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Appendix B
Research and Technical Planning Needs

This appendix lists and briefly describes research and technical planning needs. Research includes studies needed to fully implement the Forest Plan. Technical planning which can be gathered with existing techniques is needed for the scheduled Plan revision .

Research Needs

Air Quality

- Establish and validate region-wide standards for screening AQRV.

Cultural Resources

- Develop and implement suitable criteria for allocation of cultural resource properties to preservation, conservation, public use (interpretation), or no management.
- Research the significance of information gathered from light density, surface lithic scatters.
- Determine the significance of large obsidian quarry sites present on the Medicine Lake Highlands, Blue Mountain, and Warner Mountains.

Range

- Rejuvenate mountain mahogany stands.

Riparian

- Establish the relationship of grazing to riparian area maintenance and recovery.
- Determine the composition and condition of climax riparian communities.
- Study the effects of large woody debris on channel stability, pool development, and fish populations.
- Develop a riparian classification system to determine riparian area potential and predict management effects.

Sensitive Plants

- Develop species management guides.

Soil and Water

- Establish and validate a Region-wide standard for estimating cumulative disturbance effects.
- Refine thresholds for unacceptable cumulative disturbance in sensitive watersheds.
- Refine thresholds for unacceptable soil compaction.
- Refine data on soil disturbance to relate to soil productivity.
- Determine relationships between vegetative ecosystems, channel morphology, and aquatic communities.

Timber

- Improve site preparation and release methods for natural regeneration of true fir.
- Develop practical and cost-effective methods or management schemes for vegetation management without herbicides.
- Determine conifer growth losses from different species of competing vegetation and varying densities.
- Determine soil, plant, and wildlife needs for biomass retention in the event of requests for biomass utilization.
- Improve and develop growth and yield projections for conifer species managed under the uneven-aged system.
- Develop better management schemes for low productivity (< 20 cubic feet) timberlands.
- Develop criteria for using fertilizer treatments, i.e., when, what kind, and how much fertilizer is required for what results?
- Evaluate uneven-age management techniques and related growth rates.

Wildlife and Fish

- Assist the Pacific Southwest Experiment Station and adjacent national forests in a research study to evaluate snag management requirements in eastside pine.
- Determine reasons for decline of sage grouse population and methods to reverse the trend.
- Determine reasons for low fawn rates for pronghorn on the Devil's Garden Plateau and methods to increase these rates.
- Develop new vegetation sampling techniques which meet wildlife and fish resource management needs to revise the Forest Data Base.

- Conduct a literature review and refine techniques for bitterbrush and other brush species establishment.
- Quantify the relationship between thermal and hiding cover and deer forage.
- Develop a habitat capability model for Swainson's hawk and sandhill crane.
- Assist Pacific Southwest Experiment station in research study to determine the relationship between cumulative watershed effects and condition of the aquatic biota.
- Determine reasons for stunting of largemouth bass in reservoirs and habitat related methods to achieve better growth.
- Assist Pacific Southwest Experiment Station in research study to develop fish habitat relationship models.
- Determine relationships between vegetative ecosystems, channel morphology, and aquatic communities.
- Determine relationships between old-growth habitats and species dependent on this seral stage.
- Determine relationships between riparian areas and species dependent on them.

Woodlands

- Develop juniper yield tables.
- Quantify the effects of juniper cutting patterns on diversity.

Technical Planning Needs

Cultural Resources

- Integrate plans for the management of cultural resources with those of the State of California Historic Resources Plan.
- Determine the research potential of known archaeological sites by site type (e.g., lithic scatter, temporary camp, seasonal base camp, etc.)
- Develop a Programmatic Memorandum of Agreement with the State Historic Preservation Officer and Advisory Council on Historic Preservation for managing lithic scatters and obsidian quarry sites.
- Complete a Forest assessment of National Natural Landmarks.

Geology

- Complete a Forest-wide third-order Geological Resource Inventory (GRI).

Minerals

- Develop a data base for mineral potential of the Forest.

Range

- Continue developing the habitat type classification program; and initiate a community type classification and mapping program.

Recreation

- Determine the optimum carrying capacity of the Medicine Lake Caldera, including Bullseye Lake, Payne Springs, and other peripheral sites. Prepare a general plan for the area that identifies priorities for development.
- Identify acres that are to managed for semi-primitive recreation. Determine where controls or signing is needed to prevent motorized use of semi-primitive non-motorized areas. Determine carrying capacity and evaluate the accuracy of capacity coefficients used in the Plan.
- Refine and correct the ROS inventory based on current aerial photos and field surveys.
- Complete an inventory of caves, lava tubes, popular dispersed recreation sites, and other features of value for recreation. Compile data on these sites and display in the Recreation Opportunity Guide. Identify measures to protect and enhance recreational values.

Riparian

- Develop a riparian area inventory.

Special Interest Areas

- Evaluate Dismal Swamp as a potential bontanical special interest area.

Soil and Water

- Complete a Forest-wide Watershed Improvement Needs (WIN) Inventory to determine the location and priority of needed watershed restoration.
- Assess soil fertilization opportunities on the forest.
- Conduct an Order 2 Soil Resource Inventory in sensitive watersheds and other sensitive areas, and on the Standard Non-interchangeable Component lands.
- Inventory and analyze the physical, chemical, and biological water quality of select streams and lakes.
- Inventory the instream (non-consumptive) flow needs of select streams.

Timber

- Inventory growth and stocking of plantations.
- Determine land base lost to landings, skid trails, and roads.
- Complete a new forest timber inventory before the next plan revision.
- Verify inventory of < 20 cu. ft. growth potential lands.
- Verify changes to land base caused by large fires and harvesting since the 1974 aerial photos were taken, which is the basis for the Forest Plan.

Wildlife and Fish

- Identify deer migration routes and key areas and habitat improvement needs for these areas.
- Develop computer habitat capability models for all species currently without them and validate all models.
- Conduct fish habitat assessment and stream surveys on all streams on the Forest that do or could contain fisheries.
- Determine the benefits and costs of wildlife and fishery habitat improvements.
- Identify peregrine falcon cross-fostering sites.
- Determine effects on fish populations of various management practices, including but not limited to logging, livestock grazing, mining, and recreation.
- Develop management strategies for reservoir fisheries.
- Validate all fish habitat relationship models for fish species on the Forest.
- Develop and validate fish habitat relationship models for all species on the Forest currently without them.
- Conduct surveys for amphibians and reptiles to add to the data base for fish and wildlife.

Visuals

- Identify priorities for rehabilitation of areas that do not meet Adopted VQOs. Prepare a comprehensive strategy to accomplish work.

Wild and Scenic Rivers

- Evaluate Willow and Boles Creeks for wild and scenic river designation.

Woodlands

- Quantify the ecological relationships unique to juniper woodlands and identify management opportunities for these areas.

Appendix C
Tentative Ten-Year Timber Sale Program

Reasons for Harvest

Stands to be Managed Intensively – Timber will be harvested 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 in excess of desired basal area stocking.
- To meet local and national demand for wood fiber.

Stands to be Managed for Special Emphasis – Timber yields are realized by managing for other resource objectives such as landscape or wildlife.

Harvest Priority

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

Regeneration Harvest – for moving the Forest toward a regulated condition.

Intermediate Cuttings – for maintaining stocking for optimum net growth of young stands; or capturing mortality in older stands.

The highest timber management priority is to regenerate stands. Regeneration is the means by which productivity is 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.

Generally, intermediate harvests have second priority – except in the case of catastrophic salvage. Where heavy, concentrated losses cause understocking, land managers must consider trading affected strata for strata that would otherwise have been regenerated. In such cases, achieving regeneration acreage goals is 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 compartment.

Table C-1 shows tentative priorities for harvest by type of harvest (regeneration and intermediate) as interpreted from the FORPLAN Harvest Report. Priorities are graded from 1 to 3 with priority 3 the lowest for entry.

Table C-1. Tentative Priorities for Timber Harvest – Decade 1 (1990-1999)

Type of Harvest	Timber Strata	Priority	Decade Acreage
Even-aged Regeneration Harvest (clearcut, shelterwood, seed tree)	LXX	2	1,700
	M3G	2	1,300
	M4G	2	5,400
	M4P	1	1,500
	M6G	2	300
	P3G	2	9,500
	P4G	2	4,500
	P4P	1	8,900
	R3G	2	200
	R4G	2	300
	R4P	1	400
Intermediate Harvest (Thinning and Sanitation)	All Strata	2	21,000
Uneven-aged Selection	M4G	2	1,400
	P4G	2	2,000
Other Harvest (NIC)	All Strata	3	22,000

Silvicultural Systems

The Forest will write a silvicultural prescription for each stand to be treated. We determine 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.

We 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 (i.e., visual retention areas, streamside management zones);
- land management objectives which 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 which are on slopes less than 40% (tractor loggable):
- stands of tree species which are not highly susceptible to logging damage;
- stands of tree species which are very or moderately 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 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 *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 area controls for the planning period.

Table C-2. Vegetative Management Practices. Annual Average in the 1st Decade for Suitable Land.

Practice	Acres
Regeneration Harvest:	
Clearcut	3,120
Shelterwood and Seed Tree:	
Preparatory Cut	0
Seed Cut	280
Removal	0
Selection	340
Intermediate Harvest:	
Commercial Thinning	200
Salvage/Sanitation	1,900
Timber Stand Improvement	5,400
Reforestation*	3,400

*Almost 10% of harvest acres will not require planting.

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-3 shows volume controls for the planning period.

Table C-3. Allowable Sale Quantity and Timber Sale Program Quantity[1]. (Annual Average for 1st Decade.)

Harvest Method	Allowable Sale Quantity [2]	
	Sawtimber (MMCF)	Other Products (MMCF)
Regeneration Harvest:		
Clearcut	4.9	0.4
Shelterwood and Seed Tree	-	-
Preparatory Cut	-	-
Seed Cut	0.6	-
Removal Cut	-	-
Selection	0.8	0.1
Intermediate Harvest:		
Commercial Thinning	< 0.1	nominal
Salvage/Sanitation	< 0.1	nominal
Special Harvest[3]	0.7	-
Total	7.1	0.5
	Additional Sale [4]	
Total for all harvest methods	-	0.3
Allowable sale quantity: 7.6 MMCF or 45.5 MMBF[5]		
Timber sale program quantity [6]: 7.9 MMCF or 47.5 MMBF [5]		

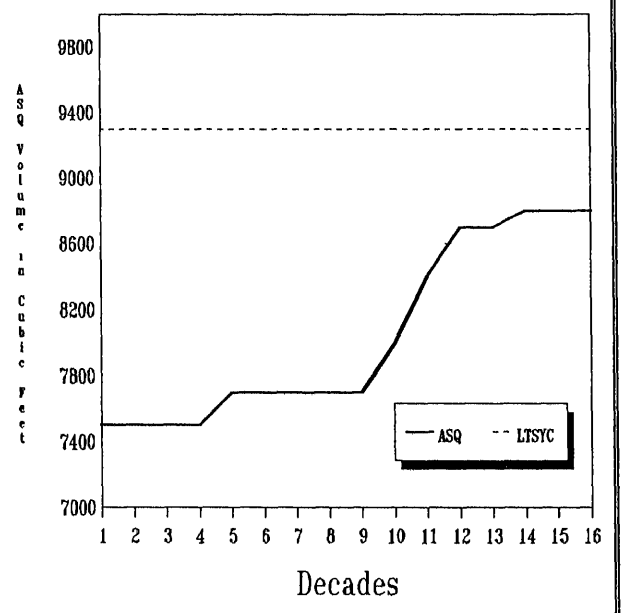
[1] To be expressed to nearest .1 MM board and cubic feet.
[2] Only includes chargeable volumes from suitable lands.
[3] < 20 ft^3 lands, Retention, and Riparian.
[4] Only includes nonchargeable volumes from suitable and/or unsuitable lands.
[5] Based on local unit of measure.
[6] Total of allowable sale quantity and additional sales.

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

Allowable Sale Quantity (ASQ) is established as the maximum harvest for the planning period. Scheduled volume offered 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. Additional non-scheduled volume may be obtained from unsuitable timber lands. Non-scheduled volume may be offered for sale in any year, depending on its availability, demand for it, and funding available for preparing sales.

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

Figure C-1.Long-Term Sustained Yield Capacity (LTSYC) and Allowable Sale Quantity (ASQ).



nations that consider site specific-conditions and factors;

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

Tentative Ten-Year Timber Sale Action Plan

Preparing a reliable timber sale program, especially for periods longer than five years, is difficult because of factors beyond our control. One critical factor is that much 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 six years to complete. Also, harvest levels in the first few years of the program are tied to current program budget levels. Therefore, the first five years of the program – particularly the first two or three years – respond largely to the existing timber management plan and projected budget levels.

Table C-4 outlines the Forest's Tentative 10-Year Timber Sale Action Plan.

First Five Years (1990-1994) – Individual sale information is presented by ranger district and fiscal year. (The projected volume to be sold during this period averages 49 MMBF per year.) This program is based on current information. It is a tentative plan subject to periodic revisions, at least annually.

Second Five Years (1995-1999) – Specific details of sale areas, volume to be harvested, and road construction are not known for sales in the second half of the planning period. This information will be available, and incorporated into the Forest Plan, as the timber sale program is updated and revised. (The projected volume to be sold during this period averages 42 MMBF per year.) Timber sales during this period are subject to volume and area controls discussed previously in this Appendix. The ten-year average is about 45.5 MMBF.

Table C-4. Tentative 10-Year Timber Sale Action Plan. (See key to abbreviations at end of Appendix.)

Fiscal Year	Ranger District	Sale Name	Management Area	Harvest Area (Acres)	Proposed			Primary Harvest Methods	
					Volume (MMBF)	Road Miles		Silvicultural	Logging Methods
						Const.	Reconst.		
FY 90	Warner Mtn	Joseph II	34	540	7.2	0	3.9	OSR[1], CC	Tractor
		Middle	34	800	4.5	0.1	0	OSR, CC	Tractor
		Refuge	34	760	6.8	0.1	7.0	OSR, CC	Tractor
		Bridge	36	430	5.8	0	0	OSR, CC	Tractor
	Big Valley	COPT	41	100	2.1	0	0	CC	Tractor
		Southsun (BVFSYU)	44	470	7.3	0	0	CC	Tractor
		Long Bell	41	800	10.0	21.0	0	CC,OSR	Tractor
	Devil's Garden	Mowitz	53	1,100	3.5	0	0	OSR, CC	Tractor
	Doublehead	Buckborde	62	110	3.5	0.8	0	CC, OSR	Tractor
		Shotgun	62	430	7.2	0.1	0	CC, OSR, SHELT	Tractor
	Total FY 90			**5,540**	**57.9**	**1.1**	**33.0**		
FY 91	Warner Mtn	Del Prat	32	1,520	4.4	4.5	2.6	OSR, CC	Tractor
		Lassen	32	1,280	5.1	0	0	OSR, CC	Tractor
		Sheeprock	34	880	13.5	9.5	0	CC, OSR	Tractor/ Cable
	Big Valley	Foxy (BVFSYU)	44	290	4.0	0.8	5.5	OSR, CC	Tractor
	Devil's Garden	Badger I	53	1,050	6.0	0	12.4	UEAM	Tractor
		Badger II	53	1,330	6.0	0	0	UEAM	Tractor
	Doublehead	Bruin	61	230	4.6	0.3	2.3	CC, OSR	Tractor
		Paynetakers	61	670	9.0	0	5.1	OSR, CC, SHELT	Tractor
	Total FY91			**7,250**	**52.6**	**15.1**	**27.9**		

Table C-4.Tentative 10-Year Timber Sale Action Plan (cont'd)

					Proposed			Primary Harvest Methods	
Fiscal Year	Ranger District	Sale Name	Manage-ment Area	Harvest Area (Acres)	Volume (MMBF)	Road Miles		Silvicultural	Logging Methods
						Const.	Reconst.		
FY 92	Warner Mtn	Mill	31	1,300	16.0	9.6	0	SHELT	Tractor
		Horse II	34	380	7.6	1.2	0	OSR, CC	Tractor
	Big Valley	Canyon II (BVFSYU)	44	500	2.0	4.0	1.1	CC, OSR	Tractor
		Big John II (BVFSYU)	45	1,550	2.1	1.2	1.0	CC	Tractor
		Letterbox II (BVFSYU)	45	570	1.3	0	0.5	OSR, CC	Tractor
		Stratton II (BVFSYU)	45	1,300	2.0	0	1.0	OSR, CC	Tractor
	Devil's Garden	Grizzlie	52	1,500	3.0	0	0.2	CC, OSR	Tractor
		Badger III	53	1,570	3.0	1.6	7.1	UEAM	Tractor
	Doublehead	Red Lyon	62	620	2.0	0	1.0	OSR, CC, SHELT	Tractor/ Cable
		Bertha	63	1,250	5.0	0	2.0	CC, OSR, SHELT	Tractor
	Total FY 92			**10,450**	**44.0**	**17.6**	**13.9**		
FY 93	Warner Mtn	Compt 301	31	500	3.0	8.0	0	OSR, CC	Tractor
		Franklin CT	32	500	2.0	0	0	CT	Tractor
		N. Fork	32	270	4.0	6.0	0	OSR, CC	Tractor
		Irons	33	200	3.0	1.5	0	CC, OSR	Tractor
		Pepperdine	34	600	2.0	1.0	0	OSR, CC	Tractor
		Compts 338-342	36	600	6.0	1.5	0	OSR, CC	Tractor

