

Appendix A - Implementation Plans

Needed Implementation Strategies or Plans

Table A-1 lists strategies or plans that are necessary to better coordinate project development or implementation, or are required by law. Applicable laws, policies and procedures will be followed during project implementation. Table A-2 lists the existing plans or strategies retained and incorporated into the Forest Plan. All other plans, strategies or Forest direction are superseded by the Forest Plan.

Table A-1. Necessary Implementation Strategies or Plans*			
Name or Type of Plan	Purpose	Target Completion Date	Scope of the Strategy
Cave Management Strategy	Establish interpretive, scientific study and public use and safety objectives.	As Inventoried	As cave resources are discovered that require management strategies, a Forest-wide management strategy will be developed.
Watershed Needs Assessment	To inventory and schedule watershed improvement projects.	As Inventoried	Watersheds that do not meet water quality goals will be inventoried and projects scheduled to enhance recovery efforts. These strategies would apply to any watershed not meeting the Forest Plan goals and objectives.
Ecosystem Analysis	To coordinate management actions by providing analyses at the landscape/watershed level.	Ongoing	These analyses will be conducted at the landscape/watershed level. They would include watershed analysis, transportation plan reviews and LSR assessments (where appropriate).
Late Successional Reserve Assessments	To identify important components and appropriate treatments for LSRs.	As Needed	These assessments will apply to LSRs. They may be conducted in conjunction with ecosystem analysis at the landscape/watershed level and then might apply to portions of LSRs.
Deer Herd Action Strategies for the McCloud Flats Herd	To coordinate maintenance and enhancement projects.	1997	The primary focus of this strategy will be directed within the management area. The management of existing or potential habitat outside of the management area will be compatible with Forest-wide standards and guidelines.
Visual Corridor Management Strategy	Determine visual character and management options within the foreground and middleground and interpret significant natural/cultural and management activities.	As Needed	Scenery and Interpretation strategies for the State of Jefferson and Mt. Shasta Scenic Byways will be developed.
Visual Rehabilitation Strategy	To coordinate the recovery of areas currently not meeting the desired level of VQO.	1997	Forest-wide, with emphasis on areas of public sensitivity or high scenic value.
Off-Highway Vehicle Strategy	To schedule projects to implement vehicle restrictions and closures.	1997	This strategy would apply Forest-wide to areas where vehicle closures or restrictions have been identified.

Table A-1. Necessary Implementation Strategies or Plans*

Name or Type of Plan	Purpose	Target Completion Date	Scope of the Strategy
Wilderness Management Strategy	To coordinate the management of wilderness.	1997	Management implementation strategies will be developed for the Marble Mountains and Trinity Alps Wildernesses.
Wild and Scenic River Management Strategy	To coordinate the management of Wild, Scenic and Recreational Rivers	1997	Management implementation strategies will be developed for the Klamath, Scott and Salmon rivers, and Wooley Creek. Implementation plans for other rivers recommended for inclusion in the Wild and Scenic River system will be completed within 3 years of Congressional designation.
Research Natural Area Management Strategy	To promote research opportunities within each RNA.	2002	An establishment report has been prepared for 4 of the 9 RNAs proposed. Establishment reports, which establish the actual RNA boundaries, will be needed for the remaining RNAs. The development of research opportunities for all RNAs will be needed.
Special Interest Area Management Strategy	To promote interpretive management strategies within the SIA.	2002	Management strategies to develop the most effective interpretive SIA options for each area will be developed. Strategies may include more than 1 SIA.
Law Enforcement Strategy	To coordinate the implementation of law enforcement actions.	1997	This strategy will coordinate law enforcement priorities with the available resources. It will affect all of the Forest's programs.
Fire Management Action Strategy	To establish specific implementation actions within the fire management program.	1997	This action strategy will affect the Forest-wide fire and fuels management program.
Coordinated Resource Management Strategies (CRMP)	To coordinate the grazing use of Forest and private lands.	Periodic review	Coordinated resource management plans will be developed or revised for the Butte Valley National Grassland, and in other areas where it is important to coordinate range use on Forest lands, with use on private lands.
Cultural Resource Management Strategies	To coordinate the management of Inam, Cottimien and Helkau with the Karuk Tribe of California.	1997	This strategy will identify appropriate management actions with the Karuk ceremonial areas.
Community Action Plans – Rural Development	To coordinate economic development plans that utilize Forest resources.	As submitted	As the community proposes economic development projects that require the use of Forest products, we will respond by attempting to implement the proposals where possible.

*Budgets have been requested to complete these implementation strategies and plans by the date displayed.

Table A-2. Existing Plans or Strategies Retained and Incorporated by Reference into the Forest Plan*

Name or Type of Plan	Purpose	Scope of the Strategy
Regional Health & Safety Plan for the Inventory & Investigation of Inactive/Abandoned Mine Sites	To coordinate treatment of hazardous materials.	Applies to Forest Service Region 5
Species Management Guides	To coordinate habitat enhancement and project implementation	Existing guides have been prepared for the following species: <i>Calochortus persistens</i> , <i>Cypripedium spp. (3)</i> , <i>Lilium wigginsii</i> , <i>Pedicularis howellii</i> , <i>Perideridia leptocarpa</i> , <i>Phacelia cookei</i> , <i>P. dalesiana</i> and <i>Trillium ovatum ssp. oettingeri</i> .
Peregrine Falcon Recovery Plan	To provide direction for recovery of peregrine falcon populations.	Applies throughout the range of peregrine falcons.
Bald Eagle Habitat Management Plan	To provide direction for recovery of bald eagle populations.	Applies throughout the range of bald eagles.
Three Sisters Bald Eagle Winter Roost Plan	To coordinate habitat enhancement and project implementation	Applies to the roost site.
The Long Range Plan for the Klamath river Basin Conservation Area Fishery Restoration Program	To provide direction for recovering fish stocks.	Applies to the Klamath River Basin.
Recreation Program Management Strategy and Direction	To coordinate the protection and management of recreational settings.	Applies to the forest.
The Pacific Southwest Region Vegetation Management for Reforestation Final EIS.	To provide direction for vegetation management.	Applies to Forest Service region 5.





Appendix B - Research and Technical Planning Needs

This appendix lists and briefly describes research and technical planning needs identified during the analysis of the Draft Environmental Impact Statement. Research includes studies desired to fully implement the Forest Plan, and monitor the appropriateness of the data and assumptions. Technical planning, which can be gathered with existing techniques, is needed for future plan revision.

It is anticipated that additional research and technical needs will be identified as the Plan is implemented. Many of the research studies have already been initiated and will continue. These studies will be coordinated through the Pacific Southwest Experiment Station, and the Pacific Southwest Regional Office (Region 5).

Implementation of the Forest Plan will be enhanced by the development of a coordinated, comprehensive, relational database. The database will need to be structured in a manner to respond to Forest-level issues, as well as project-related issues. Despite the size and extensive requirements, the database must be developed to more thoroughly address specific issues in the next round of Forest planning.

Research Needs

Physical Environment

Geology

Validate coefficients used to predict sediment change. Examine techniques to assess impacts to beneficial uses.

