be protected will include inner-gorge landforms, and they will be designated as a Riparian Reserves.

## **Soils and Water**

### **Soils and Water Improvement**

This management practice includes erosion-reduction, and soil/water quality enhancement projects. An erosion-reduction project might entail the plugging of gulleys and the revegetation of slopes to reduce sediment that would otherwise run off during wet weather. Soil quality enhancement projects might include fertilization or scarification of the soil.

Water resource improvement practices will be directed toward improving the quantity, quality, or timing of water flows. Projects listed above for soil improvement will also be included here, except for fertilization.

## **Special Areas**

### **Research Natural Area Establishment and Management**

This practice includes the establishment of Research Natural Areas (RNAs), in as close to a natural condition as possible, for research and educational purposes.

For each RNA established, a specific management plan will be developed to maintain the target element and other resource values in the best possible condition.

### **Special Interest Area Establishment and Management**

This practice includes the establishment of Special Interest Areas (SIAs) that possess unusual recreation and scientific values. These values will be available for public study, use, or enjoyment.

For each SIA established, a specific management plan will be developed to protect the important resources while accommodating an appropriate level of public use.

## **Threatened, Endangered (T&E), and Sensitive Species (Plants and Animals)**

### **Wildlife Habitat Management - Existing T&E Species**

#### **Peregrine Falcon**

Management practices include protection of the nesting territory from disturbance and maintenance and/or enhancement of foraging areas, especially riparian areas. A high level of vegetation diversity is maintained through prescribed fire and silvicultural prescriptions.

Within an approximate 1/2 to 3/4 of a mile zone around the nest some management activities may be restricted. These activities include logging, road construction, hauling, mining, grazing, recreation, etc.

#### **Bald Eagle**

Management practices are designed to protect nesting bald eagles from disturbance; to maintain nest tree and stand characteristics; and to maintain the forage resource.

Prescribed fire and silvicultural prescriptions are used to maintain nest trees, future nest trees, roosts, perches, and screening cover. Ponderosa pine and sugar pine tree species are maintained as the dominant canopy within the nesting territory.

Activities within an approximate 1/2 to 3/4 of a mile zone around the nest may be restricted. These activities include logging, road construction, hauling, grazing, recreation, marinas, etc.

Associated water bodies (lakes and rivers) will be managed to maintain the fishery for bald eagles.

#### **Spotted Owl**

Spotted owl habitat is provided for through a system of Late-Successional Reserves (LSR's) and other withdrawn land allocations plus dispersal through a network of Riparian Reserves and other retention requirements and within Matrix and AMA Lands.

## **Wildlife Habitat Management - Sensitive Animals**

### **Goshawk**

A network of withdrawn areas including LSR's will provide adequate habitat for goshawks. These stands will be managed to provide a dense, mature coniferous forest. Decadence is an important component of these stands. Silvicultural prescriptions will be designed to provide for these stands.

Activities around an existing nest may be restricted. These activities include logging, road construction, hauling, grazing, recreation, etc.

### **Habitat Management--Sensitive and Endemic Plants**

This management practice includes habitat protection and enhancement for maintaining viability of sensitive and endemic plant populations.

Techniques for protection include: (1) avoidance of occupied habitat during project design and implementation; (2) designation of SIAs and RNAs with existing sensitive and endemic plant populations to serve as refugia; (3) fencing of populations in high-impact areas; and (4) appropriate signing to increase public awareness of potential impacts.

Habitat enhancement techniques for disturbance-dependent species include prescribed burning, surface scarification, and limited shrub or overstory removal. Watershed stabilization and other rehabilitation techniques are suitable for species needing undisturbed conditions. Land acquisition of parcels with suitable habitat is used to increase the amount of habitat available for sensitive and endemic plants on the Forests.

Propagation may be used to increase individual populations or to reintroduce sensitive plants into formerly occupied sites.

### **Timber**

#### **Intensive Management**

This management practice includes the use of even-aged silvicultural systems to achieve a high timber volume output from that part of the Forest land base classified as fully

suitable for timber management. Occasional use of uneven-aged silvicultural systems may be warranted. The goal is to capture a large percentage of the potential yield. Cutting units are generally greater than 5 acres and less than 40 acres in size, averaging between 10-20 acres. Timber yields are chargeable towards the Allowable Sale Quantity (ASQ).

This timber management regime assumes a wide range of cultural and silvicultural treatments including: (1) precommercial thinning to maintain optimal growth rates; (2) brush control (release) to reduce competition; (3) appropriate intermediate harvest methods including commercial thinnings and sanitation salvage; (4) appropriate final harvest methods under a variety of even-aged silviculture including regeneration cutting systems such as clear-cutting, green tree retention, and shelterwood cutting and occasional uneven-aged systems such as selection cutting; (5) site preparation; (6) artificial reforestation by planting; and (7) the inclusion of genetic improvement and fertilization, as feasible.

Rotation length is relatively short, ranging from about 90 to 140 years and averaging about 100 to 110 years, depending on site, species, and management intensity.

Tractor or cable logging systems will normally be used, with occasional use of aerial systems. The appropriate transportation system will be constructed with arterial, collector, or local roads.

### **Modified Management**

This management practice includes timber and silvicultural related activities which will be implemented primarily to meet other special resource management objectives, such as recreation, visual, wildlife, or watershed objectives.

Timber is managed with the goal of yielding about 70-80 percent of the biological potential from suitable timber lands. Reduced yields are the result of extended rotations and/or less area harvested. Timber yields are chargeable towards the ASQ.

Silvicultural and cultural practices are similar to the intensive management practice and may include site preparation, reforestation, release, stocking control by thinning, sanitation/salvage cutting, and regeneration cutting. However, the intensity and scope of these treatments is often less than under the intensive management practice. Regeneration cutting is normally done by a mix of even-aged and uneven-aged systems.

Regeneration harvest units are usually smaller than in the intensive management practice, as little as less than 2 acres in size, but they may be as large as 5-25 acres. Harvest units are typically designed to meet the other resource objectives.

Rotation ages are normally longer than for the intensive management practice. Rotation lengths will vary, depending on the site, species, and resource objective, but will generally range from a minimum of 90 years to as much as 160 years or more; the average is about 125 years.

A variety of timber harvest methods may be used, depending on specific site and resource considerations. These methods include tractor/skidder, high-lead cable, skyline cable, and helicopter.

Roads will be constructed to facilitate the management of the timber resource, whenever possible, when compatible with other resource objectives.

### **Minimal Management**

This management practice includes primarily individual tree harvest by salvage and high-risk sanitation for the removal of fire killed, insect infested, and dead trees, although other live trees may be cut in the process. This practice is often referred to as stand maintenance.

The primary purpose of this practice will be to protect or enhance other resource values. This practice is applied to lands which are suitable for timber management, but where other resource values or site conditions preclude normal timber activities. This practice is applied to visual retention and riparian areas, difficult to regenerate lands, and some low site lands that are sparsely stocked.

Regeneration harvests are not foreseen, and cultural activities will not normally be employed. Regeneration will normally be by natural seeding.

Timber yields will be minimal, normally about 20 percent of potential. Yields are chargeable towards the ASQ.

Tractor logging is most common, although cable and aerial systems may be used. Harvesting is generally done in areas that already have access, so road construction is usually unnecessary.