Table C-4.Tentative 10-Year Timber Sale Action Plan (cont'd)

Fiscal Year	Ranger District	Sale Name	Management Area	Harvest Area (Acres)	Proposed			Primary Harvest Methods	
					Volume (MMBF)	Road Miles		Silvicultural	Logging Methods
						Const.	Reconst.		
	Big Valley	Snicker	41	2,300	3.0	0.2	1.0	SEL	Tractor
		Manzanita	44	60	1.5	0.4	0.5	CT, CC	Tractor
		Dutch II (BVFSYU)	44	485	6.0	1.0	1.2	OSR, CC	Tractor/ Cable
		Exchange (BVFSYU)	45	2,500	1.5	0.3	0.5	OSR	Tractor
	Devil's Garden	Craig Springs	54	2,800	1.0	0	1.5	OSR, CC	Tractor
		Fingers	54	2,200	0.5	1.0	0.2	OSR	Tractor
		Spaulding	54	2,700	0.5	0	0.5	OSR	Tractor
		Shot	62	500	5.0	1.0	0.5	OSR, CC	Tractor/ Cable
		Shacknasty	63	1,000	2.0	0	5.9	OSR, CC	Tractor
	Total FY 93			**14,215**	**44.0**	**21.9**	**5.9**		
FY 94	Warner Mtn	Compt 303	31	600	3.0	1.5	0	OSR, CC	Tractor
		Compt 304	31	400	3.0	2.5	0	SHELT, OSR	Tractor
		Plum Compt 312	32	530	8.0	3.0	0	CC, OSR	Tractor
		Parsnip I	36	240	6.0	1.0	0	CC	Tractor
	Big Valley	Dutch III (BVFSYU)	44	350	3.0	1.0	0.5	CC, OSR	Tractor/ Cable
		Foxy II (BVFSYU)	44	200	2.0	0.3	1.0	CC	Tractor
		Hunter Rdg II (BVFSYU)	44	300	5.0	0.1	0.5	OSR, CC	Tractor
	Devil's Garden	Badger Short	53	3,150	1.5	0	0	OSR	Tractor

Table C-4.Tentative 10-Year Timber Sale Action Plan (cont'd)

					Proposed			Primary Harvest Methods	
Fiscal Year	Ranger District	Sale Name	Manage-ment Area	Harvest Area (Acres)	Volume (MMBF)	Road Miles		Silvicultural	Logging Methods
						Const.	Reconst.		
		Duncan	53	1,900	2.5	1.0	0.5	OSR	Tractor
		Gas Drum II	53	3,700	2.0	0	0	OSR	Tractor
	Doublehead	Black	62	330	5.0	2.0	1.0	CC, OSR, SH	Tractor
		Damudtim	64	1,250	5.0	3.0	3.0	OSR, CC	Tractor
	Total FY 94			**12,950**	**46.0**	**24.9**	**9.5**		
FY 95	Warner Mtn	Compt 333 & 334	34	1,500	5.0	1.5	1.0	OSR, CC	Tractor
		Granger SL	34	300	4.5	1.0	1.0	CC	Tractor
		Compt 343	36	250	2.0	0	0.5	CC, OSR	Tractor
		Compt 348	36	400	1.0	2.0	8.0	OSR	Tractor
		Parsnip 2	36	320	8.0	1.5	1.0	CC	Tractor
	Big Valley	Southsun II	44	400	5.0	0	2.0	CC, OSR	Tractor
		Sweagert Flat (BVFSYU)	44	400	1.0	0	0.5	OSR	Tractor
		Rush II (BVFSYU)	44	250	3.0	2.0	1.0	OSR, CC	Tractor
		Heartrock (BVFSYU)	45	2,000	4.0	0	2.0	OSR	Tractor
		Ash Ck Ex (BVFSYU)	45	900	2.0	0.5	1.0	OSR	Tractor
	Devil's Garden	East Blue	52	3,000	2.0	0	1.5	OSR	Tractor
		Beeler	54	2,700	2.0	0	2.0	OSR	Tractor

Table C-4.Tentative 10-Year Timber Sale Action Plan (cont'd)

Fiscal Year	Ranger District	Sale Name	Management Area	Harvest Area (Acres)	Proposed			Primary Harvest Methods	
					Volume (MMBF)	Road Miles		Silvicultural	Logging Methods
						Const.	Reconst.		
	Doublehead	Hawk	62	740	4.0	0	1.0	OSR, CC	Tractor/ Cable
		Border II	62	600	6.0	1.0	0.5	OSR, CC	Tractor
	Total FY 95			13,760	**49.5**	**8.5**	**23.0**		
FY 96	Warner Mtn	Compt 314, 315	32	350	7.0	5.0	2.0	OSR, CC	Tractor
		Compt 318	33	400	4.0	0	3.0	OSR, CC	Tractor
		Blue CT	34	600	3.0	1.0	0.5	CT	Tractor
		Cedar SL	34	250	5.0	0	3.0	OSR, CC	Tractor
		Green SL	34	450	2.0	0.5	1.0	OSR, CC	Tractor
		S.Pine SL	34	880	4.0	0	3.0	OSR, CC	Tractor
		Yellow	34	650	3.0	0	1.5	OSR, CC	Tractor
	Big Valley	Fir (BVFSYU)	44	500	3.0	0.5	1.0	OSR, CC	Tractor
		Letterbox II (BVFSYU)	45	1,000	3.0	0	1.8	OSR	Tractor
		Moron Spring (BVFSYU)	44	500	1.5	0	0	OSR	Tractor
		Manzanita II (BVFSYU)	44	130	2.0	0.2	0.2	OSR	Tractor
		Quaking Aspen (BVFSYU)	44	500	3.0	0.3	1.0	OSR	Tractor

Table C-4.Tentative 10-Year Timber Sale Action Plan (cont'd)

					Proposed			Primary Harvest Methods	
Fiscal Year	Ranger District	Sale Name	Manage-ment Area	Harvest Area (Acres)	Volume (MMBF)	Road Miles		Silvicultural	Logging Methods
						Const.	Reconst.		
	Devil's Garden	Wart	53	2,000	1.5	0	0	OSR	Tractor
	Doublehead	Stud	61	500	5.0	0	2.5	OSR, SHELT, CC	Tractor
		Four Mile	65	200	2.5	0.5	1.0	OSR	Tractor/ Cable
	Total FY 96			**8,910**	**49.5**	**8.0**	**21.5**		
FY 97	Warner Mtn	Compt 307-309	32	1,500	10.0	3.0	5.0	CC	Tractor
		Compt 327-328	34	450	3.0	0	1.5	CC	Tractor
	Big Valley	Compt 417-419	42	400	2.0	0.2	0.2	CC	Tractor
		Compt 456 (BVFSYU)	44	1,600	8.0	1.5	3.0	CC	Tractor
	Devil's Garden	Timber Mtn	52	800	0.5	0	0	OSR	Tractor
		Stovepipe	53	2,400	2.0	0	1.5	OSR	Tractor
		Ambrose	54	3,100	2.5	0	1.5	OSR	Tractor
	Doublehead	Mt Hoff-man	61	600	6.0	5.0	0.5	CC, OSR, SHELT	Tractor/ Cable
		Medicine Lake	61	1,200	6.0	2.0	3.5	CC, OSR, SHELT	Tractor/ Cable
	Total FY 97			**12,050**	**40.0**	**7.0**	**11.7**		
FY 98	Warner Mtn	Compt 310-312	32	1,800	10.0	0	0	OSR, CC	Tractor
	Big Valley	Compt 410	41	1,800	10.0	0	0	CC	Tractor

Table C-4.Tentative 10-Year Timber Sale Action Plan (cont'd)

Fiscal Year	Ranger District	Sale Name	Management Area	Harvest Area (Acres)	Proposed			Primary Harvest Methods	
					Volume (MMBF)	Road Miles		Silvicultural	Logging Methods
						Const.	Reconst.		
		Compt 422, 423 (BVFSYU)	44	1,800	8.0	1.0	5.0	CC, OSR	Tractor/ Cable
	Devil's Garden	Compt 505-508	52	800	3.0	0	2.0	CC	Tractor
		Compt 542, 543	54	500	2.0	0	0	CC	Tractor
	Doublehead	Compt 605-607	61	700	8.0	1.0	6.0	CC	Tractor
	Total FY 98			**6,800**	**37.0**	**6.0**	**2.4**		
FY 99	Warner Mtn	Compt 345-348	36	1,200	6.0	2.0	4.0	OSR, CC	Tractor
		Compt 336	36	1,500	3.0	1.0	2.0	UEAM	Tractor
		Compt 340-342	36	500	2.0	0	1.0	OSR, CC	Tractor
	Big Valley	Compt 411-413	41	1,000	5.0	0	3.0	UEAM	Tractor
		Compt 450-454 (BVFSYU)	44	1,200	4.0	1.0	2.0	OSR, CC	Tractor
		Compt 443-444 (BVFSYU)	44	1,000	2.0	0	1.5	OSR, CC	Tractor
		Compt 460-462 (BVFSYU)	45	1,000	3.0	0	1.0	CC, OSR	Tractor
	Devil's Garden	Compt 509-511	52	1,000	2.0	0	1.0	OSR	Tractor
		Compt 520-525	53	1,000	2.0	0	2.0	OSR	Tractor

Table C-4 (cont'd.)

					Proposed			Primary Harvest Methods	
Fiscal Year	Ranger District	Sale Name	Manage-ment Area	Harvest Area (Acres)	Volume (MMBF)	Road Miles		Silvicultural	Logging Methods
						Const.	Reconst.		
	Doublehead	Compt 616, 618	61, 62	700	3.0	0	2.0	OSR	Tractor
		Compt 608, 609, 622	62	800	4.0	0	3.0	OSR	Tractor
	Total FY 99			**10,900**	**36.0**	**4.0**	**22.5**		

Key to Abbreviations:

CC clearcut

OSR overstory removal

SHELT shelterwood (seed tree)

CT commercial thinning

UEAM uneven-aged management

SEL selection

MMBF Million board feet

C construction

R Reconstruction

SL small log (sale)

BVFSYU Big Valley Federal Sustained-Yield Unit

Compt compartment.

Appendix D
Timber Data

Table D-1. Present and Future Forest Timber Conditions

	Unit of Measure	Suitable Land	Unsuitable Land
Present forest:			
Growing stock	MMCF	615.2	188.3
	MMBF	3,778.6	1,151.5
Live cull	MMCF	11.6	3.1
	MMBF	52.6	14.5
Salvable dead	MMCF	4.1	1.3
	MMBF	26.9	8.1
Annual net growth	MMCF	8.9	2.5
	MMBF	57.5	16.2
Annual mortality	MMCF	1.3	0.4
	MMBF	8.3	2.7
Future forest:			
Growing stock	MMCF	647.4	
Annual net growth	MMCF	10.3	
Rotation ages:[1]			
Lodgepole pine	70-140		
Mixed conifer	70-150		
Eastside pine	70-150		
Red fir	80-140		

[1] **Rotations shown are average rotations**

Table D-1. (cont'd.)		
Age class distribution — suitable acres		
Age Class	**Present Forest**	**Future Forest**
10	62,270	26,860
20		28,350
30		26,580
40		32,690
50		32,690
60		33,230
70	77,850	29,310
80		26,600
90	166,070	34,570
100	15,570	40,800
110	5,190	18,690
120	93,420	23,030
130	67,470	17,680
140	5,190	9,490
150		3,930
160		4,300
170		20,220
180	25,950	
190		
200 +		110,260
Total	518,980	**518,980**

Table D-2. Land Classification

	Classification	Acres	% of Forest
1	**Non-Forest Land**	505,024	30%
	Includes rangeland vegetation, meadows, water, barren areas, rock, and developed areas.		
2	**Forest Land**	1,158,296	70%
	Item 11 less Item 1		
3	**Forest Land Withdrawn From Timber Production**	28,604	2%
	Forest lands withdrawn by Act of Congress, the Secretary of agriculture, or the Chief of the Forest Service. Includes the South Warner Wilderness.		
4	**Forest Land Not Capable of Producing Industrial Wood**	492,594	30%
	Available forest land with species not currently utilized such as western juniper, aspen, black oak, and white-bark pine.		
5	**Forest Land Physically Unsuitable**		
	a. Irreversible damage to soils, watershed, or productivity likely to occur.	0	0%
	b. Cannot be adequately restocked within 5 years of final harvest	17,840	1%
6	**Forest Land For Which Information is Inadequate To Predict Response**	0	0%
7	**Tentatively Suitable Forest Land**	619,258	37%
	Item 2. less Items 3, 4, 5, and 6.		
	a. >20 cu. ft. lands	435,103	26%
	b. <20 cu. ft. lands	184,155	11%
8	**Forest Land Not Appropriate for Timber Production**	100,278	6%
	a. Minimum Management Requirements	69,403	4%
	b. Multiple-use Objectives	23,013	1%
	c. Cost Efficiency	7,862	<1%
9	**Unsuitable Forest Land**	639,316	38%
	(Items 3, 4, 5, 6, and 8)		

Table D-2 (cont'd.)

Classification	Acres	% of Forest
10 **Total Suitable Forest Land**	518,930	31%
(Items 2 minus Item 9)		
a. >20 cu. ft. lands	366,510	22%
b. <20 cu. ft. lands	152,470	9%
11 **Total National Forest**	**1,663,320**	**100%**

Table D-3. Eastside Pine Age and Size Class Distribution

Description	Stratum Label	Average Age[1]	Acres	(%)
Plantations, seedlings, saplings, good stocking	PLG	10[2]	40,513	(9%)
Plantations, seedlings, saplings, poor stocking	PLP	10[2]	16,001	(4%)
Poles and small sawtimber, good stocking	P3G	90	40,202	(10%)
Poles and small sawtimber, poor stocking	P3P	70	168,207	(42%)
Medium and large sawtimber, good stocking	P4G	130	28,069	(7%)
Medium and large sawtimber, poor stocking	P4P	120	109,967	(27%)
Two-storied stand	P6G	110-230	2,463	(1%)
Total			405,422	

[1] Average age is equal to the basal areas weighted age.

[2] Plantations are 1-50 years old. As a matter of convenience, they were assigned ages of 10 years.

Table D-4. Mixed Conifer Age and Size Class Distribution.

Description	Stratum Label	Average Age	Acres	(%)
Saplings	M1X	10	9,460	(5%)
Poles and small sawtimber, good stocking	M3G	120	54,840	(27%)
Poles and small sawtimber, poor stocking	M3P	130	64,198	(32%)
Medium and large sawtimber, good stocking	M4G	180	36,516	(18%)
Medium and large sawtimber, poor stocking	M4P	130	31,580	(16%)
Two-storied stand	M6G	90-490	3,807	(2%)
Total			200,401	

Table D-5. Red Fir Age and Size Class Distribution.

Description	Stratum Label	Average Age	Acres	(%)
Poles and small sawtimber, good stocking	R3G	140	5,099	(38%)
Poles and small sawtimber, poor stocking	R3P	110	3,897	(29%)
Medium and large sawtimber, good stocking	R4G	160	3,208	(24%)
Medium and large sawtimber, poor stocking	R4P	170	1,221	(9%)
Total			13,425	

Table D-6. Timber Age and Size Class Distribution.

Description	Stratum Label	Average Age	Acres	(%)
Plantations, seedlings, saplings, good stocking	PLG, M1X	10	49,999	(8%)
Plantations, seedlings, saplings, poor stocking	PLP	10	16,001	(2%)
Poles and small sawtimber, good stocking	P3G, M3G R3G, LXX	90-140	120,809	(19%)
Poles and small sawtimber, poor stocking	P3P, M3P, R3P	70-130	236,302	(37%)
Medium and large sawtimber, good stocking	P4G, M4G, R4G	130-180	67,793	(11%)
Medium and large sawtimber, poor stocking	P4P, M4P, R4P	120-170	142,768	(22%)
Two-storied stand	P6G, M6G	90-490	6,270	(1%)
Total			**639,942**	

Table D- 7. Suitable Timberland : >20 and <20 Cubic Feet Per Acre Per Year.

Strata	Total Acres	Acres	
		>20 cu.ft.	<20 cu.ft.
LXX	17,903	5,570	2,333
M1X	9,407	8,733	674
M3G	49,452	49,452	0
M3P	57,245	30,705	26,540
M4G	29,558	29,558	0
M4P	28,134	19,386	8,748
M6G	2,654	2,654	0
PLG/PLP	56,579	51,568	5,011
P3G	39,960	39,960	0
P3P	167,310	84,394	82,916
P4G	27,976	27,976	0
P4P	109,934	52,015	57,919
P6G	1,859	1,859	0
R3G	5,099	5,099	0
R3P	3,897	3,883	14
R4G	3,208	3,208	0
R4P	1,221	1,221	0
Subtotal	611,396	427,241	184,155
Nonstocked[1]	7,862	7,862	0
Total	619,258	435,103	184,155

NOTE: Total acreage is 340 acres less than the data base because of rounding errors when aggregating analysis areas.

