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Agriculture

Forest Service

Pacific Southwest
Region

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# Status Report to Congress
# Fiscal Year 2009

## Herger-Feinstein Quincy Library Group Forest Recovery Act Pilot Project

## Report Preparation and Contact Information

This document was prepared by the Herger-Feinstein Quincy Library Group Pilot Project Implementation Team for the Lassen, Plumas and Tahoe National Forests.

This report will be made available online following finalization. Printed copies or CDs of the document will beavailable upon request by contacting the team.


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## Cover Photos

Clockwise from Top Center: Meadow Restoration on Sierraville Ranger District using pond and plug technique to restore eroded channel through meadow. Nelson Creek, Plumas National Forest. Public monitoring field trip on the Eagle Lake District, Lassen National Forest. A group selection unit on the Almanor Ranger District of the Lassen National Forest.

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# Introduction and Background

The fiscal year (FY) 2009 Herger-Feinstein Quincy Library Group (HFQLG) pilot project Status Report to Congress is the tenth annual status report on the pilot project. This report is a concise summary of the information required by the HFQLG Forest Recovery Act. For more detailed information, the FY 2009 HFQLG Monitoring Reports will be available at www.fed.us/r5/hfqlg . Printed copies of all documents are also available upon request.

Implementation of the pilot project continues to be affected by appeals and litigation. Court decisions are pending on cases that have been in litigation for up to 5 years. Uncertainty because of the potential for litigation has also affected the process of project planning and preparation. These issues have resulted in reduced acreage accomplishments and less timber available from the Forests.

The HFQLG pilot project area had only a moderate fire season in FY 2009. However, severe fire seasons in 2007 and 2008 continued to affect the pilot project in 2009, as the Forest Service allocated resources to plan and implement fire recovery and roadside hazard removal projects, in addition to the HFQLG work program, in order to complete these projects before the burned timber deteriorates.

In December 2007, an amendment to the HFQLG Act directed the Forest Service to initiate a collaboration process to consider modifications to the pilot project with environmental group plaintiffs and the Quincy Library Group. The collaboration process began in FY 2008 with a neutral facilitator interviewing representatives of the parties to assess issues and potential for common ground. In FY 2009, the parties participated in a series of meetings, but were unable to reach agreement. The Forest Service will continue to collaborate with these parties and other stakeholders in the planning of individual projects.

Monitoring efforts continue to provide effective feedback to inform planning and implementation of current and future projects. Over the course of the pilot project, various modifications have been made to management techniques in response to issues identified through monitoring, such as soil compaction and smoke from prescribed burning. Socioeconomic monitoring continues to track the effects of the pilot project on local economies using a series of indicators. The contribution of the timber industry to local economies appears to be decreasing, while other industries, including tourism, contribute an increasing share.

As directed by Congress, an independent scientific panel reviewed the pilot project monitoring program and made recommendations for changes in FY 2008. In response, in FY 2009 HFQLG pilot project monitoring teams made changes to various components of the monitoring program, ranging from minor adjustments to major overhauls.

## Background

Congress enacted the HFQLG Forest Recovery Act and established the pilot project in October 1998. The pilot project has been extended twice and is now scheduled to conclude in September 2012.

*Caboose Defensible Fuel Profile Zone (DFPZ) completed on Eagle Lake Ranger District*

The pilot project area covers approximately 1.53 million acres in the Lassen and Plumas National Forests and the Sierraville Ranger District of the Tahoe National Forest. It is designed to implement and demonstrate the effectiveness of fuels and vegetation management activities to meet ecologic, economic and fuel reduction objectives. These activities include shaded fuel breaks or Defensible Fuel Profile Zones (DFPZs), group selection (GS), individual tree selection (ITS) and riparian management. The Quincy Library Group Community Stability Proposal, the basis for the HFQLG Act, identifies a desired condition of an all-aged, multi-storied, fire-resilient forest that will provide a continuous supply of forest products and promote community stability. The Record of Decision and Final Environmental Impact Statement for the pilot project were released in August 1999.