Evaluate effects of disturbances on landslide rates. Conduct studies in sample watersheds over 5-10 years following landslide-producing storms. Coordinate with the academic and research communities. Utilize on-going monitoring of channel configuration and landslide monitoring.

Seismic, Volcanic, Snow Avalanche and Land Subsidence/Collapse Hazards. Compile information on the occurrence of any adverse effects from these hazards, review current research. Identify y instances of cave or mine collapse.

Soils

Develop parameters for nutrient cycling necessary to maintain ecosystem health.

Water

Examine criteria used to determine watershed condition. Determine if ERAs are an effective measure or if another measure is more appropriate.

Air

Establish and validate Region-wide standards for screening air quality related values.

Biological Environment

Biological Diversity

Define successional processes that occur in various ecological types.

Develop methods to quantify ecosystem patterns, including information on the most relevant scales of study.

Describe the range of conditions and identify patterns of variability in ecosystems. Examine ecosystem recovery from natural or human induced disturbance.

Conduct biological studies to obtain missing information needed to develop Species Management Strategies for all Federally listed Endangered or Threatened Species, or those species listed as Sensitive by the U.S. Forest Service. Such research would include studies on the distribution, habitat requirements, population dynamics and responses to management activities. This information would be important to assure the recovery of Threatened or Endangered Species, and the continued viability of other species, including those Sensitive Species.

Continue investigations of habitat needs for Endangered, Threatened and Sensitive species using such accepted means as the Wildlife Habitat Relational Database.

Evaluate the capability of MIS and Guild species to adequately represent the needs of other species. Examine potential to move away from a single species management approach.

Sensitive Plants

Develop species management guides which integrate biological, ecological and resource program information for each Sensitive species. Determine habitat requirements, reproductive and dispersal requirements, and investigate genetic variability for Sensitive species.

Wildlife

Validate the assumptions used to develop the Wildlife Habitat Relational model and applicability to the Klamath Province habitat.

Continue research on the relationships between vegetative disturbance, and late-seral stage habitat-dependent species. Establish a better defined threshold of population viability.

Fisheries

Assess and verify the current and potential production capabilities for anadromous fish on the Forest. Determine the habitat parameters that limit population levels. Coordinate this research with studies on fish population parameters.

Resource Management Programs

Visual Resource Management

Develop an objective process for estimating cumulative effects on visual quality. Validate coefficients used for the Forest.

Specially Designated Area Management

Determine if identified uses and activities planned for in the Forest Plan are appropriate for each specially designated area.

Identify additional areas of special interest as ecosystem interactions with management activities are identified

Timber Management

Examine the relationships between soil moisture stress and seedling survival and growth. Establish practical, field-tested parameters to use in determining potential, non-regenerable sites and incorporate them into the Soil Resource Inventory.

Continue to examine opportunities and cooperate with studies to increase utilization of forest biomass.

Fire Management

Coordinate with research to determine if wildland fires are continuing to get larger and hotter.

Coordinate with research to study effects of prescribed fire on future wildland fires.

Range Management

Identify vegetation reference areas on sites with low disturbance history. Establish exclusion plots or larger exclosures in representative areas to determine vegetative composition in the absence of grazing and other disturbances.

Determine effects of livestock grazing in riparian areas.

Social and Economic Environment

Social

Coordinate with county and university and other studies which link social values and needs to Forest management issues. Develop effective measures for social impacts.

Economic

Conduct research on the social and economic value of recreation, tourism and visual resources to the local economy.

Determine what economic development opportunities would be cost effective. Coordinate with other agencies, county and local community groups to identify rural economic development opportunities.

Technical Planning Needs

Physical Environment

Geology

Complete a Forest-wide third order Geologic Resource Inventory.

Soils and Water

Complete a Forest-wide Watershed Improvement Needs inventory to determine the location and priority of needed watershed restoration.

Water

Conduct inventories of underground water resources on the Forest.

Biological Environment

Biological Diversity

Complete the Ecological Unit Inventory and Ecological Unit Mapping for the Forest.

Conduct Endangered, Threatened and Sensitive species habitat inventories.

Evaluate existing and potential RNAs to determine how well they represent different ecosystems as examples of diversity.

Sensitive Plants

Develop species management guides for Sensitive species.

Wildlife

Determine appropriate snag densities for given vegetation types. Determine the relationship between snag densities and cavity nesting wildlife populations.

Inventory big game presence and use on the Forest. Determine the carrying capacity of seasonal deer, elk and pronghorn herd ranges. Coordinate with CDFG.

Determine fire effects on species habitat capabilities.

Fisheries

Determine anadromous fisheries distribution and abundance, habitat conditions and habitat availability.

Determine the relationship between anadromous smoke production and the number of adults which subsequently return and successfully reach the spawning grounds.

Resource Management Programs

Visual Resource Management

Determine Forest-wide current visual conditions and scenic character through photo interpretation and field correlation.

Recreation Management

Identify the demand for recreation activities and facilities on the Forest.

Specially Designated Area Management

Prepare Establishment Reports and management plans for new RNAS.

Minerals Management

Survey approximately 50% of the Forest to determine the mineral potential where there is no current inventory.

Transportation and Facilities Management

Update the road inventory to include roads riot currently on the transportation system.

Fire Management

Incorporate information on fire history and fire occurrence into the Forest database.

Range Management

Determine ecological status of important range types in conjunction with the Ecological Unit Inventory.

Cultural Resources

Integrate plans for management of cultural resources with those of the State of California Historic Resources Plan.

Determine the research potential of known archeological sites by site type (for example, lithic scatter, temporary camp, seasonal base camp, etc.).

Appendix C - Tentative Ten-Year Timber Sale Program

Timber Sale Program

The Forest Timber Sale Program has 2 components. The Allowable Sale Quantity (ASQ) is attained from regulated lands, lands managed for a sustained timber yield and lands with an incidental programmed yield. The estimated ASQ for the first decade is 51.0 million board feet (MMBF) of timber per year. As more land is placed in a regulated condition over time, the ASQ will increase. It is estimated to be 89.2 MMBF by the fifth decade.

The second component is attained from unregulated lands, lands managed for objectives other than timber management. The yields from unregulated lands are not programmed as they are generally incidental, highly speculative and dependent on ecosystem conditions. They are not part of the ASO. Based on the current conditions of an extended drought, heavy fuel loading from past fire suppression and many dead and dying trees throughout the Forest, it is estimated that approximately 20 MMBF per year might be removed from unregulated lands to achieve goals of ecosystem health.

Reasons for Harvest

All silvicultural systems and harvesting methods may be used to achieve these objectives, although Tables C-1 through C-3 will display only the major methods used in FORPLAN's linear program solution.

Stands to be Managed for Timber Emphasis (Regulation Class 2 only) - 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.
- To salvage dead and dying trees.
- To reduce stocking where trees are excess to desired basal area stocking.
- To meet local and National demand for wood fiber.
- To achieve a stable vegetative condition as a part of a desired condition for a landscape.
- To recruit conditions associated with a young forest (early seral stage) such as wildlife habitats, resistance to insect and disease epidemics, enhance horizontal structural diversity, fuel reduction and scenic variety.

