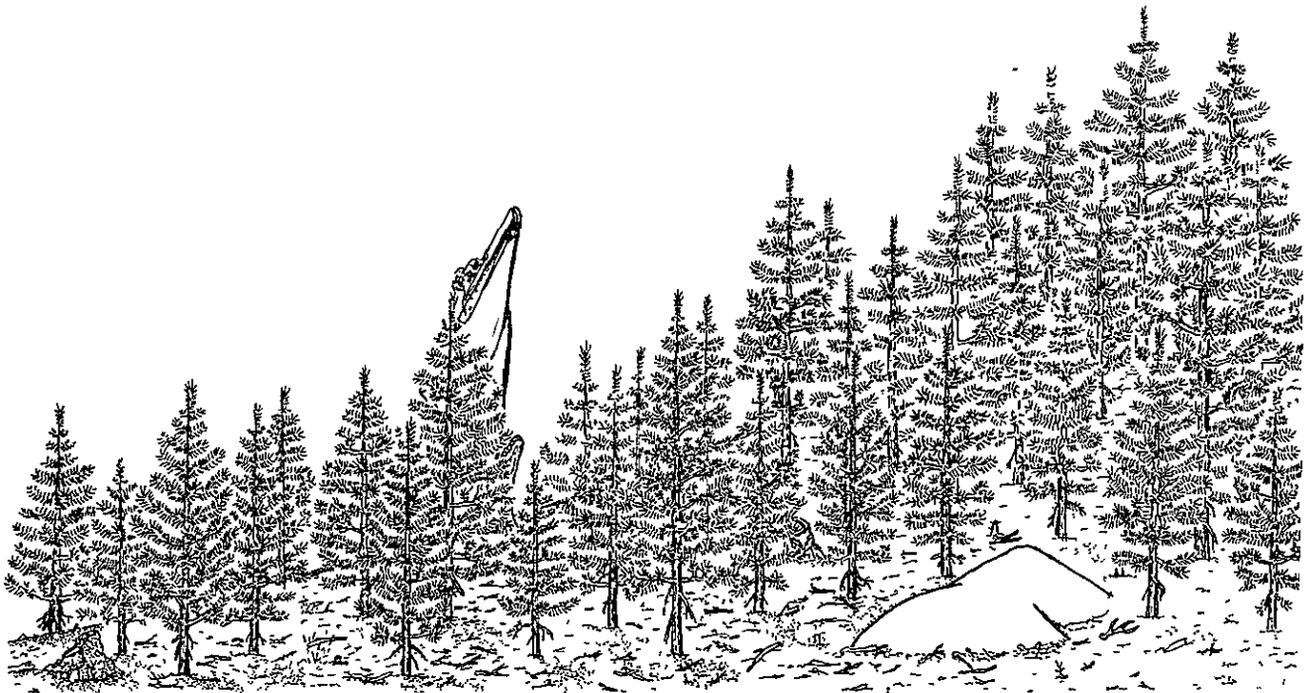


Chapter V

Monitoring and Evaluation Requirements



V. Monitoring and Evaluation Requirements

A. Purpose

The purpose and need for monitoring and evaluating implementation of the Forest Plan is to provide a basis for periodic determination and assessment of the effects of management activities on the forest.

The Forest's objectives of monitoring the plan are to determine that:

- * Planned output levels are being achieved.
- * Environmental quality standards are being achieved.
- * Programmed practices and activities are being implemented.
- * Management direction is being followed.
- * Management direction standards and guidelines are achieving the desired management results.
- * Resource information used in projecting outputs and impacts of management is accurate.
- * Budget levels are consistent with the management intensity projected.
- * Estimated costs used in the Forest Plan preparation are accurate.
- * New information is needed for Plan revision.

B. Monitoring System

The results of monitoring and evaluation are reported on a fiscal year basis within 60 days after the close of each fiscal year of the plan. The report will summarize accomplishments for the previous fiscal year.

The main data sources for monitoring the Plan are as follows:

1. Management Reviews
 - a. General Management Review
 - b. Program Review
 - c. Activity Review

2. Other Ongoing Inventories and Monitoring Programs

These programs will include, but are not limited to, soil productivity monitoring, surface erosion monitoring, water quality monitoring, forest inventory plots for timber, range trend inventories, and wildlife species monitoring.

3. Environmental Analysis

During the data acquisition phase of an environmental report, assessment of project area data validity will be completed. As necessary, data elements will be updated to reflect current resource conditions.

4. Management Attainment Reports

These reports are filed quarterly by the Districts and various branches of the Supervisor's Office. Targets are established at the beginning of the year, and accomplishments are recorded in percent per quarter. These reports are then forwarded to the Regional Office.

