



United States
Department of
Agriculture

Forest
Service

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To Those Interested in the Mendocino
National Forest:

Attached is the Mendocino National Forest's Monitoring, Evaluation, and Accomplishment Report for the 1996 fiscal year (FY; October 1, 1995 to September 30, 1996). Despite continuing declines in annual budgets, we have accomplished a great deal of what we set out to do in our Land and Resource Management Plan (Forest Plan). Included in the Forest Plan is Chapter V, Monitoring and Evaluation, and this report contains a summary of the monitoring and evaluation conducted during our first full year of implementing the Forest Plan.

No Forest Plan amendments were identified based on an evaluation of the monitoring data collected in FY 96. A potential amendment for direction regarding the Lake Red Bluff recreation area was identified in FY 95 and is planned for FY 98. Direction to eradicate the Tree of Heaven by mechanical means only has not been successful in achieving the management objectives of restoring the native plant communities to the area.

All of the higher priority actions items will be initiated in fiscal year 1998.

Any comments received on this report will be considered during the next year's report. Please submit comments at the above address, Attention LMP.

Sincerely,

DANIEL K. CHISHOLM
Forest Supervisor

MENDOCINO NATIONAL FORESTS

FISCAL YEAR 1996 (FY 96) MONITORING AND EVALUATION REPORT For Monitoring Activities Conducted from 10/1/95 to 9/30/96 OVERVIEW AND BROAD CONCLUSIONS

Chapter V of the Mendocino National Forest Land and Resource Management Plan includes direction regarding monitoring and evaluating the implementation of the management direction in the Forest Plan. This chapter includes 62 monitoring objectives. Twenty-eight of those objectives were accomplished to some degree, 19 are not required annually, and 11 cannot be accomplished without decisions from the Regional Ecosystem Office regarding methods, timing, and standards. The most thorough monitoring activities accomplished in FY 96 were in the areas of Heritage Resources and Range programs. Monitoring objectives related to some types of facility maintenance needs and implementation of standards and guidelines to protect aquatic and terrestrial resources were also relatively thorough. Fifteen of the objectives were monitored at the full Plan level, though analysis of results could be improved for most of them. Overall, the Forest program of work was funded at 71% of the Plan level.

Broad conclusions cannot be drawn from the monitoring and evaluation process used to produce this report. Many of the monitoring activities which are reported herein are based on a single project or are based on the evaluation of a single individual (there are exceptions to both). Monitoring information for entire resource program areas were not available for evaluation, therefore, this report documents only a portion of the efforts made in FY 96. In addition, several years of monitoring may be necessary to accurately determine the effectiveness of much of the Forest Plan direction. Developing a monitoring process and reporting procedures or forms should alleviate this situation to some degree.

Many monitoring objectives can be met by utilizing the results of required oversight and reporting such as harvest inspector daily reports and reforestation stocking surveys. There are many opportunities to utilize professional observations which lead to proposed actions or program development. Information from these sources are often not documented or are otherwise unavailable. Examples include road maintenance needs whereby system roads are regularly driven and maintenance needs are noted on maps or retained in memory. Two monitoring objectives may be satisfied if the observers were to document their best estimate of the cause of the maintenance problems (e.g. heavy traffic during the wet season, water bar failure, rusted out culvert, normal use patterns, etc.).

Full utilization of data from traditional efforts or collecting additional data during traditional efforts should be a desirable practice, where possible, in a time of reduced budgets and personnel. At this time there are no mechanisms for making the information available to an interdisciplinary team for an evaluation of the results.

There have been several project reviews conducted by individual resource specialists or by interdisciplinary teams to determine project compliance with standards and guidelines, and to review the effectiveness of the standards and guidelines. While the information gained through the discussions at a project site is used during later project planning, oftentimes the intent of the monitoring activity as well as the results are not documented.

Of the three recent monitoring and evaluation reports issued by other National Forests, all have highlighted similar difficulties in achieving effective monitoring, evaluation, and documentation.