Stands to be Managed for Special Emphasis (Regulation Class 3 or Unregulated) – Timber yields are realized by managing for resource objectives such as ecosystem health or wildlife management. Examples are:

- To reduce the amount of standing dead trees so the risk of intense stand-destroying future wildfires is reduced.
- To reduce stocking levels so residual trees will be healthy, vigorous and resilient.
- To create habitat conditions more favorable to TE&S species.

Harvest Priority for Regulated Lands

Priorities for timber harvest would generally follow the FORPLAN solution. Two types of harvest are recognized:

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

Intermediate Cuttings - intended to maintain stocking for optimum net growth of young stands (thinning), to capture mortality in older stands (salvage) and to maintain health by removing dying trees (sanitation).

The highest timber management priority is for the regeneration of stands. Regeneration is the means by which productivity can be increased and regulation approached. Poorly stocked 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. This provides a starting point for prioritizing. Actual opportunities would be identified at the site level using information for landscape/watershed and site analyses to determine desired conditions.

Generally, intermediate harvests have second priority except in the case of catastrophic salvage. Where heavy, concentrated losses cause understocking, land managers must consider trading the affected strata for strata that would otherwise have been regenerated. In such cases, achieving ecological stability by meeting regeneration acreage goals may be more important than distribution among strata. Although intermediate harvests for stocking control are important, they are scheduled only after regeneration acreage objectives are met, as feasible, in any landscape unit. All scheduled activities will be consistent with standards and guidelines.

Silvicultural Systems

A silvicultural prescription will be written for each stand to be treated. The Forest determines the silvicultural system through site-specific analysis of each stand. The analysis is based on land management objectives, environmental considerations, stand and site conditions and economic considerations.

The Forest will consider both even-aged and uneven-aged systems when appropriate. The following criteria should be used as a guide for identifying those stands which are the best candidates for uneven-aged management systems (selection cutting):

- land management objectives which restrict large openings, or a continuous tree cover is desired (for example, visual retention areas, riparian management zones);
- land management objectives which emphasize resource values other than timber growth and yield (for example, key wildlife habitat);
- stands which display an uneven or mixed size structure (3 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 (for example, dwarf mistletoe and root diseases);
- stands which are on slopes of less than 400% (tractor loggable);
- stands of tree species which are not highly susceptible to logging damage;
- stands of tree species which are moderately or very tolerant to shade;
- stands where repeated entries do not create significant soil compaction problems.

Timber Management Controls

Regulation is the organization and control of the Forest's growing stock to achieve a sustained yield of wood products over time. The Forest's goal is to approach regulation through scheduled regeneration harvests over a period of time. This period is 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 silvicultural. 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-1 shows the area controls for the first decade.

Volume Control - This method can be applied to even-aged or uneven-aged management schemes. It provides for nearly equal yields over the conversion period, based on present and predicted stand volumes. Table C-2 shows the volume controls for the first decade.

Implementing the timber management portion of the Forest Plan requires maintaining control over both volume and area to achieve optimum yields during and after the conversion period.

ASQ is established as the maximum harvest for the planning period from regulated lands. Scheduled volume in a single year may fluctuate, but the decade scheduled volume must reflect the average annual ASQ. Scheduled volume is based on inventory data and growth and yield projections from the suitable, regulated timber land base.

Table C-1. Vegetation Management Practices Average Acreage in the First Decade for Capable, Available and Suitable Lands	
Practice	Acres
<i>Regeneration Harvest:</i>	
Green Tree Retention (GTR)	32,100
Group Selection	5,800
<i>Intermediate Harvest:</i>	
Sanitation, Salvage, Thinning ¹	2,500
<i>Timber Stand Improvement</i>	10,000
<i>Reforestation</i>	28,500
¹ Modeled as stand maintenance.	

Table C-2. Allowable Sale Quantity and Timber Sale Program Quantity (Annual Average Volume for the First Decade)				
Harvest Method	Allowable Sale Quantity*			
	Sawtimber		Other Products	
	MMCF	MMBF	MMCF	MMBF
Regeneration Harvest:				
Green Tree Retention (GTR)	5.1	34.1	0	0
Group Selection	1.0	6.9	0	0
Intermediate Harvest:				
Sanitation	0.5	3.3	0	0
Salvage	1.0	6.7	0	0
Total Allowable Sale Quantity	7.6	50.9		
MMCF = Million Cubic Feet MMBF = Million Board Feet				
*Includes only chargeable scheduled volumes from suitable lands, rounded to the nearest 0.1 MMCF and MMBF.				

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

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

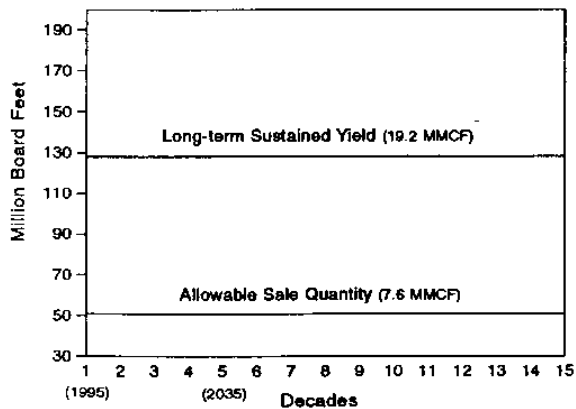
- changes in the Uumber land base (resulting from new planning evaluations or land status changes);
- inability to meet volume or acre goals because of inadequate financing and/or personnel;
- unresolved restrictions on regeneration and stand maintenance methods (such as brush control);
- failure to meet restocking time limits to accomplish regenerated stand maintenance.
- inventory changes resulting from catastrophic damage from fire, insect, or disease.
- significant differences between the current Forest timber inventory and new compartment or stand examination data;
- changes in the projected clearcut/shelterwood/selection regeneration 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.

Ecosystem Management Timber Products

A number of activities will produce products that are not chargeable to the ASQ. Table C-1 and C-2 relate to the treatment of stands for the scheduled timber program. Other programs such as wildlife habitat improvement will likely produce wood fiber products as a result of logging to improve habitat conditions. Fuel treatment activities to reduce fire hazards may produce wood fiber that has some value and can be sold to defray some of the treatment costs.

Climatic variations, fire and insect/forest pathogen populations affect the number of acres subject to salvage harvest. Where this occurs on regulated land, it is typically charged to the ASQ. Where the conditions occur on unregulated land, the volume is not chargeable. The occurrence of wildfires on unregulated land could create conditions that would require salvage of dead trees and fuel treatment to promote recovery of desirable conditions.

Figure C-1. Long-term Sustained Yield and Allowable Sale Quantity



The extent of such treatments could easily range from 6,000 to 12,000 acres per year. Continued drought could cause this change to accelerate in the early part of the planning period.

Tentative Ten Year Timber Sale Action Plan

Preparing a reliable timber sale program is difficult because of factors beyond the Forest's control. One critical factor is that some of the suitable timber land on the Forest is currently under timber sale contracts. Termination dates for many sales are uncertain.

In addition, the timber sale planning process for an individual sale from compartment inventory and analysis until sale date, takes at least 6 years to complete. Also, harvest levels in the first few years of the program are tied to current program budget levels. Therefore, the first 2 or 3 years of the program respond largely to projected budget levels and work currently prepared. It will take time to incorporate the additional requirements such as the survey and manage provision in Forest-wide Standard and Guideline 6-17.

