Forest Plan Monitoring & Evaluation Report

Inyo National Forest

FY 1999 & 2000

Monitoring Activities

A number of activities occurred during Fiscal years 1999 and 2000 as a part of the Forest's on-going monitoring and evaluation program. These can be divided into routine monitoring items and items identified in the Forest Plan.

The Forest routinely monitors large numbers of items including but not limited to the success of reforestation, thinning and release practices; timber sale practices; inventories of cultural sites; and the presence of selected species including Threatened, Endangered, and Sensitive species. Items identified in Chapter 5 of the Forest Plan that were monitored and reported on a Forest-wide basis in FYs 1999/2000 include air quality, soil productivity, inventories of species and inventories of some habitat components, inventories of cultural sites, pest management, range vegetation composition and utilization. The appendix contains additional information.

Outputs associated with timber products, roads, fuel management, and grazing are also routinely monitored and reported in other formats such as the Management Attainment Report (MAR), the All Resources Reporting System (ARR), and the Timber Sale Program Information Reporting System (TSPIRS). Such information will not be duplicated in this report.

Evaluation of Monitoring Results

This document concentrates on Forest Plan monitoring. While gathering this data, it became apparent that an extensive list of items being monitored could be compiled with additional monitoring items being discovered as more Forest employees are contacted. Due to the physical environment of the Inyo National Forest, most projects and their monitoring are very site specific. Little Forest-wide analysis has been done. There is currently no systematic way to collect information on everything that has been monitored. Many times the acknowledged expert or program leader does not know the entirety of monitoring work being accomplished and only a portion of the whole is reported.

Changes to monitoring programs are needed in order to use limited time and funding more effectively. The design of some of the original monitoring requires time intensive measurement. Such monitoring was designed to answer questions involving ecological relationships rather than looking at the question of whether or not management activities are adversely affecting resources.

The Forest's efforts in cooperating with other agencies, organizations, tribes and individuals are extensive and useful. The Forest cooperates with numerous partners in restoration projects, in surveying rare plant habitat, and in monitoring range allotments. The Forest in cooperation with other groups and agencies has assisted in securing Rural Development grants. In FY 1999 several efforts in monitoring, including snag and downed log measurement, and heritage resource recordation, were completed using Elderhostel volunteers.

Action Plan

An evaluation of the monitoring information collected in FY 1999/2000 identified once again the need to reevaluate applicability of standards and guidelines and in some cases the need to refocus monitoring strategies.

There is no provision in the Forest Plan for monitoring Research Natural Areas. A proposal to remedy this condition can be found on page 18 of the FY 1996 Monitoring and Evaluation Report Appendix.

Potential Forest Plan Amendments

- The Plan should be amended to clarify the means of monitoring streambank disturbance and stability.

- The Forest Plan monitoring requirement should be modified to include review of decisions as a way to track VQO implementation.

Status of Previous Recommendations

Previous monitoring reports made recommendations for Forest Plan amendments. Recommendations made prior to FY 1999 which are still pending are listed as well as all recommendations made last year. These recommendations and their disposition follow.

Pre-FY 1999 Recommendations:

Watershed Direction: Modify standards and guidelines such that state-of-the-art methodologies are used.

Furbearer Habitat Direction: Provide additional direction on the management and monitoring of furbearer habitat. **(On hold pending Sierra Nevada Conservation Framework direction)**

Management Direction for the John Muir and Ansel Adams Wildernesses: Provide management direction to ensure protection of these two wildernesses. (**Wilderness management plan Revised Draft Environmental Impact Statement is being written.)**

Snag Retention Direction: Provide direction that ensures adequate number of snags will be protected from fuelwood activities. **(On hold pending Sierra Nevada Conservation Framework direction)**

Prescribed Natural Fire: Allow the use of prescribed natural fire in all wildernesses, and provide necessary guidance for its application. **(On hold pending Sierra Nevada Conservation Framework direction)**

Fiscal Year 1996 - 1999 Recommendations:

- More specific direction regarding implementation of Soil Quality Standards or revision of SQSs.
- More specific direction regarding the implementation of BMPs.
- Inclusion of monitoring plan for Research Natural Areas.
- When the Shady Rest Park was expanded, the park boundary was extended beyond what the Forest Plan had allowed. A Forest Plan amendment was not executed at the time and should be done.

Fiscal Year 1999 - 2000 Recommendations:

- As part of the Forest Plan revision, conduct a Forest-wide assessment of the distribution of successional stages of major vegetation types.
- There is a need to either simplify the Range monitoring requirements or to ensure additional funding.
- Continue and expand current monitoring of riparian areas. Include implementation and effectiveness monitoring.
- With the advent of Ecosystem Management and desired condition statements for the timber base, the ASQ is probably no longer valid and should be revisited. The Forest harvests about 20% of the timber base per decade.
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Update of Research Needs

- Research is needed into identifying the extent and impacts of contaminant transport on AQRV's.

- Updated research needs for heritage resources are included in the 1997 Inyo National Forest Interim 110 Plan prepared under the stipulations of the Sierra PA. These are described as follows: The goals to "Identify and date major geomorphic and geological events; Determine the frequencies, age, and location of past volcanic eruptions, including tephra fall and pyroclastic flow patterns; and Reconstruct past riparian and neoglacial events" have been substantially met. The need to "Reconstruct the succession of past biotic communities" is critical to understanding reference variability for ecosystem management. Current knowledge has been summarized and a research design for future work is in

progress. The need to "Investigate the effects of various botulism bacilli on fish and avifauna populations, and the potential effects of such outbreaks on past human exploitation of these resources" is not a pressing one and has been dropped from the Programs research agenda. On the other hand, the need to "Determine the initial appearance date of the pandora moth (Coloradia pandora) in the region" remains. The answer to this question would contribute to an understanding of past subsistence/settlement patterns. The final goal, to "Determine the effect of historic activities such as mining, grazing, and water diversion on the pre-contact environment" is an important goal for both reconstruction of the aboriginal environment and establishment of reference variability for ecosystem management. It is one of the focuses of historical era research on the Forest.

- A riparian classification should be developed to establish site potential. In addition, the instream flows needed to support riparian resources for each landscape should be determined.

- All listed research or technical data needs are still relevant for sensitive plants. Eighteen interim management guides have been completed since the Forest Plan was signed, and one species management guide is complete. More data regarding the trends, status, distribution, ecological requirements, and/or response to management activities is needed to move the interim guides from interim to full species guide status, and to complete management guides for species that have no guide, interim or otherwise, in place.

- Research is needed to determine whether the current SQSs are appropriate to the Eastern Sierra. If not, appropriate standards must be developed and should include criteria for evaluation of rangeland with regard to long-term soil productivity. Also, research is needed to determine how best to remove watershed structures that are not meeting resource objectives. The quantification of instream flows to meet resource objectives is still a critical need. Research into the quantification of the effects of grazing on watersheds is ongoing but still highly controversial. This research should be expanded and continued.

- Determine whether desired conditions described for Jeffrey pine forests are compatible with sustaining goshawk habitat needs. Expand to include other timber types. Expand monitoring/research to address the question of non-timber harvest impacts, particularly falconry on goshawk reproductive success and population maintenance. Expedite development of landscape level management SSG's or eastside pine habitats. Begin evaluation of prey utilization versus availability. Determine whether a need exists to manage post-fledging areas for prey species.

- Identify limiting factor(s) for nesting success for peregrine falcon.

- Determine carrying capacity for bighorn based on habitat quantity/quality. Define a safe buffer distance between wild sheep and adjacent domestic sheep allotments. Pursue high elevation habitat assessments to locate potential reintroduction sites. Evaluate the potential efficacy of a captive breeding program and determine whether opportunities exist to implement one on the Forest.