## **Uneven-Aged Management**

This management practice includes the use of uneven-aged silvicultural systems to achieve resource objectives. There are two options available: single tree selection or group selection. Normally, group selection cutting methods will be used with stands typically ranging from about a tenth of an acre to two acres in size.

Under the uneven-aged option, practices will be employed in special management situations where the land is suitable for timber management, but where it is more appropriately allocated to purposes which make it desirable to maintain a continuous forest cover over time. Three or more distinct size/age classes will be present in a stand at all times.

Cultural practices will normally include site preparation for reforestation. Both artificial and natural regeneration methods will be employed. Timber stand improvement, including release and thinning, will be used as necessary.

Logging methods include primarily tractor, with occasional cable and aerial yarding. Roads will be constructed as necessary to facilitate management.

Timber yields are chargeable towards the ASQ.

Uneven-aged management will most commonly be used on lands where modified timber management intensity is practiced, but it may also be used on land where intensive timber management is practiced.

## **Wilderness and Roadless Areas**

### **Primitive Recreation**

Includes practices which can be applied to existing Wilderness and/or other areas which are characterized by unmodified environments. Evidence of humans will be unnoticed by observers in the area. VRM activities include very low visual impact recreation facilities. These areas must have opportunities for solitude or primitive type recreation and be at least 5,000 acres in size to make practicable their preservation. Motorized travel is prohibited.

## **Wildlife**

### **Hardwood Habitat Management**

In nearly pure stands of hardwoods both even-age and uneven-age management will be used to maintain all age classes. Thinning will be implemented in oak stands to provide for fewer large trees that will be greater mast producers.

In managed stands, where conifers are the dominant species, single hardwoods or groups of hardwoods will be left.

### **Wildlife Habitat Management - Consumptive Species**

#### **Black Bear**

Management for black bear is aimed at providing a diverse array of vegetative types, seral stages, and special components (i.e. dead and down). An important element is the management of mature berry producing brushfields. Within these habitats black bear must be free from human harassment. Prescribed fire, hardwood management, and control of human access can be required to manage black bear habitat.

#### **Mule Deer**

Optimum mule deer range is divided into 40 percent cover and 60 percent foraging area. Foraging areas are early successional stages of forest vegetative types, young brushfields, meadows, and riparian areas. Deer must be free of intense human harassment to fully utilize the habitat.

Direct treatments include prescribed fire, hardwood management, water development, and control of access. In timber management areas coordination of silvicultural practices and wildlife objectives would provide for the habitat needs of deer.

### **Non Consumptive Species**

Management for non-game species is all encompassing. Non-game species will be provided for to some degree through management of endangered, sensitive, and harvest species as well as hardwood resources. Management

of these species, plus maintenance of overall plant diversity, will provide for healthy non-game populations.

All commercial timber types and associated seral stages will be provided through coordination with timber

management activities. Other timber/vegetation types will receive direct improvement such as thinning in hardwoods types and prescribed burning of brushfields. Water sources will be developed where they are lacking. Dead and down management will provide the habitat for many species.

---

Appendix M

*Fire Management Program*

---

# APPENDIX M

## Fire Management Program

---

This appendix describes the overall fire management program for the Shasta-Trinity National Forests. Included is a discussion about the following aspects of that program: (1) the National Fire Management Analysis System (NFMAS); (2) the Fire and Aviation Management Program; (3) the annual fuels treatment; and (4) the anticipated annual acres burned by wildfire.

1. **National Fire Management Analysis System (NFMAS).** This analysis is carried out at the National Forest level for planning, budgeting, and administering the Forest fire protection program. Data developed from the analysis is aggregated for program planning, budgeting and evaluation at the Regional and National levels.

NFMAS uses a computer simulation model that systematically tests proposed fire organizations and dispatch strategies against wildfire-related conditions (fire occurrence patterns, weather, fuels, terrain, access) that occur on the planning unit. The NFMAS process is designed to be used for "marginal analysis," that is, to estimate the magnitude of the differences in the outputs that would occur as a result of changes of a known amount in one or more of the inputs.

The NFMAS data is used to provide an estimate of the consequences in changes in Regional and National fire program budgets, and to support the National fire program in the annual Forest Service budget request. Also to help guide the efficient allocation of constrained fire funds to Regions and Forests.

The program is used to help understand the probable effects of changes in the kind, location, and number, of initial attack forces; changes in fuels conditions; changes in access; changes in fire occurrence; changes in dispatch strategies.

2. **Fire and Aviation Management Program.** This program, including fuels management, is predicated using the NFMAS process. The Forest-wide fire and aviation management organization for the Fiscal Year 1995 budget is as follows:

### Forest Service Resources

- 10 prevention patrol units
- 11 engine crews, Type III
- 9 brush engine crews, Type IV
- 2 water tenders
- 8 fixed lookouts
- 1 Type 3 helicopter with initial attack crew

3. **Annual Fuels Treatment.** There are two types of fuels treatment programs managed by the Fire Management program: (1) natural fuels hazard reduction, which is the treatment of naturally generated fuels to reduce fire hazard; and (2) timber generated activity fuels treatments, which is the treatment of fuels to reduce the increased fire hazard following timber harvesting practices. Treatments include prescribed burning as well as other fuel reduction practices (i.e., type conversions, crushing, biomass utilization, firewood collection, brush removal, etc.). The proposed fuel treatment is shown in **Table M-1**.

4. **Wildfire Acreage Burned.** The anticipated annual acreage burned by wildfire, by decade and intensity, is shown in **Table M-2**.

**Table M-1  
Annual Fuel Treatment by Benefiting Resource (acres)**

	<b>Decade 1</b>	<b>Decade 2</b>	<b>Decade 3</b>	<b>Decade 4</b>	<b>Decade 5</b>
Ecosystem Management Related Treatment (Natural Fuel)	26,500	26,500	86,500	86,500	86,500
Timber-related Fuel Treatment (Activity Fuel)	3,500	3,500	3,500	3,500	3,500
<b>TOTAL</b>	<b>30,000</b>	<b>30,000</b>	<b>90,000</b>	<b>90,000</b>	<b>90,000</b>

**Table M-2  
Average Annual Acres Burned by Wildfire**

<b>Burned Acres</b>	<b>Decade 1</b>	<b>Decade 2</b>	<b>Decade 3</b>	<b>Decade 4</b>	<b>Decade 5</b>
Fire Intensity Class 1	55	55	55	55	55
Fire Intensity Class 2	154	154	154	154	154
Fire Intensity Class 3	330	330	330	330	330
Fire Intensity Class 4	451	451	451	451	451
Fire Intensity Class 5	4,686	4,686	4,686	4,686	4,686
Fire Intensity Class 6	5,324	5,324	5,324	5,324	5,324
<b>TOTAL</b>	<b>11,000</b>	<b>11,000</b>	<b>11,000</b>	<b>11,000</b>	<b>11,000</b>

---

Appendix O

*Soil Quality Standards*

---

# APPENDIX O

## Soil Quality Standards

---

### Soil Quality Standards

Soil quality standards provide threshold values to identify when changes in soil properties or conditions become detrimental. This condition results in significant change or impairment in the productive capacity, hydrologic function or environmental health of the soil.

Areas of detrimental soil disturbance that affect soil productivity, should not be of a size or extent that would result in a significant change in production potential for the activity area. The size or extent of detrimental soil disturbance that is allowable and which affects hydrologic function is determined by the Region 5 Cumulative Watershed Effects Analysis (Chapter 20, R-5 Forest Service Handbook [FSH] 2509.22).