C. Evaluation

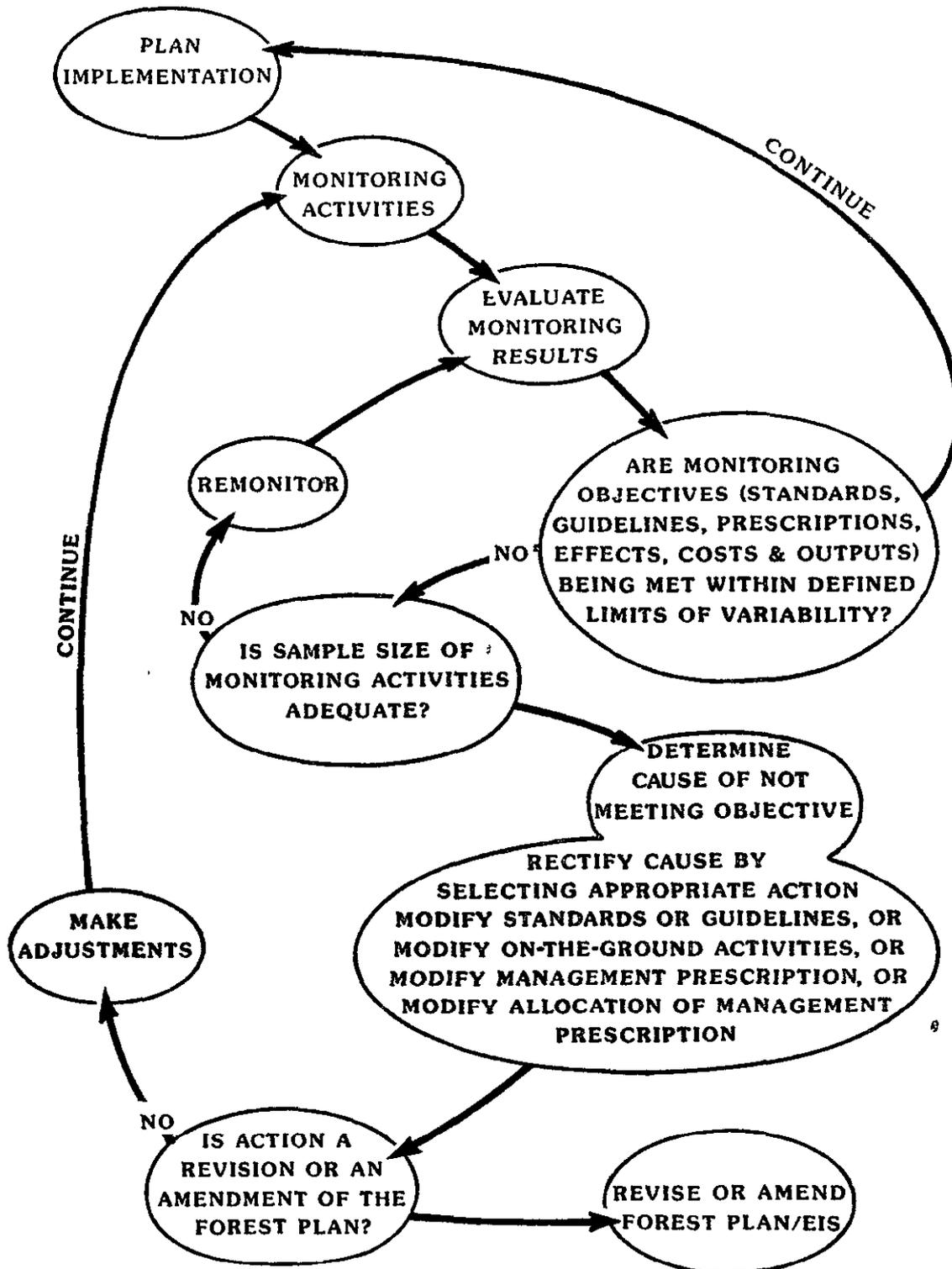
Resource management practices, activities, and effects to be monitored are summarized and displayed in Table V-1. The reliability of the data, and frequency of monitoring are established for each monitoring activity, practice, or effect.

When monitoring results are reported, their significance will be evaluated by the Forest interdisciplinary team. Based on the evaluation, any need for further action is recommended to the Forest Supervisor. The recommendations can include:

- * No action needed. Monitoring indicates goals, objectives, and standards are achieved.
- * Refer recommended action to the appropriate line officer for deletion, modification, or revision of Management Area Prescriptions.
- * Modify the management prescription as a Plan amendment.
- * Modify the allocation of a prescription as a Plan amendment.
- * Revise the projected schedule of outputs.
- * Initiate revision of the Plan.

Figure V-1, titled "Monitoring Process Flow Chart" graphically displays the monitoring process from evaluation of a specific activity, practice or effect through the review action, to determine whether a revision or amendment is necessary.

FIGURE V-1



D. Monitoring Element Display

Monitoring and evaluation requirements are displayed in Table V-1. The table is comprised of a number of components (columns), which are described below:

<u>Col. No.</u>	<u>Component Name</u>	<u>Description</u>
1	Category Number	The item to be monitored is identified by using Forest Service Management Information Handbook (MIH) codes (Forest Service Handbook 1309.11).
2	Activity, Practice or Effect to be Measured	The specific items that respond to either the National Forest Management Act, Forest Service Manual 1920, plan direction, local or subsequent project needs. This is, as the name states, an activity, practice, or effect - a specific statement of what will be monitored.
3	Monitoring Objective	A specific statement of what is intended to be accomplished.
4	Monitoring Techniques	The description of the specific sampling or inventory techniques and the sources of information to be used.
5	Expected Precision and Validity	This is exactness or accuracy (repeatability) of the measurement technique and the expected probability that the information acquired through monitoring reflects the actual conditions. Both precision and reliability are qualitatively rated as either high, moderate or low. Some components such as key targets (e.g., MBF) will have a high level of accuracy and high probability of reflecting actual conditions. Other components, such as range condition and trend, will have a reduced level of precision and reliability based on the monitoring techniques available. The accuracy limits for precision and reliability are:

		<u>Level of Precision and Reliability</u>	<u>Accuracy Limits</u>
		High	Allows 10 percent variation of the standard
		Moderate	Allows 33 percent variation of the standard
		Low	Allows 50 percent variation of the standard
		N/A	Not applicable or measurable by standard statistical methods
6	Minimum Monitoring Frequency	The schedule on which activity, practice, or effect is sampled.	
7	Reporting Period	The frequency at which monitoring results are summarized for a specific activity, practice or effect.	
8	Standard of Comparison (Yardstick)	These are the standards by which the activity, practice or effect will be evaluated.	
9	Responsible Staff	For each activity, practice, or effect to be monitored, the responsible individual (Resource Staff Officer, Forest Range Conservationist, etc.) is identified.	
10	Variability from Standard Indicating Further Action	This is the criteria describing the tolerance limits or standards from which the activity, practice or effect can vary from predicted performance. When these limits are exceeded, further action is taken as shown in Figure V-1.	
11	Average Annual Cost	This is the Forest's best estimate of the average annual monitoring costs that are over and above current standard operating costs. This includes additional manpower, travel, equipment or contract costs.	