- Conduct a manipulative study to determine the impacts of "open, park-like" stands on sustaining marten populations. Examine the impacts of concentrated recreation (e.g. ski area operation/expansion) on marten population viability. Understand the reproductive ecology of marten within red fir, mixed

conifer, lodgepole pine and Jeffrey pine habitats. Compare health of marten between managed and unmanaged portions of the Forest.

- Develop enough baseline data for conservation strategies and more effective standards and guidelines for TES management.

- Determine the historical role of fire in Eastern Sierra shrub steppe plant communities and what role fire should play in its future.

- Determine the importance of large logs in the dry eastside pine forest ecosystems. Are they really needed to maintain wildlife populations? If so at what levels and condition classes? How does the current knowledge of downed logs in west-side ecosystems apply to the Eastern Sierra? Technical research to determine more effective ways to retain downed logs within prescribed burn units.

- Validate the applicability of the MIS species concept. Provide low cost, reliable methodology at a Regional level for monitoring if concept is valid.

List of Preparers

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Gary Milano	Wildlife Biologist
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Location of Supporting Documentation

The supporting information for this report is on file in the various resource departments in the Bishop office and at the ranger stations. Refer to the appendix for specific comments.

Public Participation Plan

A notice of the availability of the FY 1999/2000 Monitoring and Evaluation report will be mailed to those on the Forest Plan mailing list. The report will be posted to the Inyo National Forest web page.

Appendix

Inyo National Forest

FY 1999/2000 Monitoring & Evaluation Report

This appendix contains the background information for the Fiscal Years 1999 and 2000 Monitoring and Evaluation Report. It is organized by functional area as shown in the Inyo National Forest Land & Resource Management Plan Chapter V, Monitoring and Evaluation, pages 246 -- 257. The supporting documentation for the Monitoring and Evaluation Report is kept in the various resource departments of the offices listed.

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Supervisor's Office
873 N. Main
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(760) 873-2400

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P. O. Box 429
Lee Vining, CA 93541
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White Mountain Office
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Mammoth Office
P. O. Box 148
Mammoth Lakes, CA 93546
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P. O. Box 8
Lone Pine, CA 93545
(760) 876-6200

Applies to all Resource Elements

Cost and Benefits of Implementing the Forest Plan

Monitoring Objective 1: Validate predicted versus actual Plan Implementation costs.

Monitoring Technique: Analyze expenditure and allocation.

Monitoring Done in FY 1999/2000: Analyzed allocation and obligation patterns.

Results: Budget is no longer tied directly to the Forest Plan. However, the allocation received is reasonably consistent with the percentage distribution envisioned in the Plan.

Standard of Comparison: 10% difference between predicted and actual costs of implementing the Forest Plan.

Resource Output attainment

Monitoring Objective: Compare actual versus predicted outputs.

Monitoring Technique: Attainment reports.

Monitoring Done in FY 1999/2000: Reviewed MAR reports.

Results: Annual outputs were met.

Standard of Comparison: 10% deviation from predicted outputs over a five year period.

Air Quality

Monitoring Objective: Evaluate compliance with State and Federal Air Quality standards in designated Class I and Class II Airsheds.

Monitoring Technique: Monitor AQRV indicators by: photography, measurement, analysis, and recordation.

Monitoring Done in FY 1999/2000: Air quality was monitored during the summer months in the John Muir Wilderness using a visibility camera on Mazourka Peak and wilderness ranger visibility reports, which included photographs. This effort was funded by Sequoia-Kings Canyon National Park.

Results: The visibility monitoring in the John Muir indicated that air quality degradation is significantly impacting visibility in the John Muir Wilderness.

Standard of Comparison: Any deviation from designated federal and state standards.

Recommendation: The visibility monitoring program should be expanded to include the Ansel Adams Wilderness. In addition, the water quality of lakes should be monitored as an indicator of air quality impacts. Direct measurement of air quality should be conducted to validate indicators and to identify contaminant transport.

Update Research Needs: The technical data needs identified in the LMP were completed. Future research is needed into identifying the extent and impacts of contaminant transport on AQRV's.

Heritage (Cultural) Resources

(NOTE: Since approval of the Inyo Forest Plan, Cultural Resources has been changed to Heritage Resources.)

Mitigation and protective measures

Monitoring Objective 1: Assess effectiveness of protective measures taken to achieve "no effect" status on cultural resources from land use projects and other resource management activities.
Monitoring Technique: On-site inspection: photography, measurement, and recordation.

Monitoring Objective 2: Assess target to complete a total Cultural Resource Inventory by the year 2030.
Monitoring Technique: Monitor status of inventory.

Monitoring Objective 3: Determine the occurrence and extent of vandalism effectiveness of cultural resources public awareness, interpretation, and enforcement programs.

Monitoring Technique: Signing sites, periodic on-site inspection, photography, measurement, and recordation.

In 1999 Heritage mitigation efforts were focused upon sites that through previous monitoring efforts were identified as having received serious inadvertent impacts from previous Forest project activities such as timber harvests, plantation establishment and grazing activities. Additional monitoring efforts have focused upon OHV and dispersed recreational activities, especially when these activities are near significant Heritage Resource locations..

Project related monitoring was utilized to insure that project implementation activities had "No Effect" upon known, recorded Heritage sites. More elaborate photo point photographic monitoring was utilized for both thinning and prescribed fire projects in the vicinity of historic railroad grades in the Mono Mills historic complex.

Results: Results of the monitoring efforts have produced positive results for the resource, but difficult to quantify, other than all projects were retained in "No Effect" status through monitoring and field corrective efforts such as signing, additional site buffer marking, and temporary skid trail closures during fuel wood gathering periods.

Results of our fiscal year 1999/2000 monitoring activities have given us important insights in seven areas of consideration:

1. That site monitoring has a definite positive effect during project planning and during project implementation.
2. That sites are being degraded due to previous unforeseen or unplanned forest and visitor activities.
3. That by using site monitoring we can better plan site mitigation, protective measures, and data retrieval activities.
4. That we are not powerless to lessen the various impacts to Heritage Resources through the implementation of a vigorous monitoring program.
5. That site monitoring is an excellent way to employ volunteer help in the Heritage Program.
6. That monitoring efforts give us increased data resolution regarding previously recorded sites.
7. That monitoring efforts need to be expanded into remote areas of the forest where significant prehistoric and historic remains are located.

Update Research Needs: Updated research needs are included in the 1997 Inyo National Forest Interim 110 Plan prepared under the stipulations of the Sierra PA. These are described as follows: The goals to "Identify and date major geomorphic and geological events; Determine the frequencies, age, and location of past volcanic eruptions, including tephra fall and pyroclastic flow patterns; and Reconstruct past riparian and neoglacial events" have been substantially met. The need to "Reconstruct the succession of past biotic communities" is critical to understanding reference variability for ecosystem management. Current knowledge has been summarized and a research design for future work is in progress. The need to "Investigate the effects of various botulism bacilli on fish and avifauna populations, and the potential effects of such outbreaks on past human exploitation of these resources" is not a pressing one and has been dropped from the Programs research agenda. On the other hand, the need to "Determine the initial appearance date of the pandora moth (Coloradia pandora) in the region"

remains. The answer to this question would contribute to an understanding of past subsistence/settlement patterns. The final goal, to "Determine the effect of historic activities such as mining, grazing, and water diversion on the pre-contact environment" is an important goal for both reconstruction of the aboriginal environment and establishment of reference variability for ecosystem management. It is one of the focuses of historical era research on the Forest.

Diversity

Vegetative Diversity

Monitoring Objective: Ensure that the Forestwide distribution of all successional stages meet Forest Service Guidelines & Prescriptions; that spatial and structural diversity is maintained in riparian areas; and that the prescribed quantity, quality and distribution of snags and down woody material is maintained.

Monitoring Technique: Compare existing and long-term minimum levels. Sample range, recreation, timber and prescribed burn projects to determine the cumulative effects on successional stage, spatial and structural diversity.