Use the following threshold values to identify detrimental soil disturbance for an activity area: Soil Productivity, Soil Hydrologic Function, and Soil Environmental Health.

### Soil Productivity

**Soil cover** for erosion protection is sufficient to prevent the rate of accelerated soil erosion from exceeding the rate of soil formation.

The kind, amount and distribution of soil cover necessary to avoid detrimental accelerated soil erosion is guided by the Region 5 Erosion Hazard Rating system (Chapter 50, R-5 FSH 2509.22) and locally adapted standard erosion models and measurements.

For highly erodible soils (soils developed from granitic parent material), ground cover should be in excess of 90 percent and evenly distributed. Skid roads, trails, temporary roads, and landings would be tilled to the depth of 18 inches or more, straw mulched or respread slash, and planted.

**Soil porosity** is at least 90 percent of the total porosity found under undisturbed or natural conditions. Porosity is evaluated between 4 and 8 inches below the surface for soils with tree and shrub potential, and between 0 and 4 inches for soils with herbaceous potential.

**Organic matter** is present in sufficient amounts to prevent significant short or long-term nutrient cycle deficits, and to help avoid adverse physical soil characteristics.

The kinds and amounts of organic matter are guided below and by local analyses.

*Soil organic matter* in the upper 12 inches of soil is at least 85 percent of the total soil organic matter found under undisturbed conditions for the same or similar soils.

**Surface organic matter** is present in the following forms and amounts:

*Litter and duff* occurs over at least 50 percent of the activity area. Determine minimum organic layer thickness locally and base it on an amount sufficient to persist through winter season storms and summer season oxidation.

Use the presence of living vegetation that could contribute significant annual litter fall to compensate for conditions when immediate post disturbance litter and duff coverage is too thin or less than 50 percent.

If the soil and potential natural plant community are not capable of producing cover over 50 percent of the area, adjust minimum amounts to reflect potential soil and vegetation capability.

*Large woody material*, when occurring in forested areas, is at least 5 logs per acre in contact with the soil surface. Desired logs are about 20 inches in diameter, about 10 feet long and represent the range of decomposition classes defined in exhibit 2, section 2.41. Attempt to protect logs in decomposition classes 3 through 5 from burning and mechanical disturbance. Do not count stumps as large woody material. Large woody material requirements may be waived in strategic fuelbreak areas.

**Soil Moisture Regime** is protected where productivity or potential natural plant community are dependent upon specific soil drainage classes.

### Soil Hydrologic Function

Infiltration and permeability are not reduced to ratings of 6 or 8 as defined in Region 5 Erosion Hazard Rating system (Chapter 50, R-5 FSH 2509.22).

## Soil Environmental Health

Soil reaction class, buffering or exchange capacities, or biological populations are not altered to the degree that significantly affects soil productivity, soil hydrologic function, or the health of humans and animals.

## Definitions

**Litter and duff** are the organic layers on top of mineral soil consisting of fallen vegetative matter in various stages of decomposition. Specifically referred to as O horizons in soil descriptions (Oi, Oe and Oa horizons). Litter includes woody material up to 3 inches in diameter.

**Soil environmental health** is the inherent capacity of a soil to absorb, filter or degrade added chemicals, heavy metals or organic compounds.

**Soil hydrologic function** is the inherent capacity of a soil to intake, retain and transmit water.

**Soil organic matter** is the organic fraction of soil. It includes plant, animal and microbial residues, fresh and at all stages of decomposition, and the relatively resistant soil humus.

**Tillage** is the mechanical treatment of compacted or puddled soils to restore desirable porosity. Tillage is accomplished with implements such as winged subsoilers, forest cultivators and disks. Ripping with toolbar mounted rock rippers is not considered tillage.

**Activity Area** is that area of land to which soil productivity soil quality standards are applied. It is that area within a management area where soil disturbing activities take place. It is of a practical size for management, sampling and evaluation. Activity areas include timber harvest units within a sale area, burn areas within a prescribed burn, and grazing areas within an allotment. System roads and trails and other dedicated areas are not considered activity areas.

---

Appendix P

*Sensitive and Endemic Plant List*

---

## Appendix P

# Sensitive and Endemic Plant List

---

Appendix P consists of **Table P-I** which shows the "Sensitive and Endemic Plant List for 1993" for the Shasta-Trinity National Forests. This table includes:

- Sensitive plants known to occur on the Forests;
- Sensitive plants suspected to occur on the Forests;
- Plants endemic to the Forests (in addition to endemic sensitive species).

NOTE: Refer to Appendix G in the EIS for a discussion of the botany program.

**Table P-1**  
**Sensitive and Endemic Plant List 1993\***

<b>Scientific Name</b> <b>Common Name</b>	<b>Range on Shasta-Trinity</b>			<b>Habitat</b>
	<b>Districts</b>	<b>Mgt. Areas</b>	<b>Elevation (ft.)</b>	
<b>Sensitive Plants Known to Occur on the Shasta-Trinity National Forests</b>				
<i>Arctostaphylos klamathensis</i> Klamath manzanita	Mt. Shasta Weaverville?	5	5,500-6,500	Montane mixed conifer forest, serpentine & gabbro soils; Scott and Trinity Mountains
<i>Calochortus longebarbatus</i> var. <i>longebarbatus</i> Long-haired star-tulip	McCloud	2	3,000-4,300	Wet meadows within pine forest or sagebrush communities
<i>Campanula shetleri</i> Castle Crags harebell	Mt. Shasta	4,5	3,600-6,000	Granite and diorite cliffs; north and northeast exposures
<i>Campanula wilkinsiana</i> Wilkins' harebell	McCloud Mt. Shasta Weaverville	3,4	5,500-8,600	Streambanks and springs in red fir and subalpine forests
<i>Collomia larsenii</i> (= <i>C. debilis</i> var. <i>larsenii</i> ) talus collomia	McCloud	1	7,200+	Cinder and scree slopes
<i>Cordylanthus tenuis</i> ssp. <i>pallescens</i> pallid bird's beak	Mt. Shasta	3,5	3,600-5,200	Lightly disturbed openings in ponderosa pine forest; gravelly volcanic or ultramafic soils
<i>Draba aureola</i> Golden draba	Mt. Shasta	5	7,000-9,000	Among rocks on ridges, fell-fields; subalpine forest
<i>Draba carnosula</i> Mt. Eddy draba	Mt. Shasta	5,6	7,600-8,400	Alpine and subalpine boulder fields and rock outcrops.
<i>Epilobium siskiyouense</i> Siskiyou fireweed	Mt. Shasta Weaverville	4,5,6	5,000-8,000	Exposed, rocky serpentine ridges and slopes
<i>Eriastrum brandegeae</i> (includes) <i>E. tracyi</i> Brandegee's eriastrum	Hayfork	18	1,000-2,600	Dry, gravelly, flat openings in chaparral, foothill woodland

\* Information in this list is current as of October 1993

? Suspected to occur or not currently documented

Table P-I (continued)