Implementation has been subject to a variety of challenges, including restrictions from previous land and resource management documents. The Sierra Nevada Forest Plan Amendment (also known as the Sierra Nevada Framework) Record of Decision, signed in January 2004, provides for full implementation of the act, but continues to be subject to litigation.

*Group selection treatment, Pittville project on the Lassen NF*

# Funding

Funding and expenditures for the HFQLG pilot project over the 11 years since inception are summarized below.

**Allocation and Expenditures, 1999 through 2009 (millions)**

| Fiscal Year | Available Funding | Indirect Cost | Funding to Projects | Total Expenditures | Unobligated Balance | Not Returned to Project |
|---|---|---|---|---|---|---|
| 1999 | 8.0 | 0.0 | 2.0 | 2.0 | 6.0 | 0.0 |
| 2000 | 12.2 | 0.8 | 6.4 | 7.2 | 5.0 | 5.0 |
| 2001 | 31.2 | 3.1 | 25.1 | 28.2 | 3.0 | 3.0 |
| 2002 | 26.2 | 3.1 | 18.4 | 21.5 | 4.7 | 1.3 |
| 2003 | 29.6 | 3.1 | 20.0 | 23.1 | 6.5 | 1.9 |
| 2004 | 30.8 | 3.1 | 27.0 | 30.1 | 0.7 | 0.7 |
| 2005 | 31.0 | 3.1 | 26.1 | 29.2 | 1.8 | 1.8 |
| 2006 | 26.2 | 3.4 | 22.4 | 25.8 | 0.4 | 0.4 |
| 2007 | 26.2 | 3.1 | 22.7 | 25.9 | 0.3 | 0.3 |
| 2008 | 25.3 | 2.6 | 21.6 | 24.2 | 1.1 | 0.9 |
| 2009 | 26.2 | 2.9 | 22.9 | 25.8 | 0.3 | TBD |
| **Total** | **272.9** | **28.3** | **214.6** | **243.0** | **29.8** | **15.3** |

Note: Numbers have been rounded.

FY 2009 project expenditures include:

- ✓ Administering and monitoring projects from prior years
- ✓ Implementing projects from prior-year planning
- ✓ Planning and implementing FY 2009 projects and planning projects for FY 2010 and beyond
- ✓ Responding to appeals
- ✓ Responding to litigation

Three primary fund codes are used to track project expenditures:

- ✓ Wildland Fire Hazardous Fuels (WFHF) – Fuels reduction project (includes Defensible Fuel Profile Zone, DFPZ) planning, preparation, implementation, monitoring and administration.
- ✓ National Forest Timber Management (NFTM) – Timber sale planning, preparation and administration.
- ✓ National Forest Vegetation and Watershed (NFVW) – Forest health improvement, watershed and riparian restoration project planning, preparation and implementation.

**FY 2009 Pilot Project Expenditures (millions)**

| Forest/Unit | WFHF | NFTM | NFVW | Total |
|---|---|---|---|---|
| Lassen | 4.450 | 1.369 | 2.070 | 7.889 |
| Plumas* | 12.072 | 0.955 | 0.369 | 13.396 |
| Tahoe | 1.324 | 0.167 | 0.155 | 1.646 |
| Total | 17.846 | 2.491 | 2.594 | 22.931 |
| 12 Percent Indirect Cost | | | | 2.896 |
| Unobligated Balance | | | | 0.343 |
| Total FY 2009 Budget | | | | 26.170 |

*Plumas funds include HFQLG implementation team and monitoring program

Indirect costs are expenses for general administration support, office space, rental agreements, communications and other expenses, which are not to exceed 12 percent of the annual HFQLG budget.

# Revenue and Resource Accomplishments

To help monitor the effects of the pilot project and the level of accomplishment, the HFQLG act requires a report of the revenue, expenditures and timber management activities between 1992 and 1997 for the National Forests in the pilot project area. This information provides a valuable perspective on the activities and accomplishments of the pilot project, as well as an opportunity to compare historic and current figures.