Monitoring Done in FY 1999 & 2000: No Forest-wide analysis has been undertaken recently to evaluate the distribution of successional stages. Riparian and snag/down log monitoring is discussed in the Riparian and Wildlife/Snag and Downed Logs sections of this report.

Results: Refer to Riparian and Wildlife/Snag and Downed Logs, results.

Standard of Comparison: 20% change in the expected acreage of successional stages of major vegetation types as a result of forest management activities.

Recommendations: As part of the Forest Plan revision, conduct a Forest-wide assessment of the distribution of successional stages of major vegetation types. Further recommendations can be found in the Riparian and Wildlife/Snags and Downed Logs sections of this report.

Fish

Note: There is a need to identify all aquatic biota, not just fish. As species of amphibians and invertebrates on the INF have been identified as sensitive by the Regional Forester since the LMP was completed in 1988, there is a need to cover these other species and related issues. Questions regarding non-native species management and issues related to biodiversity are emerging that require inventory, monitoring, and assessment.

Threatened and Endangered Fish

Monitoring Objective: Ensure compliance with recovery plan Forestwide Standards and Guidelines.

Monitoring Technique: Population inventories were coordinated with California Fish and Game for existing populations of Paiute cutthroat trout in the Cottonwood Creek (White Mtns.), Lahontan cutthroat trout in O'Harrel Creek (Glass Mtns.), and Owens tui chub in Little Hot Creek. Habitat inventories were completed in the Cottonwood Creek drainage.

Monitoring Done in FY 1999/2000, Results and Recommendations: For Owens tui chub in Little Hot Creek, all terms and conditions in the biological opinion from USFWS were met. Habitat was inspected and determined to support a healthy population of this species. Fish numbers appear to have improved after decline during drought years, although continued monitoring is needed to validate the proper size man-made pools that can support long-term populations of tui chub. The recently signed and completed Owens Valley Multi-Species Recovery Plan Potential identifies the opportunity expand the population and habitat range downstream in Little Hot Creek.

The Paiute cutthroat population in North Fork Cottonwood was sampled by CDFG and indicates there was an increase in 1999 likely associated with recent increases in annual precipitation. However, this population has yet to reach minimum levels required in the USFWS recovery plan for the purpose of re-introduction elsewhere, possibly due to the high levels of fine sediment still existing within the channel. The grazing allotment including this drainage, rested from grazing the last five years, was recently re-analyzed under NEPA, which determined that continued rest for the next ten years was appropriate in part to protect PCT as directed in the recovery plan, and also to restore the condition of fish and watershed habitat. Stream surveys were completed for reaches downstream of the confluence of the North and South Forks. Comparison of results with data collected ten years ago are not completely appropriate due to differences in sampling intensity, however cautionary analysis indicate that the channel has narrowed slightly and residual depth of pools have increased.

To accomplish objectives identified in the Lahontan cutthroat trout recovery plan, the Forest completed fencing of a total of two miles of O'Harrel Creek in 1999. In addition, over-wintering habitat, specifically log sill plunge pools and rock dam pools, were installed in O'Harrel Creek in 1999. Habitat and population surveys scheduled for the summer of 2001 should relate what changes have occurred in the population and habitat since the last surveys were completed. Initial results of summer water temperature monitoring indicate a slight trend of decrease in the reach fenced in 1999, an improvement expected to continue in future years. Population surveys performed cooperatively with CDFG in 1999, in addition to other observations that year, indicates that LCT now occupy habitat over one kilometer farther downstream than observed during previous surveys, an indication that LCT have responded positively to habitat restoration efforts.

Standard of Comparison: Existing population censuses, recovery plan criteria.

Update Research Needs: The 1988 Forest LMP called for a habitat capability model to be developed for the Paiute cutthroat trout. At this time a model is not needed, as long as the habitat of the two Inyo NF populations are maintained and channel function/structure is allowed to continue restoring itself.

Trout Streams

Monitoring Objective: Monitor habitat conditions of resident trout. Ensure that the integrity and productivity of trout streams are maintained or enhanced through the protection of such trout habitat

factors as streambank stability, bank and stream cover, riparian vegetation, and channel bottom composition.

Monitoring Technique: Monitor habitat condition of resident trout. Ensure that the integrity and productivity of trout streams are maintained or enhanced through the protection of such trout habitat factors as streambank stability, bank and stream cover, riparian vegetation, and channel bottom composition.

Monitoring Done in FY 1999/2000, Results and Recommendations: Field data collection with analysis of instream habitat parameters (bankfull width, bank angle, and residual pool depth) using the R5 Stream Condition Inventory (SCI) protocol in the S. Fork Kern, Golden Trout Creek, and Cottonwood Creek (White Mtns.). Results from 1999 stream surveys have been compiled and reported for the S. Fork Kern and Golden Trout drainages, which encompass the native range of California golden trout (renamed from Volcano Creek golden trout in 1999). This report may be downloaded from the Inyo NF web page (http://fsweb.r5.fs.fed.us/inyo). Results from this report indicate that condition in fish habitat within the native range of California golden trout is generally poor, and that the trend in condition recovery will require many decades.

Standard of Comparison: Activities that cause deviation from Forest Service guidelines require an environmental analysis.

Update Research Needs: As with the Paiute cutthroat, research needs in the 1988 Forest Plan called for a habitat capability model to be developed for golden trout. The model for golden trout needs to be developed for meadow and forested reaches in the South Fork Kern and Golden Trout Creek drainages. This is not necessary to complete the conservation strategy for golden trout, but could be helpful in later conservation work. Desired condition parameters for this model have been proposed in the conservation strategy. Peer review is needed to agree on the parameters, and may be incorporated as part of regional monitoring standards. The development of a reference watershed reach appears to be as important as a habitat capability model.

Pest Management

Damage and Populations

Monitoring Objective: Early detection and evaluation of pest related problems on commercial timber lands and other Forest lands.

Monitoring Technique: Aerial and ground surveys, surveillance, timber stands examinations and other resource specific examinations.

Monitoring Done in FY 1999/2000: To determine extent of bark beetle activity and identify new centers, the entire forest is flown annually (some years semi-annually) using protocol established by the Regional Pest Management team. Pockets of dead and dying trees are mapped and the data are passed on to the Regional Remote Sensing lab where they are incorporated into a GIS database.

Results: Monitoring results show that parts of the Forest, particularly where fire has been suppressed and the vegetation left unmanaged, are susceptible to bark beetle attack during periods of extended drought.

Standard of Comparison: Pest related damage levels must not interfere with the attainment of management goals and objectives.

Recommendation: No changes to the monitoring program are needed. However, fire needs to be re-introduced to all forested areas and where appropriate, the forest needs more aggressive thinning.

Protection

Fire Suppression

Monitoring Objective: Validate predictions of acres burned by wildfire for next Forest Plan update.

Monitoring Technique: From fire reports (5100-29) compare actual acres burned with predictive tables.

Monitoring Done in FY 1999/2000: 1934 total acres burned by wildfire were recorded in FY 1999 and 1578 total acres in FY 2000.

Results: : In FY 1999, the wildfire breakdown by type was 23 human caused fires for 17 acres, 51 lightning caused for 24 acres, other causes 1893 total acres. In FY 2000, the wildfire breakdown by type was 25 human caused fires for 743 acres, 62 lightning caused for 835 acres, and no other cause acres. Breakdown by intensity level is not available. Average annual acres burned by wildfire were predicted to be 918 in decade one and 981 in decade two. The actual value is 2x time greater than the predicted value for FY 1998 for the Forest as a whole. However, over the decade actual values fall well within the standard of comparison.

Standard of Comparison: Variation - 50% between actual and predicted acres burned within a Management Area.

Range

1) Monitoring Objective: Ensure proper level of forage utilization in riparian areas and meadows and others. Check AOP compliance. Determine the effects of grazing levels on the range resource. Update AMPs as per Manual and Plan

Monitoring Technique: Conduct field surveys.