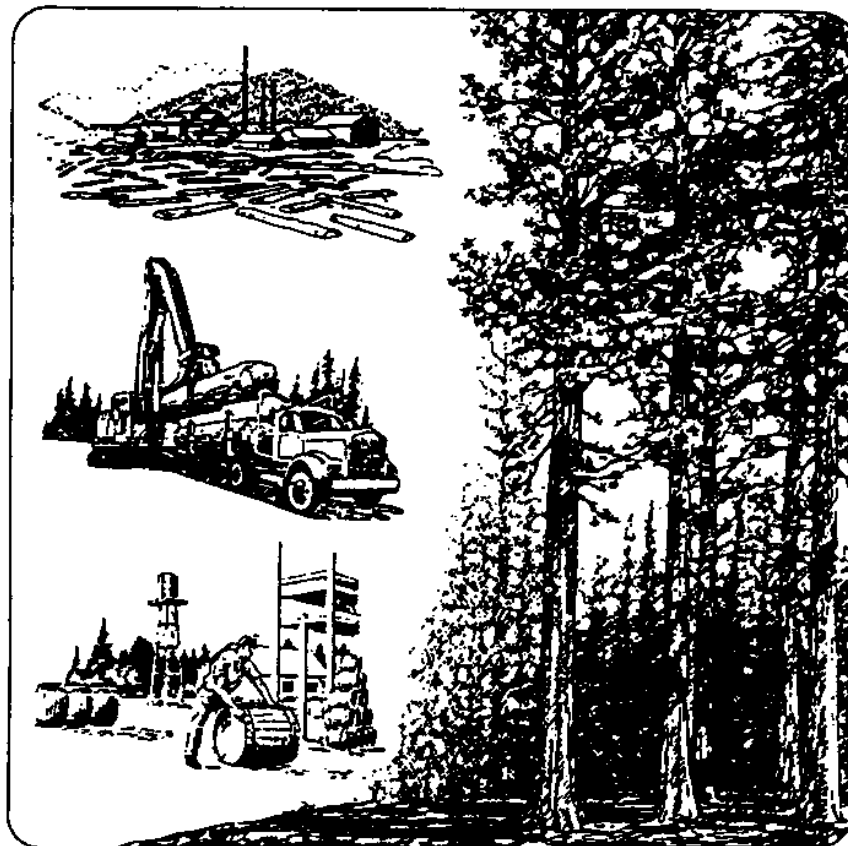
1995-1997 - Table C-3 shows the proposed timber sale program for the first 3 years of the Forest Plan. Individual sale information is presented by ranger district and fiscal year.

1998-2004 - Specific details of exact sale areas and volume to be harvested are not known for sales in these years. This information will be incorporated into the Forest Plan as the timber sale program is updated and revised. The volume projected to be sold during this period would average about 51.0 MMBF per year. Timber sales during this period will be subject to the volume and area controls discussed previously in this appendix.

Table C-3. Tentative Ten-Year Timber Sale Action Plan				
Ranger District	Sale Name/Landscape Area	Proposed Volume (MMBF)	Primary Silvicultural Harvest Method	Primary Logging System
Fiscal Year 1995				
Oak Knoll	Middle	< 0.1	GTR	Cable
	Monument Heli Salvage	0.5	Salvage	Helicopter
	Slinkard Heli Salvage	0.5	Salvage	Helicopter
	Beaver Heli Salvage	1.0	Salvage	Helicopter
	Scraggy Heli Salvage	0.5	Salvage	Helicopter
Happy Camp	Frypan Heli Salvage	1.2	Salvage	Helicopter
	Twin Hazard		Sanitation	Cable
	Happy Thinning	0.3	Thin	Cable
	Facelift Heli	0.2	GTR	Helicopter
	East Fork Thinning	1.0	Thin	Helicopter
	Gold	2.5	GTR	Tractor
	Small Sales	1.5	Sanitation/Salvage	Tractor
Salmon River	Cecil Ray Roadside	0.2	Sanitation/Salvage	Tractor
	Blue/Ray Heli Thin	1.0	Thin	Helicopter
	Methodist Heli Salvage	0.8	Salvage	Helicopter
	Shanty Heli Salvage	0.2	Sanitation/Salvage	Helicopter
	Bower Heli Salvage	1.0	Sanitation/Salvage	Helicopter
	North & South Blue Salvage	0.4	Salvage	Cable
	Heiney Heli Salvage	0.3	Sanitation/Salvage	Helicopter
	Hotelling Salvage	0.4	Salvage	Cable
	Cecil Kelly Heli Salvage	0.3	Salvage	Helicopter
Scott River	Up Boulder Heli	3.3	GTR	Helicopter
	Nutcracker Thin	1.8	Thin	Tractor
	Guffy Heli Salvage	4.5	Sanitation/Salvage	Helicopter
	OXB Roadside	0.5	Sanitation/Salvage	Tractor
	Shot Gun YG	0.1	Thin	Tractor
	Small Sales	0.2	Salvage	Tractor

Table C-3. Tentative Ten-Year Timber Sale Action Plan				
Ranger District	Sale Name/Landscape Area	Proposed Volume (MMBF)	Primary Silvicultural Harvest Method	Primary Logging System
Goosenest	Sink	1.0	Sanitation	Tractor
	Colt-Baird Thin	4.0	Thin	Tractor
	Garner Thin	1.0	Thin	Tractor
	Sharp	3.0	GTR	Tractor
	Cedar Mountain II	2.0	GTR	Tractor
	Ahab	4.0	GTR	Tractor
	Shaffer	1.0	Sanitation	Tractor
	Squab	2.0	Thin	Tractor
Ukonom	Patterson Roadside Hazard	< 0.1	Sanitation/Salvage	Tractor
	Small Sales	< 0.1	Sanitation/Salvage	Tractor
Total		43.7		
Fiscal Year 1996				
Oak Knoll	Craggy Mountain Salvage	1.0	Sanitation/Salvage	Tractor/Cable
	Doggett	1.0	GTR	Tractor/Cable
	Middle	1.0	GTR	Tractor/Cable
	Humbug	1.0	GTR	Tractor/Cable
	Beaver Creek	1.0	GTR	Tractor/Cable
	Johnny O'Neil	1.0	GTR	Tractor/Cable
	Small Sales	2.0	Sanitation/Salvage	Tractor
	Happy Camp	Poker	5.0	GTR
Dead Run Heli		6.0	GTR	Helicopter
Green Mill		6.0	GTR	Tractor
Small Sales		6.0	Salvage/Salvage	Tractor
Salmon River	Upper South Fork	2.0	Thin/GTR	Tractor/Cable
	Upper North Fork	2.0	Thin/GTR	Tractor/Cable
	Specimen	5.0	Thin/GTR	Tractor/Cable
	Small Sales	2.0	Sanitation/Salvage	Tractor
Scott River	Canyon Creek	3.0	Thin	Tractor/Cable
	Lick	2.5	Thin/GTR	Helicopter
	Small Sales	2.5	Sanitation/Salvage	Tractor
Goosenest	First Creek Thin	1.0	Thin	Tractor
	Deer Mountain Thin	2.0	Thin	Tractor
	Deer Rose	3.0	Thin/Sanitation/GTR	Tractor
	Mount Hoffman Lookout	2.0	Thin/Sanitation/GTR	Tractor
	Bald Mountain	8.0	Thin/Sanitation/GTR	Tractor
Ukonom	Dillon	2.0	Thin/GTR	Tractor/Cable
	Small Sales	3.0	Sanitation/Salvage	Tractor
Total		71.0		
Fiscal Year 1997				
Oak Knoll	Beaver	1.3	GTR	Tractor/Cable
	Buckhorn	1.3	GTR	Tractor/Cable
	Spalding	1.4	GTR	Tractor/Cable
	Lumgrey	1.3	GTR	Tractor/Cable
	Soda Mountain	1.4	GTR	Tractor/Cable
	Thin/Sanitation	1.3	Thin/Sanitation	Tractor/Cable

