Appendix F   Freeman Monitoring

Introduction

Monitoring activities on the Freeman Project will be a useful tool to land management. Information from monitoring will then guide future activities and/or adjust current management practices. The following efforts will take place on areas deemed to be of particular concern during project development.

Overall goals of monitoring activities will be:

Provide information useful to mangers applying the principles of adaptive management.

Assist the public in gauging the success of implementing the resource management activities as designed.

Assess the effectiveness of the resource management activities in achieving resource objectives.

Programmatic HFQLG monitoring will occur concurrently(USFS HFQLG EIS 1999), testing the effectiveness of the entire HFQLG Pilot Project, of which Freeman is only one project. Since main HFQLG monitoring sites are determined randomly, it is not known yet how many of these sites will be included in the Freeman project area. Direction for HFQLG Pilot Project monitoring is derived from the HFQLG FEIS, Chapter 6 and the Record of decision (ROD). This monitoring plan is comprised of three parts:

Part I is the process developed to track viability concerns expressed in the HGQLG ROD.

Part II (Implementation Monitoring) has three levels of assessment, Ranger District project evaluations, topic specific questions, and interagency project reviews.

Part III (Effectiveness Monitoring) assesses the degree to which implemented resource management activities meet resource objectives.

The following described monitoring activities will address the purpose and needs of the Freeman Project. In order to do so, post implementation assessment will be project specific.

Monitoring for Watershed Effects

Implementation and effectiveness monitoring for cumulative watershed effects are currently accomplished through the Best Management Practice Effectiveness Evaluation Process (BMPEEP), developed for Region 5. In this process individual BMPs are evaluated on-site where management practices are installed.

Sampling Design

Sites to be evaluated are identified by random or non-random sampling selection procedures. The random selection process for monitored sites involves looking at projects within the Beckwourth Ranger District. Within the selected project, randomly selected units that meet certain issues deemed appropriate by the hydrologist are then designated for monitoring. If the unit does not require monitoring, another is chosen within the project area. Randomly identified sites are very important for drawing statistical conclusions on the implementation and effectiveness of BMPs.

Non-random selected sites are clearly identified and kept separate from the randomly selected sites by the Forest Hydrologist during data storage and analysis.

Non-random selected sites are identified in various ways:

- Identified as part of a monitoring plan prescribed in an EA, EIS or LRMP.
- Identified as part of a Settlement or Negotiated Agreement.
- Part of a routine site visit.
- Sites that are of particular interest to site administrators, specialist and/or management due to their sensitivity, uniqueness and so forth.
- Selected for a particular reason specific to local needs.

California Regional Water Quality Silvicultural Waiver Monitoring

As of January 30, 2003, the State of California Regional Water Quality Board, Central Valley Region, adopted a resolution granting the Forest Service a water quality waiver. In lieu of submitting a report of waste discharge and obtaining waste discharge requirements of timber harvest activities, the Forest Service will, along with other requirements, monitor as required:

BMP implementation and effectiveness monitoring at programmatic level

Project-specific monitoring (Attachment A, CA State Board Water Quality Waiver)

RHCA Monitoring

RHCA monitoring will observe and track sediment transport into streams. Monitoring methods will be similar to BMP Procedure TO1. Two random sample plots per unit would be chosen. Plots would only be placed in the treated portion of the RHCA. There would be a least one sample per 25', 50' and 100' buffer width.

Aspen Unit Treatment Monitoring

Treated aspen units will be monitored for sediment transfer to streams. Like the RHCA monitoring, methods will be similar to BMP Procedure TO1. Sampling plots will be chosen at random.

Effectiveness and Implementation Monitoring for Botanical Resources

Implementation Monitoring

Implementation monitoring will begin in the year following project implementation. The objective will be to answer the following two questions from the HFQLG Monitoring Plan (1999):

- Were TES plants surveyed and protected?
- Were noxious weed introductions prevented and existing infestations suppressed?

Effectiveness Monitoring

Effectiveness monitoring will begin three years after project implementation. The objective will be to answer the following four questions from the HFQLG Monitoring Plan (1999):

• How do TES plant species respond to resource management activities? Randomly selected units without TES plants will also be selected to determine if any new TES plant occurrences have occurred in response to management activities.