TABLE V-1
MONITORING REQUIREMENTS

Category Number	Activity, Practice or Effect to be Measured	Monitoring Objective	Monitoring Techniques	Expected Precision & Validity	Minimum Monitoring Frequency
A - RECREATION					
A01	Recreation Opportunity Spectrum	Identify changes of Recreation Opportunities	Field observations, road counts, ROS Users Guide, RIM reports	Moderate	3 years
A07	Condition and Trend of Developed Sites	Identify need for maintenance and rehabilitation	Field observations of hazard trees and vegetative deterioration	Moderate	Annual (20% sample)
A01	Actual Use of Developed Recreation Sites	Provide data for Recreation Planning, update and revision	Occupancy rate samples, RIM reports and handbook, Forest Plan projections	Moderate	Annual (all sites)
A08 F09	Condition of Dispersed Camping Areas	Identify need to close sites, regulate use or convert to developed site	Occupancy rate sampling, Code-a-site, research publications	Moderate	3 years
A01	Wild, Scenic and Recreation River Management	Retention of river designation	Field observations and assessment of planned program activities	Moderate	3 years
A01	Visual Condition of Forest	Determine, on project basis, if planned Visual Quality Objectives are being met. Validate the VQO inventory	Field observations, project environmental analysis, Special Use Permits, FERC Licenses, contracts, computer simulations, sketches	Moderate	Annual (25% sample)
A01	Trend of Visual Character in Visual Corridor	Monitor maintenance of Visual Character of the specified Scenic Corridors	Field reviews, with Landscape Control Point Photo method	Moderate	5 years
A01	Visual Resource Improvement	Determine if visual resource improvement program is being carried out	Field review and photo point method	Moderate	Annual

Reporting Period	Standard of Comparison (Yardstick)	Responsible Staff	Variability From Standard Indicating Further Action	Average Annual Cost	Category Number
Years	ROS Guidelines	Recreation Staff Officer	+20% difference between actual and projected use	\$200	A01
Annual	FSM 2336 & 2340	Recreation Staff Officer	Deterioration of site beyond that anticipated under normal use	\$1,000	A07
Annual	FSH 2309 12	Recreation Staff Officer	When site use reaches 40% of theoretical capacities, plan for new facilities	\$500	A01
Years	FSH 2309.11	Recreation Staff Officer	Deterioration of site beyond that anticipated under normal use	\$500	A08 F09
Years	FSM 2372 & Federal Wild River Plan	Recreation Staff Officer	Reduction in scenic values and resource degradation	\$500	A01
Annual	Forest Plan & FSH 2309 16	Forest Landscape Architect	Failure to achieve the planned Visual Quality Objective within 5% of total project acreage by each VQO	\$2,500- 5,000	A01
Years	Forest Plan & FSH 2309.16	Forest Landscape Architect	Trend is away from stated goal	\$2,000	A01
Annual	Forest Plan & FSH 2309 16	Forest Landscape Architect	Less than 50% accomplishment of visual improvement projects identified in Forest goals and objectives, in any year	\$500	A01

TABLE V-1 (continued)
MONITORING REQUIREMENTS

Category Number	Activity, Practice or Effect to be Measured	Monitoring Objective	Monitoring Techniques	Expected Precision & Validity	Minimum Monitoring Frequency
A - RECREATION (continued)					
A01	Condition of Identified Cultural Properties	Determine the effects of management activities, vandalism and recreational use on approximately 10% of identified cultural resources Identify need for protection measures, verify adequacy of protection and mitigation measures and effectiveness of interpretation and law enforcement programs.	Field examination and evaluation, ARR, SHPO reports, LMP overview, FSM 2360, FPT patrol and law enforcement surveillance	Moderate	As identified in the EA and in response to reports of resource damage
A08 F09	Effects of Off-Road Vehicles on Open and Restricted Areas.	Determining whether Standards and Guidelines for ORV use have been met and evaluate their effectiveness	Field reviews and transects	Low	Every 3 years
A08	Behavioral Objectives Established for Self-Guided Interpretive Activities (signs, brochures, etc.)	Identify need for modification of messages or communication methods	Questionnaires, Suggestion Box, Observation	Moderate	Within 2 years of installation
A08	Behavioral Objectives Established for Guided or Personal Service Activities (office, campfire programs, etc.)	Identify need for modification of messages or communication methods	Questionnaires, Suggestion Box, Observation, Interaction Analysis	Moderate	Annual (each activity)
A08	Environmental Education Activities, not part of Interpretive Program	Identify need for modification of messages or communication methods	Observation, Tests	High	Completion of each activity
B - WILDERNESS					
B03	Amount and Distribution of Wilderness Visitor Use	Obtain wilderness use by area	Field counts, electronic eye counts, wilderness permits	Moderate	Annual
B03	Condition of Wilderness Campsites	Identify need for maintenance and rehabilitation	Apply Frissel Method for classifying campsite conditions.	High	Annual

Reporting Period	Standard of Comparison (Yardstick)	Responsible Staff	Variability From Standard Indicating Further Action	Average Annual Cost	Category Number
Annual	Pre-project or pre-affected condition (if known), site record - FSM 2360	Forest Archaeologist	Identification of adverse effect	\$7,000-15,000	A01
Annual	FSM 2355	Resource Officer	Unacceptable soil or other resource damage	\$500	A08 F09
Annual	FSH 1660 2	Interpretive Services Staff Specialist	30% deviation from behavioral objectives	\$1,000	A08
Annual	FSH 1660 2	Interpretive Services Staff Specialists	30% deviation from behavioral objectives	\$1,000-3,000	A08
Annual	FSM 1623 8	Environmental Education Facilitator	30% deviation from behavioral objectives	\$500-1,000	A08
Annual	FSM 2323 & Wilderness Plans	Recreation Staff Officer	Desolation quota exceeded, Mokeelumne capacity exceeded, resource deterioration	\$500	B03
Annual	FSM 2326 & Wilderness Plans	District Ranger	10% of sites in Condition Class 3 would be unacceptable Any sites in Class 4 or 5 would also be unacceptable	\$300	B03