Table C-3. Tentative Ten-Year Timber Sale Action Plan				
Ranger District	Sale Name/Landscape Area	Proposed Volume (MMBF)	Primary Silvicultural Harvest Method	Primary Logging System
Happy Camp	Perkins	4.0	GTR	Cable
	Oak #3	3.0	GTR	Cable
	Four Oak Heli	2.0	Sanitation/Salvage	Helicopter
	Wilson Heli	2.0	Sanitation/Salvage	Helicopter
	Small Sales	5.0	Sanitation/Salvage	Tractor
Salmon River	Six Mile	2.5	Thin	Tractor/Cable/ Helicopter
	St. Claire Canyon	1.5	Sanitation	Helicopter
	River Corridor	2.0	Sanitation	Helicopter
	Main Stem	1.0	Sanitation	Tractor/Cable/ Helicopter
Scott River	Jackson Creek	2.0	Sanitation/GTR	Tractor/Cable
	Bolivar	3.0	Sanitation/GTR	Tractor/Cable
	Small Sales	2.5	Sanitation/Salvage	Tractor/Cable
Gooseneast	Black Fox	5.0	Thin/Sanitation/GTR	Tractor
	Transition Zone	5.0	Thin/Sanitation/GTR	Tractor
	Butte	5.0	Thin/Sanitation/GTR	Tractor
Ukonom	Commercial Thin	1.0	Thin	Tractor/Cable
	Dillon	1.0	Thin/Sanitation/GTR	Helicopter
	Small Sales	2.0	Sanitation/Salvage	Tractor
Total		57.5		



Appendix D - Best Management Practices

Introduction

The Forest Service developed water quality maintenance and improvement measures, called Best Management Practices (BMPs). These were developed in compliance with Section 208 of the Federal Clean Water Act (Public Law 92-500), 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).

In 1981, a Management Agency Agreement was signed. This 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 3 remaining practices are still being improved before referral to the State and EPA for certification and approval. Also, 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 NFS lands through the continued implementation of BMPs and through the guidance of the 1981 Management Agency Agreement 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. Due to 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 project initiated to implement the Forest Plan, a separate site-specific EA 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 on-site, project-specific assessment. Therefore, 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. Not all apply 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. Roads are drained in various ways: outsloping the road surface, installing water bars, installing French drains, insloping the road surface, installing culverts, etc. The appropriate method, or combination of methods, to correctly drain the road are identified during the on-site environmental assessment of a specific road construction project proposal.

After the methods and techniques of implementing the appropriate BMPs are identified, they are discussed by the project ID team. As a result of discussions, the appropriate mix of implementation methods and techniques are selected. They are incorporated into the environmental document as required mitigation measures. These mitigation measures are then carried forward into project plans and implementation documents (such as 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 on-site 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.

Best Management Practices

The 99 current practices are identified in 8 different resource categories. Listed below are the section titles from these 99 practices. (For a more complete discussion of the actual practices, refer to the *Water Quality Management for National Forest Systems Lands in California, 1979*.)

Timber

- | | | | |
|------|---|------|--|
| 1.1 | Timber Sale Planning Process | 2.4 | Road Slope and Spoil Disposal Area Stabilization (Preventative Practice) |
| 1.2 | Timber Harvest Unit Design | 2.5 | Road Slope Stabilization (Administrative Practice) |
| 1.3 | Use of Erosion Hazard Rating for Timber Harvest Unit Design | 2.6 | Dispersion of Subsurface Drainage from Cut and Fill Slopes |
| 1.4 | Use of Sale Area Maps for Designating Water Quality Protection Needs | 2.7 | Control of Road Drainage |
| 1.5 | Limiting the Operating Period of Timber Sale Activities | 2.8 | Constraints Related to Pioneer Road Construction |
| 1.6 | Protection of Unstable Areas | 2.9 | Timely Erosion Control Measures on Incomplete Road and Streamcrossing Projects |
| 1.7 | Prescribing the Size and Shape of Clearcuts | 2.10 | Construction of Stable Embankments (Fills) |
| 1.8 | Streamside Management Zone Designation | 2.11 | Minimization of Sidecast Material |
| 1.9 | Determining Tractor Loggable Ground | 2.12 | Servicing and Refueling of Equipment |
| 1.10 | Tractor Skidding Design | 2.13 | Control of Construction in Streamside Management Zones (Buffer Strips) |
| 1.11 | Suspended Log Yarding in Timber Harvesting | 2.14 | Controlling In-channel Excavation |
| 1.12 | Log Landing Location | 2.15 | Diversion of Flows Around Construction Sites |
| 1.13 | Erosion Prevention and Control Measures During Timber Sale Operations | 2.16 | Stream Crossings on Temporary Roads |
| 1.14 | Special Erosion Prevention Measures on Disturbed Land | 2.17 | Bridge and Culvert Installation (Disposition of Spoil Materials and Protection of Fisheries) |
| 1.15 | Revegetation of Areas Disturbed by Harvest Activities | 2.18 | Regulation of Streamside Gravel Borrow Areas |
| 1.16 | Log Landing Erosion Prevention and Control | 2.19 | Disposal of Right-of-Way and Roadside Debris |
| 1.17 | Erosion Control on Skid Trails | 2.20 | Specifying Riprap Composition |
| 1.18 | Meadow Protection During Timber Harvesting | 2.21 | Water Source Development Consistent with Water Quality Protection |
| 1.19 | Streamcourse Protection | 2.22 | Maintenance of Roads |
| 1.20 | Erosion Control Structure Maintenance | 2.23 | Road Surface Treatment to Prevent Loss of Materials |
| 1.21 | Acceptance of Timber Sale Erosion Control Measures Before Sale Closure | 2.24 | Traffic Control During Wet Periods |
| 1.22 | Slash Treatment in Sensitive Areas | 2.25 | Snow Removal Controls to Avoid Resource Damage |
| 1.23 | Five-Year Reforestation Requirement | 2.26 | Obliteration of Temporary Roads |
| 1.24 | Non-recurring 'C' Provision That Can be Used for Water Quality Protection | 2.27 | Restoration of Borrow Pits and Quarries |
| 1.25 | Modification of the Timber Sale Contract | 2.28 | Surface Erosion Control at Facility Sites |

Road and Building Site Construction

- 2.1 General Guidelines for the Location and Design of Roads
- 2.2 Erosion Control Plan
- 2.3 Timing of Construction Activities

Mining

- 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

- 5.12 Cleaning and Disposal of Pesticide Containers and Equipment
- 5.13 Untreated Buffer Strips for Riparian Area and Streamside Management Zone (SM4) Protection During Pesticide Spraying
- 5.14 Controlling Pesticide Drift During Spray Application

Recreation

- 4.1 Sampling and Surveillance of Designated Swimming Sites
- 4.2 On-site Multidisciplinary Sanitary Surveys Will be Conducted to Augment the Sampling of Designated 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 of Off-road 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

- 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

Fire Suppression and Fuels Management

- 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

- 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

- 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 Rangeland Improvements

(*These are the 3 practices that have not been recommended for certification and approval as BMPs at this time.)