<i>Scientific Name</i> Common Name	Range on Shasta-Trinity			Habitat
	Districts	Mgt. Areas	Elevation (ft.)	
<b>Sensitive Plants Known to Occur on the Shasta-Trinity National Forests</b>				
<i>Eriogonum alpinum</i> Trinity buckwheat	Mt. Shasta Weaverville	5	6,700-9,000	Exposed serpentine ridges and talus slopes
<i>Eriogonum umbellatum</i> var. <i>humistratum</i> Mt. Eddy buckwheat	Mt. Shasta Weaverville	4,5	5,700-9,000	Serpentine slopes and outcrops within mixed conifer forest or subalpine; Scott and Trinity Mountains
<i>Erythronium citrinum</i> ** var. <i>roderickii</i> Scott Mountain fawn lily	Weaverville	4,8,6	900-4,000	Mixed conifer forest; Scott Mountains. Serpentine & granitic soils (?)
<i>Galium serpenticum</i> ssp. <i>scotticum</i> Scott Mountain bedstraw	Mt. Shasta Weaverville	4,6	5,100-7,600	Serpentine talus slopes, rock outcrops in mixed conifer forest
<i>Ivesia pickeringii</i> Pickering's ivesia	Weaverville	6	2,500-4,500	Seasonally wet serpentine meadows and swales
<i>Lewisia cotyledon</i> var. <i>heckneri</i> Heckner's lewisia	Big Bar Mt. Shasta Weaverville	4,7	2,500-8,000	Moist rock outcrops in chaparral, oak or conifer forest
<i>Lewisia cotyledon</i> var. <i>howellii</i> Howell's lewisia	McCloud Shasta Lake	10,12	500-4,500	Rock outcrops in chaparral, oak or conifer forests
<i>Linanthus nuttallii</i> ssp. <i>howellii</i> Howell's linanthus	Yolla Bolla	22	4,000-5,000	Jeffrey pine woodlands; mostly on serpentine soils
<i>Madia doris-nilesiae</i> Niles' madia	Hayfork	19,21	2,600-4,400	Rocky serpentine slopes and openings in Jeffrey pine woodland

\*\* Plants recommended to the Regional Forester for addition to the sensitive species list, but not listed as of October 1993

? Suspected to occur or not currently documented

Table P-I (continued)

<i>Scientific Name</i> Common Name	Range on Shasta-Trinity			
	Districts	Mgt. Areas	Elevation (ft.)	Habitat
<b>Sensitive Plants Known to Occur on the Shasta-Trinity National Forests</b>				
<i>Madia stebbinsii</i> Stebbins' madia	Yolla Bolla	21,22	4,000-5,000	Rocky serpentine openings in chaparral, Jeffrey pine forest
<i>Minuartia rosei</i> Peanut sandwort	Hayfork Yolla Bolla	18,19,21	2,500-5,800	Rocky serpentine slopes and openings in Jeffrey pine and mixed conifer forest
<i>Neviusia cliftonii</i> ** Shasta snow-wreath	Shasta Lake	8,12	2,400-3,000?	North-facing slopes on limestone-derived soils, within riparian areas
<i>Penstemon filiformis</i> Thread-leaved penstemon	Mt. Shasta Weaverville	4-7,9	2,000-6,000	Meadows and lightly disturbed openings; serpentine soils
<i>Penstemon tracyi</i> Tracy's beardtongue	Big Bar Weaverville	4	6,000-8,000	Rock cliffs and outcrops; Trinity Alps
<i>Phacelia cookei</i> Cooke's phacelia	Mt. Shasta	3	4,100-5,000	Lightly disturbed volcanic sand
<i>Phacelia dalesiana</i> Scott Mountain phacelia	Mt. Shasta Weaverville	4-6,9	5,000-7,000	Meadows and openings in red fir forest; serpentine soils
<i>Phacelia greenei</i> Scott Valley phacelia	Weaverville	6	5,000-7,000	Gravelly serpentine slopes and forest openings
<i>Potentilla cristae</i> crested or Klamath potentilla	Mt. Shasta	4,5	7,000-9,000	Rocky slopes and ridges in depressions where snow lingers; serpentine or basic substrate
<i>Raillardella pringlei</i> showy raillardella	Mt. Shasta Weaverville	4-6	4,000-7,500	Wet serpentine meadows, seeps and streambanks
<i>Raillardopsis scabrida</i> (= <i>Raillardella scabrida</i> ) rough raillardella	Shasta Lake Yolla Bolla?	11	5,500-7,500	Rocky, open subalpine slopes

\*\* Plants recommended to the Regional Forester for addition to the sensitive species list, but not listed as of March 1993

? Suspected to occur or not currently documented

Table P-1 (continued)

Scientific Name Common Name	Range on Shasta-Trinity		Elevation (ft.)	Habitat
	Districts	Mgt. Areas		
<b>Sensitive Plants Known to Occur on the Shasta-Trinity National Forests</b>				
<i>Rorippa columbiae</i> ** Columbia cress	McCloud	2	500-4,500?	Seasonal lakebeds and drainages east of the Cascades
<i>Sedum laxum</i> ssp. <i>flavidum</i> pale yellow stonecrop	Hayfork Yolla Bolla	18-20	2,500-6,000	Rock outcrops
<i>Sedum paradisum</i> (= <i>S. obtusatum</i> ssp. <i>p.</i> ) Canyon Creek stonecrop	Big Bar Shasta Lake? Weaverville	4	3,800-6,500	Granite outcrops
<i>Silene invisa</i> short-petaled campion	Weaverville	4	5,800-8,000	Red fir and subalpine forest
<i>Swertia fastigiata</i> (incl. <i>Frasera umpquaensis</i> ) Umpqua green gentian	Hayfork Yolla Bolla	20	4,000-6,000	Meadows, springs, openings in Douglas-fir/white fir forest
<i>Trillium ovatum</i> ssp. <i>oettingeri</i> Salmon Mountains wakerobin	Weaverville McCloud	2,4,6,7,10,11	3,900-6,400	Moist, shady conifer forest, especially near streams and montane riparian scrub
<i>Trimorpha acris</i> var. <i>debilis</i> (= <i>Erigeron a.</i> var. <i>d.</i> ) northern daisy	Mt. Shasta	4	7,000+	On Shasta-Trinity known only from Mt. Shasta; open rocky habitat above timberline
<b>Sensitive Plants Suspected to Occur on the Shasta-Trinity National Forests</b>				
<i>Calochortus greenei</i> Greene's mariposa lily	Mt. Shasta (poex)		4,000-5,000	Brushy openings in montane conifer forests
<i>Ivesia longibracteata</i> Castle Crags ivesia	Mt. Shasta?		4,400-4,800	Granite and diorite outcrops near and above timberline
<i>Lewisia cantelovii</i> Cantelow's lewisia	Mt. Shasta?		500-3,000	Moist rock outcrops in broad-leaf and conifer forests

\*\* Plants recommended to the Regional Forester for addition to the sensitive species list, but not listed as of October 1993

? Suspected to occur or not currently documented

poex Possibly extirpated (not relocated in recent times)

Table P-1 (continued)