TABLE V-1 (continued)
MONITORING REQUIREMENTS

Category Number	Activity, Practice or Effect to be Measured	Monitoring Objective	Monitoring Techniques	Expected Precision & Validity	Minimum Monitoring Frequency
C - FISH AND WILDLIFE					
C01	Population and Habitat Trends for Management Indicator Species	Establish population trends and changes in habitat quality for DEER	Map habitat (vegetation) changes to detect changes in habitat capability DFG deer herd plans, Spot Kill maps, fetal number surveys, herd composition counts	High	Annual
C01	Population and Habitat Trends for Management Indicator Species	Establish population trends and changes in habitat quality for Black Bear	Map habitat (vegetation) changes to detect changes in habitat capability State spot kill maps, sighting records	Low	Annual
C01	Population and Habitat Trends of Sensitive Species	Determine use of available habitat by and establish population trends for SPOTTED OWL Ensure Plan direction has been followed and verify predicted results. Verify accuracy of capability models of and assumptions.	Follow protocols in the Spotted Owl inventory and monitoring handbook Map habitat changes (vegetation) to establish changes in habitat capability	Moderate	Annual (33% of territories per year)
C01	Population and Habitat Trends of Sensitive Species	Determine use of available habitat by and establish population trends for GOSHAWK. Ensure Plan direction has been followed and verify predicted results. Verify accuracy of models and assumptions	First year-survey to locate goshawks and habitat used, then direct counts in designated territories and determination of nesting success and track changes in nest stand vegetation to determine change in habitat capability	Moderate	Annual

Reporting Period	Standard of Comparison (Yardstick)	Responsible Staff	Variability From Standard Indicating Further Action	Average Annual Cost	Category Number
5 years	Blue Canyon, Pacific, Grizzly Flat and Salt Springs Interagency Deer Herd Plans and Habitat Capability Models	Forest Wildlife Biologist	+10% change in deer populations over a 5 year period Net change to a lower capability level	\$1,000	C01
5 years	<u>Black Bear in California</u> , California Dept of Fish and Game, May 1982 (Project W-51-R-26) and habitat capability models	Forest Wildlife Biologist	+25% change in bear populations over a 5 year period Net change to a lower capability level	\$500	C01
3 years (33% of territories per year)	R-5 LMP Direction revised 12/84	Forest Wildlife Biologist	Reduction in habitat capacity for spotted owls within base habitat of SOHA's Any deviation from Standards and Guidelines established for spotted owl Management Areas	\$20,000	C01
2 years	R-5 LMP Direction, Revised 12/84 Habitat capability Model	Forest Wildlife Biologist	Any deviation from Standards and Guidelines established for goshawk Management Areas Reduction in habitat capability for goshawks within designated habitat areas	\$10,000 first year \$500 there-after	C01

TABLE V-1 (continued)
MONITORING REQUIREMENTS

Category Number	Activity, Practice or Effect to be Measured	Monitoring Objective	Monitoring Techniques	Expected Precision & Validity	Minimum Monitoring Frequency
C - FISH AND WILDLIFE (continued)					
C01	Population and Habitat Trends of Sensitive Species	Determine condition and use of available habitat and establish population trends for WILLOW FLY-CATCHER. Ensure Plan direction has been followed and verify predicted results	Visually check meadow areas for sign of over-utilization by cattle which may effect riparian vegetation. Review utilization analysis for grazing allotments, direct counts of breeding pairs	Moderate	2 years
C01	Population Trends of Threatened or Endangered Species	Determine use of available habitat for BALD EAGLE. Ensure Plan direction has been followed and verify predicted results.	Direct counts, surveys, cooperative State winter survey reports. Determine suitability of habitat	Moderate	Annual (100% of reservoirs per year)
C01	Population Trends of Threatened or Endangered Species	Determine success of reintroduction of PERGRINE FALCON	Field surveys of release sites each year after first release	Low	Annual
C01	Snags as a special habitat component and habitat capability for cavity nesting birds	Determine distribution number and availability of snags and habitat trends for cavity nesting species. Ensure Plan direction has been followed	Calculation of snag densities and distribution in a sample of units in each timber compartment where harvest activities are being planned	Moderate	Annual
C01	Vegetation Diversity and Distribution	Determine changes in vegetation diversity and distribution which may affect habitat of Management Indicator Species. Ensure Land Management Plan direction has been followed	Map changes in distribution and diversity of vegetation. Wildlife Habitat Relationships, stand record cards, periodic aerial photography flights	Moderate	Annual (20% of activities occurring yearly)

Reporting Period	Standard of Comparison (Yardstick)	Responsible Staff	Variability From Standard Indicating Further Action	Average Annual Cost	Category Number
2 years	Habitat capability model to be developed	Forest Wildlife Biologist/Calif Dept of Fish and Game	Reduction of habitat capability to the next lowest level as designated by Habitat Capability Standards	\$2,000	C01
Annual	Bald Eagle Recovery Plan & R-5 LMP Direction, Revised 12/84 and Habitat capability Model	Forest Wildlife Biologist/US Fish and Wildlife Service	Reduction in habitat capability, loss of snags in areas indicated as primary bald eagle habitat around reservoirs	\$500	C01
Annual	Peregrine Falcon Recovery Plan & R-5 LMP Direction, Revised 12/84	Forest Wildlife Biologist	Indication that the territory is not being actively used	\$500	C01
Annual	R-5 LMP direction revised 1/15/84 and Guidelines for Timber and Wildlife Mgmt Coordination in Regeneration Cutting	District Silviculturist	Any change from the 1985 National and Regional RPA Habitat Capability Objectives for cavity nesting birds and/or any deviation from Standards and Guidelines in the Forest Plan	\$2,000	C01
5 years	R-5 LMP Direction, Revised 12/84	Forest Wildlife Biologist	When specified seral stage combinations are reduced to less than 5% of the land base within a given compartment	\$3,000	C01