SUMMARY OF MONITORING ACTIVITIES AND EVALUATION OF RESULTS

The following information reflects some of the monitoring activities which took place in FY 96 and is organized by major resource or program areas. Information includes a summary of the monitoring, a brief description of the evaluation, and the location of the supporting documentation. Additional information regarding future monitoring efforts is included where available. A comparison of actual and predicted outputs for selected resource areas, is located in the appendix.

AIR QUALITY

Monitoring Objective: Determine trends in Air Quality Resource Values within Class I Wilderness areas.

Data has been collected over the past several years to determine Air Quality Resource Value trends in the Yolla Bolly-Middle Eel Wilderness. Water samples have been taken from wilderness lakes to determine acidity, and sightings of amphibians have been recorded. Complete evaluation of the data has not been accomplished, however, preliminary results indicate that levels of acidity are not increasing and sightings of amphibians are not decreasing. Data is stored in the air resources files at the Supervisor's Office.

Monitoring Objective: Assure that all prescribed fires are conducted in compliance with air quality regulations.

Burn plans are developed for each prescribed fire and are to incorporate requirements which will result in each fire meeting air quality regulations. Burn plans for FY 96 do not include documentation as to whether the fires were conducted, were within prescription, or met stated objectives. Standard operating procedures for ensuring burns are conducted on designated burn days and for requesting/obtaining exemption from burn day limitations, are documented in the burn plans and are normal procedure.

ECONOMICS

Monitoring Objective: To validate predicted versus actual unit costs.

An attempt was made to calculate project and program costs during FY 96 and compare to predicted costs used to evaluate economic effects and costs for the Forest Plan. Costs were modeled based upon experience and past program management when projects which benefited multiple resource programs were not common. Today, taking an ecosystem management approach in project development and implementation, we tend to develop and select projects with multiple benefits, and it is difficult to assess the cost of any one project to any one program. In particular, fuel treatments, watershed improvements, stream channel stabilization, landslide stabilization, and stream crossing improvements are very difficult to evaluate the actual cost with predicted Plan costs.

Information for some single resource projects were available. One road reconstruction project consisted of widening and paving 2.4 miles of road for \$319,192 (plus 20% for overhead). This project cost \$159,600 per mile as compared to predicted Plan costs of \$48,500 per mile. This example is only a portion of a 15.1 mile reconstruction program for FY 96 and information on the cost of reconstructing the other 12.7 miles was not available. Landline location costs for FY 96 were \$9,103 per mile compared to predicted Plan costs of \$7,035 per mile. Two wildlife structures were completed for \$2,160 each, whereas the predicted Plan cost was \$4,852 each. Reforestation projects were completed at 116% of predicted Plan costs, and timber stand improvement projects were completed at 82% of predicted.

One of the critical uses for developing and predicting costs of activities and programs when developing the Forest Plan is to form a basis for comparing alternatives. The model used to help determine the mix of outputs and effects of the various alternatives was driven by economics with the goal of finding the most cost effective mix of products and services given various management philosophies. The primary purpose of comparing predicted to actual costs is to validate the costs used. Several years would be required to validate or invalidate costs with any degree of confidence because average costs are used, and in any given year, a project may not be average.

Monitoring Objective: To validate total planned costs for Plan implementation.

The following table shows the Plan versus actual budgets in 1996 dollars. The "Other" category includes general administration, ecosystem planning/inventory/monitoring, watershed, range, heritage resources, and other miscellaneous programs.

