

SIX RIVERS NATIONAL FOREST

LAND AND RESOURCE MANAGEMENT PLAN

MONITORING AND ACCOMPLISHMENTS REPORT

FISCAL YEAR 2013



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TABLE OF CONTENTS

INTRODUCTION	1
AIR QUALITY MANAGEMENT	2
FUELS MANAGEMENT	3
FIRE MANAGEMENT	4
LANDS	6
MINERALS	8
GEOLOGY, SOIL, WATERSHED MANAGEMENT	12
PHYSICAL MONITORING.....	13
AQUATIC AND RIPARIAN ECOSYSTEMS	14
INSTREAM PHYSICAL MONITORING.....	15
FISHERIES	17
SENSITIVE PLANT SPECIES MANAGEMENT	19
INVASIVE SPECIES MONITORING AND TREATMENT-2013	33
WILDLIFE	34
FOREST-WIDE RAPTOR MONITORING	34
FOREST-WIDE PROJECT SURVEYS- NORTHERN SPOTTED OWL & NORTHERN GOSHAWKS.....	36
LISTED SPECIES, PREY & UNDESIRABLE SURVEYS	40

TABLES

TABLE 1. NUMBER OF PRESCRIBED FIRES AND ACRES BURNED	3
TABLE 2. TOTAL TIMBER VOLUME AND BIOMASS FY 2013	10
TABLE 3. FALL-RUN CHINOOK SALMON SPAWNING SURVEYS FROM 2001 TO 2013	17
TABLE 4. SUMMER ADULT SALMONID SURVEYS FROM 2001 TO 2013	18
TABLE 5. RESULTS OF FASCICLED LADY'S SLIPPER MONITORING.....	22
TABLE 6. MOUNTAIN LADY'S SLIPPER RESULTS	23
TABLE 7. ANNUAL RESULTS OF BURIED SEED STUDY (N=70 SOWN IN 2008)	25
TABLE 8. RESULTS OF PREDATION ON REPRODUCTIVE PLANTS	26
TABLE 9. INVASIVE PLANT STATS FOR 2013	34
TABLE 10. 2013 RAPTOR SURVEY RESULTS	35
TABLE 11. SUMMARY OF KNOWN NORTHERN SPOTTED OWL ACTIVITY CENTERS IN THE GORDON PROJECT.....	36
TABLE 12. KNOWN NORTHERN SPOTTED OWL ACTIVITY CENTER IN THE KELSEY PROJECT	37
TABLE 13. KNOWN NORTHERN SPOTTED OWL ACTIVITY CENTERS IN UKONOM WEST PROJECT	39
TABLE 14. RESULTS FROM CAMERA STATION MONITORING	40

FIGURES

FIGURE 1. 2013 BEST MANAGEMENT PRACTICES EVALUATION PROGRAM RESULTS.....	14
FIGURE 2. McDONALD'S ROCK-CRESS MONITORING AND HABITAT	21
FIGURE 3. SUMMARY OF POPULATION FLUCTUATIONS OVER NINE YEARS OF MONITORING LASSICS LUPINE DEMOGRAPHICS. TOTAL S: ALL SEEDLINGS COUNTED THROUGHOUT SEASON; TOTAL R: ALL REPRODUCTIVE PLANTS; END OF SEASON TOTAL: NUMBER OF INDIVIDUALS AT LAST COUNT OF SEASON; MORTALITY: SUM OF PLANTS LOST 1) WITHIN SEASON (BETWEEN FIRST AND LAST COUNTS OF CURRENT YEAR) AND 2) BETWEEN YEARS (BETWEEN LAST COUNT OF PREVIOUS YEAR AND FIRST COUNT OF CURRENT YEAR (NOT CALCULABLE FOR 2013) (FIGURE BY S. CAROTHERS, CNPS).....	25
FIGURE 4. RELATIVE ABUNDANCE OF THE 2 MAIN SMALL MAMMAL GROUPS SAMPLED ON MT. LASSIC OVER TIME, FOR ALL HABITATS COMBINED (FIGURE BY G. FALXA, USFWS)	27
FIGURE 5. RELATIVE ABUNDANCE, BY HABITAT TYPE AND YEAR, FOR ALL MAMMALS SAMPLED ON MT. LASSIC (FIGURE BY G. FALXA, USFWS).....	27
FIGURE 6. WHITE OAK - CALIFORNIA FESCUE HABITAT.....	29
FIGURE 7. ENCROACHMENT BY DOUGLAS-FIR INTO BLACK-OAK-CALIFORNIA HABITAT	29
FIGURE 8. STIGMA SHAPE IS ONE DIAGNOSTIC CHARACTERISTIC DISTINGUISHING OREGON-WILLOW HERB FROM THE MORE COMMON <i>E. CILLIATUM</i>	31
FIGURE 9. RARE PLANT TREASURE HUNT WITH MEMBERS OF THE NORTH COAST CHAPTER OF CNPS	31
FIGURE 10. NORTHWEST YOUTH CORPS CREW ON PATRICK CREEK ROAD ON THE SMITH RIVER NRA. TREATED 27 ACRES OF SCOTCH AND FRENCH BROOM AT OVER 9 SITES	33
FIGURE 11. FEMALE OR YOUNG FISHER IMAGE FROM CAMERA 4	41

INTRODUCTION

The purpose of the Six Rivers National Forest 2013 Monitoring and Accomplishment Report is to disclose accomplishments associated with the monitoring program outlined in the Six Rivers National Forest Land and Resource Management Plan (LRMP) as well as share our accomplishments for 2013. This report also includes activities on the Ukonom Ranger District which is part of the Klamath National Forest, but administered by the Six Rivers National Forest (Forest). This document addresses by resource area, goals, monitoring and accomplishments for Fiscal Year (FY) 2013 that occurred between October 1, 2012 and September 30, 2013. Due to staffing issues, range and recreation results were not included in this year's report.

Monitoring is an important step in the management process to determine if the Forest's management strategy has been appropriately implemented and are effective in achieving the identified goals. Monitoring observes and records both the effects of natural processes and the results of actions permitted by the LRMP. It is conducted at a variety of levels and scales, as deemed appropriate for each resource area. This document will address project level monitoring, LRMP monitoring, and resource-specific monitoring.

Project level and LRMP monitoring, is implemented in accordance with the Land and Resource Management Planning Handbook [FSH 1909.12, Chap. 6, WO Amendment I, 7/88]. It is limited to those actions necessary to comply with the regulations set forth by the National Environmental Policy Act (NEPA) and the National Forest Management Act (NFMA). Resource-specific monitoring is additional monitoring that is required by other laws, executive orders or supplemental plans (such as Threatened and Endangered Species Recovery Plans). Resource-specific monitoring is typically conducted to gather needed resource information and to validate management assumptions. This information can best be displayed by identifying the objectives, methods and results associated with the performed monitoring. Project level monitoring examines how well specific management direction (standards and guidelines) is applied on the ground and how effectively it produces desired or expected results.

AIR QUALITY MANAGEMENT

GOAL

To maintain air quality at acceptable levels for the protection and use of Forest resources and to meet applicable Federal and State standards and regulations. (LRMP IV – 72)

Monitoring

In 2001 the State Air Resources Board (ARB) adopted Title 17 of the California Code of Regulations regarding Agricultural Burning Guidelines. Revisions included a significant emphasis on the development of Smoke Management Plans by prescribed burners, and advanced planning and consultation between prescribed burners, air districts, and the ARB to ensure greater emphasis on smoke prevention and reduction to smoke sensitive populations.

North Coast Unified Air Quality Management District (NCUAQMD) monitoring stations are located where human impacts would be the greatest (i.e., population centers of Eureka, Weaverville, and Crescent City). Prescribed burns and other management practices on the Six Rivers National Forest have little chance of affecting readings at these stations due to their distance from the Forest. These stations show that all Federal standards are met for the NCUAQMD for particulates and ozone, but the State PM10 standard is not met, while the tri-County area is listed as “unclassified” for the State PM2.5 standard.

Siskiyou County monitoring stations are also located where human impacts would be the greatest (i.e., Yreka, Mt. Shasta, Lava Beds National Monument). Prescribed burns and other management practices on the Ukonom District have little chance of affecting readings at these stations due to their distance from the District. State and Federal standards were met for ozone and PM10 attainment was achieved for Siskiyou County in January 2005.

The entire Six Rivers NF is in attainment for National Ambient Air quality Standards (NAAQS) for PM2.5, PM10 and the 8-hr ozone standard of .075 ppm.

The Six Rivers National Forest continues to maintain an Environmental Beta Attenuation Monitor (EBAM) to measure PM 2.5 near fire management activities. Real-time data is made available on the web from this monitor at the [Interagency Real Time Smoke Monitoring website](#). The monitor and a technician capable of setting up and breaking down the device reside on the Lower Trinity District of the Forest and support the NCUAQMD monitors.

FUELS MANAGEMENT

GOAL

Provide well-planned and well-executed fuel management programs (including fire use through prescribed burning) that are responsive to land and resource management objectives. (LRMP IV – 116)

Monitoring

Table 1 displays the number and acres of prescribed burning across the Forest for 2013. The majority of these burns occurred within the Wildland Urban Interface (WUI), where smoke impacts to humans would have had a higher chance of occurring.

Table 1. Number of prescribed fires and acres burned

	2013
Number of prescribed fires – pile burning ¹	12
Acres – pile burning	644
Number of prescribed fires – understory/jackpot	4
Acres – understory/jackpot	246

Neither the NCUAQMD, nor the Siskiyou County AQMD recorded any complaints from prescribed burning on the Six Rivers National Forest in FY12.

In addition to the fire use fuel treatments shown above, mechanical fuels treatments (including thinning, hand piling, yarding, and crushing) accounted for 223 acres of fuel reduction on the Six Rivers National Forest in 2012.

Several large fires occurred on the Six Rivers National Forest during the 2013 fire season and had significant air quality impact to the region. The 22,427 acre Butler Fire occurred on the Ukonom District of the Klamath National Forest (administered by SRF) in late July, early August and had air quality impacts to residents along the Klamath River Drainage in the Orleans area and Salmon River drainage between Somes Bar and Forks of the Salmon. The Corral Complex in the Trinity Alps Wilderness east of the Hoopa Indian Reservation and just north of Willow Creek had air quality impacts on those communities and including Denny, Hawkins Bar and Burnt Ranch at times. Air quality monitors were set up in Hoopa, Somes Bar, Happy Camp

¹ Reflects number of different discrete pile burning projects, not the number of days on each project.

and Denny and Northern California Operations (North Ops) had a team producing air quality assessments for the communities impacted.

FIRE MANAGEMENT

GOAL

Provide well-planned and well-executed fire protection and fuel management programs (including fire use through prescribed burning) that are responsive to land and resource management objectives. (LRMP IV – 116)

Monitoring

Fire and Aviation Management (FAM) staff met with resource staff members to integrate resource information into the Wildland Fire Decision Support System (WFDSS) and Pre-attack planning. Collaboration with resource staff further drafted the forest's Resource/In Briefing Binder, an outline of resource coordination and consultation needs associated with managing wildfire incidents on the forest.

Fire suppression objective LRMP:

The forest staffed 131 regular-appointed fire management personnel year-round and 72 seasonal or temporary personnel for a total of 203 personnel working in Six Rivers National Forest fire management in 2013.