1 **Productive soils capable of acceptable tree growth, but currently without tree cover. These lands are probably non-stocked because of natural causes, such as wildfires.**

Table D-8. Timber Management Outputs and Activities.

Management Practice	Acres/Year	Allowable Sale Quantity	
		MMCF/Year	MMBF/Year
Regeneration Harvest			
By Forest Type:			
Eastside Pine	2,490	2.68	16.4
Mixed Conifer	985	3.3	20.4
Red Fir	95	0.4	2.4
Lodgepole Pine	170	0.2	1.5
Total	3,740	**6.6**	**40.7**
By Cutting Method:			
Clearcut	3,120	5.2	32.0
Shelterwood	280	0.5	3.2
Selection	340	0.9	5.5
Total	3,740	**6.6**	**40.7**
Intermediate Harvest			
Commercial Thinning	200	<0.8	<0.1
Sanitation Salvage	1,900	0.5	0.2
Non-Interchangeable Component (NIC) (Includes harvest from the Visual Retention, Riparian, and <20 Prescriptions)	2,200[1]	0.7	4.5
Total Harvest	8,040	**7.6**	**45.5**
Other Practices			
Release	3,400		
Precommercial Thinning	2,000		
Total Timber Stand Improvement	5,400		
Reforestation	3,400		

[1] **Estimated actual harvest rather than allocation amount.**

Table D-9. Timber Productivity Classification.		
Potential Growth (Cubic Feet/ Acre/Year)	**Suitable Lands (M Acres)**	**Unsuitable Lands (M Acres)**
Less than 20	152.5	49.5
20-49	131.8	34.9
50-84	193.5	51.3
85-119	40.1	10.6
120-164	1.1	0.3
165-224	0.0	0.0
225 +	0.0	0.0

Appendix E
Fish and Wildlife Monitoring Techniques

Threatened and Endangered Species

Bald Eagle

Populations

Objectives
- Nest occupancy and productivity
- Occupancy of identified potential habitat
- Use of winter roosts
- Mortality, nesting failures, and decreased productivity

Techniques
- Aerial surveys
- Ground surveys

Precision/Reliability - High/High
Frequency - Annual
Standard -State survey and procedures, predicted populations, recovery plan goals

Habitat

Objectives
- Monitor effects of other resource uses
- Evaluate silvicultural treatments and habitat improvements
- Monitor habitat conditions and presence of insects and disease in nest territories and winter roosts

Techniques
- Ground surveys and interpretation
- Habitat use
- Measuring techniques

Precision/Reliability - Moderate/High
Frequency - 1-5 years
Standard -Forest Standards and Guidelines (S&Gs), Raptor Management prescription, Nest/Roost Territory Plans, silvicultural objectives

Peregrine Falcon

Populations

Objectives
- Identify suitable cross-foster sites
- Monitor reintroduction
- Determine nesting success and productivity
- Determine new active nest sites

Techniques
- Ground surveys

Precision/Reliability - High/High
Frequency - Annually for 5 years after reintroduction
Standard - Forest S&Gs, Raptor Management prescription, Recovery Plan, Reintroduction Plan

Modoc Sucker

Populations

Objectives
- Measure trends in populations by stream and habitat units
- Determine causes of mortality or population fluctuations
- Determine availability of suitable spawning and holding habitat
- Determine use of habitat units

Techniques
- Seining and dipnetting
- Visual and snorkeling
- Electrofishing (last resort)

Precision/Reliability - Moderate/High
Frequency - 2 years
Standard - Forest S&Gs, Monitoring Plan, Riparian Area Prescription, Action Plan for the Recovery of the Modoc Sucker

Habitat

Objectives
- Evaluate effects of all activities in the watershed
- Evaluate habitat improvements
- Meaure streambank and channel recovery

Techniques
- Fish habitat assessment and mapping
- Channel profiles
- Photo points

– Invertebrate sampling
– Activity reviews

Precision/Reliability - Moderate/High

Frequency - 2 years or project induced

Standard - Forest S&Gs, Monitoring Plan, Riparian Area Prescritpion, Action Plan for Recovery of the Modoc Sucker

Northern Spotted Owl

Objectives

– Determine habitats used on Modoc
– Continue surveys in suspected habitats
– Consult with USFWS for biological significance of located birds

Techniques

– Calling surveys
– Mousing
– Vegetation mapping/analysis

Precision/Reliability - Moderate/Moderate

Frequency - Annual

Standard - R5 survey protocal

Lost River and Shortnose Suckers

Populations

Objectives

– Measure trends in populations by stream and habitat units
– Measure trends in populations by reservoir
– Determine causes of mortality or population fluctuations
– Determine availability of suitable sqawning and holding habitat
– Determine use of habitat units

Techniques

– Seining and dipnetting
– Visual and snorkeling
– Electrofishing (last resort)
– Coordinating with CDFG for boat-electrofishing in reservoirs

Precision/Reliability - Moderate/High

Frequency - 2 years

Standard - Forest S&Gs, Monitoring Plan, Riparian Area Prescription, future Recovery Plan for the Shortnose and Lost River Suckers

Habitat

Objectives

– Evaluate effects of all activities in the watershed
– Evaluate habitat improvements
– Measure streambank and channel recovery

Techniques

– Fish habitat assessment and mapping
– Channel profiles
– Photo points
– Intertebrate sampling
– Activity reviews

Precision/Reliability - Moderate/High

Frequency - 2 years or project induced

Standard - Forest S&Gs, Monitoring Plan, Riparian Area Prescription, future Recovery Plan for the Shortnose and Lost River Suckers

Sensitive Species

Bighorn

Objectives

– Implement recovery guidelines
– Monitor population trends, reproductive rates and mortality factors
– Identify release sites
– Determine habitat use and dispersion
– Identify bighorn, livestock, and recreation conflicts

Techniques

– Analyse reintroduction sites
– Aerial surveys
– Ground surveys
– Composition counts
– Vegetation mapping

Precision/Reliability - Moderate/Moderate

Frequency - annually

Standard - Wilderness prescription, S&Gs, Bighorn Management Plan

Goshawk

Populations

Objectives

– Identify active nest territories to meet population goals by District
– Determine nesting use of potential suitable habitat
– Monitor nest success/reproduction

Techniques

- Aerial photo interpretation
- Ground surveys during nesting season

Precision/Reliability - Moderate/High

Frequency - annually in planned timber sales

Standard - Raptor Management prescription, S&Gs

Habitat

Objectives

- Determine effect of resource activity on nest stands
- Monitor continued suitability of designated nest stands

Techniques

- Ground surveys and vegetation measurement

Precision/Reliability - Moderate/Moderate

Frequency - project induced

Standard - Raptor Management prescription, Habitat Capability Models (HCMs)

Pine Marten

Objectives

- Determine habitat use by martens
- Validate territories
- Identify required seral stages, snag, old growth and down logs
- Hair snare/aluminum track plates

Techniques

- Vegetation Mapping
- Down log and snag transects
- Snow surveys

Precision/Reliability - Moderate/Moderate

Frequency - 5 years

Standard - S&Gs, HCMs, Riparian Area prescription

Harvest Species

Deer

Objectives

- Determine population trends
- Evaluate and predict resource management effects on deer and habitat
- Benefits and execution of Timber-Forage prescription
- AUM allocations
- Habitat improvement benefits and costs
- Changes in seasonal ranges

Techniques

- Annual composition counts
- HCMs
- Vegetation sampling and mapping
- Deer use surveys

Precision/Reliability - Moderate/Moderate

Frequency - annual and project induced

Standard - S&Gs, Timber-Forage prescription, State Deer Herd Plans, HCMs

Pronghorn

Objectives

- Determine population trends
- Determine AUM allocation needs and habitat trends

Techniques

- State herd counts
- Forage condition, trend, and utilization surveys
- Type maps

Precision/Reliability - Moderate/Moderate

Frequency - annual

Standard - S&Gs, Allotment Management Plans, Revised Vegetation Inventory, State Pronghorn Management Plan

Sage Grouse

Objective

- Population trends
- Habitat trends

Techniques

- Lek counts
- Livestock utilization measurements
- Vegetation mapping and trend measurements
- Brood counts

Precision/Reliability - Low/Moderate

Frequency - annual counts, 5 years

Standard - S&Gs, HCMs

Western Gray Squirrel and Blue Grouse

Objectives

- Successional stage distribution and diversity
- Special habitat component - oaks and down logs

Techniques

– Veg type maps and project evaluation

Precision/Reliability - Low/Moderate
Frequency - project induced for 5 years
Standard - S&Gs, HCMs

Canada Goose and Mallard

Objectives

– Monitor nest success and wetlands use
– Measure whether project or wetlands met objectives

Techniques

– Nest surveys
– Livestock utilization measurements

Precision/Reliability - Moderate/High
Frequency - annual
Standard - S&Gs, State collection agreements, wetlands objectives

Fisheries (Trout and Largemouth Bass)

Objectives

– Estimate populations and relative abundances
– Monitor water quality
– Monitor stream, lake, reservoir, and riparian condition
– Determine availability of suitable sqawning and holding habitat
– Determine use of habitat units
– Evaluate habitat improvement effects
– Evaluate effects of all activities in the watersheds

Techniques

– Electrofishing, seining, dipnetting, snorkeling, visual fish population estimations
– Invertebrate sampling
– Photo points
– Vegetation sampling
– Fish habitat assessment and mapping
– Channel profiles
– Activity review

Precision/Reliability - Moderate/Moderate
Frequency - 2-5 years or project induced
Standard - Forest S&Gs, Riparian Area prescription, Monitoring Plan, fisheries program plans

Other Species

Pileated Woodpecker

Objective

– Old-growth area designation
– Snag densities
– Down log component
– Determine habitat use (seral stages, etc.)
– Validate territories

Techniques

– Vegetation mapping and project evaluation
– Snag transects for density and use
– Down log transects
– Call counts

Precision/Reliability - Low/Moderate
Frequency - 5 years
Standard - S&Gs, HCM

Hairy Woodpecker

Objectives

– Monitor snag densities and management

Techniques

– Snag transects & use measurements

Precision/Reliability - Moderate/Moderate
Frequency - annual or project induced
Standard - S&Gs, HCM

Prairie Falcon, Swainson's Hawk, Osprey, Golden Eagle

Objectives

– Measure project effects

Techniques

– Nest surveys

Precision/Reliability - High/High
Frequency - project induced
Standard - S&Gs

Red -breasted/Red-naped Sapsuckers, Willow Flycatcher, Yellow Warbler

Objective

– Determine trends in woody vegetation in riparian areas

– Monitor trends in populations for these species and/or resident bird species.

Techniques

– Vegetation sampling
– Photo points
– Species counts, nesting surveys

Precision/Reliability - Low/Moderate

Frequency - Annual for species counts at selected sites; 5 years for habitat changes.

Standard - S&Gs, Riparian Area prescription, HCMs

Sandhill Crane

Objective

– Monitor riparian/wetland areas for nesting and brood rearing
– Residual vegetation in wetlands and riparian areas

Techniques

– Nest surveys
– Livestock utilization

Precision/Reliability - Moderate/High

Frequency - annual

Standard - S&Gs, wetlands and riparian area objectives

Appendix F
Management Practices

This Appendix has been deleted since the DEIS.

Road Functional Classifications

Forest Arterial Road - provides service to large land areas and usually connects with public highways or other Forest arterial roads to form an integrated network of primary travel routes. The location and standard are often determined by mobility and efficiency needs rather than by specific resource management service needs. It is usually developed and operated for long-term land and resource management purposes and for constant service. These roads are usually paved, and often have safe travel speeds in excess of 25 mph.

Forest Collector Road - serves smaller land areas than a Forest arterial road, and is usually connected to a Forest arterial or public highway. Collects traffic from Forest local roads and terminal facilities. The location and standard are influenced by long-term multiple-resource service needs as well as by travel efficiency. May be operated for either constant or intermittent service, depending on land use and resource management objectives for the area served by the facility. The roads typically have an aggregate, aggregate and oil, or chip seal surface. Travel speed is often 15 to 25 mph and the road is usually 5 to 15 miles in length. The road generally serves three or more local roads.

Forest Local Road - connects terminal facilities such as campgrounds and timber harvest areas with Forest collector or Forest arterial roads, or public highways. The location and standard are usually controlled by a specific resource activity rather than travel efficiency. Forest local roads may be developed and operated for either long- or short-term service. The road may be closed until a future activity occurs or may be left open if on-going activities are necessary. The road is typically short in length (less than five miles), with a low travel speed (5-15 mph), and are typically unsurfaced except where necessary for resource protection (e.g. erosion), or in developed recreation sites which receive seasonally high use.

Road Development Guidelines

This chart summarizes the system used to construct and maintain Forest roads.

	Functional Classification		
	Arterial	**Collector**	**Local**
Travel Speed:	Average 15-55 mph.	Average 10-35 mph.	Average 0-15 mph.
Lanes:	Generally 2 lanes	Generally 1 lane.	Usually 1 lane except for developed recreation sites.
Surface:	All weather generally asphalt or gravel (cinders).	All weather gravel (cinders) or chip seal, sometimes asphalt.	Varies from asphalt to native surface, majority native surface.
Width:	Typically 20-24 feet but some 1 lane with intervisable turnouts.	Typically 12-16 feet with turnouts, usually intervisable.	Typically 10-14 feet, turnouts usually not intervisable or optional.
Drainage:	Permanent, not to impede traffic.	Permanent, but may impede traffic. May have some outslope and dips.	Usually outsloped with dips.
Maintenance Level:	3,4, or 5	2,3, or 4	1-5

Road Maintenance Levels

The following are definitions of the five levels of maintenance of Forest roads.

Level 1: Roads are closed to traffic. This level is basic custodial care as required to protect the road investments and to see that damage to adjacent land and resources is held to a minimum. Level 1 maintenance requires an annual inspection to determine what work, if any, is needed to maintain drainage and keep the road stable.

Level 2: Roads are open to limited traffic. This level is used on roads where Forest management activities require that the road be open for limited passage of high clearance vehicles. Traffic is minor, usually consisting of one or a combination of administrative use, permitted use, or specialized traffic. Level 2 requires the basic care of Level 1.

Level 3: Roads are open to traffic. This level is used on roads that are open for public traffic and generally applies when use does not exceed 15 vehicles per day average daily traffic (ADT). ADT should be used as a guide in determining the maintenance level and not as the sole criterion. A road may receive only one or two vehicles a day for most of the year; however, during a brief period, such as hunting season, the road may receive 20 or 30 vehicles a day. Total traffic types and planned land use are important criteria for selecting maintenance level. The road is maintained for safe and moderately convenient travel suitable for passenger cars.

Level 4: Roads are open to traffic. This level generally applies when use of a road is between 15 ADT and 100 ADT. At this level, more consideration is given to the comfort of the user. These roads are frequently surfaced with aggregate material, but some routes are paved.

Level 5: Roads are open to traffic. This level is generally maintained for use of 100 ADT and greater. Roads in this category are generally paved surfaces. Safety and comfort are important considerations. Abrupt changes in maintenance will be posted to warn a traveler until these deficiencies are corrected.

Dam Classification

Class A: Dams that are 100 feet high or more, or impound 50,000 acre-feet or more of water.

Class B: Dams that are 40 feet high or more, but less than 100 feet high, or impound 1,000 acre-feet or more, but less than 50,000.

Class C: Dams that are 25 feet high or more, but less than 40 feet high, or impound 50 acre-feet or more, but less than 1,000.

Class D: Dams that are less than 25 feet high and impound less than 50 acre-feet.

Dam Hazard Rating

Low Hazard (L): built in areas where failure would result in little economic loss; damage would be limited to undeveloped or agricultural lands, improvements are not planned, and loss of life is unlikely.

Moderate Hazard (M): built in areas where failure would result in appreciable economic loss, with damage limited to improvements such as commercial and industrial structures, public utilities, and transportation system. A few habitable structures could be involved, but loss of life is unlikely.

High Hazard (H): built in areas where failure could result in loss of life or severe economic loss. Generally, urban or community development would be involved.

Appendix H
Fire Management

This appendix describes (1) the Plan's fire management program, (2) the fire management effectiveness index, (3) the program's implementation, (4) annual fuel treatment, (5) expected annual acres burned by wildfire, and (6) the suppression difficulty index matrix.

Fire Management Program

Suppression is emphasized with a current (1982) budget for five decades. The Forest-wide fire management organization for current budget is:

- 8 engine crews
- 6 prevention units
- 4 fixed lookouts
- 2 ten-person handcrews

Fire Management Effectiveness Index

The index is a relative measure of wildfire suppression effectiveness of the fire management organization. It is calculated by the equation:

$$FMEI = \frac{Annual(FFP + FFF + NVC)\text{-}Fuels\ Investment}{National\ Forest\ Acres\ Protected}$$

Where FFP = the forest protection costs,
FFF = fire fighting costs, and
NVC = net value change.