<b>Scientific Name</b> <b>Common Name</b>	<b>Range on Shasta-Trinity</b>			<b>Habitat</b>
	<b>Districts</b>	<b>Mgt. Areas</b>	<b>Elevation (ft.)</b>	
<b>Sensitive Plants Suspected to Occur on the Shasta-Trinity National Forests</b>				
<i>Lomatium peckianum</i> Peck's lomatium	Mt. Shasta?		2,500?	Pine-oak woodland, often on ultramafic soil
<i>Minuartia decumbens</i> The Lassics sandwort	Yolla Bolla?		5,100	Jeffrey pine woodland; dry serpentine soil
<i>Ophioglossum vulgatum</i> adder's-tongue fern	Mt. Shasta (poex)		1,000?	Meadows, marshes, moist forests
<i>Puccinellia howellii</i> Howell's alkali grass	Weaverville?		1,500	Mineral seeps
<b>Endemic to the Shasta-Trinity National Forests (In addition to endemic sensitive species)</b>				
<i>Ageratina shastensis</i> (= <i>Eupatorium shastense</i> ) Shasta eupatory	Shasta Lake	8,10,12	2,000-6,000	Limestone outcrops
<i>Arnica venosa</i> veiny arnica	Shasta Lake Weaverville	7,8,12	1,500-5,000	Mixed conifer-hardwood forest with Douglas-fir, ponderosa pine, black oak; mostly north slopes & ridgetops
<i>Ericameria ophitidis</i> (= <i>Haplopappus ophitidis</i> ) serpentine maconema	Hayfork Yolla Bolla	19,21,22	2,600-5,600	Serpentine outcrops; open Jeffrey pine forest on serpentine soil
<i>Eriogonum libertini</i> Dubakella Mountain buckwheat	Hayfork Yolla Bolla	19,21,22	2,400-5,500	Open Jeffrey pine forest on serpentine soil

? Suspected to occur or not currently documented  
poex Possibly extirpated (not relocated in recent times)

---

Appendix Q

*Wilderness Opportunity Class  
Descriptions*

---

# APPENDIX Q

## Wilderness Opportunity Class Descriptions

---

### Pristine Opportunity Class

#### I. Resource Setting

The Pristine Opportunity Class is characterized by an unmodified natural environment. Ecological and natural processes are not measurably affected by the actions of wilderness users. Environmental impacts are minimal and usually restricted to temporary loss of vegetation where camping occurs. These areas typically recover on an annual basis; impacts are not apparent to most visitors.

#### 2. Social Setting

This area provides an outstanding opportunity for isolation and solitude free from evidence of human activities. Encounters with other users is very infrequent and nonexistent at campsites. The user has excellent opportunities to travel cross country using a maximum degree of outdoor skills. This environment often offers opportunities for a very high degree of challenge, self-reliance, discovery, and risk.

#### 3. Managerial Setting

Management strongly emphasizes sustaining and enhancing natural ecosystems. Direct on-site management of visitors seldom occurs. Necessary rules and regulations would be conveyed to visitors outside the area, usually at wilderness portals. Visitor contact by Wilderness Rangers would primarily be in reaction to unacceptable impacts. Infrequent patrols and monitoring of conditions would be conducted only as necessary to achieve management objectives. Trails would normally be absent or in an abandoned condition. No new administrative structures would be provided or permitted.

### Primitive Opportunity Class

#### I. Resource Setting

The Primitive Opportunity Class is characterized by an essentially unmodified natural environment. User actions minimally affect the ecological and natural processes and conditions. Environmental impacts are low and restricted to minor losses of vegetation

where camping occurs and along most travel routes. Most impacts recover on an annual basis and are apparent to a low number of visitors.

#### 2. Social Setting

A high probability exists for experiencing isolation from the sights and sounds of humans. The probability of encountering other users is low along trails and at campsites. The user has good opportunities for experiencing independence, closeness to nature, and tranquility through the application of primitive recreation skills. This environment offers opportunities for a high degree of challenge discovery and risk.

#### 3. Managerial Setting

Management would emphasize sustaining and enhancing natural ecosystems. Direct on-site management would involve minimum visitor contacts. Necessary rules and regulations would be communicated to visitors outside the area, usually at wilderness portals. Visitor contact by Wilderness Rangers would be mostly reactive and by invitation. Infrequent patrols and monitoring of conditions would be conducted only as necessary to achieve management objectives. Trails would be managed for light, infrequent, and difficult travel conditions. Pack stock would not normally be accommodated. Trail signs would provide only the minimum information necessary. Administrative structures would be provided or permitted only in a few extreme cases.

### Semi-primitive Opportunity Class

#### I. Resource Setting

The Semi-primitive Opportunity Class is characterized by an essentially unmodified natural environment. In a few areas natural processes may be moderately affected by user actions, such as the grazing of domestic livestock. Environmental impacts are moderate, with travel routes and campsites showing losses of vegetation. Most impacts persist from year to year and are apparent to a moderate number of visitors.

## **2. Social Setting**

Moderate opportunities for experiencing isolation from the sights and sounds of humans would be found. The probability of encountering other users is moderately frequent, both along trails and at campsites. The user has some opportunities for experiencing independence, closeness to nature and tranquility through the application of primitive recreation skills. This environment offers some opportunities for challenge, discovery, and risk.

## **3. Managerial Setting**

Management would emphasize sustaining and enhancing natural ecosystems. Direct on-site management tactics may be used. Necessary rules and regulations would be communicated to visitors both inside and outside the area. Routine visitor contacts would be made by Wilderness Rangers. Frequent patrols and monitoring of conditions would be conducted as necessary to achieve management objectives. Trails would be managed for moderate levels for the majority of the use season and high use during short-term periods (such as National holidays). Pack stock would also be accommodated. Trail signs would provide the minimum information necessary. Administrative structures would be provided or permitted only in a few cases.

## **Transition Opportunity Class**

### **I. Resource Setting**

The Transition Opportunity Class is characterized by a predominantly unmodified natural environment.

Natural conditions in many areas may be substantially affected by the actions of users. Environmental impacts are relatively high at entry points, along travel routes, and at campsites. Most impacts, such as vegetation loss and soil compaction, persist from year to year and are apparent to most visitors.

## **2. Social Setting**

Moderate to low opportunities for experiencing isolation from the sights and sounds of humans would be found. The probability of encountering other users is moderate to high, both along trails and at campsites. The user has some opportunities for interacting with the natural environment. This environment offers few opportunities for challenge and risk.

## **3. Managerial Setting**

Management would sustain and enhance natural ecosystems to the extent feasible given relatively high levels of recreational use. Direct on-site management tactics would be used. Necessary rules and regulations would be communicated to visitors both inside and outside the area. Routine and frequent visitor contacts would be made by Wilderness Rangers. Frequent patrols and monitoring of conditions would be conducted as necessary to achieve management objectives. Trails would be managed for moderate to high levels for the majority of the use season. Pack stock would be safely accommodated. Trail signs would provide information to encourage and disperse use. Administrative structures would be provided or permitted only in a few cases.