Volume of sawlogs and biomass is measured in hundred cubic feet (CCF). One load of either a standard log truck or a standard chip truck contains approximately 10 CCF.

**Historic Revenue, Expenditures and Timber Activity for the HFQLG Pilot Project Area**

| Fiscal Year | Revenue (millions) | Expend-iture (millions) | Regen-eration (Acres) | Site Prep (Acres) | Timber Stand Improvement (Acres) | Sawlog Vol. Offered (CCF) | Sawlog Vol. Sold and Awarded (CCF) | Total Area Harvested (Acres) |
|---|---|---|---|---|---|---|---|---|
| 1992 | $67.187 | $25.856 | 8,634 | 6,176 | 10,045 | 426,000 | 329,400 | 55,689 |
| 1993 | $34.408 | $18.194 | 7,853 | 5,264 | 10,600 | 424,000 | 535,200 | 70,885 |
| 1994 | $44.501 | $17.376 | 8,206 | 4,667 | 8,740 | 375,000 | 332,600 | 57,922 |
| 1995 | $52.873 | $22.596 | 7,531 | 2,363 | 13,866 | 555,200 | 316,400 | 47,317 |
| 1996 | $24.590 | $20.490 | 9,063 | 3,321 | 15,062 | 374,200 | 242,600 | 38,917 |
| 1997 | $24.465 | $22.207 | 15,591 | 3,321 | 22,646 | 383,000 | 353,400 | 32,223 |

From FY 1999 through FY 2006, sawlog and biomass projects were reported as accomplished once they were offered for sale. During this period there were a few projects that were offered and reported as accomplished, but then subsequently litigated so that sale and on the ground implementation were suspended. In FY 2007 reporting methods changed and since then projects are not recorded as accomplished until they are actually sold.

Appeals and litigation, including adjustments to project plans and National Environmental Policy Act (NEPA) documents due to court decisions, have affected revenue and accomplishments. Several projects continue to be tied up in litigation initiated in previous years. Market conditions also affect sawlog and biomass revenue and demand.

**Revenue, Expenditures and Timber Management for HFQLG Pilot Project**

| Fiscal Year | Revenue (Stumpage Receipts) (millions) | Expenditures (millions) | Number of Projects | Sawlog Vol. Offered/Sold (CCF) | Biomass Vol. Offered/Sold (CCF) | Sawlog and Biomass Vol. Removed (CCF) |
|---|---|---|---|---|---|---|
| 1999 | 0.000 | 1.943 | 1 | 4,785 | 4,278 | 0 |
| 2000 | 0.020 | 7.182 | 10 | 44,422 | 64,517 | 5,754 |
| 2001 | 0.140 | 28.267 | 34 | 88,802 | 143,117 | 33,151 |
| 2002 | 0.989 | 21.557 | 33 | 37,168 | 31,354 | 99,163 |
| 2003 | 0.960 | 23.100 | 28 | 41,418 | 44,402 | 61,810 |
| 2004 | 1.958 | 30.100 | 55 | 203,012 | 198,204 | 61,792 |
| 2005 | 2.914 | 29.200 | 37 | 143,373 | 129,814 | 222,770 |
| 2006 | 4.613 | 25.800 | 23 | 14,625 | 25,132 | 191,875 |
| 2007 | 2.048 | 25.866 | 33 | 57,904 | 68,818 | 82,368 |
| 2008 | 0.885 | 24.200 | 34 | 28,143 | 30,850 | 58,993 |
| 2009 | 2.610 | 25.827 | 35 | 75,459 | 52,792 | 49,282 |
| **Total** | **17.137** | **243.042** | **323** | **739,111** | **793,278** | **866,958** |
| **Average** | **1.558** | **22.095** | **29** | **67,192** | **72,116** | **78,814** |

In addition to tracking accomplishment through sawlog and biomass volume, the pilot project monitors the number of acres receiving fuels reduction treatments.