TABLE V-1 (continued)
MONITORING REQUIREMENTS

Category Number	Activity, Practice or Effect to be Measured	Monitoring Objective	Monitoring Techniques	Expected Precision & Validity	Minimum Monitoring Frequency
C - FISH AND WILDLIFE (Continued)					
CO1	Population Trends of Resident Trout	Establish fish population trends	Sample streams to determine fish biomass	Moderate	Annual (20% of stations per year)
CO1	Stream Fishery Habitat	Determine observable changes in fish habitat over time	Complete stream stability survey for a representative number of stream reaches; establish photo points to accompany survey	Moderate	Annual
C - SENSITIVE PLANTS					
CO1	Monitoring of Undisturbed Selected Populations of <u>Navarretia prolifera</u> spp. <u>lutia</u> , according to the Species Management Guide	Detect significant changes in populations	Field survey	High	Annual (25% of the selected populations per year)
CO1	Monitoring of Selected <u>Navarretia prolifera</u> ssp <u>lutia</u> Populations affected by Forest Management Activities, according to the Species Management Guide	Detect significant changes in populations	Field survey	High	Annual (Starting the year before, and continuing until 2 years after the activity is completed, then returning to the 4 year cycle)

Reporting Period	Standard of Comparison (Yardstick)	Responsible Staff	Variability From Standard Indicating Further Action	Average Annual Cost	Category Number
5 years		Forest Fisheries Biologist	Assuming 5 near normal water years, an overall 25% reduction in population	\$800	C01
5 years	FSM 2621, R-5 Supplement #3, 5/80	Forest Fisheries Biologist	Changes in habitat which are attributable to management activities	\$800	C01
Annual		Forest Sensitive Plant Coordinator	50% or more reduction or increase of individuals in a population or 25% or more reduction in numbers of populations over a 5 year period	\$370	C01
Annual		Forest Sensitive Plant Coordinator	50% or more reduction in numbers of individuals from the undisturbed base over a 1 year period	\$220	C01

TABLE V-1 (continued)
MONITORING REQUIREMENTS

Category Number	Activity, Practice or Effect to be Measured	Monitoring Objective	Monitoring Techniques	Expected Precision & Validity	Minimum Monitoring Frequency
C - SENSITIVE PLANTS (continued)					
C01	Monitoring of Unselected <u>Navarretia prolifera</u> spp <u>lutia</u> Populations	Detect significant changes in populations	Field survey	High	Annual (12.5% of the unselected populations per year)
C01	Monitoring of <u>Silene invisa</u> populations	Detect significant changes in populations	Field survey	High	Annual
C01	Interim Monitoring for Sensitive Plant Species Without Species Management Guides	Detect negative population changes for annual species	Field surveys	High	Annual (50% of populations per year)
		Detect negative population changes for perennial species	Field surveys	High	Annual (50% populations per year)
C01	Designated Botanical Areas	Assure the continuation of vegetative characteristics for which the area was designated	Field surveys	High	Annual
D - RANGE					
D01	Livestock Forage Availability as a Result of Management Practices	Collect site data to quantify available forage, consistent with multiple use objectives	Toe-point transects, photo plots	Moderate	Annual
D02	Utilization Inspection of New Forage Producing Areas	Analyze use in key areas such as plantations and riparian areas to insure proper use and validate stocking levels	Field Inspections	Moderate	Annually for 2 years following implementation

Reporting Period	Standard of Comparison (Yardstick)	Responsible Staff	Variability From Standard Indicating Further Action	Average Annual Cost	Category Number
Annual		Forest Sensitive Plant Coordinator	50% or more reduction or increase of individuals in a population or 25% or more reduction in numbers of populations over a 8 year period	\$370	C01
Annual		Forest Sensitive Plant Coordinator	See Interim Species Management Guide	\$1,500 annually 1st five years \$500 annually thereafter	C01
Annual		Forest Sensitive Plant Coordinator	50% or more reduction of individuals in a population over a 3 year period or 25% or more reduction of numbers of populations over a 3 year period	\$1,500	C01
Annual		Forest Sensitive Plant Coordinator	≥ 5% reduction in numbers of populations or ≥ 10% reduction in individuals within a population	\$1,100	C01
Annual	Forest Plan	Forest Sensitive Plant Coordinator	Any change in botanical characteristics	\$680	C01
Annual	FSM 2209 21	Range Specialist	Sites not producing at least 50 pounds per acre of forage will not be considered in calculating available forage	\$1,600	D01
Annual	FSM 2209 21	Range Specialist	150% of proper use in two consecutive years, downward trend in condition of sensitive acres or unacceptable damage to seedlings	\$2,000	D02

TABLE V-1 (continued)
MONITORING REQUIREMENTS

Category Number	Activity, Practice or Effect to be Measured	Monitoring Objective	Monitoring Techniques	Expected Precision & Validity	Minimum Monitoring Frequency
E - TIMBER					
E06	Timber Offered for Sale	Meet Plan targets for volume and acreage to be placed under contract, by cutting method, Management Area and logging system	Review summary of Programmed Harvest Statements and Five-Year Timber Sale Action Program	High (Harvest Statements) Moderate for 5-year program)	Annual
E03	Compartment Resource Examination	Verify suitable lands Accumulate data for compartment management	Review compartment map productivity overlays and sites in the field Examination of filing system, map overlays, and stand record cards	Moderate Moderate	Annual Annual
E06	Regeneration Cutting - Size and Dispersion	Meet Standards and Guidelines for size and dispersion of regeneration units	Field inspections, review of timber harvest plans	High (for size) Moderate (for dispersion)	(As sale layout is complete)
E04	Reforestation	Establish certifiable stands shortly after deforestation	Review acreages in "Current Needs Reforestation" by tenure in 1-3 years, 3-5 years, over 5 years Review first and third year stocking surveys	High High	Annual Annual