<u>CATEGORY</u>	<u>PLAN (M\$)</u>	<u>ACTUAL (M\$)</u>	<u>% OF PLAN</u>
Fire	3,923 2,731	70	
Timber	2,579 3,544	137	
Roads	2,649 1,408	53	
Recreation	2,447 910	37	
Wildlife	700	589	84

Other	4,598 2830	62	
<u>Total Budget</u>	<u>16,896</u>	<u>12,012</u>	<u>71</u>
Suppression	1,784 7,401	415	
<u>Total Cost</u>	<u>18,680</u>	<u>19,413</u>	<u>104</u>

The total budget and total cost of implementing the Forest Plan in FY 96 were within the 35% variation standard set for this monitoring objective. However, of the large categories included, only fire management and wildlife areas fell within the 35% range. The cost of fire suppression was 415% of predicted while the acreage burned by wildfire was 338% of predicted. On an acreage basis, the cost of fire suppression in FY 96 was \$108 per acre as compared to the predicted cost of \$880 per acre.

Expenditures for watershed analysis and Forest Plan monitoring have been substantially less than predicted during the development of the Plan. The cost of suppression in FY 96 included the 83,000 acre Fork fire, the largest most expensive fire in this Forest's history. Updating the National Fire Management Analysis System to reflect the entire fire history may lead to improved suppression cost estimates.

FACILITIES

Monitoring Objective: To determine the adequacy of road design and management in relation to user safety.

Twelve accident reports were completed by Forest Service personnel, and eleven of the accidents occurred on Forest Service maintained roads or sites. Three reports stated unknown causes of minor damage to vehicles, and two reports were caused by uncontrollable environmental events (ice falling from a tree and a large bird flying in the path of a vehicle). The balance of the reported accidents were directly attributable to driver error. Reports are located in the Personnel files at the Supervisor's Office.

Some safety concerns related to forest bridges were noted during bridge inspections. Maintenance actions required to replace signs have been implemented.

Monitoring Objective: To determine the effectiveness of road design and maintenance in promoting stability.

The standard for this monitoring objective is "acceptable road maintenance costs". The road maintenance budget for FY 96 was \$866,000, and 2,472 miles were reportedly maintained (MAR 91.2). The Forest-wide cost per mile would then be \$350 per mile with some roads needing little maintenance and a few roads needing extensive maintenance. Predicted maintenance costs developed for the Forest Plan were \$1,000 per mile for arterial and collector roads (wider, higher standards) and \$520 per mile for local roads. To determine the effectiveness of road design, cost by road or road segment may be more revealing.

During watershed analysis for the Black Butte watershed, road maintenance levels were linked to road-related sedimentation. This sedimentation is predicted to increase over time, preventing attainment of aquatic conservation strategy (ACS) objectives related to sediment regimes. Watershed analyses conducted in other watersheds have also identified roads as

major contributors of sediment, and have determined that lack of funding leading to inadequate road maintenance will be an impediment to attaining ACS objectives in those watersheds as well. Information is located in the watershed analysis records and the engineering records at the Supervisor's office.

Monitoring Objective: To determine facility maintenance and replacement needs, and energy consumption.

All dams and bridges were inspected in FY 96. No conditions which would cause dam failure were observed. Maintenance needs to protect some bridges, improve safe use of some bridges, and prevent future damage to bridges were noted. Some of the identified maintenance has been completed, some major bridge projects are currently underway, and the project design phase has been initiated for several of the bridges. The Howard Lake dam was damaged in January, 1997 and is scheduled for replacement within the next year. Inspection reports are located in the engineering files at the Supervisor's Office.

Transportation facilities are evaluated for maintenance needs though records were not available. During the Black Butte watershed analysis, existing condition of roads, their impacts to other resources, and potential maintenance needs were evaluated. The report concludes that the current budget for maintaining roads within the Black Butte watershed may not be adequate and is likely to prevent attainment of ACS objectives.

FIRE AND FUELS MANAGEMENT

Monitoring Objective: To determine if the terrestrial and aquatic resources are being managed according to the standards and guidelines.

Six fuel treatment projects on the eastside of the Forest were reviewed for compliance with the various standards and guides for protecting aquatic and terrestrial resources. In general, the exact location, shape, and size of prescribed burn projects cannot be known in advance. In each project that was reviewed, no deleterious effects from the prescribed burn were identified and Aquatic Conservation Strategy objectives were not adversely impacted. Results of some monitoring activities were not documented, and results of some are located in the District files.