Appendix E - Budgets and their Relationship to the Forest Plan

This appendix explains how the Forest gets its funding and what effect different funding levels may have on implementation of the Forest's Land and Resource Management Plan (Forest Plan). The appendix explains 1) the Federal budget process, 2) Forest management and budget priorities, 3) supplemental sources of funding and 4) monitoring the results of Forest Plan compliance.

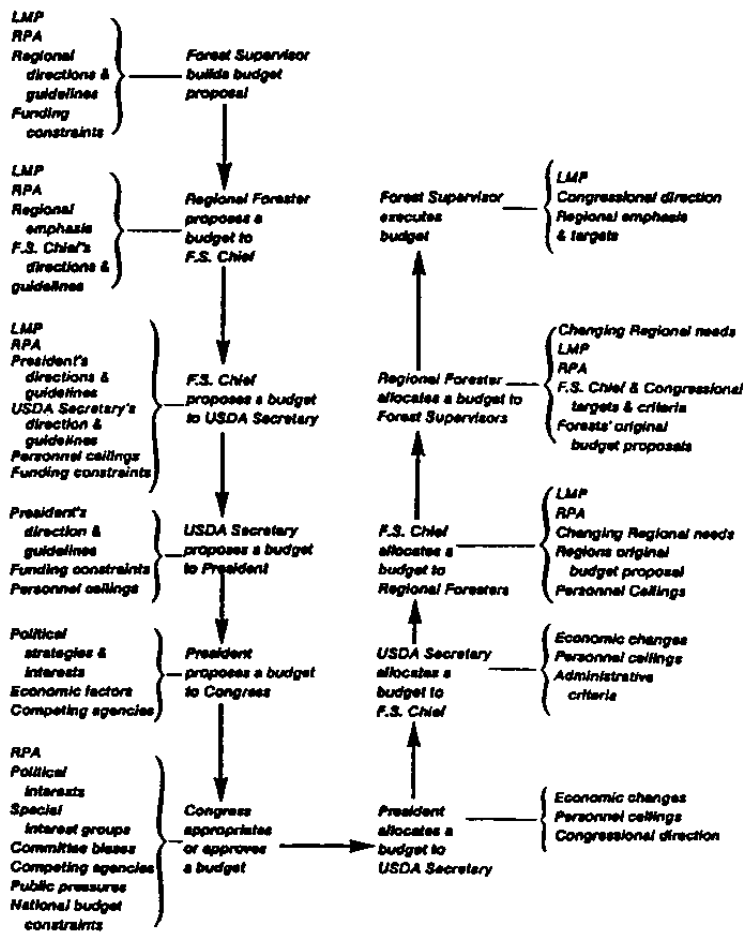
The Budget Process

The annual Federal budget process is lengthy and complex. The Forest's proposed budget is combined with the proposed budgets of the other 17 National Forests, as well as the Regional Office in the Pacific Southwest Region, to create the Region's proposed budget.

The Region's proposed budget and 8 other Regional proposals are added to the Washington Office budget, and the budget for the Forest Service Research arm to form the Forest Service's budget. This becomes part of the Department of Agriculture's budget, which is then submitted to the appropriate Congressional subcommittees.

After the budget passes both houses of Congress, disbursement of the monies follows the reverse path. Budget negotiations occur every step of the way. Table E-1 highlights the path a Forest budget follows on its way to and from Congress.

Table E-1



Note that the factors influencing the Forest's final budget are many and relatively uncontrollable from the Forest's perspective. For this reason alone the budget recommended in the Forest Plan and the budget received are unlikely to be the same. The Forest Plan's role is to identify for the Secretary of Agriculture, Congress and the public the programs and funding level for the Klamath National Forest believed to maximize Net Public Benefits.

Congress retains the ultimate decision-making power over the budget. This includes individual budget items such as timber sales, recreation development and wildlife habitat enhancement on a Nation-wide basis. This is another reason that it is unlikely that the actual Forest budget will match the budget shown in the Forest Plan. However, it is anticipated that the parties involved in the budget process will use the Forest's Plan for guidance and long range direction in deciding budget priorities.

Figure E-1 shows the proportional distribution of funds to major resource areas for the current situation and the proposed Forest Plan budget. Total costs have increased in all areas, except Engineering and Timber. The Engineering budget is 60% of the current budget. The Timber total costs are slightly lower, but the program is 10% less of the total budget than the current budget. The greatest increases in total cost are in Fire for a total of \$4.5 million and in Recreation for a total of \$2.6 million. Proportionally, costs have increased 257% in Soil/Water/Air, 135% in Wildlife and 137% in Recreation. All budget category expenditures would have to increase substantially over current levels to achieve full implementation of the Forest Plan.

Should Congress either continue to fund individual resource programs separately as in the recent past or provide inadequate overall funding, adjustments would be required in planned output levels and the rate at which some provisions of the Forest Plan were implemented. For example, should allocated funds to the Forest for timber sale preparation and administration continue at the current per unit level, the sale targets in the Forest Plan would have to be decreased. If overall funding was less than the planned budgets then Forest activities and outputs would need to be reduced, tempered by minimum needs for resource protection and by meeting the long-range goals of the Forest Plan.

Another difficulty is that the costs and estimated budget for the Forest Plan are based on average experienced costs from the past. This makes reaching the last MBF or the last AUM extremely difficult. Those outputs on the margin are NOT average and will cost much more than the first or the tenth unit. Subsequent projects in the same landscape unit have more constraints than the first project and thus cost more for the same outputs.

Forest Priorities Under the Plan

While output levels are tied to budget levels, they are not the sole or even the primary product of the Forest Plan. The Forest Plan establishes clear management policy and practices for the Forest. That includes the management requirements, implementation requirements, Forest goals and policy, and standards and guidelines as discussed in Chapter 4 of the Forest Plan.

The Forest Plan delineates which activities are appropriate for each section of the Forest (refer to Management Area Direction in Chapter 4). The Forest goals, policies and land allocations are budget-independent. They will be adhered to no matter what budget level is appropriated in the yearly funding process.