• Were existing infestations of noxious weeds eliminated or contained?

• Were all new infestations of noxious weeds eliminated or did some become established?

• Did new infestations of noxious weeds occur during or following project implementation?

A sample pool of botanical sites will be developed to address each of the above questions (Table 2). The number of sites in each sample pool is limited to thirty and if that limit is exceeded then the sites to be monitored will be chosen randomly. If the limit is not reached then every site in the pool will be monitored. The monitoring will be done by forest service botanists who will conduct field visits, and record and analyze the results.

This monitoring plan follows the direction of the HFQLG Forest Recovery Act. Monitoring requirements are detailed in Chapter 6, Monitoring Strategy, of the HFQLG FRA Final Environmental Impact Statement.

Table 2. Pool of potential sample sites in the Freeman Project area

Unit number	Prescription	Species	Occurrence Number	Mitigation
53	Mechanical thin	*Astragalus lentiformis*	ASLE 11-054	Control Area
72	Mechanical thin	*Astragalus lentiformis*	ASLE 11-036B	Control Area
72	Mechanical thin	*Astragalus lentiformis*	ASLE 11-036C	Control Area
72	Mechanical thin	*Astragalus lentiformis*	ASLE 11-036D	Control Area
none	none	*Meesia uliginosa*	MEUL 11-001	Control Area
113	Mechanical thin	*Botrychium minganense*	BOMI 11-002	Control Area
114	Grapple pile	*Botrychium minganense*	BOMI 11-002A	Control Area
114	Grapple pile	*Botrychium minganense*	BOMI 11-002B	Control Area
94	Mechanical thin	*Botrychium minganense*	BOMI 11-003	Control Area
94	Mechanical thin	*Botrychium minganense*	BOMI 11-003A	Control Area
93	Helicopter ITS	*Botrychium minganense*	BOMI 11-003B	Control Area
006	Grapple Pile	*Botrychium minganense*	BOMI 11-004	Control Area
25	Mechanical thin	*Ivesia sericoleuca*	IVSE 11-010B	Control Area
25	Mechanical thin	*Ivesia sericoleuca*	IVSE 11-010O	Control Area
83	Mechanical thin	*Ivesia sericoleuca*	IVSE 11-010P	Control Area

Implementation Canopy Cover Retention Monitoring

Canopy cover (CC) plays a vital role in ecosystem processes and wildlife habitat. The HFQLG standard and guidelines require specific CC management objectives. Implementation of a CC monitoring program will address the needs for guiding adaptive management action. CC monitoring will attend to the following concerns and needs:

• CC will be measured after project implementation to confirm a minimum of 40% CC in DFPZ's, 50% in individual tree selction areas and 60% in riparian habitat conservation areas.

• Provide information useful to managers applying the principles of adaptive management.

• Assess the effectiveness of silvicultural activities in achieving CC objectives.

CC sampling will be done using the GRS densitometer (Figure 1). This common CC sampling tool is also used by the California Department of Fish and Game. Since our management direction measures wildlife in terms of CWHR specifications set by the California DFG, application of the densitometer will lend to overall consistency in management.

Depending upon the size of the area being surveyed, the number of sample points will vary. The goal of sampling will be to cover an area thoroughly without over-sampling. CC will be calculated using the following formula:

$$(\text{canopy hits/sample points}) * 100 = \text{percent canopy cover}$$

where "canopy hits" is the vertical interception of crown cover with the crosshairs as viewed through the densitometer.
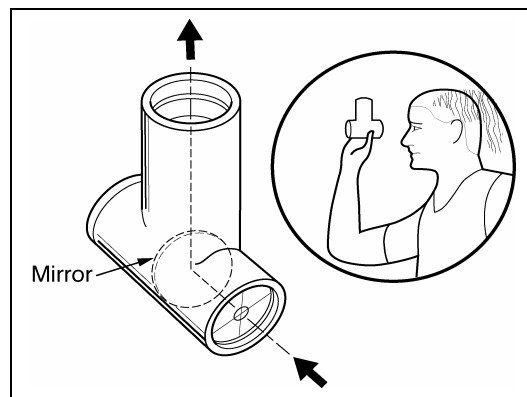

Figure 1. Different perspectives of vertical densitometer

Aspen Effectiveness Monitoring

Aspen effectiveness monitoring will be a useful tool in gauging the success of aspen treatments. Future treatments can either be copied or adjusted, depending on the efficacy of the aspen prescription within Freeman.