Monitoring Done in FY 1999/2000: In FY 1999/2000 the Range Team and Physical Sciences team cooperatively monitored three allotments for vegetative composition and hydrological function as per the LRMP Grazing Allowable Use Standards Amendment. The range team also monitored permit compliance and vegetation use on approximately 2/3 half of the Forest Allotments (35). Range Team

and Physical Sciences team cooperatively monitored proper function condition of the watershed on three allotments.

Results: The monitoring provided adequate information to be incorporated into subsequent Annual Operating Instructions, or NEPA analysis, and for establishment of appropriate allowable use standards on the these allotments. In addition, the use monitoring and permittee self monitoring provided adequate information to allow for annual operating instruction adjustments in the following year. Term Grazing Permits and AMPs were developed or amended via the NEPA/EA process for seven grazing allotments in FY 1999- FY2000 (Templeton, Whitney, Cottonwood, Tres Plumas, Bloody, Alger Lake, Horse Meadow).

Standard of Comparison: 15% deviation from standards as expressed in allotment management plans or Range Management Handbook.

Recommendation: There is a need to either simplify the monitoring requirements or to provide additional funding. The Plan lists $108 thousand in funding needs for range specific monitoring (page 250). One specific item that is complex, expensive to monitor and should be revised is the streambank stability standard.

2) Range Forage Improvement.
Determine effectiveness of browse release projects
Monitor by conducting field surveys following browse release projects. Two Range KV burns were monitored.
Results: The monitoring provided adequate information to be incorporated into subsequent Annual Operating Instructions
Standard of Comparison: 15% deviation from standards as expressed in allotment management plans or Range Management Handbook.

Recommendation: Note noted.

3) Range Condition and Trend
Determine the effects of grazing levels on the range resource. Update AMPs as per FSM and Forest Plan.

Monitor using the techniques of permanent and paced transects.

The Forest assisted the Regional Enterprise Meadow Monitoring Project in establishing vegetation and riparian greenline monitoring plots on seven allotments.

Forest staff established vegetation and PFC monitoring on 1 key area and reread vegetation transects on 5 key areas used by three SUP packstation outfitter-guides.

Results: The monitoring provided adequate information to be incorporated into subsequent NEPA analysis, and for establishment of appropriate allowable use standards on the these allotments and packer use areas.

Standard of Comparison: 15% deviation from standards as expressed in allotment management plans or Range Management Handbook.

Recommendation: Continue monitoring selected allotments annually.

4) Wild Horse and Burro.
Determine effectiveness of wild horse management.
Monitor wild horse numbers, sex ratios and vegetative condition of habitat. The Forest coordinated with BLM Tonopah and Carson City and Dr. Turner. Horse populations were monitored on-the-ground and by helicopter on the White Mountain and Montgomery Pass Herds.

Results: The monitoring provided adequate information to determine that horse populations on these territories are within desired numbers.

Standard of Comparison: 15% deviation from standards as expressed in allotment management plans or Range Management Handbook.

Recommendation: Check conditions of selected key areas on-the-ground.

Potential Forest Plan Amendment: The Plan should be amended to clarify the means of monitoring streambank disturbance and stability.

Update Research Needs: We will not have the time or funding to quantitatively assess range productivity, so we should eliminate that from the research appendix.

Recreation

Recreation Use

Monitoring Objective: Determine total recreation use: check coefficients by ROS class.

Monitoring Technique: RIM system and other sampling techniques.

Monitoring Done in FY 1999/2000: We monitor recreation use using the format in INFRASTRUCTURE. We use information from local tourism bureaus, the Department of Fish and Game, Forest Service permittees, and use figures estimated by our employees.

Results: The results of this monitoring are included in the annual recreation use report. Interpretation of the results is usually limited to support for project planning.

Standard of Comparison: Activities that cause deviation from Forest Service guidelines require an environmental analysis.

Update Research Needs: Recreation use reporting is a national level effort, so no action is needed at the forest level

Riparian

Protection and Diversity

Protection and Mitigation

Monitoring Objectives: Ensure that management prescriptions and Forest Service guidelines adequately protect meadows and riparian areas and their associated values. Ensure that spatial and structural vegetative diversity is maintained in riparian areas. Determine whether mitigation measures for small hydro projects & geothermal development are sufficient & effective in maintaining riparian vegetation & other riparian dependent resources.

Monitoring Techniques: Field surveys. Field review of applied mitigation measures.

Monitoring Done in FY 1999/2000: General riparian condition was evaluated before implementation of most projects. Quantitative monitoring of the Southern California Edison (SCE) Bishop Creek Hydroelectric projects was accomplished to determine the relationships between instream flows and riparian resources. SCE funded the monitoring. Riparian utilization and vegetation composition monitoring was conducted on selected range allotments, along with qualitative assessments of overall riparian condition.

Results: Riparian resource health varies significantly throughout the Forest. Instream flows are often not adequate to protect riparian resources. Results have varied, but monitoring has shown improvement in riparian health on some range allotments.

Standard of Comparison: Activities that cause deviation from Forest Service guidelines require an environmental analysis. A 20% deviation from Forest Service guidelines is allowed.

Recommendation: Continue and expand current monitoring of riparian areas. Include implementation and effectiveness monitoring.

Update Research Needs: No research needs were identified in the LMP. A riparian classification should be developed to establish site potential. In addition, the instream flows needed to support riparian resources for each landscape should be determined.

Sensitive Plants

Sensitive Plant Species Habitat

Monitoring Objective: Detect changes in key populations of each species and assess impacts on selected populations of occupied habitats. Identify key populations that will be used for monitoring purposes.

Monitoring Technique: Population trend censuses; Baseline and past project surveys for input into EAs. Use applicable techniques identified in interim or final Species Management Guides.

Monitoring Done in this reporting period: *Abronia alpina*, a sensitive species, was monitored for population trend and to detect impacts from livestock trampling. Protocols established in the USDA Technical Report "Field methods and monitoring guidelines for *Abronia alpina*, Bdg." and in the species management guide for the species were utilized. In addition, monitoring plots that were established in the early 1980s in selected *Lupinus padre-crowleyi* populations were re-read, using the previously established methodologies. Populations of *Astragalus lentiginosus* var. *kernensis* and *Viola pinetorum* ssp. *grisea* were selected for long term monitoring of population trend, and transects were established in these populations. Qualitative field observations were also made to determine the response to fire of a sensitive species, *Astragalus monoensis*, and a watch list species, *Lupinus duranii*.

In addition, surveys were conducted to further document the distribution and abundance of five sensitive species (*Botrychium crenulatum, Astragalus monoensis, Horkelia hispidula, Viola pinetorum* ssp. *grisea*, and *Astragalus lentiginosus* var. *kernensis*) and six watch list species (*Arabis pygmaea, Botrychium simplex, Ivesia campestris, Salix brachycarpa* ssp. *brachycarpa, Astragalus subvestitus,* and *Cordylanthus eremicus* ssp. *kernensis*). Several of these species were added to the sensitive or watch list when these lists were revised in 1998.

This monitoring and survey work was accomplished with the assistance of volunteers, through partnerships with the Institute for Collaborative Education/Interagency Resource Team, and the Garden Club of America, Partners for Plants program. Due to the large number of sensitive and watch list species on the Forest, we were unable to meet the monitoring timelines identified in existing interim species management guides, as called for in the Forest Plan, with the level of funding available. Each year, priorities for monitoring are identified based on the degree of threat to different species, and past, current, and future projects.

Results: Monitoring for *Abronia alpina* has proven to be an effective tool for evaluating the success of protection measures implemented over the past several years, and for tracking population trends. Livestock trampling damage has been significantly reduced from previous levels, and the population appears static or possibly in a slight upward trend; however, due to large year-to-year fluctuations, long term monitoring will be continued, to more accurately assess population trend.