Twelve engines, four water tenders, four handcrews, thirteen patrols, in addition to eight district chief officers and seven Supervisor's Office fire management positions were staffed for the fire season May 15 – October 15 2013.

Sixty eight fires for 36,603 acres were managed and suppressed on the forest. 23,023 acres were human-caused while the remaining 12,579 was naturally ignited by lightning.

The Six Rivers National Forest experienced the 5th busiest fire season in the last two decades. The 2013 fire season is only surpassed by the big fire years of the Biscuit Fire (2002), the Megram Fire (1999), Siege of 2008, and the Orleans Complex of 2006.

Fire activity was minimal large fire activity until the end of July. There were 21 fires across the forest up to this time, although they were suppressed easily and none exceeded an acre in size.

2013 Six Rivers NF Large Fires

- Dance 577 acres human caused
- Butler 22,427 acres human caused
- Corral 12,531 acres lightning caused
- Grizzly 35 acres lightning caused
- Green 58 acres human caused

The first large fire of the season was the human caused fire, the Dance Fire. The Dance fire started on the afternoon of July 29, 2013 within the community of Orleans, CA. It grew to 577 acres and was contained on August 2 at 0600.

On July 31st, two days after the Dance fire was ignited, several other fires were started along the Salmon River corridor, starting at Somes Bar to Sawyers Bar. The Butler fire, the first of these fires ignited, was managed by the Six Rivers National Forest and the other fires were managed as the Salmon River Complex on the Klamath National Forest. The Butler fire grew to 22,427 acres and was contained on October 1. The Klamath's Salmon River Complex grew to 14,786 acres and was contained on October 1.

On August 8, nine days after the Salmon River fires started, a thunderstorm moved over the forest and ignited 24 lightning fires, 22 of which were on the Lower Trinity Ranger District. Half of those fires were at lower elevations near homes and community, while the remainder occurred in the Trinity Alps Wilderness just south and east of the 2009 Backbone Fire and two miles from the Hoopa Valley Indian Reservation. The lower elevation fires were contained and controlled over the next few days, as holdovers were detected. The 11 Wilderness Fires were all proximate to one another and were combined into the Corral Complex. The Corral Complex was contained on October 10 at 12,531 acres. The Mad River district had the Grizzly fire from this lightning event which was contained at 35 acres.

On September 11th, another human caused fire was ignited, but due to the availability and timely response of nearby aerial and ground resources on the Corral fire, the fire was contained at 58 acres at initial attack.

There were several Type 1 and Type 2 Incident Command Teams (ICT) rotated on the Dance, Butler, and Corral Fires. Also, ICT's managed two fires at times; the Dance and Butler were managed together as the Orleans Complex from 8/1 to 8/3, and the Butler and KNF Salmon River Complex were managed together as the Forks Complex from 8/25 to 9/12.

The Forest enforced fire restrictions due to high fire danger in late July until early October. This enforcement increased restrictions on equipment use and the locations of campfires.

A local Type 3 Incident Management Team was coordinated, trained and managed on forest by forest fire management personnel and cooperators. This local team was mobilized for assignment to the Butler, Dance, and Corral fires.

The Forest hosted a significant number of local training sessions and forest fire personnel participated as cadre members for a regional training.

The Forest cooperated with other federal and state agencies, industry and the private sector. Fire and Aviation Management (FAM) staff continued establishment of the California Conservation Corps (CCC) Type 2 handcrew staffed with CCC firefighters and forest leadership. FAM provided employees all summer to participate on Type 1 and 2 fires throughout the region and nation.

The Forest hosted a pre-season stakeholder meeting in Hoopa, California to address expectations for the agency in managing fires on the forest. Critical values at risk were identified and discussions included expectations, smoke impacts on communities and public involvement during wildfires. A post-season stakeholder meeting was held December 11, 2013 to revisit pre-season expectations and discuss what was done well and what needed improvement. Meetings were attended by private, public, and cooperating agencies, such as Karuk, Yurok, and Hoopa Tribes, Cal Fire, National Weather Service, Office of Emergency services, Klamath National Forest, Orleans Somes Bar Fire Safe Council, Northern California Rx Fire Council, Willow Creek Fire Safe Council and others.

LANDS

GOALS

Reduce land management problems and minimize conflicts between uses of National Forest System and adjacent private lands and actively pursue and eliminate illegal occupancy and use. (LRMP IV-118)

LAND ADJUSTMENTS

Monitoring

The Forest Land Adjustment Strategy (LRMP, Appendix O) provides direction of various land adjustment methods to reduce land management conflicts. These methods include land purchase, exchange and donation. In areas of intermingled private and federal ownership these methods can be effectively used to eliminate property line and use problems. All these methods require a willing proponent. Between 2001 and 2005 the Forest had one land donation involving one acre of river access to the Middle Fork of the Smith River. Between 2005 and early 2008 the Forest completed purchase of the 9,483 acre Goose Creek parcel in the Smith River National Recreation Area. The purchase took place in three stages with 3,518 acres acquired in 2005, 1,579 acres acquired in 2006 and the last 4,386 acres acquired in early 2008. In 2012 the Forest completed the purchase in two phases of 1,243 acres in the Hurdygurdy drainage of the Smith River National Recreation Area. These lands were acquired for their remarkable anadromous fisheries values. In 2013 the Forest acquired an additional 2,074 acres in the Hurdygurdy drainage in two phases.

The successful completion of the Goose Creek and Hurdygurdy acquisitions indicates the Forest's Land Adjustment Strategy has been implemented appropriately. These transactions have also resulted in cost savings by eliminating the need for surveying over 45.25 miles of land line for these large in-holdings within the Smith River National Recreation Area (NRA) as well as providing additional resource protection by eliminating potential impacts of logging on Goose Creek and Hurdygurdy, both anadromous streams.

LAND USE AUTHORIZATIONS

Monitoring

Land use authorizations are administered to ensure that the use of National Forest System lands for specific purposes by adjacent landowners and others are permitted and compliant with the Six Rivers LRMP. The most common of these uses include waterlines, access roads, communication sites and utility lines. The Forest has over 300 issued permits and a backlog of over 200 expired permits and 60 new special use permit applications to process. The focus for the program is administration of the existing permits to Forest standards and guidelines, processing the expired permits that meet Forest standards in order to re-issue. The Forest administers 58 permits to standard per year, re-issues 10 to 15 permits per year and issues approximately 10 new permits per year.

From 2001 through 2013 the Forest received 35 verbal and 2 written complaints about the amount of time it takes to get a permit issued or re-issued. The time it takes to complete the environmental review and documentation for permits varies depending on the type of use, location of the activity and the resources that may be impacted by the requested use. Up to 2006 funding for administration of special uses had been limited which substantially contributed to the processing backlog. Starting in 2006 the regulations changed to allow for the charging of processing fees for most lands related special use permit. This additional funding has started to shorten the backlog list and provide for additional processing and monitoring funding.

BOUNDARY MANAGEMENT

Monitoring

The Boundary Management Program includes survey, posting and monumenting of the Forest's property lines. The Forest has approximately 929 miles of property lines adjacent to private property. Through the years, 93% of this line has been posted and their associated corners monumented. Due to wildfire, vegetation growth and vandalism, property lines require maintenance after 25 years. To keep up with maintenance would require doing approximately 29 miles of property boundary a year. The Forest maintained from 3 to 6 miles of property line per year from 2001 through 2006 due to limited funding. Starting in 2007 additional funding became available to do landline maintenance work associated with proposed timber and fuel reduction projects. Between 2007 and 2010 from 32 to 37 miles of property line were maintained. In 2011, the last year of this funding an additional 12 miles of line were maintained. The maintenance work was done by Forest Service personnel and survey contractors. The landline work done in 2008 and 2011 resulted in the discovery of seven encroachments. Resolution of these encroachments is currently in progress. No new property line was run to standard in 2013 and 0.5 miles of property line was maintained to standard in 2013.

MINERALS

GOALS

Manage National Forest System lands that are not withdrawn from mineral entry to encourage and facilitate the exploration, development and production of mineral resources while ensuring that these activities are integrated with the use and protection of other resources. (*LRMP IV-119*)

MINERAL OPERATIONS

Monitoring

Minerals operations for locatable minerals (gold, silver and other precious metals) are controlled by surface use regulations in Title 36 of the Code of Federal Regulation (CFR), Section 228. The Smith River NRA supplements the regulations in 36 CFR 288 with additions regulations specific to the NRA in 36 CFR 292.60. A mineral administrator periodically visits operations to ensure compliance with the accepted Notices of Intent (NOI) and Plans of Operation (POO). Operations not in compliance with plans are followed up with appropriate actions.

The Forest regulates a continuing program of small scale mining activities. The number of active claims and the intensity of exploration fluctuate with the price of gold. The Ukonom Ranger District is the main area of mining interest with the Orleans Ranger District the second most popular area. From 2000 through 2003 there were from four to seven Notices of Intent (NOIs) per year. Mining activities were all monitored for compliance with their operations as they identified them in their NOI. During the 2004 mining season no NOIs were accepted on the Salmon River (Ukonom Ranger District). In 2005 this same section of the Salmon River was closed to suction dredge mining by the State of California, Department of Fish and Game due to the need to protect threatened anadromous fish. As a result of a lawsuit in 2006, the State of California Department of Fish and Game withdrew their closure due to a lawsuit and again opened up the lower Salmon River to suction dredging. In 2008 mining was minimal due to several large fires that burned in the area most of the summer. In 2009 the State of California withdrew all suction dredging permits due to a need to update their environmental support document for the suction dredge permit. As a result there was minimum mineral activity on the Forest. The State's environmental support document for suction dredging is not planned for completion until 2016.

Activities on the Smith River in 2008 include one suction dredge operation on the Middle Fork of the Smith River under an NOI. There was no suction dredging activity on the Forest in 2009 through 2013. There were 3 NOI's but no POO's on Lower Trinity or Mad River Ranger Districts. On the Smith River NRA there were no NOI's or POO's in 2008 through 2013.

Historically (1860's through 1930's) there was extensive hard rock mining on the Gasquet, Ukonom and Lower Trinity Ranger Districts. This resulted in many abandoned mining adits and shafts. Starting in 2003 the Forest began identifying adits and shafts that should be closed. In

2004 the Forest closed two adits. In 2005 the Forest closed 8 adits and 5 prospect holes. In 2006 there were no safety closures. In 2007 there were 8 adits and shafts closed. In 2008 a mining waste removal action was completed for acidic waste rock at the Union Zaar mine site on the Gasquet Ranger District. Environmental clearance work was completed to closure of several additional mining adits. The completion of the closure work is dependent upon future availability of funding. No abandoned mine safety closure work was completed in 2009 through 2013 due to lack of available funding.