Reporting Period	Standard of Comparison (Yardstick)	Responsible Staff	Variability From Standard Indicating Further Action	Average Annual Cost	Category Number
Annual	Forest Plan - Allowable Sale Quantity and Acreage of Regeneration Cutting	Timber Staff Officer	Cumulative regulated volume sold is not within +5% of Forest target Cumulative acreage of regeneration cutting is not within +20% of Forest target	-0-	E06
Annual	Forest Plan	Timber Staff Officer	Failure to develop data required by Forest Standards and Guidelines for at least 10% of compartments per year	\$1,500	E03
Annual	Forest Plan	Timber Staff Officer	Failure to develop or file data required by Forest Standards and Guidelines for at least 10% of compartments per year		
Incorporated in each timber sale report	Forest Plan & R5 LMP direction revised, 10/15/83	Timber Staff Officer	Does not meet Forest Standards and Guidelines	-0-	E06
Annual	FSM 2470 & 2490	Timber Staff Officer	More than nominal acreage in "over 5 years" category	\$500	E04
Annual		Timber Staff Officer	Less than 85% of plantations certified after 5 years	\$500	

TABLE V-1 (continued)
MONITORING REQUIREMENTS

Category Number	Activity, Practice or Effect to be Measured	Monitoring Objective	Monitoring Techniques	Expected Precision & Validity	Minimum Monitoring Frequency
E - TIMBER (Continued)					
E05 F09	Condition of Regenerated Stands	Verify FORPLAN yield table projections of age at first commercial thinning	Predict age when average height of intermediates and codominants will reach 50 feet	Moderate	Annual (Examine 15% of plantations greater than 10 years old)
		Evaluate Timber Stand Improvement Needs and Results	Using appropriate yield tables, compare growth before and after treatment	Moderate	After completion of each Timber Stand Improvement Project
		Review Regional Stocking Guidelines	Predict basal area which will exist at time of first commercial entry in plantations	Moderate	Annual (minimum of 4 plantations per District by 12/85)
P- WATER					
F09	Water Yield Improvement	Determine if Practice 81 and 82 as applied to snowpack management generates the anticipated water yield increases and delays in yield	Collect existing information from State, USGS and user groups within Forest boundaries, use State Hydrologic Evaluation/Analysis Program to analyze ungauged watersheds; establish Stream gauges at key sites	High (for stations) Moderate (for interpolated sites)	Continuous

Reporting Period	Standard of Comparison (Yardstick)	Responsible Staff	Variability From Standard Indicating Further Action	Average Annual Cost	Category Number
5 years (first report by 12/85)	FORPLAN Yield Tables	Timber Staff Officer	The average age of 50-foot trees is less than 40 years or greater than 50 years	\$1,000	E05 F09
Annual	Olivers & Powers, Dunning & Reinke, Schumacher Yield Tables	Timber Staff Officer	Growth less than 85% of yield table prediction	\$500	
5 years (first report by 12/85)	PSM 2470 (Regional Standards)	Timber Staff Officer	Indicated optimum stockings is not within <u>±</u> 15% of Regional Standards	\$600	E05
5 years	Forest Plan Predicted Water Yields	Forest Hydrologist	When Practice 81 and 82 predicted water yield increases and delivery time are in error by more than 15% of actual increase and delivery time	\$50,000 first year \$10,000 thereafter	F09

TABLE V-1 (continued)
MONITORING REQUIREMENTS

Category Number	Activity, Practice or Effect to be Measured	Monitoring Objective	Monitoring Techniques	Expected Precision & Validity	Minimum Monitoring Frequency
F - WATER (Continued)					
F09	Sediment Yield and Transport	Determine if Watershed Maintenance and Rehabilitation Practice 83 and Water Resource Management Practice 84 are effective in preventing unacceptable sediment delivery to stream channel systems	Estimate the bed load and suspended load in key stream channel reaches	Moderate	Annual (selected storm events)
F09	Physical, Chemical & Bacteriological Water Quality	Determine if Practice 83 and 84 are effective and cost efficient in meeting State water quality standards	Collect water samples in selected streams and lakes and analyze at State approved water quality laboratories	Moderate to High	Annual (selected times to sample a variety of flow conditions)
F09	Cumulative Watershed Effects (CWE)	Evaluate watershed and stream channel stability to determine if CWE's are occurring as a result of plan implementation and to refine Forest CWE methodology	Measure amounts of soil disturbance and vegetative removal, by second and third order watersheds. Also measure the lag time for selected watersheds to detect changes in runoff rate and flood peaks associated with our management activities	Moderate	Annual (selected watersheds and storm events)
F09	Water Quality Management	To assess compliance with BMP direction and to continue to evaluate the effectiveness of BMP.	Review of prepared EA's, review of contract provisions, field activity reviews, water quality analysis, field observations	High	On going as part of EA and contract review process and a trips to the field are taken Annual activity review, an alysis as specified in project plans

Reporting Period	Standard of Comparison (Yardstick)	Responsible Staff	Variability From Standard Indicating Further Action	Average Annual Cost	Category Number
Annual	Federal and State Water Quality Standards and/or Objectives	Forest Hydrologist	When the beneficial uses of water are impaired and/or Federal or State Water Quality Objectives are violated	\$5,000	F09
Annual	Federal and State Water Quality Standards and/or Objectives	Forest Hydrologist	When 15% of samples exceed State water quality standards	\$3,000	F09
Annual (selected watersheds)	Existing and predicted condition of Forest watersheds	Forest Hydrologist	Downward trend or existing unstable watershed or stream channel conditions	\$8,000	F09
Annual	BMP's identified as project mitigation requirements, Forest wide Standards and Guidelines, water quality objectives for beneficial uses	Resources Staff Officer	Implementing documents for three projects are found to be missing needed water quality mitigation measures. Water quality objectives violated. Two field reviews identify mitigation measures are not being implemented	\$ 0	F09