Monitoring Objective: To evaluate the effectiveness of Forest Plan standards and guidelines in affording appropriate protection to other resources from adverse effects resulting from the use of prescribed fire.

Effectiveness monitoring conducted during FY 96 was limited to the effectiveness of Best Management Practices designed to protect water quality from the effects of prescribed burning. Two sites were evaluated and the BMPs were found to be fully successful. Lack of recorded information in prescribed burn plans may limit our ability to conduct effectiveness monitoring of standards and guidelines as there is no documentation of

whether burns occurred within the parameters of the prescription or achieved project objectives.

Monitoring Objective: To provide a comparison of actual and predicted acreage loss from wildfire.

Approximately 68,545 acres of National Forest lands were burned by wildfire in FY 96. The estimated annual losses is 2,027 acres averaged over a ten year period. If no additional wildfires occurred on Forest lands over the next ten years, the average would exceed the predicted level by three-fold. The model used to estimate future wildfire losses utilizes a combination of fire history and planned management activities. The fire history data input to the model included only the 1970 to 1985 time period, a notably inactive time period compared to the records spanning 1909 to the present. In the past decade alone, the Mendocino has experienced two of the largest fires in this Forest's recorded history.

HERITAGE RESOURCES

Monitoring Objective: To assure that heritage resource values are given appropriate consideration in project planning and design.

The objective was met through Forest's compliance with the National Historic Preservation Act (NHPA) and heritage resources input provided in compliance with the National Environmental Policy Act. Supporting documentation is found in "Mendocino National Forest Heritage Resources Annual Report 1996" (April 4, 1997) for those undertakings covered by the Forest's Programmatic Agreement for Section 106 compliance (NHPA), and Heritage Resource project files for those undertakings where compliance with NHPA required project-specific consultation with the State Historic Preservation Officer.

Monitoring Objective: To determine the extent of effects of management activities on heritage resources.

Four projects involving a total of 18 archaeological sites were monitored during project implementation. Some of these same sites were also monitored after the project. In addition, post-implementation monitoring was conducted at four other archaeological sites and project areas.

Standards and guides were effective in protecting heritage resources for six of the eight projects monitored. Changes in project boundaries of the remaining two projects may have resulted in affects to heritage resources. Site evaluations and possible treatment measures will be carried out and are expected to cost \$19,000 to \$33,000. In addition, procedures have been developed to avoid similar situations in the future. Documentation is included in the "Mendocino National Forest Heritage Resources Annual Report 1996" (April 4, 1997).

Monitoring Objective: To determine the extent and effects of vandalism on heritage resources.

One archaeological site that had been subjected to illicit vandalism was documented and information relayed to Law Enforcement. Information is contained in the "Mendocino National Forest Heritage Resources Annual Report 1996" (April 4, 1997).

Monitoring Objective: To determine the extent of natural degradation of heritage resources.

Monitoring was not undertaken because there were no reported occurrences.

RANGE

Monitoring Objective: To assure compliance with forage utilization standards specified in Forest Plan.

Utilization monitoring was measured on 12 allotments in 15 locations. The records are located in the District files. Six allotments were in full compliance; four allotments met the dryland standards and riparian standards for part of the area and did not meet the riparian standards in specific areas; and two allotments did not meet the dryland standards in type conversions and dryland standards were met on rest of the allotment. FY 96 was the first year for implementing new utilization standards, and utilization checks are currently being conducted for FY 97.

Monitoring Objective: To assure that permitted livestock use is managed consistent with Forest Plan direction.

Non-compliance problems were checked on 9 allotments. The records are located on each District. The results varied from full compliance on four allotments; 80% compliance with additional work needed on three allotments; and 50% compliance with plan objectives on two allotments. Examples of non-compliance include cattle drifting outside allotment boundaries and into rest pastures, salt placed in wrong locations, cattle on the allotment before and/or after permitted dates, and failure to meet grazing utilization standards.