MINERAL MATERIALS

Monitoring

Mineral materials (sand, gravel and rock) are regulated by Title 36 of the CFR, Subpart C Section 228.40 – 228.67 and authorized by a permit. Permit conditions are monitored for compliance by a mineral administrator. The mineral materials program provides opportunities for the public to purchase sand, gravel, river rock and pit run material. Most permits are for less than two cubic yards of material to be hand picked from two specific sites, one at Hawkins Bar on the Lower Trinity Ranger District and the other at Dolan's Bar in Orleans. In total approximately 80 low volume mineral material permits are issued annually. These sites are periodically monitored for compliance to the mineral material permit. The Forest does have two commercial sites that are used periodically. One site is one quarter mile below Big Rock on the Trinity River in Willow Creek and the other is George Geary, a borrow pit near the Salmon River. In October, 2011 the Forest sold 27,027 cubic yards of gravel at Big Rock and in October of 2012 sold another 15,083 cubic yards at the same site. In Forest sold no mineral materials from the Big Rock or George Geary sites in 2013. Both the Big Rock and George Geary sites are monitored for permit compliance annually.

Vegetation Management

Goals

Manage vegetation to maintain biological diversity at all physiographic scales. A combination of management strategies in both reserved and matrix areas shall provide a range of ecological conditions, meet a variety of resource objectives, and provide a continuous supply of forest products. (LRMP IV – 74)

Vegetation across the Forest shall be managed to reflect the range of conditions characteristic of recent, historic vegetation patterns and disturbance regimes. A mix of different aged stands will occur across the Forest in proportion to the mix, which appears to have existed in the past few centuries. Large and small patches of young stands will be created through wildfire, timber harvest, landslides and other disturbance. Older stands will be maintained and generated through natural succession, small-scale disturbance, silvicultural treatment, fuels treatment and fire suppression.

Conservation of late-successional vegetation is emphasized to provide essential habitat for species dependent on these forest conditions. The spatial and temporal distribution of old-growth stands throughout the landscape is an important component of ecosystem diversity. The long-term goal of reducing fragmentation in late-successional forests is intended to create a contiguous forested landscape that provides well distributed, functional habitat for late-successional forest related species, such that their populations remain viable and persist over time.

Accomplishments

The Forest Vegetation Management Program coordinated with the Forest Fuels and Wildlife Programs to develop integrated treatments to increase our project efficiency and provide for multiple objective accomplishments on treated acres wherever possible. Every acre of commercial thinning treatment offered in FY12 also accomplished integrated fuels treatment acres for the Forest Fuels Program. Table 2 displays the total timber volume and biomass offered in FY13, relative to timber volume targets.

Table 2. Total timber volume and biomass FY 2013

Volume of Timber	Total Volume In Cubic Feet (CCF)	Green Volume (CCF)
Target Volume FY 2013	24,500	24,500
Awarded Volume FY 2013	27,040	27,040

Special Forest Products

Goals

- Provide a wide-range of opportunities for collection of Special Forest Products (SFP). Manage plant material collected to ensure sustainability and the conservation of plant diversity.
- Maintain awareness of the cultural values placed upon certain plant species and the activity of collecting.
- Educate collectors and the general public about the ecology of the plants collected and harvesting techniques that may reduce impacts to the resource.
- Monitor collection activities to improve our knowledge base regarding tolerance of certain species to collection.
- Encourage commercial production (such as mushroom farming) through rural development programs (LRMP IV – 125).

A new firewood permit policy was implemented in FY13. Major changes included updated maps for all districts, switch from a PAL to SAL fire restriction policy, consistent policy across Forest and allow standing deadwood less than 20” dbh to be cut.

Monitoring

The Forest issued 2,320 permits for firewood, boughs, greenery, mushrooms and other special forest products in FY2012.

Pest Management

Goals

- Minimize resource damage from insects, disease, plants and animals to help achieve resource objectives. Where this damage causes undesirable changes in vegetation, minimize resource damage through integrated pest management (LRMP IV – 125).

Monitoring

Each year in July or August, the Forest conducts aerial pest detection flights over the entire forest to identify new insect and disease infestations and to monitor existing infestations. The total forested area that pests are mapped on is approximately 830,000 acres.

Port-Orford-cedar

The management of Port-Orford-cedar (POC) root disease is an emphasis area for the Pest Management Program. POC root disease can unintentionally be spread by human activities in wet areas where the disease occurs. It can be picked up on tires and shoes and transported to areas that were not previously infested. Control measures that minimize the spread of POC root disease continue to be in place. These control measures include seasonal road closures and barrier placement in areas where the spread of POC root disease is a threat. Monitoring has shown that the disease continues to spread, primarily on existing infestation sites. New POC infection sites are mapped as when they are detected. This new information is currently being used in the analysis of the Smith River National Recreation Area routes designation.

The Forest maintained the POC program on three of the Ranger Districts: Smith River National Recreation Area, Orleans and Lower Trinity.

Sudden Oak Death

Phytophthora ramorum is the pathogen responsible for Sudden Oak Death (SOD). The Forest continues to work with UC Davis Extension and several other State and local government agencies and citizen groups to develop and implement SOD monitoring efforts on the Forest and monitoring and control efforts in Humboldt County.

Recreational activities are a known source for spreading SOD. Because of this, SOD detection surveys continue to be conducted of over campgrounds, day use areas, river access points, trails, Ranger District offices, and guard stations on the Forest. *P. ramorum* has not been detected on the Forest.

SOD continues to get closer to the Forest. Confirmed SOD mortality sites near the Forest are in Wheeler Creek, on the Siskiyou National Forest in southern Oregon (4 miles from Gasquet R.D.), Redwood Creek (7 miles from Lower Trinity R.D.) and North Dobbyn Creek, near the Mad River R.D. This last site is very close to the Forest boundary and is anticipated to be on the Forest within a year. There have also been SOD positive stream detections in Mill Creek, in Jedediah Smith State Park and Grizzly Creek, in Grizzly Creek Redwood State Park.

The USFS Forest Health Monitoring Aerial Survey fly reconnaissance surveys over the Forest every year, including last summer, and Forest Service personnel helped in ground-checking areas of tanoak mortality on the Six Rivers NF. None of the dead trees were due to *P. ramorum*.

These SOD activities are in addition to off-forest monitoring and management activities designed partly to help monitor and control the spread of *P. ramorum* throughout Humboldt County.

SOD Education

The Forest continues to distribute copies SOD related material, as part of an ongoing effort to educate the public about *P. ramorum*. These documents include (1) a homeowners' guide, (2) a firefighter safety guide, (3) a guide for the recreating public, (4) an arborists' guide, (5) a guide for landscapers, (6) a guide for plant collectors, (7) a guide for foresters, (8) a guide to symptoms of *P. ramorum* on nursery plants, and (9) a matrix summary of state and federal regulations pertaining to *P. ramorum* and the movement of forest products.

GEOLOGY, SOIL, WATERSHED MANAGEMENT

GOALS

The primary management goal is maintenance of long-term soil productivity and high water quality; Identify geologic hazards and minimize the impacts from management activities on streams and facilities: Plan and conduct all forest management activities to maintain existing water quality or, where degraded, restore water quality to meet State water quality standards for the North Coast Region; and Maintain the integrity of watersheds and riparian ecosystems, including riparian zones, for the protection or enhancement of riparian-dependent resources (LRMP IV – 70).

Monitoring and Accomplishments

Roads are the primary contributor of sediment which affects water quality. Improving watershed health involves decommissioning roads that are no longer needed and storm proofing the remaining roads. In FY2013 the Forest decommissioned 12 miles of road in the Camp Creek watershed.

PHYSICAL MONITORING

Rainfall Monitoring

Objective: Quantify rainfall amounts at various locations in the Forest, particularly areas that are remote (distant from cities, towns, or other rain gauges) and at higher elevations (most historic stations are in valley bottoms even though a clear positive relationship exists between elevation and rainfall amount).

Methods: Ten tipping-bucket, recording rain gauges were monitored throughout the Forest.

Results: With a few exceptions, rainfall data was successfully collected. Rainfall amounts were found to be higher than nearby valley bottoms except where snow was a significant portion of the annual precipitation. Rainfall data from individual sites will be more meaningful after a longer period of record has been established.

BEST MANAGEMENT PRACTICES (BMPs) – ALL RESOURCES

Objective: To evaluate the implementation and effectiveness of individual BMP's to determine the success of the BMP program. BMPs are mitigations that are applied on projects to reduce the impact of activity on soil and water resources.

Methods: Each BMP has a unique field form assessing specific project activities that may impact water quality. A total of 25 evaluations were conducted during the summer and fall of 2013 (Table 3). Copies of the BMP evaluations are at the Supervisor's Office.

Analysis of the data indicates that 88% of applicable BMPs are being properly implemented and 100% are fully effective on the Six Rivers NF. None of the sites were found to have BMP effectiveness "at risk".

Table 3. Number and type of Best Management Practices monitored

BMPEP Form	Category	Number Inventoried
T01	Streamside Management Zones	3
T02	Skid Trails	2
T03	Suspended Yarding	1
T04	Landings	2
T05	Timber Sale Administration	1
T06	Special Erosion Control and Revegetation	0
E08	Road Surface and Drainage	1
E09	Stream Crossing	1
E10	Road Decommissioning	4
E11	Road Sidecast Control	1
E13	In-channel Construction Practices	0
E14	Temporary Roads	0
E15	Rip-Rap Composition	0
E16	Water Source Development	2
E18	Pioneer Road Construction	0
R22	Developed Recreation Sites	1

BMPEP Form	Category	Number Inventoried
G24	Range Management	1
F25	Prescribed Fire	1
M26	Mining Operations	0
M27	Common Variety Minerals	1
V28	Vegetation Manipulation	0
V29	Revegetation of Surface Disturbed Areas	0
R30	Dispersed Recreation Sites	3
TOTALS		25

Figure 1 shows the results in a 2 x 3 matrix, where a given suite of BMPs are placed into one of six categories: implemented and effective (IE); not implemented, but effective (NIE); implemented, but at risk (IAR); implemented but not effective (INE); not implemented, at risk (NIAR); and not implemented and not effective (NINE). A ranking of NIE results when a BMP evaluation was determined to be not fully implemented but there is no evidence of potential water quality impairment.

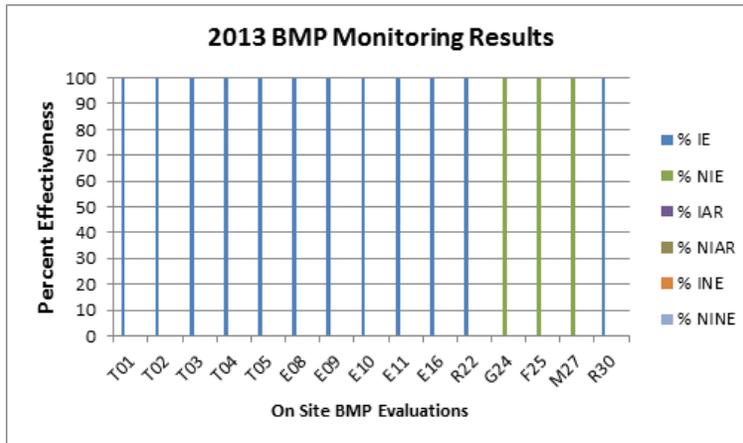


Figure 1. 2013 Best management practices evaluation program results.

However, if one or more of the responses to an implementation question is answered as “not applicable”, the model will rate that evaluation as NIE, when in fact all *applicable* BMPs were implemented.