The focus of timber management on the National Forest System lands in the pilot project area changed with passage of the Act. Instead of traditional elements like regeneration, site preparation and timber stand improvement, the pilot project reports on different treatments, including:

- ✓ Defensible Fuel Profile Zone (DFPZ) construction,
- ✓ Group Selection (GS), and
- ✓ Individual Tree Selection (ITS).

Riparian restoration is also an important part of the HFQLG pilot project. It includes meadow restoration and enhancement, stream channel improvement, road relocation, road closure, slope stabilization and aspen enhancement. In FY 2009, there were five projects focused on restoring 680 acres. Approximately 1 mile of road and two road crossings were eliminated, while three road crossings were restored.

*Panner timber sale on Hat Creek Ranger District: Trees marked for individual tree selection*

*Stream restoration on Sierraville Ranger District. Raised water table is causing sagebrush to die.*

**Acres Accomplished**

| Fiscal Year | DPFZ (Mechanical) | DFPZ (Fire) | GS | ITS | Riparian Restoration | Total |
|---|---|---|---|---|---|---|
| 1999 | 640 | 0 | 0 | 172 | 0 | 812 |
| 2000 | 7,215 | 0 | 200 | 772 | 81 | 8,268 |
| 2001 | 37,158 | 4,039 | 1,836 | 528 | 945 | 44,506 |
| 2002 | 14,982 | 1,669 | 1,258 | 395 | 838 | 19,142 |
| 2003 | 17,369 | 7,073 | 0 | 44 | 537 | 25,023 |
| 2004 | 31,023 | 5,612 | 1,738 | 80 | 603 | 39,056 |
| 2005 | 17,592 | 3,481 | 1,792 | 2,327 | 836 | 26,028 |
| 2006 | 5,299 | 3,204 | 6 | 0 | 159 | 8,668 |
| 2007 | 10,920 | 3,507 | 405 | 1,235 | 306 | 16,373 |
| 2008 | 4,944 | 5,193 | 0 | 739 | 375 | 11,251 |
| 2009 | 8,487 | 1,724 | 284 | 2,022 | 680 | 13,197 |
| **Total** | **155,629** | **35,502** | **7,519** | **8,314** | **5,360** | **212,324** |

Most projects, though reported as accomplished, have contracts that extend for several years. Actual project work may not begin until the next operating season. Thus, the number of acres treated on the ground each year through the activities of harvest, prescribed fire and riparian restoration work varies and is not the same as the acres reported as accomplished annually. FY 2009 treated acres include 4500 acres within the Watdog planning area that burned at low to moderate severity in the 2008 lightning-ignited Canyon Complex fires. These acres met fuel treatment objectives following the fire and are reported in accordance with Forest Service guidelines.

**Acres Treated**

| Fiscal Year | DFPZ (Mechanical) | DFPZ (Fire) | GS | ITS | Total Acres Treated* |
|---|---|---|---|---|---|
| 1999 | 0 | 0 | 0 | 0 | 0 |
| 2000 | 366 | 0 | 0 | 64 | 430 |
| 2001 | 5,109 | 1,453 | 17 | 256 | 6,835 |
| 2002 | 18,235 | 3,725 | 486 | 785 | 23,231 |
| 2003 | 4,244 | 9,816 | 498 | 762 | 15,320 |
| 2004 | 12,211 | 7,015 | 47 | 682 | 19,955 |
| 2005 | 14,722 | 7,325 | 1,379 | 0 | 23,426 |
| 2006 | 23,336 | 6,611 | 275 | 0 | 30,222 |
| 2007 | 10,160 | 2,653 | 978 | 0 | 13,791 |
| 2008 | 12,260 | 7,380 | 356 | 10 | 20,006 |
| 2009 | 6,204 | 10,309 | 38 | 97 | 16,648 |
| **Total** | **106,847** | **56,287** | **4,074** | **2,656** | **169,864** |

*does not include riparian restoration

# FY 2010 Program of Work

The FY 2010 enacted budget is estimated to be approximately $ 26.2 million. This estimate includes a proportionate funding reduction in alignment with the Pacific Southwest Region reduction. The following activities are planned in FY 2010:

- ✓ Number of Projects: 45
- ✓ Sawlog Vol. (CCF): 117,000
- ✓ Biomass Vol. (CCF): 71,000
- ✓ DFPZ Acres: 16,000
- ✓ GS Acres: 500
- ✓ ITS Acres: 4000
- ✓ Riparian Restoration Acres: 500
- ✓ Total Planned Acres: 21,000

Activities planned for FY 2010 include:

- ✓ Administering current contracts
- ✓ Implementation of vegetation projects planned in previous years
- ✓ Implementation of riparian management projects
- ✓ Environmental analysis for proposed projects
- ✓ Out-year data collection and planning
- ✓ Implementation of Healthy Forest Restoration Act projects

*Downtown Susanville*

# Socioeconomic Monitoring

The HFQLG Act requires the Forest Service to provide annual status reports to Congress that describe the "economic benefits to local communities achieved by the implementation of the pilot project." This report tracks socioeconomic changes since implementation of the pilot project in 1999 using the most recent available data. In some cases, data for 2009 are not yet available. The following communities and their surrounding areas are monitored:

- ✓ Bieber, Population (2000): 1,774
- ✓ Burney, Population (2000): 8,863
- ✓ Susanville, Population (2000): 19,055 (not including incarcerated persons)
- ✓ Westwood, Population (2000): 4,251
- ✓ Chester, Population (2000): 2,747
- ✓ Greenville, Population (2000): 2,831
- ✓ Quincy, Population (2000): 6,475
- ✓ Portola, Population (2000): 6,277
- ✓ Loyalton, Population (2000): 2,828

The following highlights key study conclusions. Detailed methodology and analysis narratives for each indicator are available in the *FY 2009 HFQLG Socioeconomic Monitoring Report.*

## Pilot Project Area Employment

**Total Payroll Job Impacts:** Analysis of the most recent U.S. Census data available shows that from the pilot project's initiation in 1999 to 2007, the estimated number of total payroll jobs increased approximately 5 percent. This growth indicates a rebound from the closure of the Sierra Pacific Industries Susanville sawmill in 2004, which was the major cause of a 3.7 percent drop in payroll jobs in the pilot project area in 2005. Census data for 2008 will be released in 2010. Employment data releases in the next several years will reflect the impact of the recession and additional business closures, specifically the Sierra Pacific

small-log sawmill operation in Quincy, which occurred in 2009.

**Forest Products Industry Job Impacts**: The pilot project has not offset the downturn in forest products industry employment within the project area. (However, the pilot project has not been implemented at the pace and scale originally envisioned, due in part to appeals and litigation.) Sawmills, the area's largest employers, have continued to shut down (Bieber and Loyalton in 2001, Susanville in 2004, and Quincy in 2009) and small businesses have had to search for work in other areas or close. The following table shows that the estimated total number of forest products industry jobs decreased 1.5 percent in the pilot project area from 2006 to 2007. Since implementation of the pilot project in 1999, total forest product industry jobs have decreased 35.5 percent. (Note that the sharp decrease in the Greenville area between 2005 and 2006 is likely the result of a 2005 Census data anomaly. Data for 2006 is more consistent with the historical trend.)

**Tourism Industry Job Impacts:** The number of tourism industry jobs has grown steadily throughout the pilot project area. Since the implementation of pilot project in 1999, the number of tourism jobs grew by 32 percent. However, the pilot project area experienced a 1.8 percent contraction in tourism related jobs from 2006 to 2007. Closures of food service and accommodation establishments occurred in all project areas communities, except in Burney, Chester and Loyalton. Growth is attributed to at least two new food service and accommodation establishments opening in each community.

Job growth in the tourism sector has historically outpaced the growth in the forest products industry sector. Prior to 1999, the ratio of jobs between the two sectors was approximately one to one. This means for each job in the forest products sector there was at least one job in the tourism sector. In 2001, the balance began to tip toward the tourism sector. In 2007, there were an estimated 2.28 jobs in the tourism sector for every job in the forest products sector.