Fire Management Action Plan

When prepared, this action plan will guide implementation of the fire management program described above.

Annual Fuel Treatment

The proposed annual fuel treatment by prescribed fire for five decades is:

Decade	Timber-Related	Fire-Related	Other
1	2100	350	50
2	2200	350	50
3	2800	350	50
4	3000	350	50
5	3400	350	50

Expected Annual Acres Burned by Wildfire

The expected annual extent of wildfire for five decades by fire intensity level is:

Fire Intensity Level	Decade	Annual Burned Acres
1	1	2
	2	6
	3	50
	4	85
	5	85
2	1	132
	2	132
	3	132
	4	132
	5	99
3	1	172
	2	172
	3	465
	4	482
	5	552
4	1	5,930
	2	5,930
	3	5,930
	4	5,784
	5	5,555
Total	1	6,236
	2	6,241
	3	6,577
	4	6,484
	5	6,291

Suppression Difficulty Index Matrix

The Suppression Difficulty Index (SDI) matrix is applied to fuels in harvest areas to determine fuel treatment needs. The SDI does not prescribe a fuel treatment method. Instructions for this matrix are found in the fire management analysis and planning handbook (FSH 5109.19, chapter 50).

If the resultant SDI is greater than the prescribed threshold index in the Forest Standards and Guidelines for the harvest activity that generates the fuel, then fuel treatment is necessary. Examination of the rating values for each element can lead to the appropriate treatment methods.

Appendix I

Special Stipulations for Geothermal, Oil and Gas Leasing

Protection of Surface Areas with Scientific, Educational Value, Developed Recreation Sites, and Other Facilities and Improvements

This stipulation protects lands with critical surface resource values to preserve them in as nearly natural condition as possible. These lands are identified as:

- National Register cultural resource sites;
- Developed recreation sites;
- Devil's Garden Research Natural Area;
- Glass Mountain Glass Flow, Burnt Lava Flow, and Medicine Lake Glass Flow Geologic Special Interest Areas.

Special Stipulation 1

Lessee shall not occupy or use the surface of *[name site]* to protect *[name value]* more particularly described as *[township, range, and section(s)].*

Protection of Active Bald Eagle Nest Sites

Direction for bald eagle management and its habitat comes from the Endangered Species Act of 1973, as amended, which directs government agencies to "utilize their authorities...by carrying out programs for the conservation of endangered species and threatened species listed." The term "conserve" means "to use...all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this chapter are no longer necessary." The Forest Service must manage threatened and endangered species at recovery levels (the point at which they can be removed from the federal threatened and endangered list).

Special Stipulation 2

Lessee shall not occupy or use the surface of the lands within one-half mile of active bald eagle nest sites.

These sites are more particularly described as *[township, range, and section(s)].*

Protection of Modoc, Shortnose and Lost River Sucker Habitat

Direction for Modoc, shortnose and Lost River sucker management and its habitat comes from the Endangered Species Act of 1973, as amended, which directs government agencies to "utilize their authorities...by carrying out programs for the conservation of endangered species and threatened species listed." The term "conserve" means "to use...all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this chapter are no longer necessary." The Forest Service must manage threatened and endangered species at recovery levels (the point at which they can be removed from the federal threatened and endangered list).

Special Stipulation 3

Lessee shall not occupy or use the surface within 300 feet of those streams designated as habitat for the Modoc shortnose or Lost River sucker. This restriction applies to *[streams in township, range, and section (s)].*

Protection of Highly Scenic and Sensitive Visual Areas

This stipulation protects highly scenic and sensitive visual areas as identified in Visual Quality Objectives (VQOs) as Retention and those areas identified in the Recreation Opportunity Spectrum (ROS) as Semi-Primitive Non-Motorized (SPNM).

The Forest Service will require that the lessee's or operator's plan of operation is consistent with this stipulation, and may require restrictions or modifications to the operating plan.

Special Stipulation 4A and 4B

To protect areas designated as *[SPNM (4A) or Retention (4B)]* by the Modoc National Forest *[VQO/ROS]* inventory, the lessee shall not conduct surface disturbing activities on lands more particularly described as *[township, range, and section(s)]*.

Exceptions will be made if the lessee demonstrates to the satisfaction of the Forest Service and Bureau of Land Management, through a plan of operation or permit application, that unacceptable environmental impacts to the *[name resource]* will not occur from the proposed operation.

Lessee may not conduct activities in the following areas at any time:

- bald eagle winter roosts and nesting habitat;
- bald eagle feeding sites in high concentration areas;
- goshawk nesting territories;
- peregrine falcon nesting territories;
- sage grouse strutting grounds;
- old-growth forest (marten habitat);
- streamside management zones.

Special Stipulation 5

To protect areas designated as *[name habitat]*, the lessee shall not conduct surface disturbing activities within lands more particularly described as *[township, range, and section(s)]*.

Exceptions will be made if the lessee demonstrates to the satisfaction of the Forest Service, Bureau of Land Management and the United States Fish and Wildlife Service, through a plan of operation or permit application, that unacceptable environmental impacts to *[name resource]* will not occur from the proposed operations.

Protection of Wildlife During Critical Periods

The following lands are within critical seasonal or year-round wildlife habitat for the species listed below and cannot be occupied during the periods specified, unless the lessee can demonstrate to the satisfaction of the Forest Service and Bureau of Land Management that unacceptable environmental impacts will not occur to the resource. This stipulation is intended to allow as much activity as possible while assuring that wildlife management objectives are met. It is not intended to restrict normal maintenance of existing or authorized facilities.

Lessee may not conduct activities in the following areas during the times specified:

osprey nesting territories	**February 1 to August 1**
golden eagle nesting territories	**February 1 to August 1**
winter deer and pronghorn range	**November 1 to May 1**
deer fawning areas	**May 1 to August 1**
pronghorn kidding areas	**May 1 to June 1**
Swainson's hawk areas	**April 1 to August 1**

Special Stipulation 6

To protect areas designated as *[name habitat]*, the lessee shall not conduct surface disturbing activities on the following lands, more particularly described as *[township, range, and section(s)]* during *[specify time period]*.

Exceptions will be made if the lessee demonstrates to the satisfaction of the Forest Service, Bureau of Land Management and the United States Fish and Wildlife Service, through a plan of operation or permit application, that unacceptable environmental impacts to *[name resource]* will not occur from the proposed operations.

Protection of Wetlands

This stipulation protects wetlands.

Special Stipulation 7

To protect wetlands, the lessee shall not conduct surface disturbing activities on lands more particularly described as *[township, range, section(s)]*.

Exceptions will be made if the lessee demonstrates to the satisfaction of the Forest Service and the Bureau of Land Management, through a plan of operation or permit application, that unacceptable environmental impacts to *[name resource]* will not occur from the proposed operations.

Protection of Permitted or Leased Areas

This stipulation protects areas already under permit from oil and gas ground-disturbing activities. It also ensures that new leases will not conflict with existing permits.

Special Stipulation 8

All plans to conduct surface-disturbing operations on the identified lands will require the review and concurrence of the United States Forest Service and the lessee, prior to approval by the Bureau of Land Management. Such operations may be restricted or denied on part or all of the following described lands: *[township, range, and section(s)]*.

Exceptions will be made if the lessee demonstrates to the Bureau of Land Management, the Forest Service and the permittee, through a plan of operation or a permit application, that unacceptable impacts to *[name resource]* will not occur from the proposed operations.

Protection of Watershed

This advisory notice protects watersheds from cumulative effects of ground-disturbing activities. Currently, the Modoc National Forest uses an equivalent roaded acres (ERA) index to determine management thresholds.

Advisory Notice 1

Lessee's or operator's cumulative ground-disturbing activities related to oil and gas development shall not exceed the established management threshold index for the *[name of watershed]* when combined with planned ground-disturbing activities for this watershed.

Protection of Surface Water Sources

This advisory notice protects limited water supplies from being exhausted.

Advisory Notice 2

Lessee may not use existing water in stock tanks, ponds, lakes, reservoirs, springs, creeks or streams for any activity under this lease unless specifically permitted by the Forest Supervisor, except where the lessee has water rights or the authorized use of such water rights.

Protection of Erodable Soils

This advisory notice protects sensitive soils and unstable slopes.

Advisory Notice 3

Access and development in areas or unstable slopes or sensitive soils may require special mitigation measures prior to and during any ground-disturbing activities. The exact mitigation will be determined at the notice of staking or the application for permit to drill stage.

Appendix J
Guidelines for Range Vegetative Manipulation

Vegetative manipulation includes mechanical, chemical, and biological methods for increasing forage production. To simplify, all methods were placed into three groups:

Cultivation: Type conversion to non-native species by plowing, fertilizing, and seeding.

Rejuvenation: Any one of a group of practices, including prescribed burning, herbicide spraying, chaining, crushing, and masticating.

Firewood cutting: Removal of aspen or juniper by commercial firewood sales.

The following criteria for range sites, condition class, slope, and vegetation may be used to guide site selection for range improvements. Reference the Analysis of the Management Situation for Range (Forest Planning Records) for more detail.

	Cultivation	Rejuvenation	Firewood
Range Sites:	12 - loamy, 10-14" 13 - loamy, 14-18" 14 - loamy, 18-35" 16 - gravelly, coarse loam, 10-16" 25/52 - semi-wet/wet meadow	4 - shallow loam, 12-18" 7 - shallow, stony loam, 10-14" 8 - shallow, stony loam, 14-18" 9 - shallow, stony loam, 18-35" 12 - loamy, 12-14" 13 - loamy, 14-18" 14 - loamy, 18-35" 16 - gravelly, coarse loam, 10-16" 17 - stony loam, 10-14" 18 - stony loam, 14-18" 19 - stony loam, 18-35" 23 - shallow, stony clay, 12-18" 25/52 - semi-wet/wet meadow 50 - sandy loam, 12-25" 53 - shallow, stony loam, 12-16" 55 - stony loam, 12-14" 57 - sandy loam, 16-25"	4 - shallow loam, 12-18" 7 - shallow, stony loam, 10-14" 8 - shallow, stony loam, 14-18" 9 - shallow, stony loam, 18-35" 12 - loamy, 12-14" 13 - loamy, 14-18" 14 - loamy, 18-35" 16 - gravelly, coarse loam, 10-16" 17 - stony loam, 10-14" 18 - stony loam, 14-18" 19 - stony loam, 18-35" 23 - shallow, stony clay, 12-18" 25/52 - semi-wet/wet meadow 50 - sandy loam, 12-25" 53 - shallow, stony loam, 12-16" 55 - stony loam, 12-14" 57 - sandy loam, 16-25"
Condition Classes:	poor, very poor	fair, poor	fair, poor
Slope	0-10%	0-30%	0-30%
Understory:	big sagebrush, bitterbrush, bitterbrush/big sagebrush, montane shrubs,rabbitbrush, perennial grasses, dry meadow, existing seedings, wet meadow	(same as firewood)	big sagebrush, bitterbrush, bitterbrush/big sagebrush, montane shrubs, rabbitbrush, perennial grasses, dry meadow, perennial forbs, streamside, wet meadow
Overstory:	(same as understory)	(same as understory) ponderosa pine juniper	juniper aspen

Appendix K
Recreation Opportunity Spectrum

The Recreation Opportunity Spectrum (ROS) is a system for classifying and managing recreation opportunities based on the following criteria: physical setting, social setting, and managerial setting. The combination of the three criteria results in several ROS Classes, briefly described as:

Primitive (P) - The area is 3 miles or more from roads and trails with motorized use and generally 5,000 acres or greater. The setting is essentially an unmodified natural environment with some evidence of trails. Motorized use is prohibited. The social setting provides for less than 6 parties encountered on trails and less than 3 parties visible from camp sites. Capacity is 0.5 RVD/acre/year. On-site controls are extremely limited with most regulation accomplished off-site. Typical activities include hiking, horseback riding, fishing, hunting, and camping. No areas on the Forest are categorized as Primitive.

Semi-Primitive Non-Motorized (SPNM) - The area is 1/2 mile from roads or trails with motorized use and generally exceeds 2,500 to 5,000 acres unless contiguous to primitive areas and wilderness. There is little evidence of roads. The area is closed to motorized travel. Access roads are maintenance level 1. The natural setting may have subtle modifications that would be noticed but would not draw the attention of an observer in the area. Structures are rare and isolated. The social setting provides for 6-15 parties encountered per day on trails and 6 or less parties visible at camp sites. Capacity is 1.0 RVD/acre/year. On-site controls are present but subtle. Interpretation is through self discovery with some use of maps, brochures, and guide books. Typical activities include hiking, cross-country skiing, horseback riding, canoeing, hunting, and fishing.

Semi-Primitive Motorized (SPM) - The area is 1/2 mile from roads or trails with motorized use and generally 2,500 to 5,000 acres. Roads and motorized use of roads and trails are evident. Access roads are usually Maintenance Level 1 or 2 local roads. The natural setting may have moderately dominant alterations but would not draw the attention of motorized observers. Structures are rare and isolated. Recreation sites may be development scale 1 or 2 local roads. The natural setting may have moderately dominant alterations but would not draw the attention of motorized observers. Structures are rare and isolated. Recreation sites may be development scale 1 or 2. The social setting provides for a low to moderate contact with other parties. Capacity is 1.5 RVDs/acre/year. On-site controls are present but subtle. Interpretation is through very limited on-site facilities along with use of maps, brochures, and guide books. Typical activities include OHV touring, snowmobiling, hiking, cross-country skiing, canoeing, hunting, and fishing.

Roaded Natural (RN) - The area is 1/2 mile or less from roads and trails open to motorized use. Resource modifications and utilization practices are evident but harmonize with the natural environment. Roads may be maintenance levels 2-5. Recreation sites may be development level 2-4. The social setting provides for moderate to high frequency of contact on roads and low to moderate frequency on trails away from roads. Capacity is 2.5 RVDs/acre/year. On-site user controls are noticeable but harmonize with the natural environment. Typical activities include but are not limited to hiking, cross-country skiing, downhill skiing, power boating, snowmobiling, OHV touring, trailer camping, hunting, and fishing.

Rural (R) - The natural environment is substantially modified to the point that developments are dominant to the sensitive travel route observer. Structures are readily evident and may range from scattered to small dominant clusters. Pedestrian or other slow-moving observers are constantly within view of culturally changed landscapes. The social setting provides for moderate to high visitor contact. Capacity is estimated at 75 RVDs/acre/year. Recreation sites may be development scale 3-5. Controls and regulations are obvious and law enforcement visible. Interpretation may be through more complex wayside exhibits including small lighted structures. Typical activities or facilities include but are not limited to camping, fishing information center, convenience stores, resorts, marinas, and downhill ski areas. The compatible visual quality objective is retention.

Urban (U) - The area is substantially urbanized. Sights and sounds of man predominate. This ROS class does not occur on this Forest.

Appendix L
Trail Program

Maintenance and Reconstruction

The first priority of the Forest's Trail Program is to maintain 118 miles of existing trails. A backlog of work exists on trails within the South Warner Wilderness where most use occurs. All alternatives include trail reconstruction in the 1st decade.

New Construction

Although new trail construction cannot be justified solely by demand, the existing trail system could be expanded and diversified. Most existing trails are located in the South Warner Wilderness at high elevations. The season of use is short and the weather can be harsh. Additional trails outside the Wilderness would attract users, reduce use within the Wilderness, and allow a more primitive experience. This is especially important as the Wilderness use approaches capacity. New trails can accommodate uses that are not allowed within the Wilderness, such as trail bikes. Also, they may be available at times of the year when access to the Wilderness is restricted.

Properly located trails and trailheads can improve management efficiency. Information at trailheads allows management concerns to be communicated to Forest visitors. Trails disperse use, offer new opportunities, and complement developed recreation sites.

Specific Proposals

The following projects are conceptual at this time. Prior to implementation a detailed analysis must be done. Some opportunities may have been overlooked, or proposed projects may not be practical. Effects on other resources must be considered. Projects below are listed by priority and are subject to change.

Proposed Projects	Miles	District
Medicine Lakeshore Trail	2	Doublehead
Cave and Lily link with Crane and Highgrade NRTs	9	Warner Mtn.
Lava Beds Modoc War Interpretive Trail	7	Doublehead
Lava Beds Semi-Primitive Non-Motorized Area	12	Doublehead
Blue Lake NRT completion	1	Warner Mtn.
Medicine Lake Caldera System	20	Doublehead
Mill Creek and Slide Creek Connection	3	Warner Mtn.
Warner Crest Trail System	61	Warner Mtn.
Rush Creek and Ash Creek Connection	18	Big Valley
Total New Construction	**133**	

Medicine Lakeshore Trail: This paved trail connects four developed sites along the north shore of Medicine Lake.

Cave and Lily link with Crane NRT and Highgrade NRT: Cave Lake and Lily Lake Campgrounds lie between two National Recreation Trails: the Crane NRT to the north on the Fremont N.F., and the Highgrade NRT to the South. They are linked through the campgrounds which can be used as a trailhead.