AQUATIC AND RIPARIAN ECOSYSTEMS

GOALS

Provide diverse, high quality fish habitat capable of maintaining or enhancing ecologically functional populations and stocks of fish at risk: Follow direction outlined in the Aquatic Conservation Strategy, which outlines specific objectives regarding the Forest goals in the management of aquatic and riparian resources; Maintain riparian dependent resources (water, fish, wildlife, riparian-related aesthetics, and aquatic vegetation) and Manage riparian areas to

maintain water quality; stream temperature; stream bank stability; wildlife habitat, connectors, and corridors; and to retain sources of large woody debris for habitat structure and channel stability (LRMP IV – 106).

INSTREAM PHYSICAL MONITORING

TEMPERATURE MONITORING

Objective: To monitor ambient stream temperatures within key watersheds.

Methods: Electronic data recorders (hydrothermographs) are placed in the streams in early summer and recovered in the fall each year. Some sites were also monitored year-round. This year 22 data recorders were placed in Klamath Basin streams . Sites are selected by fisheries and hydrology personnel. This data allows the monitoring of water temperatures, especially as they affect fish and track long-term trends in habitat quality.

Results: The monitoring continues to show that stream temperatures are within the normal range of variability in most streams, but that some streams or tributaries have temperatures that may be too warm for summer rearing of juvenile salmonids. This information provides a basis for identifying restoration opportunities and can highlight sensitive areas where special consideration is needed during planning processes to ensure Aquatic Conservation Strategy objectives are met.

STREAM FLOW MEASUREMENTS

During periods of low flow, most stream habitats are reduced in extent and water quality, and biota can be affected. Throughout summer months, natural low flow conditions can be exacerbated by the lack of snowpack, rainfall and increased water demands. Low flow conditions can have a variety of differing impacts on the biotic community, including reduction in habitat availability, food production, and water quality. Changes in habitat availability occur through velocity, depth, and wetted width reductions. Water quality impacts can include changes in temperature, dissolved oxygen, pH, nutrients, and conductivity. To that end, baseline conditions need to be determined and monitoring for changes in those conditions needs to be systematic and targeted. The objective of this long-term monitoring project is to assess existing summer base river flows at various tributaries throughout the lower-mid Klamath River of the Orleans/Ukonom District. Data collected from this sampling will help in determining the level of summer base stream flow within 13 individual sub-watersheds. The purpose of this low flow monitoring plan is to provide data to further refine management decisions on a basin- or subbasin-wide basis, as well as document actual conditions associated with low flow conditions.

In order to understand the base amount of water that flows through these subwatersheds, we monitor river flow along the lower segment of 13 selected streams in the months of September and October using a modified USGS methodology and Six Rivers National Forest Stream Assessment Protocol. Low stream flow conditions were recorded and analyzed for understanding

baseline conditions in the lower-mid Klamath River as relates to anadromous salmonid habitat. The project provides long-term data to assist in making management decisions to mitigate the effects of low flows; assist in making decisions regarding possible surface water withdrawals; and improve our knowledge regarding instream conditions during low flow episodes.

STREAM CONDITION INVENTORY (SCI)

Stream condition inventory surveys use a four-pass method and measures pool frequency, maximum pool depth, particle size distribution, percent pool tail fines, percent shade/sun, streambank stability, streambank angle, channel geometry (cross-section and width to depth surveys), and large woody debris. Streams surveyed in 2013 were: Madden Creek, West Fork North Fork Eel, North Fork Eel, and West Fork Van Duzen. A survey of Pilot Creek could not be completed as we were not granted access permission through private property to access the reach.

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FISHERIES

SPAWNING SURVEYS

The objective of walking streams to see how many fish have spawned is to monitor and assess the current and overall status of fall Chinook populations. Spawning surveys also help monitor the effectiveness of habitat use and conditions. Information from this monitoring can be used for future habitat improvement projects. In the Smith River basin, spawning surveys were conducted in selected reaches of Craigs, Goose, Griffin, Hurdygurdy, Idlewild, Jones, Middle Fork, South Fork, Monkey, Patrick and Siskiyou Fork. Chinook and steelhead redds and adults were observed in all streams except Griffin and Idelwild. Redd density per mile ranged from 0 to 20. These and the adult counts (below) were done in partnership with the Smith River Alliance and California Department of Fish and Wildlife. The Klamath Basin Fall Chinook Collaborative Spawning Ground Survey and Six Rivers National Forest protocol is used for fall surveys. Table 3 shows the total number of redds for the last decade, numbers with * include results from Ukonom Ranger District.

Table 3. Fall-run Chinook Salmon Spawning Surveys from 2001 to 2013

Fall- Run Chinook Spawning Surveys		
FiscalYear	ORD Total Redds	LTRD Total Redds
2001	265	353
2002	393	455
2003	614	194
2004	504	251
2005	133	104
2006	88	101
2007	409	138
2008	273*	143
2009	660*	unavailable
2010	706*	128
2011	549*	116
2012	1,296*	629
2013	1,100*	503

This consists of weekly surveys of key anadromous reaches to identify trends in spawning and success in habitat improvement. Some expected results include: population assessments and

trends of fall Chinook salmon; distribution and habitat use data for management and recovery planning; watershed analysis and project specific analysis. The surveys could not be accomplished without the help of the following partners: Watershed Stewards Project, California Department of Fish and Wildlife, Middle Klamath Watershed Council, Salmon River Restoration Council, Smith River Alliance, and Yurok Tribe.

SUMMER ADULT SALMONID SURVEYS

The objective of this project is to derive local estimates of summer steelhead, spring Chinook and coastal cutthroat trout populations and habitat use. Methods and techniques used in these surveys are intensive downstream "direct-observation" snorkel surveys. Participants are fully trained in free-diving and safety techniques/exercises derived by the US Forest Service Washington Office and modified by Six Rivers National Forest.

Some of the expected results from these summer surveys are population and trend monitoring, as well as identification of key holding pools for management and recovery planning.

Table 4. Summer Adult Salmonid Surveys from 2001 to 2013

	Cutthroat less than 12"	Cutthroat greater than 12"	Spring Chinook	Steelhead	Half-Pounders
Smith River					
2001	329	235	2	1	1
2002	330	283	14	4	2
2003	238	198	14	1	8
2004	335	196	14	14	0
2005	326	268	5	15	23
2006	642	567	11	25	17
2007	489	199	3	9	0
2008	784	235	2	6	0
2009	494	171	0	10	58
2010	535	433	0	3	113
2011	1053	207	5	8	117
2012	790	532	2	19	153
2013	638	341	3	11	3
Klamath Basin <i>Includes tributaries on Klamath and SRNF</i>					
2001	n/a	n/a	10	1153	753
2002	n/a	n/a	58	1728	993
2003	n/a	n/a	111	913	375
2004	n/a	n/a	15	587	456
2005	n/a	n/a	8	295	257
2006	n/a	n/a	0	384	330
2007	n/a	n/a	14	187	270
2008	n/a	n/a	5	200	184
2009	n/a	n/a	unavailable	154	290

	Cutthroat less than 12"	Cutthroat greater than 12"	Spring Chinook	Steelhead	Half-Pounders
2010	n/a	n/a	89	170	256
2011	n/a	n/a	105	233	296
2012	n/a	n/a	286	130	315
2013	n/a	n/a	96	200	526

KLAMATH TRIBUTARY COHO SURVEYS

Coho salmon are just one of the species in the Klamath basin that has been affected by the declining habitat. Coho need cool, clean water to spawn and rear. Yet such habitat conditions have become increasingly difficult to find. Due to the distinctive conditions of the basin, the Klamath coho salmon, which are part of a broader group consisting of southern Oregon and northern California, have been recognized as an ESU (Evolutionarily Significant Unit) and have been listed as threatened under the Endangered Species Act (ESA) (National Marine Fisheries Service [NMFS], 2001). The status of the Klamath coho has prompted many debates over the use of water in the Klamath basin and the coho has become an icon for restoration efforts. The purpose of this ongoing cooperative project is to estimate the presence and absence of juvenile coho during the summer months within tributaries of the lower-mid Klamath, and to determine their existing range and distribution, as well as utilization of thermal refugia.

Direct observation techniques were undertaken within key salmonid habitat found on the Orleans/Ukonom District using Six Rivers National Forest and CDF&W protocols. Fish crews estimated the number of juvenile coho, and record summer rearing habitat and thermal refugia utilization. During FY 2013, a total of 37 miles of stream were assessed to get a better understanding of coho migration patterns, timing, distribution, and thermal refugia usage. Cooperative survey data have been collected since the mid-1990s and this information was provided to the NMFS in preparation of the Southern Oregon/Northern California Coho Recovery Plan

SENSITIVE PLANT SPECIES MANAGEMENT

GOALS

Maintain the health and well-being of threatened, endangered and sensitive species and their habitats. Take all steps necessary to ensure that actions authorized, funded, or carried out by the Forest Service are not likely to jeopardize the continued existence of these species. Manage other botanical resources on a sustainable basis. (IV-83)

Population Monitoring

McDonald's rock-cress (*Arabis mcdonaldiana*) Federally Endangered species

Sampling Year: 2013

Objectives:

1. Conduct monitoring on a subset of populations with priority placed on those sub-populations that have not been visited since 1983 to ascertain population condition. If present, apply Level 1 monitoring (LRMP H-2) which is a semi-quantitative, plotless sampling method whereby habitat is searched and counts are made by life stage (fruit/flower/rosette).
2. For those populations that have been repeatedly monitored, identify those that have had notable downward trends.
3. Determine the extent of habitat impacts related to human activities if any.



Background: McDonald's rock-cress's range centers around the North Fork Smith River Watershed on the Smith River National Recreation Area. The species is associated with the serpentine barrens and rock outcrops of the area. Extensive surveys were conducted in 1981 and 1983 that established the general distribution of the population in the North Fork Smith. Since 2010, botany staff has been revisiting and monitoring sub-populations that have not been visited at minimum in the last 10 years. These historic populations were prioritized for monitoring to determine if still extant. If located, a monument was installed in the center of the population, global positioning (GPS) locations were recorded and population size was determined.

Results:

Objective 1): There are 37 documented (since 1983) sub-populations for McDonald's rockcress on the Smith River National Recreation Area. Two remote sub-populations were visited and monitored in 2013; habitat surveyed was approximately 40 acres. With these most recent visits, 23 sub-populations (62% of population) have been revisited and monitored since 2000. Current population size estimate is 8,126 ramets with sub-populations ranging in size from 5 to 1416 ramets (defined as a member of a clone since McDonald's rock-cress is rhizomatous, determining an individual is not always clear; therefore plant clusters are counted).

Those sub-populations that have not been visited in over two decades represent about 37% of the population whole and are either located in the High Plateau or Diamond Creek gorge. All of these areas are very remote and often require stream crossings.

Objective 2): Since 2000, monitoring of two sub-populations resulted in negative finds, leaving 35 sub-populations considered extant until further monitoring can be conducted on those documented sub-populations that have not been visited since 2000.

Based upon 2013 sampling results, the current condition represents a reduction in population size by approximately 870 plants. The plant counts of the one sub-population that had not been visited since 1983 due to its remoteness, accounted for the bulk of the reduction—sub-population size went from an estimate of 750 plants to 60. Factors accounting for the reduction could be a valid biological decline, timing of 2013 visit in late May which could have missed individuals that sites in an area that did not appear to be a strong candidate as McDonald’s rock-crec habitat.

Objective 3): No habitat impacts were identified.