## Appendix Q - Wilderness Opportunity Class Descriptions

### Wilderness Opportunity Class Description

Setting	Pristine	Primitive	Semi-primitive	Transition
<b>Physical</b>	Unmodified natural environment	Unmodified natural environment	Unmodified natural environment	Predominantly unmodified natural environment
<b>Social</b>	No contact with other users	Minimum contact with other users	Low to moderate contact with other users	Highest contact with other users
	No evidence of use	Minimum evidence of use	Moderate evidence of use	Greatest evidence of use
<b>Management Action</b>	Virtually no management presence	Minimal management presence	Low management presence	Moderate management presence

### Wilderness Opportunity Class LAC\* Indicators

Indicators	Pristine	Primitive	Semi-primitive	Transition
<b>Physical</b>	0 camps/640 acres	1 camp/640 acres	3 camps/640 acres	6 camps/640 acres
	No permanent campsites	No highly or moderately impacted camps/640 acres	No highly impacted, maximum 2 moderately impacted camps/640 acres	Maximum 1 highly and 3 moderately impacted camps/640 acres
	No user-created trails	No user-created trails	No more than 1 discernible user created trail/640 acres	No more than 2 discernible user created trails/640 acres
<b>Social</b>	0 encounters/day	1 encounter/day	4 encounters/day	Encounters not regulated
	0 camps within sight	0 camps within sight	1 camp within sight	Camps within sight not regulated

\* Limits of acceptable change (LAC)

---

Appendix R

*Survey and Manage Species*

**Appendix R** - Species to be protected through survey and management standards and guidelines. Each of the four strategies is described in the text.

Species	Suspected/ Known	Survey Strategies			
		1	2	3	4
<b>Fungi</b>					
<b>Mycorrhizal Fungi</b>					
<b>Boletes</b>					
<i>Gastroboletus turbinatus</i>	S			X	
<i>G. subalpinus</i>	S	X		X	
<b>Rare Boletes</b>					
<i>Boletus haematinus</i>	S	X		X	
<i>Boletus pulcherrimus</i>	S	X		X	
<b>Low elevation Boletes</b>					
<i>Boletus piperatus</i>	S			X	
<i>Tylopilus pseudoscaber</i>	S	X		X	
<b>False Truffles</b>					
<i>Nivatogastrium nubigenum</i>	K	X		X	
<i>Rhizopogon abietis</i>	K			X	
<i>R. truncatus</i>	S			X	
<i>Thaxterogaster pingue</i>	K			X	
<b>Rare False Truffles</b>					
<i>Alpova olivaceotinctus</i>	S	X		X	
<i>Arcangeliella crassa</i>	S	X		X	
<i>Arcangeliella lactarioides</i>	S	X		X	
<i>Destuntzia fusca</i>	S	X		X	
<i>D. rubra</i>	S	X		X	
<i>Gautieria magnicellaris</i>	K	X		X	
<i>G. otthii</i>	S	X		X	
<i>Leucogaster citrinus</i>	S	X		X	
<i>Martellia fragrans</i>	S	X		X	
<i>Rhizopogon brunneiniger</i>	K	X		X	
<i>Rhizopogon evadens</i> var. <i>subalpinus</i>	K	X		X	

**Survey Strategies:** **1**=manage known sites; **2**=survey prior to activities and manage sites  
**3**=conduct extensive surveys and manage sites; **4**=conduct general regional surveys.  
**s**=it is suspected to occur on the Forests. **k**=it is known to occur on the Forests.

Appendix R- Survey and Manage Species

Species	Suspected/ Known	Survey Strategies			
		1	2	3	4
<b>Rare False Truffles</b> (continued)					
<i>R. flavofibrillosus</i>	K	X		X	
<i>Sedecula pulvinata</i>	K	X		X	
<b>Undescribed Taxa, Rare &amp; False Truffles</b>					
<i>Gastrosuillus</i> sp. nov. #Trappe 7516	K	X		X	
<i>Gastrosuilles</i> sp. nov. #Trappe 9608	S	X		X	
<i>Gymnomyces</i> sp. nov. #Trappe 7545	S	X		X	
<b>Rare Truffles</b>					
<i>Balsamia nigra</i>	S	X		X	
<i>Choiromyces alveolatus</i>	S	X		X	
<b>Chanterelles</b>					
<i>Cantharellus cibarius</i>	S			X	X
<i>Cantharellus subalbidus</i>	S			X	X
<i>Cantharellus tubaeformis</i>	S			X	X
<b>Chanterelles - Gomphus</b>					
<i>Gomphus bonarii</i>	S			X	
<i>Gomphus clavatus</i>	S			X	
<i>Gomphus floccosus</i>	S			X	
<i>Gomphus kauffmanii</i>	S			X	
<b>Rare Chanterelle</b>					
<i>Cantharellus formosus</i>	S	X		X	
<b>Uncommon Coral Fungi</b>					
<i>Ramaria abietina</i>	S			X	
<i>Ramaria araiospora</i>	S	X		X	
<i>Ramaria botryis</i> var. <i>aurantiramosa</i>	S	X		X	
<i>Ramaria concolor</i> f. <i>tsugina</i>	S	X		X	
<i>Ramaria coulterae</i>	S	X		X	
<i>Ramaria fasciculata</i> var. <i>sparsiramosa</i>	S	X		X	
<i>Ramaria gelatiniaurantia</i>	S	X		X	

**Survey Strategies:** 1=manage known sites; 2=survey prior to activities and manage sites  
3=conduct extensive surveys and manage sites; 4=conduct general regional surveys.  
s=it is suspected to occur on the Forests. k=it is known to occur on the Forests.

Appendix R- Survey and Manage Species

Species	Suspected/ Known	Survey Strategies			
		1	2	3	4
<b>Uncommon Coral Fungi</b> (continued)					
<i>Ramaria lagentii</i>	S	X		X	
<i>Ramaria rubella</i> var. <i>blanda</i>	S	X		X	
<i>Ramaria rubrevanescens</i>	S	X		X	
<i>Ramaria rubripermanens</i>	S	X		X	
<i>Ramaria suecica</i>	S	X		X	
<i>Ramaria thiersii</i>	S	X		X	
<b>Rare Coral Fungi</b>					
<i>Ramaria amyloidea</i>	S	X		X	
<i>Ramaria aurantiscescens</i>	S	X		X	
<i>Ramaria celerivirescens</i>	S	X		X	
<i>Ramaria claviramulata</i>	S	X		X	
<i>Ramaria concolor</i> f. <i>marr</i>	S	X		X	
<i>Ramaria cyaneigranosa</i>	S	X		X	
<i>Ramaria hilaris</i> var. <i>olympiana</i>	S	X		X	
<i>Ramaria lorthamnus</i>	S	X		X	
<i>Ramaria maculatipes</i>	S	X		X	
<i>Ramaria rainierensis</i>	S	X		X	
<i>Ramaria rubrunnescens</i>	S	X		X	
<i>Ramaria stuntzii</i>	S	X		X	
<i>Ramaria verlotensis</i>	S	X		X	
<i>Ramaria gracilis</i>	S	X		X	
<i>Ramaria spinulosa</i>	S	X		X	
<b>Phaeocollybia</b>					
<i>Phaeocollybia attenuata</i>	S			X	
<i>Phaeocollybia californica</i>	S	X		X	
<i>Phaeocollybia carmanahensis</i>	S	X		X	
<i>Phaeocollybia dissiliens</i>	S	X		X	
<i>Phaeocollybia fallax</i>	S			X	
<i>Phaeocollybia gregaria</i>	S	X		X	

**Survey Strategies:** **1**=manage known sites; **2**=survey prior to activities and manage sites  
**3**=conduct extensive surveys and manage sites; **4**=conduct general regional surveys.  
**s**=it is suspected to occur on the Forests. **k**=it is known to occur on the Forests.