Lava Beds Modoc War Interpretive Trail: This project interprets historical and geological features in the area. It would be the first phase of the Lava Beds system, which would include a trailhead.

Lava Beds Semi-Primitive Non-Motorized (SPNM) Area: Most alternatives include a SPNM area east of Lava Beds National Monument. This project converts primitive roads to a hiking trail and excludes motorized access. It links the existing trail system within the Lava Beds Wilderness and the proposed Lava Beds Modoc War Interpretive Trail.

Blue Lake NRT Completion: This project completes the loop around Blue Lake by connecting the boat launch with the campground. Some or all of the trail could be modified to accommodate handicapped use.

Medicine Lake Caldera System: This system is a series of loops radiating from the developed recreation facilities at Medicine Lake. The Medicine Lake Loop extends the above Lakeshore Trail around the south side of the lake to complete the loop. The trail cannot be located adjacent to the shoreline because rights-of-way through private land will be needed. Glass Flow Loop rings the Medicine Lake Glass Flow. The Caldera Rim Loop is about 12 miles long connecting prominant peaks, craters, and geologic features. It accesses the Mt. Hoffman SPNM area which is managed in most alternatives. Short spur loops accessing such features as Hot Spot and Little Medicine Lake are included. These trails have outstanding potential for interpretation.

Mill Creek and Slide Creek Connection: This trail utilizes existing trails within the Wilderness to create a loop for day hikers. Clear Lake is a popular destination for day hikers. This trail will reduce use on the existing trail, and complement Mill Creek Campground.

Warner Crest Trail System: This system includes a main trail located along the crest of the Warner Mountains with several loops extending from it. It connects the South Warner Wilderness Trail System with the Desert Intertie Trail in Oregon. Several trailhead locations use existing developed sites or popular dispersed sites.

Rush Creek and Ash Creek Connection: This trail connects two of the most popular sites on the Big Valley District. A day-use loop is provided out of Rush Creek Campgrounds.

Trail Maintenance

Priorities maintaining trails will be based on the amount of use and the difficulty rating of the trail. For instance, a trail designated as challenging with a tree fallen across it would still not be a maintenance priority. However, if the trail was designated for wheelchair access, it would be prioritized for maintenance and the tree would be removed to provide wheelchair access. Volunteers, properly trained or supervised, are encouraged to assume responsibility for trail maintenence.

Costs Used For Planning Purposes

Regional guidelines were used to estimate costs of trail activities. They were adjusted downward to reflect easier terrain characteristic of the Modoc National Forest.

New Trail Construction	**cost per mile**	**$8,000**
Reconstruction	**cost per mile**	**$2,500**
Maintenance	**cost per mile per year**	**$ 150**

Appendix M
Streamside Management Zones

Streamside management zones (SMZs) are determined by stream class, channel stability, and side-slope stability. Included in the SMZ are the channel (waterway and upper banks) and side slopes (see Figure M-1). The SMZ exceeds the area dominated by riparian vegetation. Although managing an SMZ width that includes 50 feet on either side of the channel is typical, managing SMZs of variable widths affords more direct protection of riparian-dependent resources.

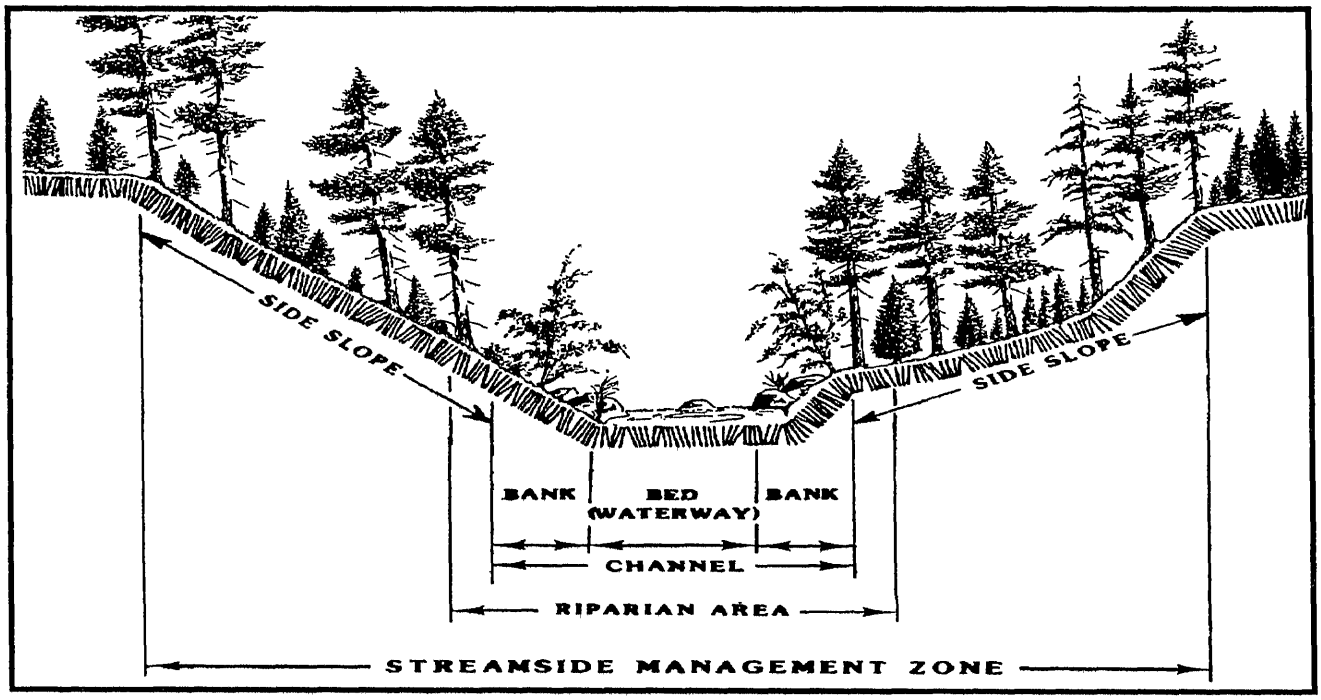
Side slope distances are determined by stream class and percent of side slope. The stream class, described below, is based on the relative importance or significance of a stream or segment, based on resource values and beneficial uses. The percent of side slope is inversely related to side slope stability (i.e., the higher the percent of side slope, the less the stability of the side slope). Streams that are more important or are less stable are assigned longer side slope distances and thus wider SMZs.

The table below contains recommended side slope distances for a given stream class and range of percent of side slope. At the project level, management standards are flexible so that widths may vary as additional information is learned about channel and side slope stability. Stream classes may also change as more information is collected about the stream.

SMZ Width in Feet (Slope Distance)

	% Side Slope			
Stream Class	**0 - 20**	**21 - 40**	**41 - 60**	**61 +**
Class I	100	150	200	250
Class II	75	100	150	175
Class III	50	75	100	125
Class IV	50	50	75	100

Figure M-1. Streamside Management Zones



Stream Class Determinations	
Class I *Highly Significant*	These are either perennial or intermittent streams, or segments thereof, which meet one or more of the following criteria: a. are habitat for large numbers of resident and/or migratory fish for spawning, rearing, or migration b. furnish water locally for domestic or municipal supplies c. have flows large enough to materially influence downstream water quality d. are characterized by major fishing or other water-oriented recreational uses e. have special classification or designation, such as wild, scenic, or recreation rivers f. have special visual or distinctive landscape features, and are classified as variety Class A as defined in *National Forest Landscape-Volume 2* (Agr. Handbook 462) g. are habitat for threatened or endangered animal species, or contain plants which are potential or viable candidates for threatened or endangered classification h. exhibit ethnological, historical, or archaeological evidence that makes them eligible for or are included in the National Register of Historical Places.
Class II *Significant*	These are either perennial or intermittent streams, or segments thereof, which meet one or more of the following criteria: a. are used by moderate numbers of fish and spawning, rearing, or migration b. furnish water locally for industrial or agricultural use c. have enough water flow to exert a moderate influence on downstream quality d. are used moderately for fishing and other recreational purposes e. are of moderate visual quality and meet variety Class B as defined in *National Forest Landscape Management-Volume 2* (Agr. Handbook 462) f. exhibit ethnological, historical, or archaeological evidence that makes them eligible for State or local registers of historical significance or interest.
Class III *Moderate Significant*	These include perennial or intermittent streams, or segments thereof, which meet one or more of the following criteria: a. are habitat for few fish or spawning, rearing, or migration b. are rarely used for fishing or other recreational purposes c. have enough water flow to exert minimum influence on downstream water quality d. are of relatively low visual quality in the landscape and classified as variety Class B as defined in *National Forest Landscape Management-Volume 2* (Agr. Handbook 462) e. exhibit historical or archaeological properties that are of archaeological interest in accordance with the Archaeological Resource Protection Act of 1979.
Class IV *Minor Significance*	These are intermittent or ephemeral streams, or segments thereof, not previously classified.

Source: FSM 2521, R-5 Supplement No 17 (2/76)
FSH 2509 22, R-5, Chapter 32 (1987)

Appendix N
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. BMPs are the measures both 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. Of the 98 practices currently documented, 96 are certified and approved. The two remaining practices are still being improved before referral to the State and EPA for certification and approval. Similarly, 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 planning documents that encompass entire forests and many management activities. Because of the physical and biological diversity of any national forest (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 for implementing BMPs are not identified at the Forest planning level. For each project that is initiated to implement the Forest Plan, a separate site-specific environmental assessment is conducted. Appropriate BMPs necessary to protect or improve water quality and methods of implementing BMPs are identified during this on-site, project-specific assessment. In this manner, the techniques can be tailored to fit the specific physical and biological environment as well as the proposed project activities. Many methods are 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. Roads are drained in various ways: outsloping the road surface, installing water bars, installing French drains, insloping the road surface, installing culverts, etc. During the on-site environmental assessment of a proposed road construction project, the appropriate method(s) to correctly drain the road are identified.

After the methods of implementing appropriate BMPs are identified, they are discussed by the project interdisciplinary team. A combination of implementation methods are selected and incorporated into the environmental document as required mitigation measures. These mitigation measures are then carried forward into project plans and implementation documents (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.

The Best Management Practices

There are 98 practices identified in eight resource categories:

Timber

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 Streamside 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

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 (Preventive Practice)
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 Streamside Management Zones
2.14 Controlling In-channel Excavation
2.15 Diversion of Flows Around Construction Sites
2.16 Streamcrossings on Temporary Roads
2.17 Bridge and Culvert Installation
2.18 Regulation of Streamside 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

- 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

- 4.1 Sampling and Surveillance of Designated Swimming Sites
- 4.2 On-site Multi-disciplinary 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

- 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 Streamside Management Zone (SMZ) Protection During Pesticide Spraying
- 5.14 Controlling Pesticide Drift During Spray Application

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)

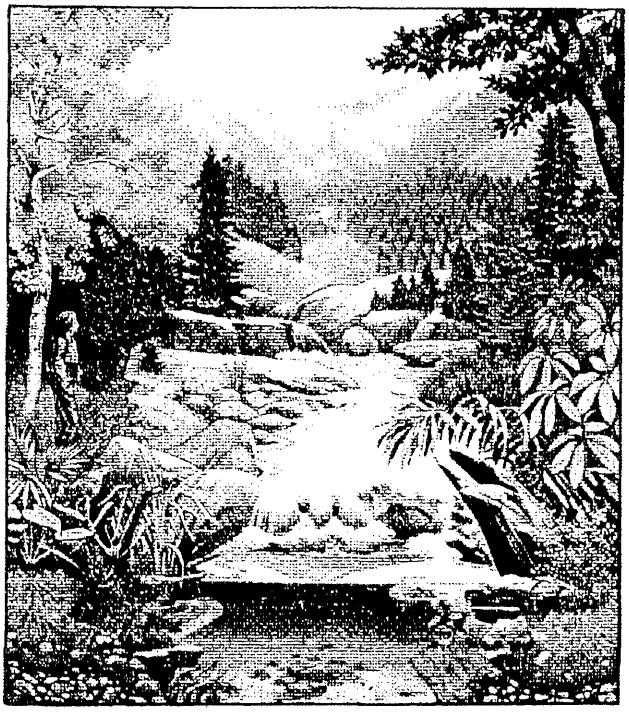
Grazing

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



Appendix O
Livestock Management Strategies

Intensive Management (Strategy D)

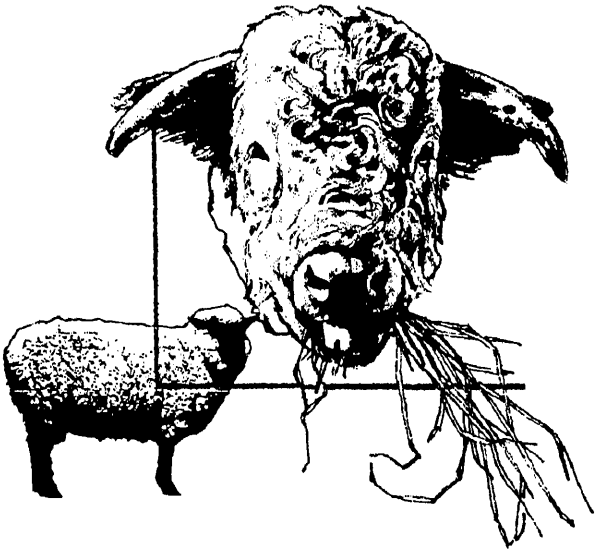
Management seeks to optimize production and utilization of forage available for livestock use consistent with maintaining the environment and providing for multiple uses of the range. From all existing range and livestock management technology, practices may be selected and used to develop cost effective methods for achieving improved forage supplies and uniform livestock distribution and forage use. Brush control, type conversion, fertilization, site preparation and seeding of improved forage species may be used to improve quality and quantity of forage. These practices may be combined with fencing and water developments to implement complex grazing systems.

Extensive Management (Strategy C)

Management seeks full utilization of forage available to livestock. Cost effective management systems and techniques, including fencing and water developments, are designed and applied to obtain relatively uniform livestock distribution and use of forage to maintain plant vigor.

Some Livestock Management (Strategy B)

Management controls livestock numbers so that livestock use is within present grazing capacity. Improvements are minimal and constructed only to the extent needed to protect and maintain the range resource in the presence of grazing.



Source: FSH 1309.11, Management Information Handbook

Appendix P

Acreage Allocations by Management Prescriptions and Management Areas

PRF - Preferred Alternative

Mgt. Rx	Prescription Description		Mgt. Area 31	Mgt. Area 32	Mgt. Area 33	Mgt. Area 34	Mgt. Area 35	Mgt. Area 36	Mgt. Area 41	Mgt. Area 42	Mgt. Area 43	Mgt. Area 44	Mgt. Area 45
1	MinimumLevel	>20	1,628	1,762	2,078	1,621	0	3,646	4,239	935	938	3,853	4,445
		<20	1,022	81	0	1,905	0	3,459	0	338	0	5,156	0
		Range	103	332	50	0	0	61	560	1,578	20	204	1,910
2	Wilderness - Standard		0	0	0	0	70,385	0	0	0	0	0	0
3	Wilderness - Low Standard		0	0	0	0	0	0	0	0	0	0	0
4	Semi-Primitive Non-Motorized §	>20	1,666	1,041	1,577	1,896	0	422	0	228	0	1,150	0
		<20	1,519	589	2,123	4,201	0	0	1,839	0	392	0	1,042
5	Dev. Recreation - Standard		0	0	0	0	0	0	0	0	0	0	0
6	Dev. Recreation - Low Standard		0	0	0	0	0	0	0	0	0	0	0
7	Visual Retention §	>20	3,325	1,908	1,216	5,769	0	5,356	0	234	22	337	313
		<20	913	1,516	619	1,777	0	2,187	0	54	0	506	476
8	Special Areas		0	0	0	0	0	0	0	0	0	0	0
9	Raptor Management	>20	196	0	0	245	0	278	112	1,717	424	404	958
		<20	121	0	0	349	0	65	430	952	17	757	999
		Range	103	0	0	1,081	0	646	289	1,860	314	200	1,278
10	Rangeland		4,369	17,382	4,053	28,108	0	21,572	14,113	7,834	7,667	28,522	35,917
11	Range-Forage		11,241	2,464	7,336	0	0	2,782	3,218	7,922	11,042	0	0
12	Even-Aged Timber		1,320	8,120	125	1,872	0	855	9,447	5,172	4,680	20,843	19,431
13	Timber-Visuals		2,798	6,783	108	7,924	0	1,752	2,000	3,452	1,146	12,490	5,493
14	Timber-Forage	PR †	1,489	7,153	277	1,848	0	789	0	0	0	0	0
		MOD ‡	3,789	9,430	924	7,044	0	5,539	0	0	0	0	0
15	Uneven-Aged Timber		0	0	0	0	0	3,151	0	0	0	4,034	0
16	<20 Cu. Ft. Timber		1,654	9,009	1,909	9,549	0	2,905	28,023	3,472	2,900	9,799	17,663
17	Riparian Area	>20	684	473	310	1,340	0	73	0	147	0	270	159
		<20	181	164	60	556	0	341	0	44	0	83	89
		Range	329	228	114	271	0	391	0	47	0	32	53

§ Timber Acres only; range acres are in Prescriptions 10 and 11.