Summary: Of the sub-populations monitored, approximately 60% are extant since 2000. Based upon monitoring in 2013, population size has decreased by 870 plants. Cause for decrease is unknown but could be a function of sampling error more than a biological basis. Given the habitat (Figure 2) in which McDonald’s rock-crec occurs—serpentine outcrops, barrens and Jeffrey pine/Idaho fescue forests—impacts since exploratory mining occurred in the 1970s have been minimal to non-existent.



Figure 2. McDonald's rock-crec monitoring and habitat

Recommendation: Continue to pursue monitoring in the High Plateau/Diamond Creek area to determine if at least a proportion of the sub-populations that represent that area in the North Fork Smith watershed are extant.

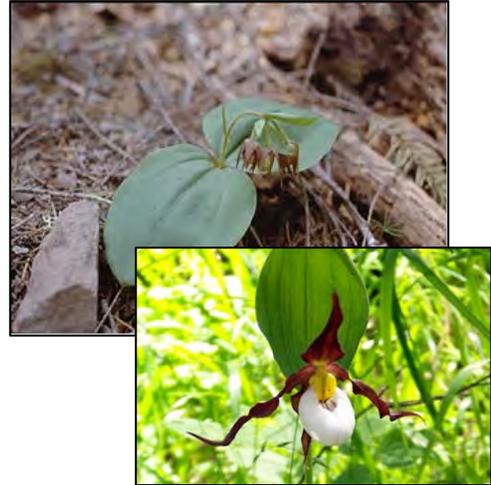
Fasciated lady’s slipper (*Cypripedium fasciculatum*) and mountain lady’s slipper (*Cypripedium montanum*)- Forest Sensitive Species/Survey and Manage Species
Sampling Year: 2013

Objectives:

1. Conduct monitoring on a subset of populations with priority placed on those sub-populations that have not been visited in the last 5 to 10 years to ascertain population condition. If present, apply Level 1 monitoring (LRMP H-2) which is a semi-quantitative, plotless sampling method whereby habitat is searched and counts are made by life stage (fruit/flower/rosette).

2. For those populations that have been repeatedly monitored, identify those that have had notable downward trends.
3. Determine the extent of habitat impacts related to human activities if any.

Background: Fascicled lady’s slipper orchid is a relatively wide ranging species extending from British Columbia south into the Rocky Mountains of Montana, Idaho and Colorado and west into California. Within the state the species is distributed south to Santa Cruz Mountains on the central Coast north to the Klamath and southern Cascade Mountains. Habitat on the Forest is primarily mid-mature and older Douglas-fir or white fir dominated vegetation types, and within these types often riparian or lower one-third slope settings. The biology of *Cypripedium* species is relatively complex involving the establishment of mycorrhizal fungal relationships during various life stages of the plant, reproduction that is both sexual and asexual. In light of this annual emergence is not guaranteed which influences monitoring results and thus trends analysis if conducted only periodically.



Results:

Objective 1): Fascicled lady’s slipper- There are 12 sub-populations known to Six Rivers National Forest and occurring on all Districts; the date of the oldest documented occurrence on the Forest is 1996. Four sub-populations were monitored in 2013; habitat surveyed was approximately 45 acres. As of 2013, ten or 83% of the sub-populations have been visited in the last four years. All but two sub-populations have been visited in the last 10 years.

Mountain lady’s slipper- There are 19 sub-populations extant on Six Rivers, occurring on the Lower Trinity and Mad River Ranger Districts. Two historic sub-populations have likely been extirpated at Cold Springs, Lower Trinity RD and Fish Lake, Orleans RD. All sub-populations have been revisited and monitored, as applicable, in the last 5 years.

Objective 2): Fascicled lady’s slipper- Across the population, the current population size is 142 plants. Sub-population sizes range from no plants detected to the largest at 71 plants. At all but one of sub-populations monitored in 2013, plant counts declined (Table 5).

Table 5. Results of Fascicled lady's slipper monitoring

Sub-population number	Count last monitored	Current count
CYFA-1	3	0
CYFA-3	26	5
CYFA-4	0	0
CYFA-7	0	5

As stated in the background information, interpreting trends without annual monitoring of each sub-population can be difficult. Without an overt sign of disturbance, the cause of reductions could range from environmental conditions that did not result in plant emergence during that year to mapping errors. In the case of CYFA-4 in the above table, two plants were observed in 2002, but subsequent monitoring in 2010 and 2013 did not locate any plants. In the case of CYFA-7, the first monitoring documented 2 plants in 2001, then none in 2006 and 2008, yet in 2013, 5 plants were counted. Monitoring of these two sub-populations results exemplify the challenges of interpreting monitoring data of *Cypripedium* species based upon periodic monitoring.

Mountain lady's slipper- In 2013, five sub-populations were monitored; all resulted in detecting few to no plants (Table 6). Of interest, we did see a “resurrection” of two sub-populations after 10 or more years. This situation highlights the challenge raised above for fascicled lady's slipper pertaining to the interpretation of trends when monitoring is so sporadic.

Table 6. Mountain lady's slipper results

Sub-population number	Count last monitored (1998-2002)	Current count
CYMO-2	13	9
CYMO-3	0	0
CYMO-4	0	1
CYMO-5	0	2
CYMO-19	31	19

Objective 3): No habitat impacts were identified.

Summary: For fascicled lady's slipper, the most recent monitoring indicates seven of the 12 sub-populations are extant and sub-population sizes are relatively small; likewise for mountain lady's slipper with 19 extant sub-populations of very small size.

Recommendation: Attempt to revisit those sub-populations that have yielded negative results since last monitored to determine if still extant.

Lassics Lupine (*Lupinus constancei*)- Forest Sensitive Species

Sampling Year: 2013

Objectives:

1. Continue annual monitoring at the permanent monitoring sites (4 transects) using Level 3 monitoring (LRMP H-2) which involves demographic sampling throughout the growing season. Continue monitoring (Level 1) of the slope of Mt. Lassic based on the four permanent transects laid out this year using laser range finder techniques. Slope sampling will emphasize flowering plants.



2. Determine the seed germination and seed banking capacity of *Lassics lupine*.
3. Identify small mammals, their abundance, and habitat utilization.
4. Evaluate the effects of caging to the viability of the population.

Background: *Lassics lupine* is endemic to the Mt. Lassic area of the Mad River Ranger District. The population covers a very restricted range within the Lassic's area and thus is ranked as G1 defined as few as 6 populations globally. Its prime habitat is serpentine barrens with two sub-populations occurring in pockets of open Jeffrey pine. Concerns for the population lead to annual demographic monitoring which has taken place annually since 2001 at one site, since 2002 at another and since 2004 at a site located in association with Jeffrey pine. In addition to demographic monitoring, associated studies surrounding reproduction/recruitment have also occurred: seed germination, seed production rate, seed banking in the soil and associated small mammal studies. The latter is associated with the predation and herbivory of *Lassics lupine* by small mammals (e.g deer mice and chipmunks). Observations of small mammal impacts lead to the caging of a proportion of plants, particularly reproductive plants, to better ensure seed production. Demographic monitoring and associated studies were undertaken in partnership with North Coast Chapter of the California Native Plant Society, U.S. Fish & Wildlife Service, California Department of Fish and Wildlife, and Humboldt State University (HSU), Department of Biological Sciences.

Results:

Objective 1: Overall population size estimate was approximately 984 plants. This figure is based upon monitoring along three transects (438 plants in different age classes) and counting adult plants only (N=546) in slope settings that are not conducive to transect installation. The plant count associated with the transects, represented an increase in individuals from 2012 to 2013. Increases occurred in both the seedling and reproductive stage classes. Figure 3 shows the results over nine years.

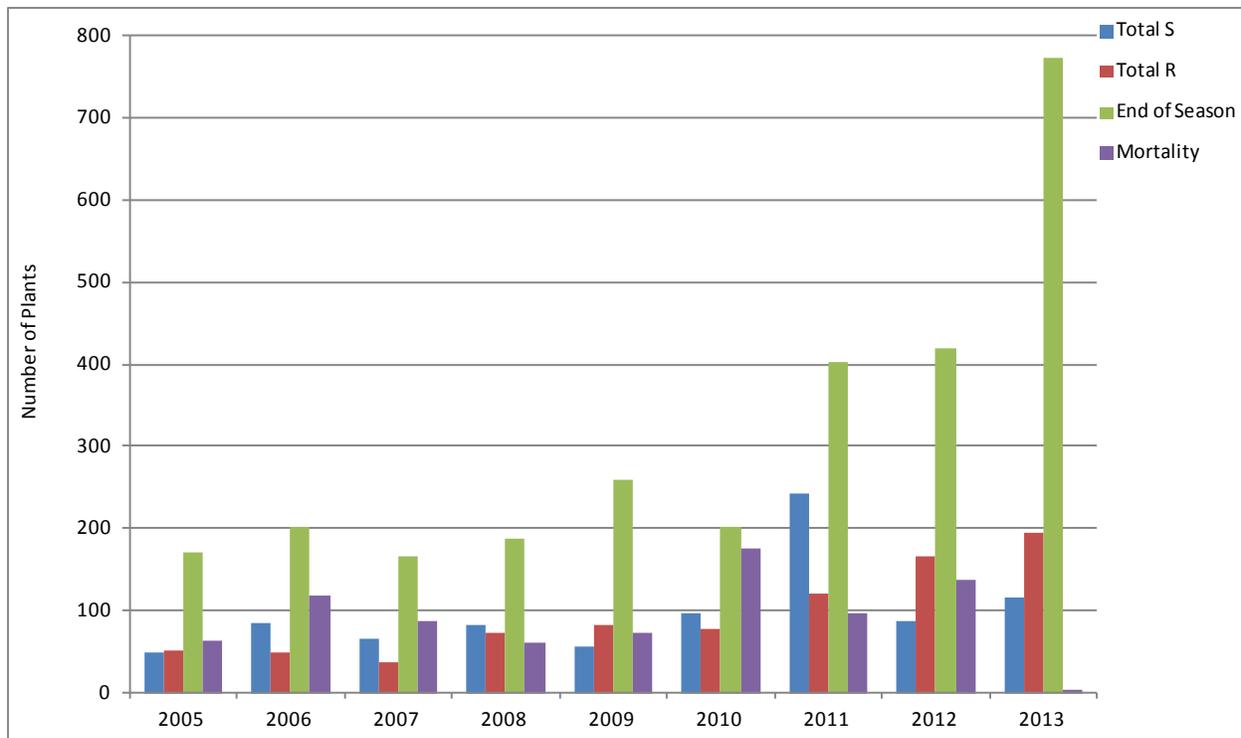


Figure 3. Summary of population fluctuations over nine years of monitoring Lassics lupine demographics. Total S: all seedlings counted throughout season; Total R: all reproductive plants; End of Season Total: number of individuals at last count of season; Mortality: sum of plants lost 1) within season (between first and last counts of current year) and 2) between years (between last count of previous year and first count of current year (not calculable for 2013)) (Figure by S. Carothers, CNPS).

Objective 2: Seed burial study- In order to determine seed germination rates and provide



estimates of seed dormancy and longevity, 70 seeds were buried in 5 mesh bags in 7 plots arrayed along a transect in an unoccupied area on the Saddle in October 2008. Annually, since 2009, a bag from each plot is removed and the seeds that have not germinated are tested to determine if the seed is alive but dormant or not viable. In 2013, one bag was retrieved at 5 of the 7 coordinates (two bags were not found). Table 7 shows the total viable seeds retrieved over five years at 7 coordinates.