TABLE V-1 (continued)
MONITORING REQUIREMENTS

Category Number	Activity, Practice or Effect to be Measured	Monitoring Objective	Monitoring Techniques	Expected Precision & Validity	Minimum Monitoring Frequency
F - SOILS AND GEOLOGY					
F09	Soil Productivity Reduction on Soils with Finer Textured Subsoils	Determine if soil support service practice 86 is effective in limiting the amount of soil compac- tion and puddling associ- ated with early and late season harvest and stand reestablishment activities	Field measurements and transects using the methods that give a direct or indirect measurement of soil compaction	Moderate	Annual If prac- tice is occurring during high moisture periods
F09 E05	Soil Productivity Reduction on Moder- ately Deep and/or Coarse Textured Soils	Determine if soil support service practice 86 is effective in preventing the removal or displace- ment of the upper surface horizons during timber harvest, stand reestablish- ment, and release and weeding.	Field measurements and transects using methods that measure erosion or soil displacement	Moderate	Annual
F09 E05	Stand Reestablishment Practices and Growth Rates	Determine if soil resource and improvement practice 87 is effective in achieving desired stocking and growth rates.	Results of Stocking Surveys and condition information on regen- erated stands followed up with soil analysis of problems areas	Moderate	Annual
G02 F09	Harvest System and Facility Development Practices on the Stability of Geologic Hazard Areas	To evaluate increases in mass wasting in relation- ship to Geologic Hazard Areas and Forest Practices	Field Reviews, Obser- vations and comparisons	Moderate	Annual
G - MINERALS					
G01 G03 G04 G05 G06	Mineral Operations	Assure compliance with approved Operating Plans to adequately protect surface resources	Field observations, review of microfiche records, active claim files and operating plans	Moderate	Annual
G01 G03 G04 G05 G06	Mining Activities	Assure mineral explor- ation and development is not unreasonably impaired by Management Prescriptions	Field observations, review of microfiche records, active claim files and operating plans	Moderate	Annual

Reporting Period	Standard of Comparison (Yardstick)	Responsible Staff	Variability From Standard Indicating Further Action	Average Annual Cost	Category Number
Annual	Timber Yield Tables/Forest Plan Guidelines	Forest Soil Scientist	80% of an activity area shall be left in a condition of acceptable productivity potential for trees and other managed vegetation following land management activities	\$2,500	F09 E05
Annual	Timber Yield Tables/Forest Plan Guidelines (to be developed) and Soil Management Guidelines	Forest Soil Scientist	Growth on impacted areas is less than 85% of yield table predictions	\$2,500	F09 E05
Annual	FSM 2470 & 2490 Timber Yield Tables/Fertilization Guidelines (Power & Miles)	Forest Soil Scientist	Less than 85% of plantation certified after 5 years, growth yields less than 85% of predicted	\$2,000	F09 E05
Annual	Order III GRI	Forest Soil Scientist	5% increase in landslide Activity over background	\$2,000	G02 F09
Annual	FSM 2817 2	Lands Officer	Failure to meet conditions of Plans of Operations	\$4,000	G01 G03 G04 G05 G06
Annual	FSM 2810, 2820	Lands Officer	Unjustified impairment of exploration and development operations	\$500	G01 G03 G04 G05 G06

TABLE V-1 (continued)
MONITORING REQUIREMENTS

Category Number	Activity, Practice or Effect to be Measured	Monitoring Objective	Monitoring Techniques	Expected Precision & Validity	Minimum Monitoring Frequency
G - MINERALS (Continued)					
G01	Mineral Withdrawals, Modifications and Revocations	Review the necessity for all existing or proposed withdrawals	Follow Federal Land Policy and Management Act provisions	Moderate	Annual to 10 years
J - LANDS					
J01	Special Uses - Nonrecreational	Evaluate Administration of Special Use Permits, Licenses and Easements	Field inspections, fee reviews, Federal Land Policy and Management Act	High	Annual to 3 years
J03	FERC Licenses and Utility Corridors	Monitor License and Special Use Permit provisions	Project Liaison Officer inspects sites for compliance	High	Annual
J12	Landownership Acquisition, Exchange and Purchase	Evaluate effectiveness of Land Adjustment Program	Review each case Environmental Analysis for conformance with direction	High	Annual
L - FACILITIES					
L01	Traffic Surveillance	To evaluate road and trail use and capacities to determine if the facility is the proper standard and performing as planned	Traffic counting and classification	High	Annual
L01	Highway Safety	To reduce traffic accidents and deaths, injuries and property damage occurring on Forest Service roads	Forest Service, State and local accident reports to identify and record all known accident locations	High	Annual
L01	Road Operations	Ensure road facilities support Forest objectives and protect users as well as resources	Determine Road Management Objectives and establish operation standards	Moderate to High	Annual