Although the tourism industry has been relatively stable, the number of tourism jobs varies significantly among communities. For example, Bieber has little or no tourism business activity while Susanville has more than twice the number of tourism jobs of any other community in the pilot project area.

Tourism jobs are highly seasonal and the wages are lower those in the forest products industry. According to the U.S. Bureau of Labor Statistics, the average annual wage for workers for in the tourism industry across the nation is approximately $21,350. This is significantly lower than the average annual wage of $35,010 earned by workers in the forest products industry.

*Delimber preparing logs from Eagle Lake Ranger District DFPZ project for haul to saw mill*

**Total Forest Products Industry Jobs (Estimated)**

| Community | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | Change '06 to '07 (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bieber | 160 | 126 | 182 | 251 | 158 | 158 | 45 | 34 | 33 | 56 | 34 | 36 | 5.9% |
| Burney | 425 | 409 | 361 | 376 | 360 | 361 | 300 | 266 | 342 | 317 | 344 | 344 | 0.0% |
| Susanville | 342 | 267 | 262 | 269 | 260 | 245 | 240 | 257 | 193 | 205 | 31 | 34 | 9.7% |
| Westwood | 20 | 54 | 36 | 26 | 24 | 27 | 31 | 49 | 44 | 28 | 13 | 12 | -7.7% |
| Chester | 277 | 197 | 209 | 185 | 166 | 169 | 43 | 146 | 152 | 150 | 143 | 143 | 0.0% |
| Greenville | 27 | 50 | 37 | 46 | 48 | 19 | 6 | 16 | 6 | 85 | 24 | 41 | 70.8% |
| Quincy | 434 | 426 | 382 | 373 | 329 | 347 | 324 | 296 | 332 | 321 | 329 | 323 | -1.8% |
| Portola | 23 | 36 | 13 | 20 | 40 | 54 | 7 | 16 | 43 | 39 | 23 | 10 | -56.5% |
| Loyalton | 224 | 216 | 210 | 195 | 216 | 105 | 42 | 41 | 42 | 27 | 35 | 18 | -48.6% |
| **Total Pilot Project Area** | **1,772** | **1,655** | **1,510** | **1,490** | **1,443** | **1,327** | **993** | **1,087** | **1,154** | **1,228** | **976** | **961** | **-1.5%** |

Source: U.S. Census Bureau, ZIP Code Business Patterns

**Tourism Industry Jobs (Estimated)**

| Community | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | Change '06 to '07 (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bieber | 5 | 7 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| Burney | 216 | 261 | 199 | 241 | 241 | 264 | 208 | 263 | 314 | 298 | 287 | 300 | 4.5% |
| Susanville | 562 | 549 | 613 | 579 | 627 | 526 | 680 | 818 | 811 | 752 | 908 | 888 | -2.2% |
| Westwood | 68 | 205 | 215 | 213 | 194 | 207 | 217 | 211 | 251 | 186 | 187 | 164 | -12.3% |
| Chester | 99 | 148 | 142 | 135 | 147 | 142 | 127 | 102 | 109 | 95 | 111 | 141 | 27.0% |
| Greenville | 47 | 37 | 46 | 45 | 38 | 59 | 40 | 35 | 38 | 45 | 31 | 25 | -19.4% |
| Quincy | 226 | 262 | 267 | 276 | 224 | 261 | 268 | 281 | 265 | 313 | 328 | 299 | -8.8% |
| Portola | 112 | 121 | 134 | 133 | 154 | 157 | 161 | 306 | 297 | 396 | 347 | 338 | -2.6% |
| Loyalton | 28 | 30 | 20 | 35 | 26 | 16 | 32 | 36 | 36 | 28 | 33 | 36 | 9.1% |
| **Pilot Project Area Total** | **1,363** | **1,620** | **1,638** | **1,659** | **1,653** | **1,634** | **1,733** | **2,052** | **2,121** | **2,113** | **2,232** | **2,191** | **-1.8%** |

Source: U.S. Census Bureau, ZIP Code Business Patterns

**Non-employer Establishments:** Non-employers are typically small family-owned and owner-operator businesses. Non-employer forest products and non-forest products industries suffered losses immediately after the pilot project's implementation in 1999. However, U.S. Census data summarized in the table below shows that the number of all non-employers and non-employers in the forest products industry began to rebound after 2001. The total number of non-employer establishments in all sectors rose by over 27 percent from 2,810 in 1999 to 3,581 in 2007. The number of non-employer establishments has consistently surpassed pre-project implementation levels.