Table 7. Annual results of buried seed study (N=70 sown in 2008)

	2009	2010	2011	2012	2013
# of viable seed	36	18	17	11	13

Table 7 indicates that about 18% of the seed originally sown can remain viable in the soil for at least 5 years.

Objective 3: In partnership with the U.S. Fish & Wildlife Service and California Department of Fish and Wildlife, small mammal trapping was conducted for another year. Small mammals have been identified as a concern for Lassics lupine both in terms of complete mortality of individuals but also seed predation. The primary objective of the sampling is to monitor small mammal abundance patterns, both over time (among years) and among 3 different habitat types present on Mount Lassic.

Based on the sampling, small mammal abundance on Mount Lassic was relatively high, particularly for deer mice (Figure 4). For all habitats combined, deer mice were the most abundant since sampling began in 2005. Across habitats, the capture rate for all small mammals was highest in the chaparral compared to the barren/open habitat or forest.

Germane to the predation records kept under objective 2, exclosures (wire-mesh cages) were installed over reproductive plants to continue the seed predation/seed production study initiated by Helen Kurkjian for her thesis. The objectives of this were to measure: 1) potential seed production (in absence of seed predation—caged plants), and 2) actual seed production (uncaged plants). Table 8 shows the results of the plant/seed predation study.

Table 8. Results of predation on reproductive plants

Locale	# of plants	# Reproductive	# R Caged	# predated flower clusters	Est. # predated fruits
Red Lassic	65	35	31	8	unknown
Saddle	289	138	22	156	2855
Forest	84	22	0	9	unknown
TOTAL	438	195	53	173	2855

Figure 4 displays the relative abundances of the primary small mammals over 9 years. In regards to habitat utilization, based upon 2013 results, most captures of small mammals occurred in the chaparral habitat which has been consistent over the years samples (Figure 5).

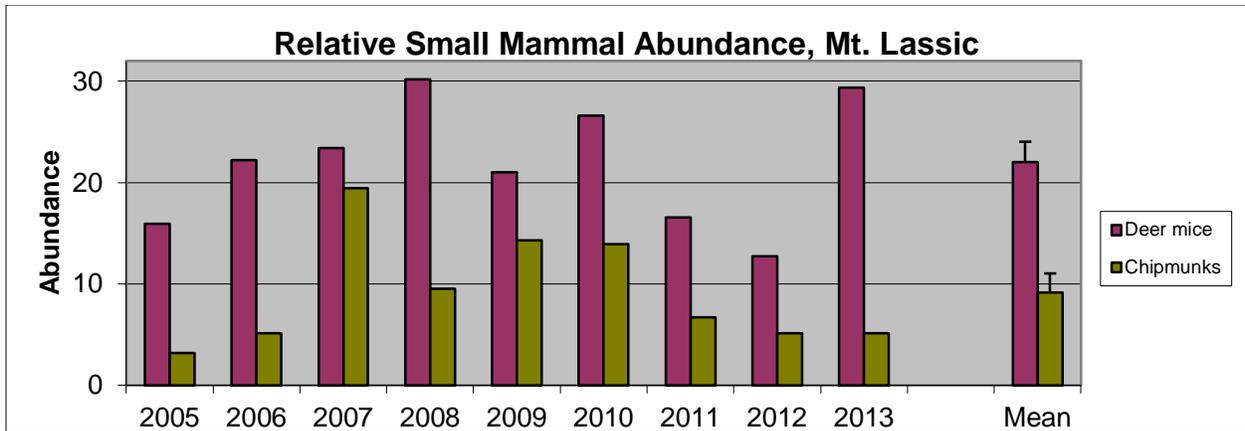


Figure 4. Relative abundance of the 2 main small mammal groups sampled on Mt. Lassic over time, for all habitats combined (Figure by G. Falxa, USFWS)

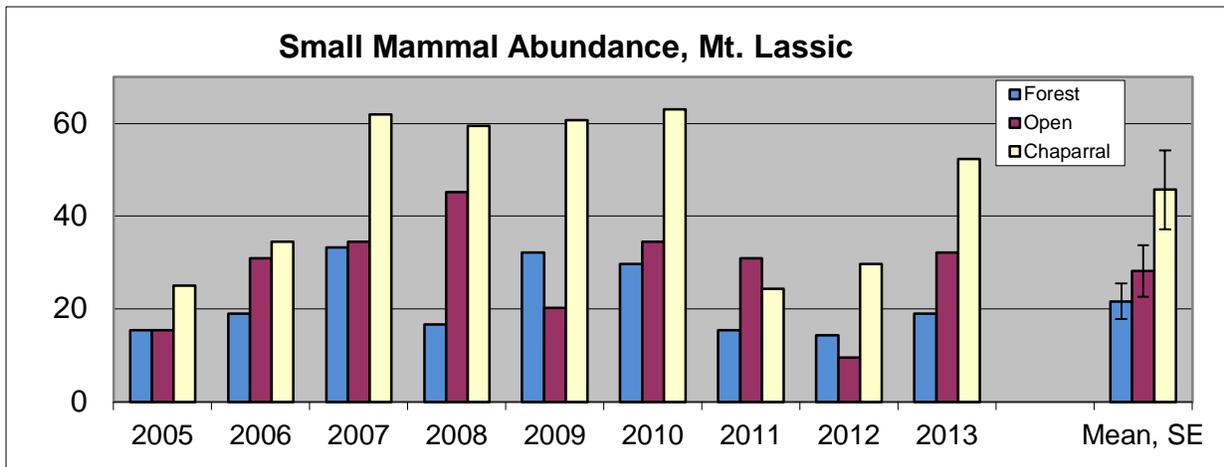


Figure 5. Relative abundance, by habitat type and year, for all mammals sampled on Mt. Lassic (Figure by G. Falxa, USFWS)

Objective 4: Using demographic monitoring data collected over the past ten years and undertaking research of seed production and seed predation rate, a population viability analysis (PVA) was conducted by graduate student Helen Kurkjian in 2012 at Humboldt State University, under the direction of Dr. Eric Jules. Her research indicated that:

- without exclosures, the population would decline at all sites; at the current rate of seed predation, there is a >68% chance that all populations would become extinct within 50 years. The PVA recommended that caging reproductive plants be continued in the short-term while long-term measures are sought to reduce seed predation.
- The PVA also recommended an examination of the relationship between seed predation and the proximity of the encroaching forest and chaparral edges, in order to determine if the elevated seed predation rate is driven by vegetation change.

Summary: 2013 results showed an increase in the population totals, with increases in both reproductive individuals and new recruits (i.e. seedlings). We have learned that depending on the seed production, a proportion of seeds in a population can remain dormant and viable in the soil for at least 5 years. Capture rate of small mammals was higher in 2013 than in the previous year and chaparral continues to be the preferred habitat for the small mammals. Habitat utilization and more to the point, availability, relates to the Lassics lupine in that the spatial relationship of habitat used by small mammals to the Lassics lupine may very well determine the rate and frequency of predation. Based upon a previous study (Carothers 2008) involving review of historical aerial photography from the 1930s and 1940s to present, indicates that the upper north slope of Mt. Lassic that was once barren is now covered with young conifer trees extending into lupine habitat from the forest to the north of Mt. Lassic. Furthermore, patches of buckbrush (*Ceanothus cuneatus*) have expanded on the south slope and saddle, also into lupine habitat. Essentially, the distribution and extent of chaparral and forest patch sizes have increased over the past 60 years and this expansion could be playing a significant part in the predation by small mammals on Lassics lupine.

Another variable that can contribute to cumulative effects to the viability of Lassics lupine is the variation in regional climate over the past six years which indicates a high degree of variability in weather conditions between years and within a season (the most variation in soil moisture occurs in June and July). Weather data were correlated with Lassics lupine mortality, particularly in regards to relatively high summer temperatures and low summer precipitation (Imper 2012).

Recommendation: In partnership with the US Fish and Wildlife Service, develop a Conservation Strategy that will identify active steps to take to best ensure the long-term viability of Lassics lupine. Focal areas would likely include out-planting in suitable sites and vegetation manipulations—specifically prescribed burning—with associated small mammal studies perhaps conducted in partnership with Humboldt State University or Pacific Southwest Research Station.

Tracy's sanicle (*Sanicula tracyi*) – Forest Sensitive species

Sampling Year: 2013

Objectives:

1. To monitor sub-populations of Tracy's sanicle included in the Conservation Strategy for this species.
2. To identify any impacts to plants or habitat concerns.

Background: Tracy's sanicle is a biennial species associated with oak woodlands and oak patches within conifer stands. The species is relatively well distributed throughout the Mad River Ranger District. The species also occurs on private lands adjacent to the District. Based upon the ecological investigation conducted in 1980 and more recently, the tracking and documentation of occurrences relative to project level surveys, we have a fairly good idea of

habitat characteristics. The combination of Tracy’s sanicle distribution and knowledge of habitat information lead to the development of a Conservation Strategy for the species in 1999 with subsequent revisions. The Conservation Strategy incorporates 54 sub-populations across the Mad River Ranger District comprising 2,306 acres. Most of these sub-populations are within the Douglas-fir-Black Oak, Douglas-fir-White Oak plant or White Oak vegetation sub-series (Figure 6) with California fescue in the understory.



Figure 6. White oak - California fescue habitat

In 2013, twelve additional sub-populations were visited and monitored bringing the total sub-populations monitored since 2010 to 51 or 94% of the population total. As a part of the



Figure 7. Encroachment by Douglas-fir into black-oak-California habitat

Review of the monitoring data in 2010 indicated that a number of populations had not been visited in over ten years. As a result sub-populations were prioritized for monitoring.

Results:

Objective 1: Between 2010 and 2012, 45 sub-populations or 83% of the sub-populations in the strategy had been monitored. Population estimate within the strategy is 9,333² individuals. Sub-population sizes range from 2-442 plants.

monitoring 472 acres of habitat were surveyed. One of the sub-populations visited in 2013 resulted in negative results. Data on this sub-population were first collected in 1996 with a plant count of 9. In 2002, monitoring did not locate any plants, likewise during this last monitoring effort. Of the sub-populations monitored, 42% declined in the number of plants present, 33% increased and the remaining stayed about the same.

Objective 2: Of the twelve sub-populations monitored in 2013, seven

² Corrected total from 2012 LMP report.

had evidence of disturbance or habitat changes: three areas were impacted by livestock trampling, one by logging, three by high cover of the non-native grass in particular dogtail grass (*Cynosurus echinatus*), and one affected by conifer encroachment (Figure 7).

Summary: Of the sub-populations visited in the strategy, all were extant but one. While the majority of sub-populations monitoring in 2013 declined in the number of plants present, there are many variables that could contribute to these changes including the given season, biennial habit and perhaps seedlings were under-counted, habitat conditions shifting beyond baseline, different surveyors over time, and the issue of disturbance noted at some of the sites.