Lupinus padre-crowleyi population size (number of individuals) appears to have declined based on previous monitoring results. Some portions of the monitoring were not repeated due to a lack of specific instructions regarding the location and methodology of some of the original transects.

As this was the first year that monitoring was established in *Astragalus lentiginosus* var. *kernensis* and *Viola pinetorum* ssp. *grisea* populations, no conclusions can be drawn at this time.

Monitoring of selected populations of *Astragalus monoensis* and *Lupinus duranii* following prescribed burns indicated a strong post-fire response by both of these species, at least in the first year following burning.

Surveys conducted to evaluate the distribution and abundance of several species resulted in the discovery and mapping of 81 new occurrences, greatly adding to our understanding of the relative rarity of these sensitive and watch list plants. This information will be used to more effectively select key populations to monitor in the future, and to determine the most appropriate monitoring intensity for these species.

Standard of Comparison: Forest Standards & Guidelines, Species Management Guides, Sensitive Plant Handbook. No new impacts to plant populations that do not have species management plans unless recommended by the Forest Supervisor.

Recommendation: Sensitive plant monitoring has not indicated a need for any Forest Plan amendments at this time. Continuation of monitoring at established intervals is recommended. There are some species on the Forest where modifications to the existing monitoring protocol are indicated, to more effectively utilize limited personnel resources, and to determine where more intensive monitoring may be warranted. Changes will be implemented the next time monitoring is conducted for those species. Long term monitoring will be established for newly listed species as appropriate, based on the results of the surveys conducted in 1999 and 2000, and available funding.

In FY00, grazing was discontinued on the allotment where *Abronia alpina* occurs. Due to this, the damage sampling portion of the monitoring will be modified or discontinued. The monitoring for population trend for this species will continue in the future and has been incorporated into a draft Conservation Agreement with the U. S. Fish and Wildlife Service.

The monitoring schedule for *Lupinus padre-crowleyi* will be modified to conduct monitoring on a more frequent basis, to ascertain whether the lower population numbers observed during this reporting period truly indicate a decline, or whether they are the result of normal population fluctuation.

Monitoring of *Astragalus monoensis* and *Lupinus duranii* will be continued, to determine post fire response in subsequent years.

Update Research Needs: All listed research or technical data needs are still relevant. Eighteen interim management guides have been completed since the Forest Plan was signed, and one species management guide is complete. More data regarding the trends, status, distribution, ecological requirements, and/or response to management activities is needed to move the interim guides from interim to full species guide status, and to complete management guides for species that have no guide, interim or otherwise, in place.

Timber

Reforestation

Monitoring Objective: Determination of success of regeneration practices.

Monitoring Technique: Described in FSH 2470. Includes sampling of species, survival, planting stock and density.

Monitoring Done in FY 1999/2000: At a minimum we have completed the first and third year survival checks on all plantations, subsequent year survival checks were completed as necessary.
Results: We continue to successfully regenerate harvested areas. **Standard of Comparison:** Described in FSH 2470. A trend in either mortality or growth inhibiting factors that indicated minimum standards will not be met at some future time.

Suitability for Timber Production

Monitoring Objective: Determine if lands classed as not suited for timber production are suitable.

Monitoring Technique: Project evaluation and timber inventory.

Monitoring Done in FY 1999/2000: As each timber compartment is analyzed during the NEPA process, all lands are evaluated for suitability.
Results: Lands identified as unsuitable were correctly classified.
Standard of Comparison: Lands identified as unsuited for any reason are determined suited and are 10% of current suitable lands.

Recommendation: This requirement could be dropped.

Annual Programmed Sale Quantity Acres and Volume Offered and Harvested by Prescription and Forest Type.

Monitoring Objective: Ensure implementation of the timber sale programmed is consistent with the Plan.
Monitoring Technique: Management Reviews, Programmed Harvest Statement, Timber Sale EAs.
Monitoring Done in FY 1999/2000: Program harvest statements and timber sale EAs were reviewed to insure consistency with LMP.
Results: The Forest has followed the program as outlined in Appendix C of the Plan. Table 5 of Appendix C is out of date. The Forest is harvesting well below its ASQ.
Standard of Comparison: 30% of acres and 10% of allowable sale quantity volume for a decade, by prescription, or by forest type.
Recommendation: With the advent of Ecosystem Management and desired condition statements for the timber base, the ASQ is probably no longer valid and should be revisited. The Forest is harvest about 20% of the timber base per decade.

Visual Resources

Visual Condition of Forest

Monitoring Objective: Determine if VQOs are being met as per Plan.

Monitoring Technique: Field reviews and photo points.

Monitoring Done in FY 1999/2000: There is no formal monitoring of visual condition using field reviews or photo points. Decision documents are reviewed to determine if VQO's are being met for project level planning

Results: Monitoring of decisions indicates that most resource management projects (timber, grazing, fire, etc.) consider and are able to meet VQO's. Consideration of VQO's for special use activities appears to be inconsistent, and when it is considered, it appears that the plan standards are not achievable for most development. If visual resources were considered in the analysis, mitigation is usually required in these cases, and a project specific amendment to the plan is approved to support the decision.

Standard of Comparison: VQO and EVC as defined in FSM 2380. 5% failure to achieve the planned VQO on total projects.

Recommendation: The Forest Plan monitoring requirement should be modified to include review of decisions as a way to track VQO implementation.

Potential Forest Plan Amendment: See recommendation.

Trend of Visual Character

Monitoring Objective: Determine if desired character stated in plan is being approached or maintained.

Monitoring Technique: Field reviews with landscape control point photo method.

Monitoring Done in FY 1999/2000: None.

Results: N/A

Standard of Comparison: Plan and PSW-91 of 1973. Indication of trend away from the stated goal.

Visual Resource Improvement

Monitoring Objective: Determine if an active program of visual resource improvement is being carried out.

Monitoring Technique: Field reviews and photo point.

Monitoring Done in FY 1999/2000: There is no program to improve visual resources.

Results: N/A

Standard of Comparison: Plan and planning records and FSM 2380. Less than 50% accomplishment of visual resource improvement projects in any year.

Watershed: Soils and Water

Soil Productivity

Monitoring Objective: Verify adequacy of prescriptions, standards and guidelines in maintaining and improving soil productivity.

Monitoring Technique: Observations & measurements, primarily using transects, focusing on key soil parameters, porosity, cover, and organic matter (including large woody debris), under various management activities to determine if regional soil quality standards (SQSs) are being met. BMP monitoring is completed according to regional direction for BMP evaluation.

Monitoring Done in FY 1999/2000: Soil productivity was monitored in random sample of prescribed burn areas, fuelwood sale areas, and site prep areas, as well as some compaction monitoring in watershed evaluations of specified grazing areas. Due to budget and time constraints SQS monitoring was minimal in the past year.

Results: The soil quality standards for porosity and hydrologic function appear to be met in the areas monitored for prescribed burning and timber related activities, however, the standards for cover, erosion, and downed logs are often not met, especially in areas where rototilling was used for site preparation. Antidotal observations indicate that wind erosion may be more of an issue than previously recognized. BMP's for prescribed fire regarding soils appear to be met. Monitoring in grazing areas indicates that there may be problems meeting the standard for porosity in some areas, especially in riparian and moist soil environments.

Recommendations: Threshold values for soil parameters identified in the R5 SQSs were developed primarily for timbered areas of the west side of the Sierra. There is a need to validate those threshold values or develop more appropriate ones for ecological types common to the Inyo National Forest, especially for the SQSs related to soil cover and downed woody material. Continue looking for reference areas to be used to help set threshold values for soil productivity parameters appropriate to eastside ecological types. Continue working with PSW and other research entities to determine appropriate levels of cover and large woody material.

Standard of Comparison: Improvement and maintenance measures 90% successful; 90% of prescribed BMPs are implemented.