† PR = Partial Retention

‡ MOD = Modification

PRF - Preferred Alternative (continued)

Mgt. Area 51	Mgt. Area 52	Mgt. Area 53	Mgt. Area 54	Mgt. Area 61	Mgt. Area 62	Mgt. Area 63	Mgt. Area 64	Mgt. Area 65	Mgt. Area 66	Mgt. Area 67	TOTAL	Prescription Description		Mgt. Rx
876	1,346	4,347	453	4,139	3,654	3,912	1,336	123	439	32	45,802	MinimumLevel	>20	1
0	0	0	499	59	263	0	0	0	0	0	12,782		<20	
433	157	82	0	1,628	1,081	1,283	0	0	0	2,087	11,569		Range	
0	0	0	0	0	0	0	0	0	0	0	70,385	Wilderness - Standard		2
0	0	0	0	0	0	0	0	0	0	0	0	Wild.- Low Standard		3
0	0	0	484	1,934	438	77	0	0	0	0	10,913	SPNM §	>20	4
90	0	0	251	0	40	14	0	0	0	0	12,100		<20	
0	0	0	0	0	0	0	0	0	0	0	198	Dev. Rec. - Standard		5
0	0	0	0	0	0	0	0	0	0	0	0	Dev. Rec. - Low Std.		6
0	0	78	159	1,658	1,309	546	292	0	0	0	22,522	Visual Retention §	>20	7
187	0	0	89	0	32	14	235	0	0	0	8,605		<20	
800	0	0	0	570	13,218	0	0	0	0	0	14,588	Special Areas		8
818	1,946	14	152	1,579	310	2,665	0	22	0	45	11,885	Raptor Management	>20	9
915	1,224	40	448	0	51	6	0	115	0	307	6,796		<20	
9,959	3,430	254	2,056	472	0	760	0	1,615	4,186	4,927	33,430		Range	
310,675	20,863	20,119	15,411	0	0	5,960	12,438	59	55,433	8,717	619,212	Rangeland		10
12,423	0	0	0	0	0	5,474	14,750	45,229	144,695	22,789	291,365	Range-Forage		11
5,118	23,823	0	6,424	5,683	15,130	11,548	0	6,193	75	0	145,859	Even-Aged Timber		12
0	1,585	0	1,073	2,480	9,024	8,727	0	0	0	0	66,835	Timber-Visuals		13
0	0	31,489	3,702	0	0	0	3,433	0	0	0	50,180	Timber-Forage	PR †	14
0	0	24,492	5,416	0	1,119	0	2,358	0	0	0	60,111		MOD ‡	
0	0	3,605	0	6,324	0	0	0	0	0	0	17,114	Uneven-Aged Timber		15
5,922	7,201	7,200	4,388	0	446	15,260	10,507	3,453	794	63	142,117	<20 Cu. Ft. Timber		16
0	203	0	179	19	0	0	0	25	0	0	3,882	Riparian Area	>20	17
34	92	0	50	0	0	0	0	61	0	0	1,755		<20	
580	245	0	46	4	0	0	0	712	585	0	3,637		Range	

Appendix Q
Visual Quality Objectives

This appendix briefly describes visual quality objectives (VQOs) and the program levels used in the alternatives.

Definitions

Visual Quality Objectives are standards for the visual management of all Forest lands. They have been assigned to each acre of the Forest based on public concern for scenic quality as well as diversity of natural features. For a description of the process used to arrive at these objectives, see the DEIS Visual Resources Affected Environment, Chapter 3. The five VQOs are:

Preservation (P)

Only ecological changes are permitted. Most management activities are prohibited. Trails, trail bridges, and other trail-related improvements are designed and located to be visually unobtrusive.

Retention (R)

Management activities result in a natural appearing landscape. Activities may occur but are not visually evident to the casual observer. Activities repeat form, line, color, and texture found frequently in the characteristic landscape. Changes in the qualities of size, amount, intensity, direction, and pattern should not be evident. Reducing contrast in form, line, color, and texture to meet retention should be accomplished during operation or immediately thereafter.

Partial Retention (PR)

Management activities remain visually subordinate to the characteristic landscape. Activities and structures may repeat form, line, color, or texture common in the characteristic landscape. Activities and structures may also introduce form, line, color or texture which are found infrequently or not at all in the characteristic landscape. Reducing contrast in form, line, color, and texture to meet partial retention should be accomplished as soon as possible after project completion or within the first year.

Modification (M)

Management activities may dominate the original landscape. However, activities of vegetative and land form alteration must borrow from naturally established form, line, color, or texture so completely and at such a scale that its visual characteristics are those of natural occurrences within the surrounding area or character type. Reducing form, line, color, and texture contrast to meet modification should be accomplished in the first year.

Maximum Modification (MM)

Management activities of vegetative and land form alterations may dominate the characteristic landscape. However, when viewed as background, the visual characteristics must be those of natural occurrences within the surrounding area or character type. When viewed as foreground or middleground they may not appear to borrow from naturally established form, line, color, or texture. Alterations may also be out of scale or contain detail that is incongruent with natural occurrences as seen in foreground or middleground. Reducing form, line, color, and texture contrast to meet maximum modification should be accomplished within five years.

Meeting Visual Quality Objectives

Many design principles used to develop VQOs can also be used on project level activities to minimize impacts and help meet the visual quality objective. General guidelines for meeting retention and partial retention are found in the Visual Retention and Timber-Visuals Prescriptions, respectively (Chapter 4). Modification and VQO guidelines are found in the Even-Aged Timber and Timber-Forage Prescriptions. More detailed guidance is found in the visual resource management handbooks:

- USDA Handbook Number 434, National Forest Landscape Management Volume 1.

- USDA Handbook Number 462, National Forest Landscape Management Volume 2. Chapter 1, The Visual Management System.

- USDA Handbook Number 559, National Forest Landscape Management Volume 2. Chapter 5, Timber.

Appendix R

Big Valley Federal Sustained-Yield Unit Policy Statement

I. Sale of Timber

1. Except as noted below and as otherwise approved by the Regional Forester to meet emergencies, not less than 80 percent of all National Forest sawtimber sold in the Unit must be given primary manufacture within the Big Valley Community, hereafter also called the Big Valley area, which is defined as that portion of the Pit River Drainage commonly known as Big Valley as shown on the attached map, and includes the towns of Adin, Bieber, Lookout and Nubieber. Sawtimber is defined as material suitable for the manufacture of lumber which meets customary minimum specifications as to size, percent sound, and net scale.
2. Cull (fiber) logs are exempt from the requirements cited herein. Cull (fiber) logs are logs 8 inches or larger in large-end diameter, 10 feet or more in length and containing less than 25 percent sound material.
3. National Forest sawtimber and other forest products will be offered for sale on a competitive basis. Standard Forest Service appraisal methods will be used in arriving at advertised rates. In determining the time and amount of such offerings, consideration will be given to the fact that there are now established in the Big Valley area sawmills with a total capacity more than sufficient to utilize the budgeted sawtimber cut of the Unit.
4. National Forest sawtimber and other forest products shall continue to be available in sufficient amounts to meet the needs of bona fide farmers, settlers, miners, residents and prospectors for minerals, and ranchers, for personal and domestic use, as provided by law and by regulation.
5. Applicable provisions to effectuate this policy statement will be included as conditions of sale, in timber sale contracts covering National Forest sawtimber and other forest products in the Unit.

II. Cutting Budget

1. The annual cutting budget, in log scale Scribner unless otherwise indicated, established for the Unit for the period October 1, 1985 to September 30, 1999, is as follows:

Sawtimber (MM Bd. Ft.) Suitable Timberland	
Pine type	2.8
Mixed Conifer type	4.7
Subtotal	**7.5**
Low productivity lands (NIC lands[1])	1.5
Total sawtimber	**9.0**

It is recognized that marketing and operating conditions may not permit cutting at the above-stated average annual rates in any single year. Sales of regulated sawtimber therefore will be programmed to promote the attainment of this average rate within plus or minus five percent for the plan period. No such program attainment target for unregulated sawtimber and forest products other than sawtimber will be attempted.

Revision of the cutting budget to reflect changes in utilization, marking policy, improved timber inventory information, including more reliable growth and mortality data, unanticipated timber losses, a national emergency, and acquisition of private lands, or other significant factors, may be made at any time upon recommendation of the Regional Forester and approval of the Chief, Forest Service.

[1] Non-interchangeable component; mostly ponderosa pine, not suitable for intensive timber production.

Before any decrease of 20 percent or more in the potential yield is recommended, an advisory hearing will be held at which interested persons will be invited to express themselves on the advantages or disadvantages of the Big Valley Sustained-Yield Unit in the light of the proposed revisions.

2. The annual cutting budget for forest products other than sawtimber may be established from time to time upon recommendation of the Regional Forester and approval of the Chief, Forest Service.

3. In the event that thrifty sawtimber on private lands within the Unit is added to the Federal Unit through land exchange, the selected sawtimber cut in exchange for such private land and sawtimber will not be charged against the annual programmed allowable harvest, and such selected sawtimber may be exempted from the other provisions of this policy statement, provided the annual programmed allowable harvest is not reduced.

III. Provisions for Community Support

The primary purpose for establishment of the Big Valley Federal Sustained-Yield Unit is to provide the maximum feasible permanent support to the Big Valley community from the lumber industry. Sawtimber from the Unit therefore will be sold under conditions designed to promote the following objectives:

1. Maintenance of steady employment opportunities in the Big Valley community, both within each year and from year to year.

2. Employment of local resident labor.

3. Opportunity for those living within and near the Unit to obtain lumber for their local requirements.

4. Efficient operation and maintenance of, and addition to, plan facilities to keep them in step with technical advances in forest products utilization and manufacture which are feasible for adoption under the economic conditions of the Big Valley area. This means, as a minimum, sufficient yard facilities for drying all lumber and sufficient planning mill capacity to surface approximately 50 percent of total production.

IV. Major Changes

Before any major changes are made in this policy statement, an advisory public hearing will be held at which interested persons will be invited to express themselves on the advantages or disadvantages of the proposed change.

APPENDIX S

Range Allotment and Riparian Improvement Priorities

To meet Forest Plan goals in range, wildlife, riparian and watershed management, land managers must analyze range and riparian conditions on a site-specific basis. When analysis is complete, the Forest can develop and implement strategies based on management direction in Chapter 4. This appendix lists the priorities for range (Table S-1) and riparian (Table S-2) analysis. Depth of analysis and extent of implementation of strategies depends on funding level.

Table S-1. Range Allotments for Analysis by Priority

Warner Mountain Ranger District	Big Valley Ranger District	Devil's Garden Ranger District	Doublehead Ranger District
Lassen Creek	Oxendine	Happy Camp	Pott ers
Yankee Jim	Ash Valley	Howard's Gulch	Boles
Bear Camp	Round Valley	Triangle Ranch	Perez
Davis Creek	Delta Lake	Big Sage	Dalton
Selic	East Bieber	Emigrant Springs	Mammoth
North Parker Creek	West Bieber	Surveyor's Valley	Clear Lake
Mount Bidwell/Bidwell	Stone Coal	West Grizzlie	Mt. Dome
North Creek	Crank Springs	Pine Springs	Deep Lake
Eagle-Barber	Ballard Ridge	139	Lavas
Mill-Eagle	Barber Canyon	Pit River	Warm Springs
Cottonwood-Owl	Centerville	Willow Creek Ranch	Timber Mountain
Henderson Meadow	Happy Camp	Blue Mountain	Glass Mountain
West Valley	Egg Lake	Mowitz	Mud Lake
Outlet	Rush Creek	East Grizzlie	Crumes
Cedar Canyon	Willow Creek	Avanzino	Tucker
Blue Lake	White Horse	Beaver Dam	
Granger	Round Mountain	Timbered Mtn.	
Buck Creek	Splawn Mountain		
Coyote	Spring Hill		
Thoms	Shawville		
Myrtle	Sherer		
Bald Mountain	Kramer		
Emerson/Cottonwood	Gerig		
Joseph Creek	Parks Pasture		
Parsnip	Baird		
	Refuge 1-N		
	Derner		
	Canyon Creek		

Table S-1. Streams Needing Riparian Improvement

Management Area	Allotment	Stream	Priority[1]
Warner Mountain Ranger District			
31	Mt. Bidwell	Mill Creek	2
32	Davis Creek	N.F. Davis Creek	1
32	Davis Creek	M.F. Davis Creek	1
32	Lassen Creek	Lassen Creek	1
32	Lassen Creek	Cold Creek	1
33	Bald Mountain	Mill Creek	2
34	Cedar Canyon	Cedar Creek	2
34	Cedar Canyon	N. Deep Creek	2
34	Cedar Canyon	S. Deep Creek	1
34	Granger	Granger Creek	2
34	Granger	N.F. Parker Creek	2
34	Granger	M.F. Parker Creek	2
34	Granger	S.F. Parker Creek	2
34	Henderson Meadow	N.F. Fitzhugh Creek	2
34	Henderson Meadow	M.F. Fitzhugh Creek	2
34	Henderson Meadow	S.F. Fitzhugh Creek	2
34	Henderson Meadow	Mill Creek	1
34	North Parker	Shields Creek	2
34	North Parker	Parker Creek	1
34	North Parker	Dry Creek	2
34	North Parker	Little N.F. Parker	2
34	North Parker	Willow Springs Canyon	2
34	Yankee Jim	Shields Creek	2
34	Yankee Jim	N.F. Shields Creek	2
34	Yankee Jim	S.F. Shields Creek	2

[1] Priorities for correcting riparian problems were determined with the following considerations:

- Beneficial use of the riparian area and water quality;
- Magnitude of the problem (access and the amount of difficulty in correction); and
- Benefit to other resources if the problem were corrected.

Priority 1: Significant problems that should be corrected in the 1st decade.

Priority 2: Problems that should be corrected within the first 2 decades.

Management Area	Allotment	Stream	Priority
34	Yankee Jim	S.F. Shields Creek	2
34	Yankee Jim	N.F. Pine Creek	2
34	Yankee Jim	M.F. Pine Creek	1
34	Yankee Jim	S.F. Pine Creek	2
34	Yankee Jim	N.F. Fitzhugh Creek	1
34	Yankee Jim	S.F. Fitzhugh Creek	2
35	Cottonwood	Mill Creek Tributary	1
35	Granger	M.F. Parker Creek	2
35	Granger	S.F. Parker Creek	2
35	Henderson Meadow	Mill Creek	1
35	Yankee Jim	N.F. Shields Creek	2
35	Yankee Jim	N.F. Pine Creek	2
35	Yankee Jim	M.F. Pine Creek	1
35	Yankee Jim	Pine Cr. Basin	1
36	Bearcamp	Bearcamp Flat Creek	1
36	Bearcamp	S.F. East Creek	1
36	Bearcamp	Homestead Flat Creek	2
36	Bearcamp	East Creek	1
36	Bearcamp	Skunk Cabbage Creek	2
36	Bearcamp	Silver Creek	2
36	Blue Lake Cattle	Blue Lake Tributary	2
36	Blue Lake Cattle	Gopher Creek	2
36	Parsnip Creek	Little Parsnip Creek	1
Big Valley Ranger District			
44	Ash Valley	Cottonwood Creek	2
44	Ash Valley	Rail Canyon	2
44	Barber Canyon	Dutch Flat Creek	1
44	Rush Creek	Rush Creek	2
44	Rush Creek	Johnson Creek	1
44	Round Valley	Ash Creek	2
45	East Barber	E.F. Juniper Creek	2
45	Oxendine	Butte Creek	2
45	Willow Creek	Willow Creek	1

Management Area	Allotment	Stream	Priority
Devil's Garden Ranger District			
51	Blue Mountain	N.F. Willow Creek	2
51	Big Sage	Logan Slough	2
51	Carey SUP	Fletcher Creek	2
51	Carey SUP	Beaver Creek	2
51	Emigrant Springs	Rattlesnake Creek Tributary	2
51	139 Allotment	Howard's Gulch	2
51	Timbered Mountain	Fletcher Creek	1
51	Timbered Mountain	Logan Slough	2
51	Triangle Ranch	Bottle Creek	2
51	West Grizzlie	Fletcher Creek	2
51	Willow Creek Ranch	Fletcher Creek	1
51	Willow Creek Ranch	Willow Creek	2
52	Beaver Dam	Willow Creek	1
52	Blue Mountain	Willow Creek	2
52	Blue Mountain	Wildhorse Creek	2
52	West Grizzlie	Grassy Ravine	2
52	West Grizzlie	Fletcher Creek	2
52	Willow Creek Ranch	Fletcher Creek	1
54	Happy Camp	Washington Creek	1
54	Happy Camp	Coffee Mill Gulch	1
54	Happy Camp	Hulbert Creek	1
54	Happy Camp	Turner Creek	1
54	Pit River	Turner Creek	1
54	Pit River	Washington Creek	1
Doublehead Ranger District			
65	Boles	Boles Creek	1
65	Boles	N.F. Willow Creek	1
65	Dalton	Boles Creek	1
66	Boles	Boles Creek	1
66	Boles	Pothole Creek	2
66	Clear Lake	N.F. Willow Creek	1
66	Clear Lake	Lost River	2
66	Clear Lake	Willow Creek	1
66	Clear Lake	Rock Creek	2
66	Dalton	Mowitz Creek	1
66	Mammoth	Boles Creek	1

Appendix T

Stream Classification For Implementing the Riparian Area Management Prescription

This appendix describes each stream type found on the Modoc National Forest. This information should be used to prioritize streams for implementing Standard and Guidelines as found in the Riparian Area Management Prescription (Plan Chapter 4). This appendix should guide the manager in implementing specific Forest-wide Standards and Guidelines only on stream types that need stream recovery and maintenance—not all streams on the Forest. A description of physical and vegetative characteristics of stream types which are properly managed is provided as a guide for the reader.