Recommendation: Remove one of the sub-populations from the conservation strategy due negative finds in 2002 and 2013. Attempt to revisit the remaining three sub-populations that have not been visited since 2010. Review information on Tracy's sanicle conservation areas relative to evidence of encroachment by conifers. Working with the fuels program, submit a proposed project to implement thinning in areas that coincide with the conservation areas. When opportunities arise, work with range management to consider methods of reducing cattle livestock in the conservation areas as the concern is not so much the direct impact to plants but the ground disturbance that could be increasing habitat for non-native annual grasses moving into occupied habitat.

Oregon willow-herb (*Epilobium oreganum*) Forest Sensitive Species

Sampling year: 2013

Objective:

To conduct surveys adjacent to the verified Oregon willow-herb sub-population to locate additional sub-populations.

Background: Oregon willow-herb is found in serpentine wetlands and stream sides at low to moderate elevations (<6700 ft) in the Klamath Range of southwestern Oregon and northwest California. In California, Oregon willow-herb populations are documented by the California Natural Diversity Database (CNDDDB) as occurring in Humboldt, Siskiyou, Trinity, and Shasta Counties, with 11 sub-populations on Six Rivers National Forest. In early 2000, peer review of collections made in Humboldt County, near the Lassics area indicated that the *Epilobium* sp. in that area is not *oreganum* but a more common willow-herb species. Given the taxonomic ambiguity for this species, between 2011 and 2012, botany staff revisited eight of the 11 suspected sites to verify these sub-populations.

Of the eight sub-populations visited in Humboldt, Del Norte and Trinity Counties, Oregon willow-herb was verified at only one site in Trinity County, just over the border from Six Rivers on Sierra Pacific Industry land. The other sites visited resulted in finding the relatively common sub-species of *Epilobium ciliatum*. One diagnostic feature that distinguishes Oregon willow-herb is the presence of a 4-parted stigma compared to round or club-like stigma (see Figure 8).

Vouchers were collected and deposited at Humboldt State University's Vascular Plant Herbarium.

	
<p><i>Epilobium ciliatum</i> ssp. <i>glandulosum</i>- Humboldt County</p>	<p><i>Epilobium oreganum</i>- Trinity County</p>

Figure 8. Stigma shape is one diagnostic characteristic distinguishing Oregon-willow herb from the more common *E. ciliatum*

Results:

In 2013 suitable habitat adjacent to the documented sub-population near the border of Six Rivers was surveyed for Oregon willow-herb. This survey sponsored by Six Rivers NF in conjunction with the North Coast Chapter of the California Native Plant Society (CNPS) under the Rare Plant Treasure Hunt program created by CNPS. As a result of the survey, 2 new sub-populations were located on Six Rivers NF in Trinity County in the South Fork Trinity watershed.



Figure 9. Rare plant treasure hunt with members of the North Coast Chapter of CNPS

Summary: Many of the historic locations of suspected Oregon willow-herb have been re-determined as other species of *Epilobium sp.* Currently there are only 2 sub-populations of Oregon willow-herb on Six Rivers National Forest.

Recommendation: Botany staff will work with Humboldt State University to re-determine/annotate vouchers with corrected names. In addition, staff will submit updates to the

California Diversity Database. Searches of other potential habitat will be fostered with CNPS through their Rare Plant Treasure Hunt program.

Strategic Surveys for Fungi: Survey and Manage

Sampling year: 2013

Objective:

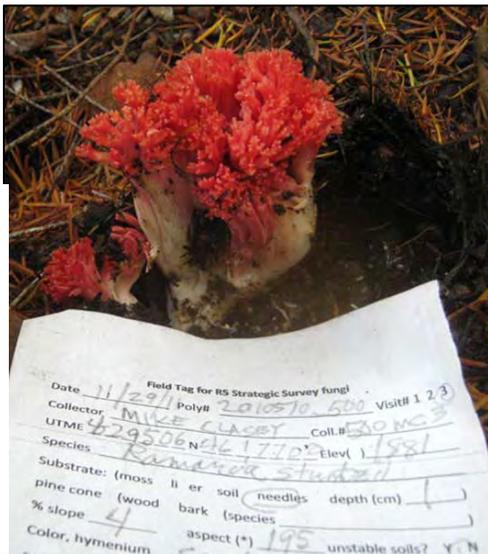
To implement strategic surveys for Survey and Manage fungi across the California portion of the Northwest Forest Plan Area in order to find new detections.

Background: The 2001 Record of Decision specified for *Category B* fungi, (those fungi considered rare and not practical for pre-disturbance surveys), that Agencies conduct strategic surveys (USDI/USDA 2001, pg. 9 Standards and Guidelines).

Strategic surveys began in the Northwest Forest Plan Area (NWFP) in 2001 with Random Grid surveys, in 2005 and 2006 with purposive surveys (surveying suitable habitat), in 2008 and 2010 with known site surveys (visiting known sites to better understand the habitat and ecology of the species). These surveys took place within the Klamath Physiographic Province of the NWFP area.



Gomphus clavatus, photo by S. Davison



Ramaria stantzi, photo by S. Davison

In 2011, the Region and some Forests provided resources to support purposive surveys across the entire NWFP area: Klamath and Cascade Provinces. The effort was planned and administered out of Six Rivers National Forest by Botany Staff and was extended into 2012 and 2013. Areas identified for surveying were stratified by land allocation (i.e. Late-Successional Reserves), seral stage (late-mature to old-growth), vegetation type, and relative access. The results below summarize the results of the surveys from 2013 in the Klamath and Cascade Province.

Results:

Of the acres of potential habitat in the Klamath Province 23% (1288 acres) were surveyed, with 319 of those acres on Six Rivers, and in the Cascade Province, 47% (895 acres) were surveyed. Voucher specimens were collected for all Survey and Manage (SM) fungi detected and subsequently sent to experts to verify identification. All positively identified SM fungi were submitted to San Francisco State Fungi Herbarium. Collection occurred on all of the National Forests involved: Six Rivers (26 SM species), Klamath, Shasta-Trinity, Mendocino, Lassen and Modoc. 310 Survey &

Manage fungi collections were made representing 54 distinct species, one species, *Arcangeliella crassa*, is new to California. All data have been entered into an ACCESS database for analysis and will be entered into NRIS.

Summary: The cumulative results indicate that some of the taxa are more common than suspected, others are primarily associated with the Cascade Province and old-growth stands in late-successional reserves may provide enough habitat for persistence of species. These data, those collected in the spring primarily in the Cascade Province, and those gathered during a repeat survey effort in FY2013 will be analyzed in full and presented to the Regional Interagency Executive Committee.

INVASIVE SPECIES MONITORING AND TREATMENT-2013

GOAL

Sites treated to eradicate invasive exotic plant species shall receive follow-up monitoring. (LRMP IV-130, 20-20)

Objective:

To reduce the incidence of invasive or noxious weed re-establishment via seed or re-sprouting by monitoring sites and retreating as necessary (LRMP IV-130).

Results:

In keeping with the Six Rivers Invasive Plant Implementation Strategy, management focuses upon small, satellite occurrences or leading edges (i.e. the edge of a new species moving onto the Forest) regardless of the species. The species, its distribution on the landscape and the size of the occurrence are all factors that play into whether monitoring and retreatment are prioritized. Table below summarizes the current statistics on invasive plant occurrences.

Summary: Early detection, treatment, monitoring and repeated re-treatment has proven effective in eradicating small (< 0.1 acres), isolated occurrences of invasive plants. Persistent treatment has also lead to downward trends. The priority sites eradicated combined with the priority sites that are less than 0.1 acre in size make up for 51% of the priority sites we manage on the Forest. The bulk of the gains have been



Figure 10. Northwest Youth Corps crew on Patrick Creek Road on the Smith River NRA. Treated 27 acres of scotch and french broom at over 9 sites

made on the Smith River NRA and Orleans/Ukonom Ranger District where we have developed partnerships including Mid-Klamath Watershed Council, Del Norte Resources Conservation District, Del Norte County and Northwest Youth Corps (Table 9).

Table 9. Invasive Plant stats for 2013

Number of priority sites managed on Forest	552
Priority species= those which exist as small, isolated, satellite occurrences or as leading edges	diffuse/spotted & meadow knapweed, scotch/french & spanish broom, meadow knapweed, yellow starthistle, leafy spurge, oblong spurge, jubata grass, dyer's woad, dalmation toadflax
Number/proportion of priority sites that are <0.1 acres	119 or 40%
Number of priority sites treated in 2013	168
Acres of priority sites treated in 2013	65

WILDLIFE

GOALS

Maintain or improve populations of endangered, threatened, and sensitive species by providing suitable habitats that are capable of meeting species requirements.

FOREST-WIDE RAPTOR MONITORING

The USDA Forest Service lists the Bald Eagle and Northern Goshawk as *Sensitive Species*. The State of California lists the Osprey and American Peregrine Falcon as *Species of Special Concern*. The Forest monitors historical raptor territories with nesting sites to determine whether sites were active and if they successfully fledged young.

Methods: 2013 Six Rivers National Forest (SRNF) conducted twenty-three nesting raptor surveys at fifteen locations. SRNF monitored for the following raptors:

- BAEA- Bald Eagles (*Haliaeetus leucocephalus*),
- NOGO - Northern Goshawks (*Accipiter gentilis atricapillus*),
- PEFA - American Peregrine Falcon (*Falco peregrinus anatum*)

Territories were monitored but not all occupancy was determined. Territories are generally visited beginning in early spring to determine whether the territory is occupied.

Results:

Target species occupied eleven of the fifteen territories.

Table 10. 2013 raptor survey results

NRIS Site Name	Date	Time	Age/ Activity*	Nest**
BAEA_Allen Creek	5/28	1430-1630	None	UnOcc/PC
BAEA_LT Office	4/10	1400-1715	1xA/ Roost	UnOcc/GC
	5/31	1430-1730	1xA/ Soaring	UnOcc/GC
BAEA_Soldier Creek	5/2	1306-1536	2xA-Roost, 1xNestling- Begging	Occ/GC
	5/26	0658-0800	1xA-Roost, 1xFI- Preen	Occ/GC
BAEA_Todd Ranch	5/9	1620-1833	None	UnOcc/GC
BAEA_Waakar	4/17	1712-1835	1xA/ Soar	1: UnOcc/PC
	5/28	1200-1500	None	NR
	5/28	1650-1710	1xA/ Soar-Roost	1: UnOcc/PC 2: UnOcc/GC
NOGO Nest - East Fork Willow Creek	8/8	0630-0830	None	ND
NOGO Nest - Horse Range	4/16	1659-1822	1xS/Roost	2010: UnOcc/GC Alt: UnOcc/PC
NOGO Nest - Little Low	5/22	1200-1400	Aural Detect	ND
NOGO Nest - Low Mountain	6/18	1030-1230	Aural Detect	ND
North Kelsey Peak – NOGO	4/30	1200-1318	Aural Detect	ND
PEFA - Dolan's Bar	5/28	1200-1400	None	UnOcc/GC
PEFA_Aikens Creek	4/17	1519-1655	1xA/ Roost-CV	ND
	7/23	0923-1235	Aural Detect	ND
PEFA_Castle Rock	5/9	1030-1215	1xPair/ Roost- Incub	Occ/ Scrape
	7/1	1530-1800	1xPair +1xA/Roost-ITD	ND
PEFA_Murderers Bar	04/18	1132-1500	1xA/ Roost-CV	ND
	5/28	1352-1600	2xA, 1xJ/ Roost-	ND

NRIS Site Name	Date	Time	Age/ Activity*	Nest**
			ITD	
	6/15	1720-2220	2xA, 1xJ/ Roost- ITD	ND
	6/16	0530-0830	2xA, 1xJ/ Roost- ITD	ND
PEFA_Somes Bar	5/30	1405-1635	1xPair/Roost- Flying	ND

* A: Adult; CV: Chasing vulture; Fl: Fledgling; Incub: Incubating; ITD: Intraspecific Territorial Defense; J: Juvenile; S: Subadult

** GC: Good Condition; ND: None Detected; NR: Not Reported; Occ: Occupied; PC: Poor Condition; UnOcc: Unoccupied

FOREST-WIDE PROJECT SURVEYS- NORTHERN SPOTTED OWL & NORTHERN GOSHAWKS

Gordon Project, Smith River National Recreation Area

The Six Rivers National Forest (SRNF) is conducting pre-project surveys for Northern Spotted Owls (SPOWs, NSO; *Strix occidentalis caurina*) in Gordon Hill. This was the fourth consistent year of Northern Spotted Owl surveys for the Gordon project, consisting of daytime surveys of eight activity centers (ACs) (15, 17, 19, 38, 309, 311, 368, and 373) and night calling at 37 call stations.