Reporting Period	Standard of Comparison (Yardstick)	Responsible Staff	Variability From Standard Indicating Further Action	Average Annual Cost	Category Number
10 years	FSM 2760, 2810, 2820, & FLPMA	Lands Officer	When withdrawal is no longer needed or justified	\$1,500	G01
Continuing	FSM 2710, 2720, 2790	Lands Officer	Nonpayment of fees or non-compliance with conditions of Special Use Permits, Licenses and Easements	\$20,000	J01
Continuing	FSM 2770	Environmental Impact Specialist	Noncompliance with License and Special Use Permit provisions	\$2,000	J03
Annual	FSM 5403, 5403 3 & Land ownership Adj Plan	Lands Officer	Presence of sensitive plants, threatened or endangered species, archaeological sites or local government agency objections	-0-	J12
Annual	FSM 7731 11 FSM 7731 32	Forest Engineer	Changes in road or trail use and traffic mix may indicate a change in operations or standards	\$4,000	L01
Annual	FSM 7733 FSH 7109 31	Forest Engineer	Identify high hazard locations in need of traffic engineering, no deviation tolerances established	\$15,000	L01
Annual	FSH 7709 15	Forest Engineer	No deviation tolerances established	\$2,000	L01

TABLE V-1 (continued)
MONITORING REQUIREMENTS

Category Number	Activity, Practice or Effect to be Measured	Monitoring Objective	Monitoring Techniques	Expected Precision & Validity	Minimum Monitoring Frequency
L - FACILITIES (Continued)					
L25	Facilities Management	Evaluate facility maintenance and replacement needs	Field and office review and inspection	Moderate to High	Annual (50% each year)
P - PROTECTION					
P04 P05 P06 P07	Fire Suppression	Review efficiency of suppression organization to meet Eldorado protection needs	Review and analysis of Individual Fire Reports	Moderate	Annual
P11 P12 P13 P14	Fuel Treatments - Natural Fuels Nonfire	Determine if target accomplishments are meeting resource objectives	Site inspections by Interdisciplinary Team	Moderate	Annual (by project)
P12 P14	Prescribed Fire - Natural Fuels	Determine if target accomplishments are meeting resource objectives	Photo point, fuel inventory, site inspection by Interdisciplinary Team	High	Annual (by project)
P11	Activity Fuel Treatment	Determine if target accomplishments are meeting resource objectives	On-site inspection	High	Annual (by project)
P01	Fire Management Areas	Manage unplanned ignitions in established Fire Management Areas	On-site inspections, weather monitoring	High	Annual (by fire season)
P17	Air Quality of Class I Areas	Determine air quality in Desolation and Mokelumne Wilderness areas	Measure specific air pollution and meteorological parameters	Moderate	Summer period
P17	Smoke Management	Determine effect of prescribed fire and wildfire on air quality	Measure smoke dispersal in accordance with approved smoke management plan	Moderate	Selected projects

Reporting Period	Standard of Comparison (Yardstick)	Responsible Staff	Variability From Standard Indicating Further Action	Average Annual Cost	Category Number
5 years	Ability of facilities to provide support necessary to manage resource programs	Forest Engineer	Replacement and maintenance program adequate to provide necessary facilities for resource programs	\$2,000	L25
Annual	FSM 5120, 5130	Fire Management Officer	Burned acreage is $\pm 25\%$ of expected loss	\$3,000	P04 P05 P06 P07
Annual	FSM 5150	Fire Management Officer	Accomplishment is greater than 120% or less than 90% of targets	\$1,500	P11 P12 P13 P14
Annual	FSM 5150	Fire Management Officer	Accomplishment is greater than 120% or less than 90% of targets	\$1,500	P12 P14
Annual	FSM 5150 & BD Activity Review	Fire Management Officer	Less than 90% of sale treatment accomplishment	\$1,500	P11
Annual	FSM 5100	Fire Management Staff	Change in fuel types and increased public safety problems	\$5,000	P01 B01
5 years	Forest Plan and Federal Air Quality Standards	Resource Staff Officer	Downward trend or in violation of State standards more than 20% of the time	\$10,000 \$50,000 first year set up	P17
Annual	Forest Plan and Federal air Quality Standards	Fire Management Officer	To be determined in cooperation with local Air Pollution Control Districts	\$5,000	P17

TABLE V-1 (continued)
MONITORING REQUIREMENTS

Category Number	Activity, Practice or Effect to be Measured	Monitoring Objective	Monitoring Techniques	Expected Precision & Validity	Minimum Monitoring Frequency
P - PROTECTION (Continued)					
P34 P35	Forest Pest Damage	Early detection, evaluation, and treatment of pest related problems and damage	Aerial and ground surveys, stand and resource examinations	Moderate	Annual
MULTI-RESOURCES					
A-P as appropriate	Effects of Plan Implementation in Resolving Public Issues	Determine to what extent plan direction is resolving public issues	Communication networks, public meetings, workshops, etc	Moderate	Continuous
J22	Effects of N F Management on Adjacent Lands, Communities and other Government Entities	Determine effect Forest Plan is having on these entities	Review of social and economic effects projected in the FEIS and compare with current situation	Moderate	2 years
A-P as Appropriate	Accomplishment of Objectives in Plan	Insure attainment	Attainment Reports	High	Continuous
A-P as Appropriate	Actual Cost of Implementing Plan Compared to Project Costs	Verify projected unit versus actual costs	Project Analysis using PAMARS and Attainment Reports	High	Quarterly

Reporting Period	Standard of Comparison (Yardstick)	Responsible Staff	Variability From Standard Indicating Further Action	Average Annual Cost	Category Number
Annual	Forest Plan	Timber Staff Officer Forest Pest Management	When mortality or damage levels appear to interfere with or threaten the attainment of resource management objectives	-0-	P34 P35
Annual	Public Issues should not become disruptive	Public Information Officer	Unacceptable results of general management reviews, functional reviews, etc	Included in appropriate functional costs	A-P as appropriate
5 years	Outputs & Effects Estimated in the PEIS	Forest Supervisor	When divergence between actual situation and projected situation is considered unacceptable	Included in appropriate functional costs	J22
Quarterly	Forest Plan	Forest Supervisor	Unacceptable results of Management Team review	Included in appropriate functional costs	A-P as appropriate
Yearly	Forest Plan Total and Unit Costs	Forest Administrative Officer	+10% variation from projected costs	Included in appropriate functional costs	A-P as appropriate