Monitoring protocols would mirror those used by the Aspen Delineation Crew in 2005. The crew examined the existing condition of aspen using an analysis done according to US Forest Service Region 5 protocols (USFS 2002). This same analysis would be used to assess the effectiveness of aspen prescriptions in the Freeman Project. If aspen stands show a decrease in the risk of loss (Table F.1.4), it can be interpreted that the prescription is having a positive effect.

Table F.1.4. Factors used by the Aspen Delineation Crew in determining aspen stand loss.

Risk Rating	Defining Factors
Highest	• The clone is being lost from above AND is not being replaced from below. • •Conifer crowns have overtopped the aspen crowns, (primary risk factor), and • •Conifer species comprise at least half the canopy (primary risk factor), and • •Regeneration absent or unsuccessful due to excessive browsing or other factors (primary risk factor)
High	• The clone is being lost from above OR is not being replaced from below
Moderate	• One or more risk factors below is present, but clone not in immediate danger. May include one or more of the factors below: • •Conifer closure > 25%, but < 50% [if > 50%, ranking is High or Highest] • •Aspen cover < 40% • •Dominant aspen are decadent • •Aspen regeneration 5 – 15 ' tall is < 500 stems per acre • •Regeneration being excessively shaded by conifers • •Browsing is limiting extent and numbers of successful (> 5' tall) regeneration
Low	• Clone essentially healthy, either mature trees and /or regeneration for the most part healthy and vigorous, no obvious signs that the clone has receded, < 15% of the clone affected by risk factors.
None	• None of the above risk factors present, mature trees vigorous, regeneration 5–15' tall ≥ 500 stems.

Range Monitoring

Browsing of aspen by deer and cattle will be part of the aspen monitoring being conducted to confirm achievement of project objectives for aspen regeneration. On a sample basis, aspen browse will be monitored before livestock are turned into the pasture and after livestock are removed from the pasture. If livestock use is shown to increase above the 20% standard from the SNFPA, then timing, season, frequency or intensity of livestock use may be adjusted through adaptive management (FSH 2209.13.92.23b). The exact criteria and steps to follow have not been identified as part of this project.

Implementation Monitoring for Prescribed Fire

Elements that may be measured in prescribed fire monitoring may include the following:

- surface fuels

- canopy base height

- flame length (feet)

These measures relate to fire types (surface, active crown, passive crown, etc.) and allow the fuels specialists to model and predict fire behavior.

DFPZ Maintenance Monitoring

Although the DFPZs were designed to remain effective for 10-years, monitoring will begin no later than 4 years after construction is completed. The monitoring plan would be completed at least every two years thereafter. Results of this monitoring would be available to the public. When surface fuel conditions reach a level of five to seven tons per acre, DFPZ maintenance activities may be necessary

Photo plot monitoring

Plots will be placed in RHCA's, edges of burn units (along roads and lines) and near areas of special resource concern. Private property, archaeological, botanical, and wildlife sites are some of the areas of special resource concern. Plots will also be placed near areas with high fuel loading, logs and snags to show fire behavior, consumption, and retention.

The Burn Boss and Fuel Officer will determine the photo plot location during burn plan development. GPS will be used to mark and establish plots for photo monitoring. Photos will be taken as the flaming front is passing through the plot area. Different angles might be taken to best illustrate fire behavior. Plots will be revisited one to two days after ignition to compare and contrast consumption and scorch. Revisits to plots will occur one, three, and five years after ignition. Photos will be taken to illustrate scorch, mortality, and regeneration.

Features that we want to display with photos:

Pre-burn – to show existing fuel conditions.

Photos during ignition - to show fire intensity/behavior.

Postburn – taken 1-2 days post ignition to show burn accomplishments (consumption, scorch)

Postburn – taken 1, 3, 5 years post ignition to show accomplishments and effects of fire behavior. (scorch, mortality, regeneration)