Monitoring Objective: To determine current condition and trend of grazed rangeland ecosystems.

Condition and trend transects were not evaluated in FY96. However, information from eight condition and trend transects was collected in FY97. The information will be analyzed and reported in the next monitoring and evaluation report.

Monitoring Objective: To assure that permitted livestock use is managed consistent with attainment of aquatic conservation strategy objectives.

Condition and trend studies have not been set up in riparian areas within range allotments. An interdisciplinary team is needed to select the location and objectives for the study prior to establishment.

Monitoring Objective: To determine the effectiveness of allotment management in reducing conflict with other resource values and uses.

Three allotments were evaluated by an interdisciplinary team. Solutions and monitoring were proposed to reduce conflicts. A fence was constructed on one project site in 1997 to reduce conflicts between livestock grazing and meadow protection. Monitoring to ensure that threatened and endangered plant species' habitat was not degraded on one allotment and to provide a baseline for determining grazing impacts in riparian reserves on another allotment were implemented in 1997.

Monitoring Objective: To evaluate success of structural and non-structural rangeland improvements.

Four rangeland improvement projects were evaluated. Three fence projects were successful with additional maintenance needs identified for one fence. A cattle enclosure was evaluated, and the fence excluding the cattle was not functioning and in need of repair.

RIPARIAN AND AQUATIC ECOSYSTEMS

Monitoring Objective: To determine if the aquatic and riparian resources are being managed according to the standards and guidelines.

Monitoring activities were conducted for three small salvage timber sales by two different interagency interdisciplinary teams. Standards and guidelines to protect or enhance aquatic and riparian resources had been fully implemented on the two sales which had been harvested at the time of the monitoring, and there were assurances that the remaining proposed sale would meet all applicable direction before the contract was advertised. Records are located in the Land Management Planning and Timber Management files in the Supervisor's office.

The results of a project to re-align an off-highway-vehicle trail which was eroding, depositing sediment into a channel, was reviewed for effectiveness. The measures taken were fully successful in maintaining soil on the slope. Records are located in Stonyford/Corning District Hydrology files.

Monitoring Objective: To determine if the aquatic, riparian, economic, and social resources are being managed according to the standards and guidelines for watershed analysis.

One watershed analysis report was reviewed by an interdisciplinary team from the Regional Office. Results are located in the FY 95-96 Monitoring files and the Watershed Analysis files at the Supervisor's Office. Representatives of multiple federal, state, and local government agencies were involved in the Grindstone Creek watershed analysis process. Private citizens were encouraged to provide input. The report was shared widely within all

levels of government, private industry, and private citizens. Areas noted which could be improved include: 1) providing the ecologic and geomorphic basis for changing the size and location of riparian reserves; 2) revealing the most useful indicators for monitoring environmental changes; and 3) providing a contextual basis at the site level for decision makers. Records are located in the Watershed Analysis files at the Supervisor's Office.

THREATENED, ENDANGERED, AND SENSITIVE (TES) PLANTS

Monitoring Objective: To evaluate the effectiveness of Forest Plan standards and guidelines in providing for the maintenance and improvement of TES plant populations on the Forest.

During FY 96, the monitoring program for TES plants was focused on establishing a baseline for potential and existing populations of Howellia aquatilis, the one threatened plant species on the Mendocino. Potential habitat in 50 lakes was surveyed, and five occurrences of Howellia aquatilis were located. Intensive monitoring of these populations was undertaken in FY 97 to determine and prevent habitat degradation which could potentially occur from grazing cattle. Results of this monitoring will be published in next year's report. Information is maintained in the Forest Botany records at the Supervisor's office.

TIMBER

Monitoring Objective: To determine if the terrestrial and aquatic resources are being managed according to the standards and guidelines.