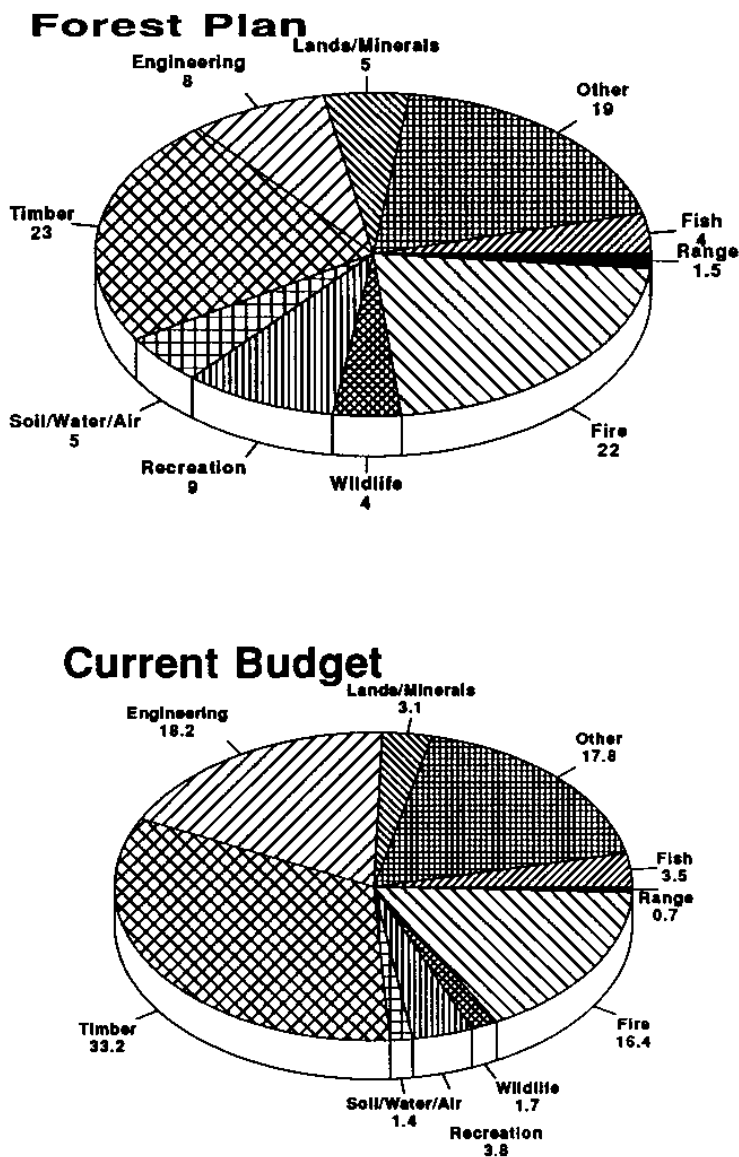
The Forest Plan shows the maximum potential the Forest can achieve (the amount of timber which can be sold, the number of cattle grazed, etc.) within the bounds of the management direction. The amount actually produced and number of activities and projects actually implemented depends on available funding and, in many cases, on actual demand.

Should Congress not provide the budget levels required for plan implementation, management intensity and/or production levels will be lower. Regardless of funding level, the Forest will follow the management direction contained in the Forest Plan. These are necessary to maintain the health of the Forest ecosystem and are not negotiable.

Standards and guidelines established by the Forest Plan to regulate implementation of projects will not be relaxed simply to meet production levels. For example, the Forest 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 NEPA, an environmental analysis is prepared for every project that may affect Forest resources. If the environmental analysis shows the project cannot be accomplished without violating Forest Plan direction, the project will be modified or revised to ensure it meets the established direction, the project will be abandoned, or the Forest Plan will be amended.

Forest goals address maintenance and/or enhancement of the environment. Lower budget levels will affect their rate of accomplishment. For example, a Forest may have a goal to maintain 5 snags per acre. This may require funding for active snag recruitment. Without the appropriate level of funding, meeting the goal may be delayed.

Figure E-1. Budget Apportionment (%)



Program Budgets

The following tables display how budgets might be prioritized using ranking criteria for selected programs if full funding is not received.

Ranking Criteria

The following ranking criteria are used in Tables E-2 through E-5:

4 = Necessary to comply with laws, Executive Orders, USDA Regulations.

3 = Necessary to meet Forest Plan goals, objectives, standards and guidelines.

2 = Necessary to meet Forest Service direction.

1 = Discretionary, scope of project can be reduced without adversely affecting rankings 4 through 2 negatively.

Project Activity	Rank
Interagency Coordination	4
Project Planning and NEPA Implementation	4
Effectiveness Monitoring	4
Cave Management	4
Determine Flow Needs (Ecosystem Analysis)	4
Resource Condition Survey	3
Basin Planning	3
Validation Monitoring	3
Prescribed Fire	3
Law Enforcement	3
Program Administration	2
Species Conservation Strategies	2
Expert Staffing Level	2
RNA/SIA Management	2
Provide Goods and Services	1

Project Activity	Rank
Scenery - Ecosystem Analysis and Projects	4
Effectiveness/Validation Monitoring – Scenery/Recreation	3
Wild & Scenic Rivers Management	3
Site Planning, Design and Accessibility	3
Viewshed Corridor Planning	3
Scenery Restoration Planning	3
District Scenery Support and Expertise	3
Program Administration	2
Interpretive Services, Planning and Design	2
Community Partnerships	2

Table E-4. Recreation Program Ranking			
Project Authority	Recreation Management Rank	Wilderness Management Rank	Trails and Trailheads Rank
Health and Cleanliness	4	4	3
Safety and Security	4	4	3
Facility Maintenance	3	4	3
Visitor Management	3	4	4
Setting	3	4	2
Permit Administration	4	4	-
*Recreation Management includes developed sites, general undeveloped areas and Wild & Scenic Rivers.			

Table E-5. Heritage and Tribal Government Program Ranking	
Project Activity	Rank
Survey acres of the Forest	4
Consultation with SHPO and the Advisory Council on Historic Preservation	4
Monitor 10% of recorded sites per year	4
Evaluate recorded sites	3
Conduct training and awareness sessions	4
Interpret now sites and improve past interpretation	3
Enhance interpretive sites and National Register sites	4
Nominate eligible sites to the National Register	4
Develop plans and co-operative agreements for site and area management	4
Analysis and synthesis of existing data	1
Stabilize significant sites	4
Curate Forest history materials recovered from the Forest	4
Public outreach	4
Partnership *	4
Program Administration	2
*Partnership includes the base line support budget for the Forest's Tribal government Program.	

Other Financing

A substantial portion of the annual Forest budget is not directly dependent on the Federal Treasury for funding. Over the years various laws have been passed which shift the responsibility for certain improvements and activities from the taxpayer to the Forest user. These include:

Knutson-Vandenburg (KV): This Act requires timber purchasers to make deposits to finance the cost of timber sale area improvements. Once the timber sale is complete, the Forest Service has the responsibility for completing the improvement work. Activities authorized within the timber sale boundary include tree planting, seeding, timber stand improvement work, wildlife enhancement, prescribed burning for wildlife, recreation and range purposes, as well as soil and water protection and improvements.

Brush Disposal: These funds are used to pay the costs of burning or otherwise disposing of logging slash. As with KV, the funds are provided by the timber purchaser.

Timber Salvage Sale Funds: This fund is intended to permit an increase in the volume of timber salvage sales beyond that normally financed by other appropriations. Funding for this activity is from collections made as a result of timber salvage sales. These funds fluctuate widely depending on catastrophic events like wildfire and insect damage. Usually when timber salvage sale funding is high due to a catastrophic event, the Forest's appropriated funds for the timber sale program are reduced. This varies year by year.