Results:

Owl surveys conducted during 2013 resulted in ten detections at four ACs. These surveys also resulted in the incidental detections of two barred owls. Incidental detections of three Northern Saw-whet Owls (*Aegolius acadicus*) and six Western Screech Owls (*Megascops kennicottii*) were reported.

Summary of Known Northern Spotted Owl Activity Centers AC in the Gordon Project

Table 11. Summary of known northern spotted owl Activity Centers in the Gordon Project

NSO Activity Center No.	Site Name	Most Recent Detection	Occupancy*
DNT0041/AC # 19	Gordon Creek	2013	Male/Status Unk
DNT0044/AC # 38	Fox Ridge	2013	Territorial Pair
DNT0057/AC # 17	Coon Mountain	2013	Territorial Pair
DNT0061/AC #15	Craigs Creek	2010	Pair - Reproducing
DNT0109/AC # 311	Haines Flat	2012	Single Male
DNT0113/AC # 309	Redwood Creek	2010	Pair
DNT0150/AC # 373	Cant Hook Creek	2013	Resident Single Male
DNT0151/AC # 368	(Unnamed)	2012	Pair

* Single: SPOW detected <3 times within season (sex of detected owl in parentheses); Resident Single: SPOW detected >3 times within season; Territorial Pair: opposite sex SPOWs detected <1/4 mi apart >1 time.

Kelsey Project, Mad River Ranger District

The Six Rivers National Forest (SRNF) conducted pre-project surveys for both Northern Spotted Owls (NSO: *Strix occidentalis caurina*) and Northern Goshawks (NOGO: *Accipiter gentilis atricapillus*) in the Kelsey area. This was the **fourth** consecutive year of NSO surveys for the Kelsey project. Surveys consisted of daytime stand searches of 14 historical Activity Centers (ACs) and nighttime broadcast surveys at 53 call points (CPs). This was the **second** year of NOGO monitoring for this project.

Methods

NSO and Other Owls

Three protocol visits were made to the Kelsey project between April 29, 2013 and June 20, 2013. All surveys followed the *2011 U.S. Fish and Wildlife Northern Spotted Owl Survey Protocol*. One or more daytime stand searches were conducted in all known historical ACs. During each of the three visits we surveyed at 53 previously established nighttime CPs.

Northern Goshawk

We conducted stand searches of three known NOGO nest sites within the Kelsey project (Little Low, Low Mountain and North Kelsey Peak) and an incidental detection at (Barry Creek). We visited each site once and searched at least ¼-mile radius around the last known nesting location while broadcasting alarm calls and adult and juvenile begging calls.

Results:

NSO Detections 2013

There were 25 NSO detections in 7 AC's during the three visits to Kelsey in 2013. This resulted in the detection of one reproductive pair (AC #241), three non-reproductive pairs (AC # 495; 252; and 244), one pair with unknown reproductive status (AC # 577) and a single detection of a male in (AC # 476). We also incidentally recorded a pair with unknown reproductive status in AC 246 during a stand search of AC 242; however AC 246 does not fall within the Kelsey survey area. We also recorded the following incidental detections at CP including; 33 Flammulated Owls (*Otus flammeolus*), 4 Western Screech Owls (*Megascops kennicottii*), 3 Northern Saw-whet Owls (*Aegolius acadicus*) and 1 Northern Pygmy-Owl (*Glaucidium brasillianum*). We did not detect any Barred Owls (*Strix varia*) in Kelsey in 2013.

Table 12. Known northern spotted owl Activity Center in the Kelsey Project

SPOW Activity Center No.	Name	Most Recent Detection	Occupancy*
TRI0029/AC # 239	Long Glade	2008	Pair
TRI0031/AC # 241	Vanhorn	2013	Reproductive pair
TRI0131/AC # 242	North Kelsey Peak	2012	Single (male)
TRI0234/AC # 243	Barry	2012	Single(unk)

SPOW Activity Center No.	Name	Most Recent Detection	Occupancy*
TRI0193/AC # 244	Low Mountain West	2013	Resident pair
TRI0047/AC # 245	Low Mountain East	2012	Resident pair
TRI0237/AC # 247	Collins West	2011	Single (male)
TRI0030/AC # 251	Little Field Creek	2012	Single (unk)
TRI0225/AC # 252	Ruth Airport	2012	Resident pair
TRI0454/AC # 371	Shasta Trinity	2012	Resident pair
AC # 476			
TRI0457/AC # 495	Longbow	2013	Resident pair
TRI0456/AC # 505	Maple Springs	2012	Resident pair
TRI0458/AC # 550	Bear Corrals	2012	Resident pair
TRI0459/AC # 577	Kelsey Peak	2013	Resident pair

*Single: NSO detected <3 times within season (sex of detected owl in parentheses); Territorial Single: NSO detected >3 times within season; Resident Pair: opposite sex NSO detected <1/4 mi apart > 1 time

Northern Goshawk Territories

North Kelsey Peak Territory: On April 30, 2013 a ground search was conducted and at 1217 both surveyors thought they heard a wail call series downslope and a visual on an accipiter like dark bird, possibly a NOGO, but no further visuals. The last detection was in 2008, when a pair was observed.

Low Mountain Territory: On June 18, 2013 a ground search was conducted and at 1035 both surveyors heard five alarm calls towards the 2008 nest location. Heading towards the call, one more vocal was heard, but no visual was made of the birds. Habitat was excellent Douglas fir dominant forest with 2-7 ft. DBH trees in a very open, gently sloped aspect.

Barry Creek Territory: On June 19, 2013 a ground search was conducted because an incidental NOGO was detected while conducting the AC 505 search earlier in the year. Shortly after starting broadcast calls we heard a single NOGO call slightly downslope of our location. No other vocalization was heard and we didn't find any potential NOGO nest or sign. One of the surveyors saw a large, NOGO-like bird flying silently through the upper canopy in the vicinity of the auditory detection location.

Little Low Territory: On May 22, 2013 a ground search was conducted in the same area last year both surveyor's heard a couple of wail calls but no visual on the bird. Last year there was a juvenile detected.

OCFR Project, Orleans Ranger District

Methods

The 2013 Six Rivers National Forest (SRNF) planned to conduct surveys for both northern spotted owls (*Strix occidentalis caurina*) and northern goshawks (*Accipiter gentilis atricapillus*)

within the Orleans Community Fuels Reduction project (OCFR) area. However, due to unhealthy air quality caused by the Orleans and Salmon River wildfire complexes (including the Dance Fire) we were only able to perform a single survey pass for these species, and only within the northern half of the project area. These fires started in late July (7/29-7/31) and continued to burn for the remainder of the northern spotted owl and northern goshawk survey seasons.

Results

We did not detect any northern spotted owls or northern goshawks during our single survey pass for these species in the northern portion of the OCFR project in 2013. The only notable wildlife detections during these surveys were of three western screech owls (*Megascops kennicottii*) in the northeastern portion of the survey area.

Ukonom West Project, Ukonom Ranger District

The SRNF is conducting pre-project surveys for both Northern Spotted Owls (SPOWs; *Strix occidentalis caurina*) and Northern Goshawks (NOGOs; *Accipiter gentilis atricapillus*) in Ukonom West. 2013 was the second consecutive year of surveys for these species in association with the Ukonom West project. Access to the project was restricted after June 28, due to safety and health concerns related to illegal marijuana activities and smoke from the Orleans and Salmon Fire Complexes. Because of these restrictions, the SRNF conducted only three of the six required nocturnal survey passes for SPOWs this year, and only one survey pass for NOGOs.

Results

In Ukonom West, the 2013 SRNF had a total of 11 SPOW detections in four ACs and an incidental detection not associated with any known ACs.

Table 13. Known northern spotted owl Activity Centers in Ukonom West Project

SPOW Activity Center No.	Site Name	Most Recent Detection	Occupancy*
IS0017 / AC # 51	Hines Creek North	2013	Single (female)
HUM0075 / AC # 52	Wilder Creek	2008	Single (unk)
SIS0031 / AC # 53	Donahue Flat	1995	Single (unk)
AC # 385	Hines Creek East	2013	Resident Pair
KL0058	None	1995	Single (male)
KL0061	None	2013	Single (unk)
KL0307	None	1994	Resident Pair
KL0308	None	1992	Resident Pair
KL4060	Reynolds Creek	2013	Resident Pair
KL4063	None	2012	Territorial Single (male)

* Single: SPOW detected <3 times within season (sex of detected owl in parentheses); Territorial Single: SPOW detected >3 times within season; Resident Pair: opposite sex SPOWs detected <1/4 mi apart >1 time.

The only NOGO detected in Ukonom West by the 2013 wildlife crew was an incidental on the evening of June 26 near SPOW AC KL0307. No NOGOs were detected during the one extensive (calling station) survey pass in the project area in 2013.

LISTED SPECIES, PREY & UNDESIRABLE SURVEYS

Wildlife cameras with bait stations are often used with a goal of detection and assessment of listed species including mustelids; specifically Pacific fisher (*Martes pennanti pacifica*) and Humboldt marten (*Martes americana humboldtensis*), both of which are listed as Sensitive Species by the SRNF. These stations are monitored for varying periods at various locations. Table 14 shows the results by camera station.

Table 14. Results from camera station monitoring

Camera	Detections
1	old black male ABB
2	cinnamon female ABB black 2 nd Year ABB black cub ABB Northern Flying Squirrel Grey Fox Douglas Squirrel
3	Male Fisher
4	female or young male Fisher black male ABB black female ABB Northern Flying Squirrel Douglas Squirrel
5	Fisher cinnamon male ABB female Columbian black-tail deer
6	black male ABB
7	black ABB cub with possible ringworm* brown male ABB
8	black ABB
9	blonde female ABB with mange* black (4-5 y/o?) male ABB with mange* black young (2-3 y/o?) ABB Northern Flying Squirrel
10	Female Fisher missing half tail
11	Black male ABB
12	No detections

ABB – American black bear

* - Based on consultations with veterinarians from California Department of Fish and Wildlife



Figure 11. Female or young fisher image from Camera 4