Non-employers in the forest products industry also experienced significant growth since the implementation of the pilot project. The number of forest products non-employers grew from 305 to 339 firms or over 11 percent from 1999 to 2007. Overall growth in the number of these firms indicates stability among family-owned, owner-operator, and other small businesses. New data will be available in mid-2010 to gauge effects in 2008.

**Non-employer Firms in the Pilot Project Area**

| | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| All Non-employers | 2,786 | 2,740 | 2,810 | 2,823 | 2,924 | 3,134 | 3,304 | 3,370 | 3,438 | 3,397 | 3,581 |
| Forest Products Industry | 290 | 302 | 305 | 290 | 290 | 331 | 353 | 353 | 340 | 329 | 339 |

Source: U.S. Census Non-employer Statistics 1997 through 2007

## HFQLG Timber Sales and Service Contract Activity

**Timber Sales**: Timber sales declined precipitously in FY 2003, prior to approval of the Final Supplemental Environmental Impact Statement and Record of Decision for the Sierra Nevada Forest Plan Amendment (SNFPA) in January 2004. The 2004 SNFPA Record of Decision permitted removal of trees with larger diameters than allowed under the 2001 SNFPA Record of Decision. Timber sales recovered in FY 2004, surged in FY 2005, and then began a decline in FYs 2006 through 2008. In FY 2008, approximately 90 percent of all timber sales or service contracts across the HFQLG pilot project area were delayed due to SNFPA litigation. As a result, the volume of sawlogs sold declined more than 50 percent to its lowest level since 2003.

From FY 2008 to FY 2009, the volume of sawlogs sold increased over two-fold. The surge in FY 2009 is attributed in part to the abnormally low volume sold in FY 2008. Of the total volume of sawlogs sold, approximately 68 percent of sawlogs were from Lassen National Forest, 6 percent from Plumas National Forest, and 26 percent from Tahoe National Forest. Several timber sales were successfully sold without litigation. On one of these projects, the Forest Service redesigned the timber sale with input from the plaintiffs, with the result that the plaintiffs informally agreed not to challenge the redesigned project. This timber sale represented the largest project in volume in the pilot project area in FY 2009.

*Sierra Pacific Industries log deck in Quincy*

**Timber and Biomass Removal**: From FY 2008 to FY 2009, the total volumes of sawlogs and biomass removed in HFQLG projects declined 31 and 23 percent respectively. For the sawlogs removed from the pilot project area, approximately 77 percent were from Lassen National Forest, 8 percent from Plumas National Forest and 16 percent from Tahoe National Forest. For biomass volume removed the percentages were Lassen: 85 percent, Plumas: 10 percent, and Tahoe: 5 percent. The value of sawlogs and biomass removed in the pilot project area also decreased in FY 2009. The total value for stumpage receipts removed in HFQLG projects in FY 2009 was $248,188 in sawlogs and $90,031 in biomass. The value of sawlogs removed in FY 2009 is allocated to national forests as follows: Lassen: 70 percent, Plumas: 16 percent, and Tahoe: 14 percent.

The decline in removal volumes is attributed to a decreased demand and low timber prices caused by the recession. Timber purchasers typically have 3 years after contract award to remove the products and may be waiting for improved market conditions before initiating harvest operations.