Water Quality Management

Monitoring Objective: Assess compliance with BMP direction and continue to evaluate the effectiveness of BMPs.

Monitoring Technique: Review of prepared EAs, review of contract provisions, field activity reviews, water quality analysis field observations.

Monitoring Done in FY 1999/2000: The implementation and effectiveness of best management practices (BMPs) were evaluated using the R5 protocol.

Results: Certain activities consistently exhibit problems in BMP implementation and/or effectiveness.

Standard of Comparison: Implementation and effectiveness of BMPs are 100% complete. State water quality objectives are met for all projects.

Watershed Improvement

Monitoring Objective: Evaluate effectiveness of watershed improvement measures.

Monitoring Technique: Observations and measurements.

Monitoring Done in FY 1999/2000: Watershed improvement structures were monitored for effectiveness and maintenance needs.

Results: Watershed improvement structure monitoring indicated that the trend toward smaller structures designed to function in harmony with the ecosystem is a large improvement over the larger, high maintenance, "cookbook-type" structures installed in the past. The construction of some of the structures resulted in improved watershed conditions.

Standard of Comparison: 80% survival rate of project over a 10 year period.

Recommendations (for Water Quality and Watershed Improvement sections): The Forest Plan needs more specific direction regarding the implementation of BMPs and SQSs. Continued monitoring of BMPs, SQSs, and watershed improvement structures is critical to making informed decisions regarding the protection of soil and water quality as well as watershed function.

Potential Forest Plan Amendment: See Recommendations.

Update Research Needs (for entire *Watershed* section): Research is needed to determine whether the current SQSs are appropriate to the Eastern Sierra. If not, appropriate standards must be developed and should include criteria for evaluation of rangeland with regard to long-term soil productivity. Also, research is needed to determine how best to remove watershed structures that are not meeting resource objectives. The quantification of instream flows to meet resource objectives is still a critical need. Research into the quantification of the effects of grazing on watersheds is ongoing but still highly controversial. This research should be expanded and continued.

Wildlife

Goshawk

Monitoring Objective: Ensure project compliance with Forestwide standards and guidelines. Determine populations and habitat trend.

Monitoring Technique: Survey all known nest sites within areas managed for timber annually. Survey 50% of known nest sites outside of areas managed for timber annually.

Monitoring Done in FY 1999/2000: All known nest sites on the Forest were monitored both years and approximately 5000 acres of previously un-explored habitat was surveyed. Occupancy of each territory was determined and reproductive success examined where possible. Take of young birds by falconers was assessed both on-site and through cooperation with California Department of Fish and Game. A forest-wide GIS coverage displaying nest locations was updated to include newly documented territories.

Results: Goshawks continue to utilize existing territories. Use fluctuates substantially from year to year, however the cause of this fluctuation is unknown. Monitoring by only visiting known nesting sites is inadequate to draw conclusions regarding impacts of land management activities. Take by falconers continues to occur, however there is insufficient data to determine the effects on overall reproductive success.

Standard of Comparison: Forestwide standards and guidelines and habitat capability models.

Recommendation: Intensify monitoring effort to locate active nests in territories where currently known nests are inactive. Determine number of nest groves currently being impacted by recreation-related activites and consider site closures if impacts are determined to threaten reproductive success.

Update Research Needs: Determine whether desired conditions described for Jeffrey pine forests are compatible with sustaining goshawk habitat needs. Expand to include other timber types. Expand monitoring/research to address the question of non-timber harvest impacts, particularly falconry and recreation on goshawk reproductive success and population maintenance. Begin evaluation of prey utilization versus availability. Determine whether a need exists to manage post-fledging areas for prey species.

Peregrine Falcon Recovery

Monitoring Objective: Verify nesting and reproductive success of peregrine falcons. Implement recovery plan. Two nesting pairs.

Monitoring Technique: Field surveys of historic nest areas and high potential nest sites.

Monitoring Done in FY 1999/2000: Visited four potential nesting sites: Grant Lake, Convict and Lundy Canyons, and Tioga Pass area.

Results: Anecdotal reports indicate that peregrine falcons are occasional visitors to the area, but nesting success in un-verified. Unable to draw conclusions with limited data.

Standard of Comparison: Establishment of two nesting pairs. Comparison of sightings from year to year. No active site in 5 years or decline in sightings over 5 years.

Recommendation: Continue annual field surveys. Spend more time at sites. Update monitoring requirements to reflect results of downlisting species from endangered to sensitive.

Update Research Needs: Identify limiting factor(s) for nesting success.

Sierra Nevada Bighorn Sheep

Monitoring Objective: Insure compliance with Forestwide Standards and Guidelines, and recovery plans.

Monitoring Technique: Coordinate compliance counts with California Fish and Game, evaluate habitat for specific proposed project.

Monitoring Done in FY 1999/ 2000: Forest personnel continued to cooperate with CDFG and White Mountain Research Station personnel during annual herd composition counts. Substantial effort was expended to examine use patterns by domestic sheep in areas adjacent to known bighorn sheep habitat and assure that contact between the two species did not occur. Monitoring of potential predators (primarily mountain lions) intensified throughout the year.

Results: Bighorn numbers continue to remain precariously low. On February 9, 1999 several groups petitioned the U. S. Fish and Wildlife Service (USFWS) to list the distinct population segment of Sierra Nevada bighorn sheep as endangered. The subspecies was emergency listed as endangered on April 20, 1999. A final rule was published by the USFWS on January 3, 2000, extending the endangered status indefinitely.

Monitoring indicates that predation on sheep by mountain lions, modification of sheep habitat utilization patterns and stochastic events such as avalanches have contributed substantially to individual mortality and population decline. Other factors, primarily the possibility of disease transmission from domestic to wild sheep, also pose a substantial threat to population persistence, however to date, there have been no documented occurrences of this locally.

Standard of Comparison: Draft Recovery Plan objectives, Forestwide Standards and Guidelines, previous censuses; +/- 10% change in population levels over a 5 year period or deviation from above documents.

Recommendation: Continue development of an Interagency Domestic Sheep Management Plan and implement any new monitoring requirements identified. Monitor effectiveness of past habitat improvement projects and utilize this information to design additional projects in southern sheep winter ranges. Assess all activities occurring within occupied bighorn habitat and consult with USFWS on those which may affect bighorn sheep.

Update Research Needs: Determine carrying capacity based on habitat quantity/quality. Define a safe buffer distance between wild sheep and adjacent domestic sheep allotments. Pursue high elevation habitat assessments to locate potential re-introduction sites. Evaluate the potential efficacy of a captive breeding program and determine whether opportunities exist to implement one on the Forest. Conduct a literature review to identify whether recreational activities, specifically human contact and sheep-domestic dog interactions, negatively impact bighorn sheep.

Winter Bald Eagle Habitats

Monitoring Objective: Implement recovery plan. Evaluate trends of habitats delineated to meet recovery goals. Determine trend of winter populations.

Monitoring Technique: Survey known winter areas, survey capability of delineated habitats for specific proposed projects.

Monitoring Done in FY 1999/2000: Conducted annual winter eagle survey in conjunction with other Federal, state, and local agencies. In 2000, initiated monitoring of eagles in conjunction with motorized over-snow vehicle program (visited roost/foraging sites during periods of intense use).

Results: Wintering eagle numbers appear to have remained relative constant over recent years. Initial monitoring did not detect disturbance of birds by snowmobiles.

Standard of Comparison: Forestwide Standards and local recovery plans, and Habitat Capability Models and Forestwide Standards and Guidelines; deviation from the above or +/- 25% change in population levels.

Recommendation: Continue annual mid-winter eagle counts and nest surveys. Intensify monitoring during OSV use periods.

Yosemite Toad

Monitoring Done in FY 1999/2000: Visited 80% of all recent and historic known breeding habitats on the Forest to determine presence/absence of toads and what factors may be affecting the species at its breeding sites. In key breeding habitats where human activities were potential affectors re-visited sites on multiple occasions to determine human impacts on toad habitats. Developed a photo library and GIS coverage identifying all known locations and areas surveyed.