Stream Types

Table 1 lists stream type classification developed by Rosgen (1985). Stream channel gradient are designated by the letter A (high), B, (moderate), or C (low). Braided stream channels are designated with the letter D. Channels that are completely confined are designated by the letter F. The size of channel bottom materials, from bedrock to silt or clay, is designated numerically from 1 to 6.

Recovery Priority

Table 2 presents the recovery priority for streams with grazing impacts. Priority 1 streams generally are very sensitive to livestock grazing and have high potential to recover. Often these streams have been degraded from past management practices; e.g., from stream type C6 to C3. Priority 2 streams have high sediment loads and also have the potential to recover from livestock grazing disturbances. Priority 3 and 4 streams are inherently stable and generally are not subject to grazing impacts.

Stream Type Descriptions and Management Recommendations

The following describes each stream type and recommendations measures for protection and recovery.

Vegetative plant communities are listed for each stream type, if known. Specific plant communities or cover types are referenced whenever possible. Source documents for referenced plant communities are Kovalchik (1987) and Padgett, et al (1988). Additional information was obtained from Clary (1989), and ongoing work in the ecological classification of riparian areas on the Modoc, Lassen, and Plumas National Forests.

A1 - High Gradient Bedrock Streams: High gradient, stable, bedrock streams with steep side slopes and/or vertical rock walls.

Vegetation is characterized by stable stands of trees and shrubs. Represented communities include black cottonwood, white fir, chokecherry, and bitter cherry.

Only the utilization Standards and Guidelines (S&Gs) for shrubs in the Range section of the Riparian Area Management Prescription apply. All S&Gs in the Timber section apply. Because A1 channels are important sources of large woody debris, apply S&G #2 of the Timber section: *"Maintain 50-70% of the timbered sites within SMZs in an old-growth state...."*

A1-a - Very High Gradient Bedrock Streams: Very steep, deeply incised drainages with steep side slopes and/or vertical rock walls.

Vegetation is characterized by stable stands of trees and shrubs. Communities include white fir, black cottonwood, chokecherry, and bitter cherry.

The Range section of the Riparian Prescription does not apply. All S&Gs in the Timber section apply. Because A1 channels are important sources of large woody debris, apply S&G #2 of the Timber section: *"Maintain 50-70% of the timbered sites within SMZs in an old-growth state...."*

A2 - High Gradient Boulder Streams: High gradient, stable boulder streams with steep side slopes.

Vegetation is characterized by stable stands of trees and shrubs. Communities include white fir, black cottonwood, chokecherry, bitter cherry, red osier dogwood, and lemon willow.

Only the utilization S&Gs for shrubs in the Range section of the Riparian Prescription apply. All S&Gs in the Timber section apply.

Table T-1. Stream Types

Stream Type	Gradient	Sinuosity	Width to Depth Ratio	Dominant Particle Size of Channel Materials	Entrenchment Valley Confinement	Landform Feature Soil/Stability
A1	4-10	1.0-1.1	10 or less	**Bedrock**	Very deep; very well confined	Deeply incised bedrock drainage way with steep side slopes and/or vertical rock walls.
A1-a	10+			Same as A1		
A2	4-10	1.1-1.2	10 or less	Large and small **boulders** with mixed cobbles.	Same as A1	Steep side slopes with predominantly stable material.
A2-a	10+			Same as A2		
A3	4-10	1.1-1.3	10 or less	Small boulders, **cobble, coarse gravel.** Some sands.	Same as A1	Steep, depositional features with predominantly coarse-textured soils. Debris avalanche is the predominant erosion process; stream-side slopes are rejuvenated with extensive exposed mineral soil.
A3-a	10+			Same as A2		
A4	4-10	1.2-1.4	10 or less	Predominantly **gravel, sand,** and some silts.	Same as A1	Steep side slopes with mixture of either depositional landforms with fine-textured soils such as glacialfluvial or glaciallacustrine deposits or highly erodible residual soils such as grussic granite, etc. Slump-earth flow and debris avalanche are dominant erosional processes; stream-adjacent slopes are rejuvenated.
A4-a	10+			Same as A4		
A5	4-10	1.2-1.4	10 or less	**Silt** and/or clay bed and bank materials.	Same as A1	Moderate to steep side slopes; fine-textured cohesive soil. Slump-earthflow erosional processes dominate.
A5-a	10+			Same as A5		
B1-1	1.5-4.0	1.3-1.9	10 or more ($\bar{x}$=15)	**Bedrock** bed; banks are cobble, gravel, some sand.	Shallow entrenchment; moderate confinement.	Bedrock controlled channel with coarse-textured depositional bank materials.
B1	2.5-4.0 ($\bar{x}$=3.5)	1.2-1.3	5-15 ($\bar{x}$=10)	Predominantly small **boulders** and very large cobble.	Moderate entrenchment; moderate confinement.	Moderately stable, coarse-textured resistant soil materials; river terrace.
B2	1.0-2.5 ($\bar{x}$=2.0)	1.3-1.5	8-20 ($\bar{x}$=14)	Large **cobble** mixed with small boulders and coarse gravel.	Moderate entrenchment; moderate confinement.	Coarse-textured, alluvial terrace with stable, moderately steep side slopes.
B3	1.5-4.0 ($\bar{x}$=2.5)	1.3-1.7	8-20 ($\bar{x}$=12)	**Cobble** bed with mixture of gravel and sand, some small boulders.	Moderate entrenchment; well confined.	Glacial outwash terrace and/or rejuvenated slopes. Unstable, moderate to steep slopes; unconsolidated, coarse-textured unstable banks; depositional landforms.
B4	1.5-4.0 ($\bar{x}$=2.0)	1.5-1.7	8-20 ($\bar{x}$=10)	Very coarse **gravel with cobbles,** sand and finer material.	Deeply entrenched; well confined.	Relatively fine-grained river terrace. Unconsolidated coarse to fine depositional material; steep slopes; highly unstable banks.
B5	1.5-4.0 ($\bar{x}$=2.5)	1.5-2.0	8-25 ($\bar{x}$=15)	**Silt/clay.**	Deeply entrenched; well confined.	Cohesive fine-textured soils; slump-earthflow erosional processes.
B6	1.5-4.0	1.8-2.0	0.1-4	Gravel with few cobbles and with noncohesive **sand and finer soil.**	Deeply entrenched and slightly confined.	Narrow and deep meandering coarse-grained channel with well vegetated banks and with accessible flood plain.

(Table T-1. Stream Types - continued)

Stream Type	Gradient	Sinuosity	Width to Depth Ratio	Dominant Particle Size of Channel Materials	Entrenchment Valley Confinement	Landform Feature Soil/Stability
C1-1	1.5 or less ($\bar{x}$=1.0)	1.5-2.5	10 or greater ($\bar{x}$=30)	**Bedrock** bed, gravel, sand or finer banks.	Shallow entrenchment, partially confined.	Bedrock controlled channel with depositional fine-grained bank material.
C1	1.0-1.5 ($\bar{x}$=1.3)	1.5-2.0	10 or greater ($\bar{x}$=18)	**Cobble**, coarse gravel bed, gravel, sand banks.	Moderate entrenchment; well confined.	Predominantly coarse-textured with stable, high alluvial terraces.
C2	0.3-1.0 ($\bar{x}$=0.6)	1.3-1.5	12-30 ($\bar{x}$=20)	Large **cobble** bed with mixture of small boulders and coarse gravel.	Moderate entrenchment; well confined.	Overfit channel, deeply incised in coarse-grained alluvial terraces or other depositional features.
C3	0.5-1.0 ($\bar{x}$=0.3)	1.8-2.4	10 or greater ($\bar{x}$=25)	**Gravel** bed with mixture of small cobble and sand.	Moderate entrenchment; slightly confined.	Predominantly moderate to fine-textured multiple low river terraces; unstable banks, unconsolidated, noncohesive soils.
C4	0.1-0.5 ($\bar{x}$=0.3)	2.5+	5 or greater ($\bar{x}$=25)	**Sand** bed with mixture of gravel and silt, no bed armor.	Moderate entrenchment; slightly confined.	Predominantly fine-textured, alluvium with low flood terraces.
C5	1.0 or less ($\bar{x}$=0.5)	2.5+	5 or greater ($\bar{x}$=10)	**Silt/clay** with mixture of medium to fine sand, no bed armor.	Moderate entrenchment; slightly confined.	Low, fine-textured alluvial terraces, delta deposits, lacustrine, loess or other fine-textured soils; predominantly cohesive.
C6	1.5 or less	2.5+	3 or greater ($\bar{x}$=5)	**Sand** bed with mixture of silt and some gravel.	Deeply entrenched; unconfined.	Same as C4 except has more resistant vegetated banks.
D1	1.0 or greater ($\bar{x}$=2.5)	Braided	n/a	**Cobble** bed with mixture of coarse gravel and sand and small boulders.	Slightly entrenched; no confinement.	Glacial outwash, coarse depositional soil, very erodible; excess sediment supply of coarse size material.
D2	1.0 or less ($\bar{x}$=1.0)	Braided	n/a	**Sand** bed with mixture of small to medium gravel and silt.	Slightly entrenched; no confinement.	Fine-textured depositional soil, very erodible; excess of fine textured sediment.
F1	1.0 or less	1.3	10-40	**Bedrock** bed with few boulders, cobble and gravel.	Total confinement	Flat-gradient, confined, meandering bedrock stream. Highly weathered bedrock where stream has been deeply incised.
F2	1.0 or less	1.3 +	10-40	**Boulder** with small amounts of cobble, gravel and sand.	Same as F1	Flat gradient, confined, meandering boulder bed stream. Weathered bedrock and/or very coarse depositional or residual material, such as talus; deep stream incision.
F3	1.0 or less	1.3 +	10-40	**Cobble/gravel** bed with locations of sand in depositional sites.	Same as F1	Flat-gradient, confined, meandering, cobble/gravel bed streams. Weathered bedrock or depositional coarse-grained terraces where stream is deeply incised.
F4	1.0 or less	1.3 +	10-40	**Sand** bed with smaller amounts of silt	Same as F1	Flat-gradient, confined, meandering, sand bed channel; highly weathered bedrock or fine-textured depositional and/or residual soil where the stream has deeply incised.
F5	1.0 or less	1.3 +	10-40	**Silt/clay** bed and banks with smaller amounts of sand.	Same as F1	Flat-gradient, confined, meandering, silt/clay streams; highly weathered bedrock or fine-textured depositional and/or residual soil where the stream has deeply incised.

Table T-2. Stream Type Recovery Priority [1]

Stream Type	Priority [2]	Sensitivity to Grazing Impacts [3]	Recovery Potential [3]	Altered State	Recovered State	Utilization Herbaceous Communities % by Weight/Stubble Height				Bank Stability
						SL [5]	DR [6]	RR [7]	ES [8]	Allowable Bank Disturbance (trampling)
C6	1	5	4	C3, C4, C5, F3, F4, F5	C6	↑	↑	↑	↑	<5%
C4	1	5	5	F4, C4	C6					↑
C3	1	5	5	F3, C3	C6					
F4	1	2-5 [4]	4	F4, C4	C6					<20%
F3	1	2-5	4	F3, C3	C6	25-35% 4-6"	30-45% 4-5"	35-45% 4-5"	45-55% 3"	↓
F5	1	2-5	4	F5, C5	C6	↓	↓	↓	(Re-growth to 4-8")	
B6	1	5	4	B3	B6				↓	<5%
C5	1	4	5	C5, F5	C5, C6					↑
B4	2	4	2	B4	B4					<20%
B3	2	3	1	B3	B3, B6	↓	↓	↓		↓
B5	2	3	2	B5	B5	Do Not Occur on Modoc NF				
C1-1	3	3	3	C1-1	C1-1					
C1	3	3	4	C1	C1	35-50% 3-5"	40-55% 3-4"	45-60% 3"	55-65% 3"	<20%
B2	3	2	5	B2	B2	↓	↓	↓	(Re-growth to 4-8")	↓
B1-1	3	2	3	B1-1	B1-1					
B1	3	1	n/a	B1	B1				↓	
F2	3	1	n/a	F2	F2					
C2	3	1	n/a	C2	C2					
F1	3	1	n/a	F1	F1					

[1] Stream type recovery was first developed by Sherman Swanson, Extension Range Specialist and Research Associate, University of Nevada, Reno. Slight modifications were made by Dick Jones, former Forest Hydrologist, Modoc National Forest, to fit conditions on the Forest.

[2] Priority 1 (high priority) streams are very sensitive to grazing or a high recovery potential or both. Priority 2 (high priority) streams are well confined and have high sediment loads. Priority 3 (medium priority) streams are stable. Priority 4 (low priority) streams have little potential for grazing impacts. (See Riparian Area Management Prescription—Plan 4-138.)

[3] Sensitivity to grazing and recovery potential:

1 = Very Low; 2 = Low; 3 = Medium; 4 = High; 5 = Very High.

[4] Sensitivity to grazing varies based on gully age. Young, narrow channels are not often subject to intense grazing; however, older, wide channels can be subject to intense grazing.

[5] Season-long Grazing

[6] Deferred Rotation (includes late season grazing)

[7] Rest-Rotation

[8] Early Season with Regrowth

(Table T-2. Stream Type Recovery Priority - continued)

Stream Type	Priority [2]	Sensitivity to Grazing Impacts [3]	Recovery Potential [3]	Altered State	Recovered State	Utilization Herbaceous Communities % by Weight/Stubble Height				Bank Stability
						SL [5]	DR [6]	RR [7]	ES [8]	Allowable Bank Disturbance (trampling)
A3	4	n/a	n/a	A3	A3	Little Potential for Grazing Impacts				<20%
A4	4	n/a	n/a	A4	A4					
A1	4	n/a	n/a	A1	A1					
A2	4	n/a	n/a	A2	A2					
A5	4	n/a	n/a	A5	A5					
D1	4	1	n/a	D1	D1					
D2	4	1	n/a	D2	D2					

A2-a - Very High Gradient Boulder Streams: Very high gradient, stable boulder streams with steep side slopes.

Vegetation is similiar to *A2-High Gradient Boulder Streams* above.

The Range section in the Riparian Prescription does not apply. All S&Gs in the Timber section apply.

A3 - High Gradient Cobble/Gravel Streams: High gradient, cobble/gravel streams with steep rejuvenated slopes and extensive exposed mineral soil.

Vegetation is characterized by trees and shrubs. Tree communities include water birch, white fir, and aspen. Shrub communities include yellow willow, lemon willow, coyote willow, firmleaf willow, and red-osier dogwood. Prunus species can be present in these communities. One herbaceous cover type, Nebraska sedge, has been documented.

Only utilization S&Gs in the Range section of the Riparian Prescription apply. All S&Gs of the Timber section apply. Because of steep, rejuvenated slopes, apply S&G #2 of the Timber section: *"Maintain 50-70% of the timbered sites within SMZs in an old-growth state...."*

A3-a - Very High Gradient Cobble/Gravel Streams: Very high gradient, cobble/gravel streams with steep rejuvenated slopes and extensive exposed mineral soil.

Vegetation is similiar to A3 above.

Debris avalanche is the predominant erosional process.

S&Gs in the Range section of the Riparian Prescription do not apply. All S&Gs in the Timber section apply. Because of steep, rejuvenated slopes, apply S&G #2 of the Timber section: *"Maintain 50-70% of the timbered sites within SMZs in an old-growth state...."*

Due to the nature of the rejuvenating side slopes, also apply S&G #2 of the Facilities section: *"Minimize sediment production and mass-wasting during pioneer road construction."* Because culvert blockage and subsequent channel blowout of this stream type can be significant, plan all crossings with these problems in mind.

A4 High Gradient Gravel/Sand Streams: High gradient, gravel/sand streams with steep depositional features and erodible residual soils. Slump-earthflow is the dominant erosional process.

This type is characterized by stands of trees and shrubs. Soils are unstable. Tree communities can include water birch and white fir. Shrub communities can include eastwood willow, booth willow, yellow willow, firmleaf willow, coyote willow, and Prunus species.