The budget given to the Forest Service by Congress authorizes R to spend both appropriated and trust funds. While the budget is paramount in a National Forest's ability to carry out activities, R is not the only factor that allows work to be done. Forests also receive money and services from many other sources such as cooperators, permittees, State agencies and volunteers. These other sources are becoming increasingly important as money appropriated by Congress has decreased.

Cooperators and permittees often aid in accomplishing needed work. Many grazing permittees do range improvement work such as fencing as part of the management of their grazing allotments.

The Forest has ongoing cooperative work agreements with many Federal, State and other agencies. In 1992 there were over 100 different projects. These included agreements with U.S. Fish and Wildlife Service, California Department of Fish and Game and Siskiyou County, as well as private businesses and environmental organizations.

The Forest has one of the largest and most productive Human Resources Programs in the Region. New and innovative programs and new partnerships beneficial to the Forest, its partners and the communities within Siskiyou County are continually being explored. Funding for these programs comes from many sources. Some are funded through program dollars from the Department of Labor, some from project funds here on the Forest and some from cost share agreements with partners.

As budgets shrink, the use of Human Resource Programs to accomplish goals becomes more important. Table E-6 shows a break-down of the programs for 1992 by program area:



Klamath National Forest - Plan

Table E-6. Human Resource Programs in 1992

Programs	Total Participants	Person-Years Accomplished	Value of Work Accomplished (\$)
Youth Conservation Corps	78	14.20	204,300
Senior Community Service Employment	38	14.81	289,400
Volunteers	377	15.52	291,100
Job Corps	3	00.32	9,100
Hosted Programs	139	36.87	680,000
Totals:	635	81.72	1,473,900
Hosted Programs include:			
<ul style="list-style-type: none"> • Student Conservation Association • Job training Partnership Act • Greater Avenues for Independence • California Conservation Corps • California Department of Corrections • Northern California Indian Development Council • Siskiyou County Regional Occupations Program 			

Person Years are figured at 1,800 hours for one person year and Value of the Work Accomplished is based on estimated costs to accomplish the work by another method (for example, force account labor or contracting).

Nationally, the Forest Service is exploring ways to make additional use of user fees to fund operating programs. In addition, the Forest is continually investigating ways to improve efficiency and productivity such as ongoing analysis to reduce Forest fixed costs. By operating more efficiently, more can be accomplished with available resources.





Appendix F - Air Quality Related Values for the Marble Mountain Wilderness Class I Airshed

The Marble Mountain Wilderness is a Class I airshed. This area is a large (223,500 acres) distinctive area. It is composed of a unique mixture of unique geological features, large forested areas, endemic plant communities, breath-taking scenic views, numerous wildlife species and swift canyon streams originating from cold alpine lakes. Waking in the morning to the "clean smell of wilderness fragrances" with few people in a relatively undeveloped wilderness is unique to most wilderness areas and National Parks.

Geologic Features

Marble Mountain, for which the wilderness is named, is an outstanding scenic area of white and gray marbles. The Marble Rim reaches a height of 6,880 feet and can be viewed in a distance from low and high vantage points both inside and outside the wilderness. A closer view of the Marble Rim will show the layering and marine organisms which were created as these one-time tropical coral reefs rose out of the ocean. Other notable geological features within the wilderness include numerous limestone caves, the Wooley Creek and English Peak Granite Batholith formations, as well as various types of volcanic metamorphic and sedimentary rocks.

Vegetation

The Marble Mountain Wilderness contains one of the most diverse (535 species) and interesting floras in the State of California. It lies in a transition region of overlap between the hotter and drier species of southern U.S. and the cooler and wetter species from the northern U.S. These species occur on a large elevation range of 1,400 to 8,300 feet situated among the oldest geologic areas in California. Many plant species are living at the extreme edge of their ranges and ecological requirements and are very susceptible to changes in their environment. Seventeen plant species are restricted primarily to the Marbles. The plant communities in the wilderness include chaparral, oak woodland, mixed conifer forests, riparian woodlands, wet and dry mountain meadows and high elevation alpine slopes. Meadows and riparian streams have a large set of their own unique plant species. A closer inspection will yield several varieties of lichen both on Marble Rim as well as other locations in the wilderness.

In addition to the diversity of plant communities and the large number of different plant species found within the area, the Marble Mountains are unique in their large number of endemic plants. The winged-seed draba, weeping (Brewer) spruce, wake-robin and catch-fly can be found within the wilderness. White bark pine and foxtail pine are two southern Sierra species found within the wilderness at the northern extreme of their limits. The silver firs also make their southernmost stand here.

Scenic Values

Various plant species, such as maples, dogwoods, oaks, large expanses of red forbs and golden meadows produce crisp brilliant fall colors. This can be viewed from many vantage points along the 383 miles of high trails inside the wilderness. These colors can also be seen from the higher elevation roads and trails outside the wilderness. Local views of vast wilderness forests, interspersed with deep canyon streams, deep blue lakes and barren serpentine hillsides, add variety to middle range views. Long distant views (30 to 50 miles) can be seen from the many high trails in the wilderness. Long distant views can be seen most of the year, except when cloudy in the winter and during short periods of forest burning in late spring and late fall. South and west views are of Castle Crags State Park, the glaciers in the Trinity Alps Wilderness, the Pacific Ocean, Orleans Mountain and Preston Peak (Siskiyou Wilderness). Red Buttes Wilderness, Mt. Ashland Crest Zone, volcanics of Goosenest Mountain and Mount Shasta comprise the north and east views. Marble Mountain can be viewed from outside the wilderness from several of these locations, plus some of the local highways.

Wildlife

The higher environmental quality of the wilderness is conducive to excellent wildlife conditions due to available water, forage, cover and relatively light pressure of human influences. Big game species include elk, blacktail deer, black bear and mountain lion. Furbearers observed include bobcat, coyote, marten, fisher, wolverine and weasel. Several species of small rodents, such as gray squirrel, rabbit, chipmunk and golden-mantled squirrel, are common. The large range in elevation allows for a large variety of birds. Game birds include mountain quail, band-tailed pigeon, blue and ruffed grouse. Small birds, such as robins, wrens, nuthatches, woodpeckers, jays, kinglets and hummingbirds, are common. The bald eagle, osprey and peregrine are rare but occasionally are seen in the Marbles.

Water and Aquatic Communities

One of the major attractions of the wilderness is the opportunity to fish in a variety of lakes and streams. Rainbow, eastern brook and brown trout are present. Most of these fish are present due to periodic stocking by CDFG. There are 79 glacial lakes with a surface area of about 576 acres, plus 125 miles of streams available to the fisherman. Three of these lakes, Cuddihy, Lower Wrights and Big Elk, were tested for acid rain in 1986. These tests indicated that there is no effect of acid rain with the wilderness. The granitic streams also have a low buffering effect to acid rain. None of the streams within the wilderness are stocked by the CDFG. Fish found in most of the higher streams are either native rainbow trout or are fish originally planted in one of the many lakes and have drifted, migrated or been washed down stream. Wooley Creek has a unique run of both spring Chinook salmon as well as summer steelhead.