Results: Toads were present at all historical locations visited. The numbers of individuals of varying age classes detected were highly variable and could not be assesed for lack of historic population data to measure against as a benchmark. The Tioga Pass population (famous for its long-term research effort) has been virtually extirpated possibly a result of disease. Yosemite toads at breeding sites are potentially being impacted by several affectors. Affectors include taking of juvenile toads for bait by anglers as well as collection for pets, uncontrolled dogs playing in vernal pool breeding habitats where toad eggs and larvae are present, and the presence of non-native fish. In addition, commercial and

recreational stock, and hiker use of meadows and trails in and adjacent to meadows where toads breed is resulting in an unknown level of juvenile and adult mortality from trampling.

Standard of Comparison: No current standards are available. A regional effort is underway as a part of the Sierra Nevada Forest Plan Amendment to define this standard.

Recommendation: Develop a conservation strategy. Develop standards and guidelines at the regional level for recreation management. Implement an aggressive regional monitoring strategy and research effort that is standardized and evaluates all affectors of viability. Forest biologists need metapopulation ecological information to determine affectors on viability and whether these affectors are leading to a trend toward federal listing for input into biological evaluations. Non-native fish are present in some breeding habitats. Their impact on toad breeding and rearing success is unknown and needs to be investigated immediately.

Update Research Needs: Research is desparately needed on eastside populations of Yosemite toad to assess affectors such as human and livestock trampling impacts on toads in breeding habitats, impacts of dogs running and playing in vernal pools used as breeding habitats for toads in high use recreation areas, and how these factors are affecting the viability of the species, as well as the need for recreation management recommendations from reasearchers. Recreation impacts need to be understood in terms of are they contibuting to a trend toward federal listing of the species. The effect of non-native fish as well as the presence of diseases in the population need to be evaluated for impacts to viability of the species.

Willow Flycatcher

Monitoring Done in FY 1999 and 2000: Compiled all historic survey data, and developed a GIS coverage of suitable habitat and known use areas. Point Reyes Bird Observatory (PRBO) researchers have established over 450 point count stations in riparian habitats as part of the Forests Partners in Flight, Eastern Sierra Riparian Songbird Monitoring Study. These point count stations are designed to detect willow flycatcher occurrence.

Results: Suitable nesting and migratory habitat potentially occurs across the entire Forest from the lowest elevations to over 10,000 feet. Whether the majority of this suitable habitat is truly suitable or whether it will ever be occupied for nesting is speculative since the exisiting willow flycatcher population is limited to migratory individuals and three known nesting pairs in one location on the Forest. The PRBO riparian songbird monitoring study has detected numerous observations of migratory willow flycatchers moving through the eastern Sierra riparian habitats at low and moderate elevations to 8,000 feet. The three nesting pairs of willow flycatchers were discovered in Rush Creek in 2001 at Mono Lake as part of the PRBO study and the Forest willow flycatcher survey effort. These are the first nests discovered on the east side of the Sierra in many decades.

Recommendation: Develop a conservation strategy. Develop standards and guidelines at the regional level for recreation management. Implement an aggressive regional monitoring strategy and research effort that is standardized and evaluates all affectors of viability. Continue to fund at the regional level the Inyo's PIF riparian songbird monitoring study to assess willow flycatcher migration habitat use and continued nest searching efforts. Implement Sierra Nevada Forest Plan Amendment survey protocols.

Update Research Needs: Utilize genetic analysis to determine which subspecies of *Empidonax trailii* occurs on the Forest.

Bats

Monitoring Done in FY 1999 and 2000: Cooperated with CDFG to monitor two maternity colonies of Townsend's big-eared bats. Procured specialized equipment for future survey efforts and developed a GIS coverage of roost sites and incidental sightings.

Results: Several species of bats are utilizing caves and mines located throughout the Forest. Insufficient data is available to determine types of use, population levels or population trends.

Recommendation: In June of 1998 four species of bats were added to the Pacific Southwest Region's Sensitive species list. Three of these species likely occur on the Inyo National Forest. It will be essential to increase our knowledge of bat locations and threats to population persistence, develop local habitat capability models, and identify Forest-wide Standards and Guidelines necessary to assure species protection.

Update Research Needs: Determine impacts of affectors such as caving and mine visitation by humans on the local population of Townsends big-eared bats in their maternity and hibernation roosts. Determine extent of western red bat, and pallid bat populations in the eastern Sierra and their habitats, especially maternity and hibernation roosts. Determine whether bats are utilizing timbered areas of the Forest and whether this vegetation type is an important habitat component.

Threatened, Endangered and Sensitive Species Management

Monitoring Objective: Ensure that management activities afford protections of all Threatened, Endangered and Sensitive species as prescribed in Plan.

Monitoring Technique: Sample EAs and conduct filed surveys of completed project.

Monitoring Done in FY 1999/2000: Monitoring of EAs was accomplished by having a biologist participate during all NEPA analysis and prepare a Biological Evaluation for all projects potentially affecting sensitive species and a Biological Assessment for threatened, endangered and proposed species. Field surveys during project implementation were conducted within habitat for bald eagles, Sierra Nevada bighorn sheep, goshawk, forest carnivores, mountain yellow-legged frogs, Yosemite toad, willow flycatchers and several bat species. The Forest entered into consultation with USFWS regarding domestic sheep grazing allotments and habitat enhancement projects to provide protection to the newly listed distinct population segment of Sierra Nevada bighorn sheep.

Results: Insufficient data to draw conclusions.

Standard of Comparison: Any detectable decline in population.

Recommendation: Project implementation and effectiveness monitoring is rarely identified as a priority and is frequently ignored during planning and budgeting. Expand the role of this type of monitoring to become the norm rather than the exception.

Update Research Needs: Develop conservation strategies and more effective standards and guidelines. Focus efforts on recently listed species (both sensitive and endangered) and species recently petitioned for listing (e.g. mountain yellow-legged frog, yosemite toad).

Mule Deer (as amended by Plan Amendment #5)

Monitoring Objective: Insure compliance with, and evaluate effectiveness of, Forestwide standards and guidelines and Management Area Direction.

Monitoring Technique: Evaluate California Fish and Game population counts as necessary to ensure compliance with the above objectives. Evaluate habitat quality and quantity as influenced by specific proposed projects.

Monitoring Done in FY 1999/2000: Continued annual review of CDFG deer herd census and demographic assessments. Monitored post-fire vegetation succession at two locations in mule deer winter range.

Results: Deer numbers increased in 1999 according to CDFG population estimates. This increasing trend has been evident each year since the end of the drought which affected the area during the late 1980s and early 1990s. Bitterbrush (preferred forage species) response to fire differed at the two sites visited. Within the Division fire, both root sprouting and seedling establishment was wide spread. In contrast, surveys on the area burned by the Tom fire detected neither form of recruitment.

Standard of Comparison: 20% loss in the capacity of key habitats (winter range, holding areas, migration routes, and fawning areas); or a 10% decline in deer population levels over 5 years directly attributed to National Forest habitat conditions.

Recommendation: Survey winter range habitats to more accurately define condition and trend and potential habitat improvement projects. Work with CDFG and Forest Service fuels managers to develop interdisciplinary objective driven projects on deer winter range. Consider planting bitterbrush when large fires in critical deer habitat eliminate this forage species.

Update Research Needs: Determine the historical role of fire in Eastern Sierra shrub steppe plant communities and what role fire should play in its future.

Quantity and Distribution of Snags and Downed Logs

Monitoring Objective: Ensure minimum quantity, quality, and distribution of snags, dead and down woody material.

Monitoring Technique: Review EAs and conduct field surveys of completed projects; monitor MIS group.