Only the utilization S&Gs in the Range section of the Riparian Prescription apply. All S&Gs in the Timber section apply. Because of steep, rejuvenated slopes, apply S&G #2 of the Timber section: *"Maintain 50-*

70% of the timbered sites within SMZs in an old-growth state...."

Due to the nature of the rejuvenating side slopes, also apply S&G #2 of the Facilities section: *"Minimize sediment production and mass-wasting during pioneer road construction."* Because culvert blockage and subsequent channel blowout of this stream type can be significant, plan all crossings with these problems in mind.

A4-a Very High Gradient Gravel/Sand Streams: Very high gradient, gravel/sand streams with steep depositional features and erodible residual soils. Slump-earthflow and debris avalanche are the dominant erosional process.

Vegetation is similiar to that described for A4.

S&Gs in the Range section of the Riparian Prescription do not apply. All S&Gs in the Timber section apply. Because of steep, rejuvenated slopes, apply S&G #2 of the Timber section: *"Maintain 50-70% of the timbered sites within SMZs in an old-growth state...."*

Due to the nature of the rejuvenating side slopes, also apply S&G #2 of the Facilities section: *"Minimize sediment production and mass-wasting during pioneer road construction."* Because culvert blockage and subsequent channel blowout of this stream type can be significant, plan all crossings with these problems in mind.

Because the potential for slump-earthflow and debris avalanche is high, crossings on these stream types is not recommended.

A5 and A5-a High and Very High Gradient Silt Streams: These stream types do not occur on the Modoc National Forest.

B1-1 Moderate Gradient Bedrock Streams: Moderate gradient, stable, bedrock streams with coarse-textured depositional bank materials.

This stream type is characterized by tree, shrub, and herbaceous communities. Tree types include white fir, ponderosa and jeffrey pine, and black cottonwood. Shrub types include red osier dogwood, willow, and prunus cover types. Herbaceous cover types include Nebraska sedge, baltic rush, tufted hair grass, and bentgrass communities.

Only the utilization S&Gs for shrubs in the Range section of the Riparian Prescription apply. All S&Gs of the Timber section apply.

B1 Moderate Gradient Boulder Streams: Moderate gradient, stable, boulder streams with coarse-textured, resistant soil materials.

Vegetation is similiar to B1-1.

Only the utilization S&Gs for shrubs under Element D, Range, in the Riparian Prescription apply. All of Element E, Timber, applies. Excellent fish habitat is provided by the numerous boulders.

B2 Moderate Gradient Cobble Streams. Moderate gradient, stable, cobble streams with coarse-textured, moderately steep side slopes.

Vegetation is similiar to the B1 and B1-1 types.

Only the utilization S&Gs for shrubs in the Range section of the Riparian Prescription apply. All S&Gs of the Timber section apply. Fish habitat is provided mostly from large woody debris. Because woody debris is often sparse in these stream types, apply S&G #2 of the Timber section: *"Maintain 50-70% of the timbered sites within SMZs in an old-growth state...."*

B3 Moderate Gradient Cobble/Gravel Streams: Moderate gradient, cobble/gravel streams with unconsolidated, coarse-textured unstable banks.

These stream types can be occupied by tree, shrub, or herbaceous plant communities. Tree cover types include white fir, yellow pines, aspen, black cottonwood, and water birch. Shrub types include booth willow, lemmon willow, firmleaf willow, whiplash willow, and coyote willow. Coyote willow is an aggressive, many-stemmed pioneer on gravelly sites in habitats that are favorable, e.g., gravel bars or exposed cut banks. Red osier dogwood and Prunus plant communities also occur. Herbaceous cover types include Nebraska sedge, baltic rush, tufted hairgrass, and bentgrass. Smallfruit bulrush stands can often be found along streambanks.

All S&Gs in the Range and Timber sections of the Riparian Prescription apply. Fish habitat is provided mostly from large woody debris. Because woody debris is often sparse in these stream types, apply S&G #2 of the Timber section: *"Maintain 50-70% of the timbered sites within SMZs in an old-growth state...."*

B4 Moderate Gradient Gravel/Sand Streams: Moderate gradient, gravel/sand streams with unconsolidated, fine-textured unstable banks.

Vegetation cover types are similiar to B3. This stream type is unstable and can experience gullying.

All S&Gs in the Range and Timber sections of the Riparian Prescription apply. Fish habitat is provided

mostly from large woody debris. Because woody debris is often sparse in these stream types, apply S&G #2 of the Timber section: *"Maintain 50-70% of the timbered sites within SMZs in an old-growth state...."*

B5 Moderate Gradient Silt/Clay Streams: This stream type does not occur on the Modoc National Forest.

B6 Moderate Gradient Fine-Textured Deeply Entrenched Streams: Moderate gradient, fine-textured, deeply entrenched streams with well vegetated banks.

This site is favorable for the establishment of willow communities. Willow cover types include lemmon willow, firmleaf willow, whiplash willow, yellow willow, geyer willow, and coyote willow. Coyote willow is an important early seral species on cut banks and gravel bars. Herbaceous cover types found on these stream reaches include baltic rush, wooly sedge, Nebraska sedge, and aquatic sedge.

When subjected to improper livestock management, these streams readily alter to the B3 stream type. When this occurs, the stream widens; meanders are cut so the channel straightens; vegetation changes from species dominating a wet site to those dominating a dry site; and fisheries habitat is degraded or eliminated.

All S&Gs in the Range section of the Riparian Prescription apply. Where channels have been altered to stream type B3, monitor recovery to a B6 stream type. When timber exists within close proximity to these streams, apply S&Gs in the Timber section of the Riparian Prescription.

C1-1 Low Gradient Bedrock Streams: This stream type does not occur on the Modoc National Forest.

C1 Low Gradient Cobble Streams: Low gradient, cobble streams with stable alluvial terraces.

All S&Gs in the Range and Timber section of the Riparian Prescription apply.

C2 Low Gradient Cobble Overfit Streams: Low gradient, cobble, overfit streams incised in coarse-grained alluvial terraces.

S&Gs in the Range section of the Riparian Prescription do not apply. All S&Gs in the Timber section apply.

C3 Low Gradient Gravel Streams: Low gradient, gravel streams with unstable banks and unconsolidated, noncohesive soils.

Shrubs and herbaceous types comprise the vegetative community types. The Region 6 Riparian Zone Associations in this stream type include the willow/wooly sedge, willow/Kentucky bluegrass, the sagebrush/cusick bluegrass plant associations, and the R4 coyote willow cover type. Herbaceous communities include types dominated by Kentucky bluegrass, Nebraska sedge, wooly sedge, aquatic sedge, tufted hairgrass, and baltic rush. The potential stream type is C6. Willow plantings of coyote willow and other willows are appropriate in the early stages of a recovery program. Lemon willow appears to be somewhat less palatable to livestock than other willow species. Geyer willow is very palatable and should not be planted in a recovery program. Kentucky bluegrass and silver sage occur in degraded, drained sites. In general, sedge communities are indicators of the healthiest ecological condition. Bluegrass dominated communities indicate that the site is somewhat drained. Silver sage and, finally, big sagebrush and rabbitbrush will occupy these sites when they are severely degraded and drained.

C3 streams are generally, if not always, altered from the C6 stream type. The cause of alteration on this Forest is almost always improper livestock management. C3 streams occur in dry meadows or flats that once were wet, productive meadows before these streams downcut and the water tables dropped. C3 streams are wider, shallower, and straighter than the C6 stream type. Fisheries habitat is always degraded from the natural C6 stream type, and in many instances eliminated. Many intermittent C3 streams on the Forest may once have been perennial C6 streams.

All S&Gs in the Range section of the Riparian Prescription apply. Monitor the recovery of C3 streams to a C6 stream type. When timber exists within close proximity to these streams, apply S&Gs in the Timber section of the Prescription.

C4 Low Gradient Sand Streams: Low gradient, sand streams with unstable, fine-textured banks.

Vegetation is similiar to that described for C3. Shrubs and herbaceous species predominate. Willow/sedge and sedge communities are indicators of desireable or improving ecological conditions.

Like the C3 stream type, C4 streams are generally, if not always, altered from the C6 stream type. The cause of alteration on this Forest is usually improper livestock management. C4 streams occur in dry meadows or flats that once were wet, productive meadows before these streams downcut and the water tables dropped. C4 streams are wider, shallower, and

straighter than the C6 stream type. Fisheries habitat is always degraded from the natural C6 stream type, and in many instances eliminated. Some intermittent C4 streams on the Forest may once have been perennial C6 streams.

All S&Gs in the Range section of the Riparian Prescription apply. Monitor the recovery of C4 streams to a C6 stream type. When timber exists within close proximity to these streams, apply S&Gs in the Timber section of the Prescription.

C5 Low Gradient Silt/Clay Streams: Low gradient, silt/clay streams with fine-textured cohesive banks.

Vegetation communities are primarily grasses and sedges. The fine textured materials and slow permeability of the sites do not favor shrub establishment. Plugs of strongly rhizometous species such as Nebraska sedge, aquatic sedge, or baltic rush are suitable for planting in a recovery program. Willow plantings may be less successful than sedge establishment in stabilizing these streams. Recovery potential is high where livestock management can be changed to allow sedges and grasses to establish and spread.

Like the C3 stream type, C5 streams are generally, if not always, altered from the C6 stream type. The cause of alteration on this Forest is usually improper livestock management. C5 streams occur in dry meadows or flats that once were wet, productive meadows before these streams downcut and the water tables dropped. C5 streams are wider, shallower, and straighter than the C6 stream type. Fisheries habitat is always degraded from the natural C6 stream type, and in many instances eliminated. Some intermittent C5 streams on the Forest may once have been perennial C6 streams.

All S&Gs in the Range section of the Riparian Prescription apply. Monitor the recovery of C5 streams to a C6 stream type. When timber exists within close proximity to these streams, apply S&Gs in the Timber section of the Prescription.

C6 Low Gradient Fine-Textured Deeply Entrenched Streams: Low gradient, fine-textured, deeply entrenched streams with well vegetated banks.

Vegetation communities in these channels are dominated by species of shrubs and herbaceous plants. The sites are usually seasonally wet and can be marshy. Healthy C6 reaches with fully developed water relations often are too poorly drained to be suitable for extensive stands of tall willows, although single individuals or small clumps can be found. Some willows, such as Eastwood willow, can tolerate the waterlogged conditions. Sometimes extensive stands of these and similiar willows are found in the riparian areas associated with the C6 stream type. Tall willow establishment is important and encouraged in the recovery of C3 and C4 sites toward the C6 morphology.

The Region 6 willow/aquatic sedge and R4 Eastwood willow community types occur in these stream reaches. Herbaceous communities include few flowered spikerush, creeping spikerush, aquatic sedge, beaked sedge, holm's sedge, short-beaked sedge, Nebraska sedge, wooly sedge, Nevada rush, and small fruit bulrush communities.

Improper grazing management can alter these stream to the C3, C4, C5, F3, F4, or F5 stream types. When this occurs, the stream widens; meanders are cut so the channel straightens; vegetation changes from species dominating a wet site to those dominating a dry site; and fisheries habitat is degraded or eliminated.

All S&Gs in the Range section of the Riparian Prescription apply. Where these channels have been altered to another state, monitor their recovery to a C6 stream type. When timber exists within close proximity to these streams apply S&Gs in the Timber section of the Prescription.

D1 Moderate Gradient Cobble Braided Streams: Moderate gradient, cobble, braided streams.

Vegetation is favorable for willow establishment. These streams may have short-term potential to attain a B3 morphology with willow dominated vegetation.

S&Gs in the Range section of the Riparian Prescription do not apply. All S&Gs in the Timber section apply.

D2 Low Gradient Sand Braided Streams: Low gradient, sand, braided streams.

Channel potential is C3 or C4, and, ultimately, C6. Coarse substrate materials and good drainage favor willow establishment. Coyote willow will thrive in bar communities. Sedge communities, such as Nebraska sedge, aquatic sedge, and wooly sedge, can occur in this stream type.

S&Gs in the Range section of the Riparian Prescription do not apply. All S&Gs in the Timber section apply.

F1 Low Gradient Bedrock Total Confinement Streams:

This stream type does not occur on the Modoc National Forest.

F2 Low Gradient Boulder Total Confinement Streams:

Low gradient, boulder, totally confined streams.

All S&Gs in the Range and Timber section of the Riparian Prescription apply.

F3 Low Gradient Cobble/Gravel Total Confinement Streams: Low gradient, cobble/gravel totally confined streams with unstable banks.

Vegetation is similiar to that described for the C3 stream type.

F3 streams are generally, if not always, altered from C3 and C6 stream types. The cause of alteration on this Forest is often improper past livestock management. F3 streams occur in dry meadows or flats that once were wet, productive meadows before these streams downcut and the water tables dropped. F3 streams are wider, shallower, and straighter than the parent C6 stream type. Fisheries habitat is always degraded from the natural C6 stream type, and in many instances eliminated. Some intermittent F3 streams on the Forest may once have been perennial C6 streams.

S&Gs in the Range section of the Riparian Prescription apply. Monitor the recovery of F3 streams to C3 and C6 stream types. When timber exists within close proximity to these streams, apply S&Gs in the Timber section of the Prescription.

F4 Low Gradient Sand Total Confinement Streams: Low gradient, sand totally confined streams with unstable banks.

Vegetation is similiar to that described for the C4 stream type.

F4 streams are generally, if not always, altered from C4 and C6 stream types. The cause of alteration on this Forest is often improper past livestock grazing. F4 streams occur in dry meadows or flats that once were wet, productive meadows before these streams downcut and the water tables dropped. F4 streams are wider, shallower, and straighter than the parent C6 stream type. Fisheries habitat is always degraded from the natural C6 stream type, and in many instances eliminated. Some intermittent F4 streams on the Forest may once have been perennial C6 streams.

S&Gs in the Range section of the Riparian Prescription apply. Monitor recovery of F4 streams to C4 and C6 stream types. When timber exists within close proximity to these streams, apply S&Gs in the Timber section of the Prescription.

F5 Low Gradient Silt/Clay Total Confinement Streams: Low gradient, silt/clay totally confined streams with unstable banks.

Vegetation types include silver sage, big sagebrush, and grass communities.

F5 streams are generally, if not always, altered from the C5 and C6 stream types. The cause of alteration on this Forest is often improper past livestock grazing. F5 streams occur in dry meadows or flats that once were wet, productive meadows before these streams downcut and the water tables dropped. F5 streams are wider, shallower, and straighter than the parent C6 stream type. Fisheries habitat is always degraded from the natural C6 stream type, and in many instances eliminated. Many intermittent F5 streams on the Forest may once have been perennial C6 streams.

S&Gs in the Range section of the Riparian Prescription apply. Monitor recovery of F5 streams to C5 and C6 stream types. When timber exists within close proximity to these streams, apply S&Gs in the Timber section of the Prescription.

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LIST OF PLANT NAMES:

COMMON NAME	SCIENTIFIC NAME
Aquatic sedge	*Carex aquatilis*
Arrowleaf balsamroot	*Balsamorhiza sagitata*
Baltic rush	*Juncus balticus*
Beaked sedge	*Carex rostrata*
Bentgrass	*Agrostis sp.*
Big sagebrush	*Artemisia tridentata*
Bitter cherry	*Prunus emarginata*
Black Cottonwood	*Populus trichocarpa*
Booth willow	*Salix boothii*
Cherry	*Prunus sp.*
Chokecherry	*Prunus virginiana*
Coyote willow	*Salix exigua exigua*
Creeping spikerush	*Eleocharis palustris*
Eastwood willow	*Salix eastwoodii*
Fewflowered spikerush	*Eleocharis pauciflora*
Firmleaf willow	*Salix pseudocordata*
Geyer willow	*Salix geyeriana*
Holm's sedge	*Carex scopulorum*
Jeffrey pine	*Pinus jeffreyi*
Kentucky bluegrass	*Poa pratensis*
Lemmon willow	*Salix lemmoni*
Nebraska sedge	*Carex nebraskensis*
Nevada rush	*Juncus nevadensis*
Ponderosa pine	*Pinus ponderosa*
Rabbitbrush	*Chrysothamnus sp.*
Red osier dogwood	*Cornus stolonifera*
Short-beaked sedge	*Carex simulata*
Silver sagebrush	*Artemisia cana*
Smallfruit bulrush	*Scirpus microcarpus*
Tufted hairgrass	*Deschampsia caespitosa*
White fir	*Abies concolor*
Wooly sedge	*Carex lanuginosa*
Yellow willow	*Salix lutea*

Appendix U

Electronic Site Designation and Recommendations

The following sites have been previously designated by the Regional Forester as electronic sites; or the Forest has recommended their designation.

Site	Ranger District	Designated by the Regional Forester	Recommended by the Forest
Grouse Mountain	Big Valley		●
Likely Mountain	Big Valley		●
Manzanita Lookout	Big Valley		●
Happy Camp	Devil's Garden		●
Harvey Jones	Doublehead	●	
Red Shale	Doublehead	●	
Timber Mountain	Doublehead	●	
Payne Peak	Warner Mountain		●
Sugar Hill	Warner Mountain		●

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