Monitoring activities were conducted for three small salvage timber sales by two different interagency interdisciplinary teams. Standards and guidelines to protect or enhance aquatic and riparian resources had been fully implemented on the two sales which had been harvested at the time of the monitoring, and there were assurances that the remaining proposed sale would meet all applicable direction before the contract was advertised. Records are located in the Land Management Planning and Timber Management files in the Supervisor's office.

Monitoring Objective: To assure that the total volume sold during the Plan period (i.e.; 10 years) is within the Allowable Sale Quantity (ASQ) established by the Forest Plan.

Fiscal year 1996 was the first full year of Forest Plan implementation. During FY 97 and beyond, the cumulative volume sold by fiscal year will be discussed during the timber sale program planning meetings held twice yearly. This information will also be used while developing the Five-Year Sales Program annual report.

Monitoring Objective: To make appropriate adjustments to the suitable timberland base as site specific information becomes available.

No adjustments have been made to date. We are currently mapping interim riparian reserves and have mapped the 100-acre late successional reserves. Once the riparian reserve layer is complete, an analysis of the suitable timberland base will be completed. This should be accomplished in late FY 98.

Monitoring Objective: To assure that harvested areas are reforested within 5 years of final harvest.

The FY 96 Annual Reforestation and timber Stand Improvement Accomplishment Report, Status of Reforestation After Final Harvest indicates that 90% of the area subjected to a final harvest between FY 1988 and FY 1992 has been adequately reforested. Reforestation is usually "certified" as meeting the prescribed stocking levels between three and five years after planting, but should be certified within five years of final harvest. In order to respond quickly to reforestation problems, plantings are monitored using stocking surveys following the first and third growing season. In FY 96, stocking surveys were completed on 1,510 acres.

VISUAL

Monitoring Objective: To assure that project level activities meet the Visual Quality Objectives as established in the Forest Plan.

One timber sale project was reviewed while in the planning phase. Recommendations were made to protect views from recreational residences within the timber sale area by increasing the visual quality objective in the area. Permanent protection may be made through a non-significant Forest Plan amendment, or the Forest Supervisor may decide to modify the visual quality objective for this one project without amending the Forest Plan.

WATERSHED

Monitoring Objective: To determine if the aquatic, terrestrial, economic, and social resources are being managed according to the standards and guidelines for key watersheds.

One small salvage timber sale within a key watershed was reviewed for compliance with standards and guidelines by an interagency interdisciplinary team prior to completion of the planning process. Most standards and guidelines to protect or enhance aquatic and riparian resources were in place, and a watershed analysis had been completed for the watershed. The riparian reserve marking guidelines had not been implemented at the time of review, though trees were marked at that time. The review team was satisfied with assurances that the proposed sale would meet all applicable direction before the contract was advertised. The review team recommended that the National Marine Fisheries Service be given advance notice of ground disturbing projects in key watersheds. Records are located in the Land Management Planning and Timber Management files in the Supervisor's office.

Monitoring Objective: To assure watershed improvements are implemented as scheduled in the Forest Plan.

The Forest accomplished 62 acres of watershed improvements as compared to the Forest Plan average of 350 acres per year. Reasons include: 1) lack of funding and personnel to plan and carry out projects; 2) projects which are being accomplished have a high cost per acre; and 3) conditions have changed on large areas included in the watershed improvement needs inventory.

The watershed improvement needs inventory is updated as new problems or needs are identified. However, updates to remove projects or reduce the size of projects have not occurred. For example, observations made by the Forest Hydrologist indicate that some of the large, high elevation areas previously identified as needing active intervention to recover from sheep and cattle grazing in the late 1800's through the 1920's are improving at desired rates since recent changes in requirements for range permits (primarily in the area between Bald and Hull Mountains). Small sites within this area still require active restoration.

Monitoring Objective: To assure Best Management Practices (BMPs) are implemented as appropriate and are accomplishing the intended purpose.