Appendix R- Survey and Manage Species

Species	Suspected/ Known	Survey Strategies			
		1	2	3	4
<b>Phaeocollybia (continued)</b>					
<i>Phaeocollybia kauffmanii</i>	S	X		X	
<i>Phaeocollybia olivacea</i>	S			X	
<i>Phaeocollybia oregonensis</i>	S	X		X	
<i>Phaeocollybia piceae</i>	S	X		X	
<i>Phaeocollybia pseudofestiva</i>	S			X	
<i>Phaeocollybia scatesiae</i>	S	X		X	
<i>Phaeocollybia sipei</i>	S	X		X	
<i>Phaeocollybia spadicea</i>	S	X		X	
<b>Uncommon Gilled Mushrooms</b>					
<i>Catathelasma ventricosa</i>	S			X	
<i>Cortinarius azureus</i>	S			X	
<i>Cortinarius boulderensis</i>	S	X		X	
<i>Cortinarius cyanites</i>	S			X	
<i>Cortinarius magnivelatus</i>	S	X		X	
<i>Cortinarius olympianus</i>	S	X		X	
<i>Cortinarius spilomius</i>	S			X	
<i>Cortinarius tabularis</i>	S			X	
<i>Cortinarius valgus</i>	S			X	
<i>Dermocybe humboldtensis</i>	S	X		X	
<i>Hebeloma olympiana</i>	S	X		X	
<i>Hygrophorus caeruleus</i>	S	X		X	
<i>Hygrophorus karstenii</i>	S			X	
<i>Hygrophorus vernalis</i>	S	X		X	
<i>Russula mustelina</i>	S			X	
<b>Rare Gilled Mushrooms</b>					
<i>Cortinarius verrucisporus</i>	S	X		X	
<b>Tooth Fungi</b>					
<i>Hydnum repandum</i>	S			X	

**Survey Strategies:** **1**=manage known sites; **2**=survey prior to activities and manage sites  
**3**=conduct extensive surveys and manage sites; **4**=conduct general regional surveys.  
**s**=it is suspected to occur on the Forests. **k**=it is known to occur on the Forests.

Appendix R- Survey and Manage Species

Species	Suspected/ Known	Survey Strategies			
		1	2	3	4
<b>Tooth Fungi (continued)</b>					
<i>Hydnum umbilicatum</i>	S			X	
<i>Phellodon atratum</i>	S			X	
<i>Sarcodon fuscoindicum</i>	S			X	
<i>Sarcodon imbricatus</i>	S			X	
<b>Saprobies (Decomposers)</b>					
<b>Uncommon Gilled Mushrooms</b>					
<i>Baeospora myriadophylla</i>	S			X	
<i>Chrysopthalina grossula</i>	S			X	
<i>Collybia bakerensis</i>	S	X		X	
<i>Fayodia gracilipes (rainierensis)</i>	S			X	
<i>Gymnopilus punctifolius</i>	S	X		X	
<i>Marasmius applanatipes</i>	S	X		X	
<i>Mycena hudsoniana</i>	S	X		X	
<i>Mycena lilacifolia</i>	S			X	
<i>Mycena marginella</i>	S			X	
<i>Mycena monticola</i>	S	X		X	
<i>Mycena overholtsii</i>	S	X		X	
<i>Mycena quinaultensis</i>	S	X		X	
<i>Mycena tenax</i>	S			X	
<i>Mythicomycetes corneipes</i>	S			X	
<i>Pholiota albivelata</i>	S	X		X	
<i>Stagnicola perplexa</i>	S			X	
<b>Rare Gilled Mushrooms</b>					
<i>Clitocybe subditopoda</i>	S	X		X	
<i>Clitocybe senilis</i>	S	X		X	
<i>Neolentinus adherens</i>	S	X		X	
<b>Bondarzewia Polypore</b>					
<i>Bondarzewia montana</i>	S	X	X	X	

**Survey Strategies:** 1=manage known sites; 2=survey prior to activities and manage sites  
3=conduct extensive surveys and manage sites; 4=conduct general regional surveys.  
s=it is suspected to occur on the Forests. k=it is known to occur on the Forests.

Appendix R- Survey and Manage Species

Species	Suspected/ Known	Survey Strategies			
		1	2	3	4
<b>Rare Resupinates and Polypores</b>					
<i>Aleurodiscus farlowii</i>	S	X		X	
<i>Dichostereum granulatum</i>	S	X		X	
<i>Cudonia monticola</i>	S			X	
<i>Gyromitra californica</i>	S			X	X
<i>Gyromitra esculenta</i>	S			X	X
<i>Gyromitra infula</i>	S			X	X
<i>Gyromitra melaleucoides</i>	S			X	X
<i>Gyromitra montana</i> (syn. <i>G. gigas</i> )	S			X	X
<i>Otidea leponna</i>	S			X	
<i>Otidea onotica</i>	S			X	
<i>Otidea smithii</i>	S	X		X	
<i>Plectania melastoma</i>	S			X	
<i>Podostroma alutaceum</i>	S			X	
<i>Sarcosoma mexicana</i>	S			X	
<i>Sarcosphaera eximia</i>	S			X	
<i>Spathularia flavida</i>	S			X	
<b>Rare Cup Fungi</b>					
<i>Aleuria rhenana</i>	S	X		X	
<i>Bryoglossum gracile</i>	S				
<i>Helvella compressa</i>	S	X		X	
<i>Helvella crassitunicata</i>	S	X		X	
<i>Helvella elastica</i>	S	X		X	
<i>Helvella maculata</i>	S	X		X	
<b>Club Coral Fungi</b>					
<i>Clavariadelphus ligula</i>	S			X	X
<i>Clavariadelphus pistillans</i>	S			X	X
<i>Clavariadelphus truncatus</i>	S			X	X
<i>Clavariadelphus borealis</i>	S			X	X
<i>Clavariadelphus lovejoyae</i>	S			X	X

**Survey Strategies:** **1**=manage known sites; **2**=survey prior to activities and manage sites  
**3**=conduct extensive surveys and manage sites; **4**=conduct general regional surveys.  
**s**=it is suspected to occur on the Forests. **k**=it is known to occur on the Forests.

Appendix R- Survey and Manage Species

Species	Suspected/ Known	Survey Strategies			
		1	2	3	4
<b>Club Coral Fungi</b> (continued)					
<i>Clavariadelphus sachalinensis</i>	S			X	X
<i>Clavariadelphus subfastigiatus</i>	S			X	X
<b>Jelly Mushroom</b>					
<i>Phlogotis helvelloides</i>	S			X	X
<b>Branched Coral Fungi</b>					
<i>Clavulina cinerea</i>	S			X	X
<i>Clavulina cristata</i>	S			X	X
<i>Clavulina ornatipes</i>	S			X	X
<b>Mushroom Lichen</b>					
<i>Phytoconis ericetorum</i>	S			X	X
<b>Parasitic Fungi</b>					
<i>Asterophora lycoperdoides</i>	S			X	
<i>Asterophora parasitica</i>	S			X	
<i>Collybia racemosa</i>	S			X	
<i>Cordyceps capitata</i>	S			X	
<i>Cordyceps ophioglossoides</i>	S			X	
<i>Hypomyces luteovirens</i>	S			X	
<b>Cauliflower Mushrooms</b>					
<i>Sparassis crispa</i>	S			X	
<b>Moss Dwelling Mushrooms</b>					
<i>Cyphellostereum laeve</i>	S			X	
<i>Galerna atkinsoniana</i>	S			X	
<i>Galerna cerina</i>	S			X	
<i>Galerina sphagnicola</i>	S			X	
<i>Galerina vittaeformis</i>	S			X	
<i>Rickenella setipes</i>	S			X	

**Survey Strategies:** **1**=manage known sites; **2**=survey prior to activities and manage sites  
**3**=conduct extensive surveys and manage sites; **4**=conduct general regional surveys.  
**s**=it is suspected to occur on the Forests. **k**=it is known to occur on the Forests.