Monitoring Done in FY 1999/2000: All environmental analyses were monitored by having a biologist participate as an interdisciplinary team member. Field monitoring was conducted in conjunction with several timber sales, prescribed burns, hazard tree removal and the fuelwood collection program. Initial snag recruitment efforts conducted in 1996 were assessed to determine efficacy and use by target species.

Results: Most of the Jeffrey pine forest type continues to lack sufficient snags and hard downed logs. Forest standards and guidelines are not being met in portions of the managed forest landscape. It is unknown what percentage of this landscape is not meeting the objective however cursory field observations indicate it is a substantial part of the 75,000 acre managed forest. Snag and log numbers are generally more than adequate in forest areas such as roadless and wilderness where public and commercial utilization of the forest products does not occur.

Within planned and active timber sales, green trees are identified for later snag recruitment. This work is proceeding, with approximately 1,000 snags being created each year. Snags created in 1996 are beginning to receive use by foraging birds but no nesting has been detected. Existing snag retention within prescribed burns is possible, but requires site prep prior to ignition. Current efforts to retain downed logs within prescribed burn perimeters is not effective.

Public fuelwood collection in 1998 was modified to prohibit the cutting portions of logs greater than 30 inches diameter at breast height (DBH). Law enforcement personnel who patrol the fuelwood program indicate that compliance with this restriction is high. Numerous examples of log fragments are present throughout the forest in both easily accessible and remote areas. Few, if any logs less than 30 inches DBH in decay classes 1 and 2 survive the fuelwood gathering season.

Standard of Comparison: Any detectable decline in snags and downed logs from shown in Forest-wide Standards and Guidelines.

Recommendation: Continue to monitor all vegetation manipulation activities within forest types to assure that existing snags and logs are not removed un-necessarily. Continue to monitor large diameter log retention standard in the current fuelwood program. Continue efforts to retain logs within prescribed burn units and modify prescriptions or pre-ignition preparations as necessary to increase retention. Expand efforts to create and protect logs in decay classes 1 and two .

Update Research Needs: Explore literature to determine what historical log densities were under a natural fire regime. Determine the importance of large logs in the dry eastside pine forest ecosystems. Are they really needed to maintain wildlife populations? If so at what levels and condition classes? How does the current knowledge of downed logs in west-side ecosystems apply to the Eastern Sierra? Conduct research to determine more effective ways to retain downed logs within prescribed burn units.

Relationship between MIS and Represented species

Monitoring Objective: To validate that maintenance of MIS habitat capability maintains habitat for the species they represent.

Monitoring Technique: Field survey to determine if represented species are present.

Monitoring Done in FY 1999/2000: A Partners in Flight (PIF) study continued in FY99 and 00 in partnership with Point Reyes Bird Observatory and BLM to document bird species composition of Eastern Sierra riparian zones and relationships to habitat variables. The study expanded in 1999 to include additional sites in the Mono Basin corresponding to stream restoration efforts. The study will continue through the 2003 avian breeding season. Forest personnel also monitored sage grouse breeding activities to assess population numbers and long term trends. A GIS layer depicting known breeding sites, sightings and winter range was developed.

Results: Preliminary data is available from the PIF study, describing species richness, numbers of individuals, nesting chronology for various species, nest parasitism rates and breeding season. The study has demonstrated that the yellow warbler, a Forest Plan MIS species is not an appropriate indicator in many cases to represent the health of riparian songbird populations for low elevation foothill riparian and mid-elevation montane riparian zones, since the species does not inhabit many of the different riparian habitats present on the Inyo National Forest. Other species and/or suites of species are indicative of the diversity of healthy riparian habitats and their associated riparian songbird communities. The study has indicated localized areas of high parasitism rates on yellow warbler nests by non-native brown-headed cowbirds and a few other representative species. This parasitism rate data raises questions about source or sink population considerations for the yellow warbler in the Eastern Sierra. Do we have self-sustaining populations or are immigrants maintaining the population because our resident birds are failing to produce sufficient young for a self sustaining population? How does habitat quality relate to parasitism rates? Another finding of the monitoring is that nest parasitism rates are not consistent between host species. The study also has provided important nesting chronology data for the Inyo to use in meeting the Migratory Bird Treaty Act as it relates to take and implementation of Forest projects.

Standard of Comparison: 70% of species represented are present.

Recommendation: Consider dropping the concept of an indicator species and rather describe desired conditions for riparian songbird habitat health alond with a suite of species expected to occur by structural habitat gradients and elevation. Incorporate data on migratory bird breeding season with prescribed fire planning to avoid impacts during this critical reproductive period.

Update Research Needs: Validate the applicability of the MIS species concept. Provide low cost, reliable methodology at a Regional level for monitoring if concept is valid.

Other State listed or sensitive species as affected by specific projects. Sierra Nevada red fox, pine Marten, fisher, wolverines, and spotted owl, great gray owl

Monitoring Objective: Ensure protection provided by Forestwide standards and guidelines and habitat capability models.

Monitoring Technique: Appropriate survey methods. Application and development of habitat capability to delineate habitats on project areas.

Standard of Comparison: Past population surveys, habitat capability models, Forestwide standards and guidelines, or lowers habitat capability for species.

American Marten

Monitoring Done in FY 1999/2000: Completed the first phase of marten surveys at Mammoth and June Mountain ski areas. Utilized remote camera detection stations to document marten presence/absence at each facility. Established camera transects along heavily used OSV routes. Updated Forest GIS coverage to include new detections.

Results: Marten are present at both ski areas utilizing remnant timber stands between runs. Marten use appears to be concentrated along the northern periphery of the Mammoth Mountain permit boundary and fairly wide spread at June Mountain. Marten were present along OSV routes, including directly adjacent to trail segments.

Recommendation: Continue monitoring effort to detect changes in use patterns relative to recently collected baseline data.

Update Research Needs: Cooperate with Mammoth Mountain Ski Area to conduct a radio-telemetry study of marten habitat use patterns. Determine whether ski areas provide important habitat areas or are only used peripherally by this species. Assess the impacts of concentrated human activity, night lighting and roads on marten behavior. Understand the reproductive ecology of marten within red fir, mixed conifer, lodgepole pine and Jeffrey pine habitats. Compare health of marten between managed and unmanaged portions of the Forest.

Wilderness

Actual Use Compared to Planned (established) Desired Conditions

Monitoring Objective: Measure changes and compare with limits of acceptable change and evaluate associated environmental effects.

Monitoring Technique: Remeasure campsite condition class rating using Parsons/Stolghren.

Monitoring Done in FY 1999/2000: Ten drainages within the Ansel Adams/John Muir Wilderness.

Results: A total of 665 sites were monitored. Of those 665, the following condition classes were noted: 16% Class 1, 57% Class 2, 21% Class 3, 5% Class 4 and 9% Class 5.

Standard of Comparison: Any decline in campsite conditions Class below Class III. (no reference before 1999 available.)

Mono Basin NF Scenic Area

In addition to the monitoring actions listed in the Forest Plan, the Comprehensive Management Plan for the Mono Basin Scenic Area adopted the following:

Lands and Minerals

Monitor research uses.
Monitor active mining operations through Plans of Operation.

Monitoring Done in FY 1999/2000: None reported.

Results: Not applicable.

Research Natural Areas

(NOTE: There is no provision in the original monitoring plan for RNAs. This is the proposal for consideration)

Ecological integrity of target vegetation types

Monitoring Objective: Track long-term trends in ecological conditions; compare current conditions to previous conditions relative to stated management objectives, baseline data, and recommended actions for each RNA; record any evidence of prohibited use, encroachment or degradation; ensure compliance with research permits.

Monitoring Technique: Field sample surveys of established monitoring sites and photo points.

Monitoring Done in FY 1999/2000: None reported.

Results: Not applicable.

Standard of Comparison: Deviations from baseline conditions described in the ecological survey and establishment report, the RNA management strategy, and Forest-wide Standards and Guidelines.