BMP implementation and effectiveness monitoring was conducted through the Regional BMPEP monitoring effort. Numbers and types of projects to monitor are set by the Regional Office Watershed Staff, and specific projects and locations to evaluate are selected following a Regional protocol. The evaluation is conducted following on the ground completion of the project. The Mendocino had very few projects completed in the assigned types, therefore, we did not meet the BMPEP targets for FY 96. The monitoring is conducted by an interdisciplinary team in some cases and by individuals in other cases. Records are maintained in the hydrology files at the Supervisor's Office.

BMPs were successfully implemented as planned for the projects which were monitored. BMPs were considered to be mostly to fully successful. Erosion control on the skid trails samples was mostly successful. While no sediment entered a stream, rutting and rilling resulted from waterbars being too far apart. Snow removal sampled was also mostly successful in that "windows" allowing snow melt to drain off of the road surface were effective. However, sediment resulting from vehicle traffic on the saturated road bed was carried by the snow melt and deposited in a stream and meadow.

PROPOSED ACTION PLAN

Higher Priority:

Develop a timeline and strategy for completing the FY 97 M&E report prior to FY 98 field season.

Develop an active LRMP monitoring strategy for the FY 98 field season.

Develop and utilize a monitoring form to encourage documentation of monitoring activities and objectives.

Update NFMAS for the entire burn history and take measures necessary to ensure model accuracy for the Mendocino National Forest.

Follow-up assistance and guidance to field evaluators of BMPEP.

Consider or evaluate closing snow covered roads rather than plowing and keeping them open while the road surface is saturated.

Update the watershed improvement needs list.

Develop and implement a strategy to establish condition and trend studies in riparian reserves within active grazing allotments.

Complete mapping of all land allocations in the Geographic Information System. Perform an analysis to determine if there are significant changes to the effects and outputs of implementing the Forest Plan, given the improved analysis capabilities of a spatial data base.

Evaluate the need to amend the Forest Plan to adjust the visual quality objectives in the Ski Hi area.

Lower Priority:

Evaluate the usefulness of comparing actual with predicted Plan costs.

Formally evaluate proposed changes to the research and technical needs lists.

FOLLOW-UP TO PREVIOUS YEAR ACTION PLAN

This is the first year that the Mendocino NF has prepared and distributed an annual monitoring report. Future monitoring reports will include a status report on action plans or follow-up items identified in previous years' reports.

UPDATE OF RESEARCH NEEDS

Changes to consider include:

1. Remove identified research needs to evaluate the economic feasibility of timber harvest designed for increased water yield, and continued research on the effects of logging and road construction on sediment delivery, runoff, and water quality. There is either adequate existing research or measures to increase water yield conflict with current direction designed to protect threatened and endangered species.
2. Add the development of a sediment budget study of various watersheds on the Forest to the list of technical needs.
3. Coordinated updates to soil mapping has been completed and should be removed from the technical needs. Add to the technical needs a link between the soil maps in the Geographic Information System to the text of the soils reports.
4. Continued research on the effects of prescribed burning and other management activities on landslide potential is still needed. Adequate research regarding the effects of timber harvesting and road construction may exist.
5. Add an update of the landslide or land instability risk map through the use of aerial photos to the technical needs.

Changes to the research and technical data needs lists may be completed following an interdisciplinary review and formal decision by the Forest Supervisor.

LIST OF PREPARERS

The following individuals participated in the development of this document and the information therein:

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PUBLIC PARTICIPATION AND DISCLOSURE

Generally, the public has not been actively involved in monitoring efforts or the development of this report. Private citizens who are members of the Northwest Sacramento Province Advisory Committee were invited to participate in implementation monitoring of the Kingsley Glade hazard tree removal project, however, only representatives for other Federal agencies chose to participate. This report will be made available to the public on request and will be mailed to those individuals and organizations on the mailing list for the Schedule of Proposed Actions.

APPENDIX