Appendix R- Survey and Manage Species

Species	Suspected/ Known	Survey Strategies			
		1	2	3	4
<b>Coral Fungi</b>					
<i>Clavicornia avellanea</i>	S			X	
<b>Rare Forage Lichen</b>					
<i>Bryoria tortuosa</i>	S	X		X	
<b>Nitrogen-fixing Lichens</b>					
<i>Lobaria oregana</i>	S				X
<i>Lobaria scrobiculata</i>	S				X
<i>Lobaria pulmonaria</i>	S				X
<i>Nephroma bellum</i>	S				X
<i>Nephroma helveticum</i>	S				X
<i>Nephroma laevigatum</i>	S				X
<i>Nephroma parile</i>	S				X
<i>Nephroma resupinatum</i>	S				X
<i>Pannaria leucostictoides</i>	S				X
<i>Pannaria mediterranea</i>	S				X
<i>Pannaria saubinetii</i>	S				X
<i>Peltigera collina</i>	S				X
<i>Peltigera neckeri</i>	S				X
<i>Peltigera pacifica</i>	S				X
<i>Pseudocyphellaria anomala</i>	S				X
<i>Pseudocyphellaria anthraspis</i>	S				X
<i>Pseudocyphellaria crocata</i>	S				X
<i>Sticta beauvoisii</i>	S				X
<i>Sticta fuliginosa</i>	S				X
<i>Sticta limbata</i>	S				X
<b>Pin Lichens</b>					
<i>Calicium abietinum</i>	S				X
<i>Calicium adaequatum</i>	S				X
<i>Calicium adpersum</i>	S				X
<i>Calicium glaucellum</i>	S				X
<i>Calicium viride</i>	S				X
<i>Chaenotheca brunneola</i>	S				X
<i>Chaenotheca chrysocephala</i>	S				X
<i>Chaenotheca ferruginea</i>	S				X
<i>Chaenotheca furfuracea</i>	S				X
<i>Chaenotheca subroscida</i>	S				X

**Survey Strategies:** 1=manage known sites; 2=survey prior to activities and manage sites  
3=conduct extensive surveys and manage sites; 4=conduct general regional surveys.  
s=it is suspected to occur on the Forests. k=it is known to occur on the Forests.

Appendix R- Survey and Manage Species

Species	Suspected/ Known	Survey Strategies			
		1	2	3	4
<b>Pin Lichens (continued)</b>					
<i>Chaenothecopsis pusilla</i>	S				X
<i>Cyphelium inquinans</i>	S				X
<i>Microcalicium arenarium</i>	S				X
<i>Mycocalicium subtile</i>	S				X
<i>Stenocybe clavata</i>	S				X
<i>Stenocybe major</i>	S				X
<b>Riparian Lichens</b>					
<i>Collema nigrescens</i>	S				X
<i>Leptogium burnetiae</i> var. <i>hirsutum</i>	?				X
<i>Leptogium cyanescens</i>	S				X
<i>Leptogium saturninum</i>	?				X
<i>Leptogium teretiusculum</i>	?				X
<b>Aquatic Lichen</b>					
<i>Hydrothyria venosa</i>	S	X		X	
<b>Bryophytes</b>					
<i>Antitricha curtipendula</i>	S				X
<i>Douinia ovata</i>	S				X
<i>Kurzia makinoana</i>	S	X		X	
<i>Ptilidium californicum</i>	S	X	X	X	
<i>Scouleria marginata</i>	S				X
<i>Ulota meglospora</i>	S	X		X	
<b>Vascular Plants</b>					
<i>Allotropa virgata</i>	K	X	X		
<i>Arceuthobium tsugense</i>	S	X	X		
<i>Botrychium minganense</i>	S	X	X		
<i>Botrychium montanum</i>	S	X	X		
<i>Cypripedium fasciculatum</i>	K	X	X		
<i>Cypripedium montanum</i>	K	X	X		

**Survey Strategies:** **1**=manage known sites; **2**=survey prior to activities and manage sites  
**3**=conduct extensive surveys and manage sites; **4**=conduct general regional surveys.  
**s**=it is suspected to occur on the Forests. **k**=it is known to occur on the Forests.

Appendix R- Survey and Manage Species

Species	Suspected/ Known	Survey Strategies			
		1	2	3	4
<b>Amphibians</b>					
Del Norte salamander	S	X	X		
Larch Mountain salamander	K	X	X		
Shasta salamander	K	X	X		
Siskiyou Mountains salamander	S	X	X		
Van Dyke's salamander (Cascades)	K	X	X		
<b>Birds</b>					
Great Gray Owl	S	X	X		
<b>Mammals</b>					
Red tree vole ( <i>P. longicaudus</i> )	K		X		
Lynx	K			X	
<b>Mollusks</b>					
<i>Helminthoglypta hertleini</i>		X	X		
<i>Helminthoglypta talmadgei</i>		X	X		
<i>Monadenia churchi</i>		X	X		
<i>Monadenia troglodytes troglodytes</i>		X	X		
<i>Monadenia troglodytes wintu</i>		X	X		
<i>Trilobopsis roperi</i>		X	X		
<i>Trilobopsis tehamana</i>		X	X		
<i>Vespericola pressleyi</i>		X	X		
<i>Vespericola shasta</i>		X	X		
<i>Prophysaon dubium</i>		X	X		
<i>Fluminicola n. sp. 14</i>		X	X		
<i>Fluminicola n. sp. 15</i>		X	X		
<i>Fluminicola n. sp. 16</i>		X	X		
<i>Fluminicola n. sp. 17</i>		X	X		

**Survey Strategies:** **1**=manage known sites; **2**=survey prior to activities and manage sites  
**3**=conduct extensive surveys and manage sites; **4**=conduct general regional surveys.  
**s**=it is suspected to occur on the Forests. **k**=it is known to occur on the Forests.

Appendix R- Survey and Manage Species

Species	Suspected/ Known	Survey Strategies			
		1	2	3	4
<b>Mollusks</b> (continued)					
<i>Fluminicola</i> n. sp. 18		X	X		
<i>Fluminicola seminalis</i>		X	X		
<i>Lyogyrus</i> n. sp. 3		X	X		
<i>Vorticifex</i> n. sp. 1		X	X		
<b>Arthropods</b>					
Canopy herbivores (south range)					X
Coarse wood chewers (south range)					X
Litter and soil dwelling species (SR)					X
Understory and forest gap herbivores					X
<b>Bats</b>					
Fringed myotis	S	X	X		
Silver-haired bat	S	X	X		
Long-eared myotis	K	X	X		
Long-legged myotis	S	X	X		
Pallid bat	K	X	X		

**Survey Strategies:** 1=manage known sites; 2=survey prior to activities and manage sites  
 3=conduct extensive surveys and manage sites; 4=conduct general regional surveys.  
 s=it is suspected to occur on the Forests. k=it is known to occur on the Forests.