**Service Contracts**: One of the goals of the HFQLG pilot project is to sustain the local economy and support community stability by placing an emphasis on awarding contracts to local bidders. The Forest Service defines "local" as those firms in the pilot project area and the remainder of the Sierra Cascade Province (defined as northeast California, east of Interstate 5 and north of Interstate 80). The percent share of total contract dollars awarded to local companies in FY 2009 was 70 percent (pilot project area, 22.1 percent plus Sierra Cascade Province Contracting Area, 47.9 percent). Overall (FYs 2000 through 2009), 65.4 percent of contract value has been awarded to local contractors (pilot project area, 23.8 percent plus Sierra Cascade Province Contracting Area, 41.6 percent). These trends indicate the local economy captures the majority of HFQLG contract dollars.

**Biomass Electricity Generation:** Electric power generation from biomass grew by 35.9 percent from 2007 to 2008 in the pilot project area. This is a significant rebound from the over 30 percent decline witnessed from 2006 to 2007. Growth is attributed to biomass power plants in Quincy and Chester. Electric generation in Chester has exceed its 1999 peak in 2008 even though the sawmill has produced less wood waste since its renovation in 2003. The biomass power plant in Quincy operated by Sierra Pacific Industries, increased electricity generation over 100 percent from 2007 to 2008. According to a company representative, the power plant became fully operational and had been receiving fuel supplies from two log sawmills operated by company.[1] However, a decrease in electricity generation from this plant is expected to materialize in next year's CEC data release because Sierra Pacific's small-log sawmill operation in Quincy, a key feedstock provider for the plant, closed in early 2009. California Energy Commission data for FY 2009 activity will be available in 2010.

*Chipper feeding biomass into chip trailer for haul to electrical cogeneration facility near Susanville*

[1] Interview with Representative of Sierra Pacific Industries' power plant. January 5th, 2010.

### Local Business Environment

**Jobs in Locally-owned Businesses:** From 1998 to 2008, the percentage of workers employed by locally-owned businesses in the manufacturing sector increased in all communities within the pilot project area except Susanville. This shift in jobs in the manufacturing sector to locally-owned businesses indicates growth and stability in the local economy. This is also a positive sign since wages in the manufacturing industry are higher than the retail and services industries.

**Establishments by Age:** Dun and Bradstreet (D&B) data from 1998 through 2008 indicates significant growth in the number of business 0 to 5 and 6 to 15 years old age brackets in the pilot project area. However, changes in D&B data collection methodology implemented in 2006 may have artificially inflated these figures. In 2008, corresponding growth did not occur in the over 15 year old age bracket. This data anomaly limits the study team's ability to determine a trend at this time. Therefore, trend analysis will be available after several years of more consistent data are collected through this monitoring effort.

### Lodging Revenue

Lodging revenue is a measure of the degree to which tourism is increasing or decreasing in a region. Most California jurisdictions impose a transient occupancy tax (TOT) on lodging for up to 30 days. While lodging revenue in the Project Area has remained relatively stable since the implementation of the pilot project, revenue decreased by 11.44 percent from FY 2007-2008 to FY 2008-2009. This decline is consistent with the reduced traveling trends associated with the recession. In fact, several vacation resorts and cabins rental complexes in the pilot project area have closed or been converted into condominiums.

### Retail Business Activity

The most recent data published by the California Board of Equalization shows that from 2006 to 2007 taxable sales transactions in the pilot project area declined greater than those of California. Measured in constant dollars, taxable sales at the state level decreased by 1.62 percent compared to a 5.22 percent decline in the Project Area.

## Social Health: Family Poverty and Population Age Structure

There is little statistical connection between implementation of the pilot project and change in the two social indicators (youth education and family poverty). In the 2007-2008 school year participation in the free and reduced lunch program increased to its highest point since the beginning of the pilot project. However, most of this increase is due to a handful of schools in the Burney and Westwood areas. Five communities experienced decreases in program participation in the past year. Data shows those communities that lost sawmills, Loyalton (2001) and Susanville (2004), exhibited an increase in program participation.

For example, in the 2000-2001 school year 27 percent of Loyalton students participated in the free and reduced lunch program compared to 33.2 percent participation in 2007-2008. Despite these spikes, region-wide free and reduced lunch program participation is relatively stable with fluctuations between 34 and 39 percent since 1999.

High school dropout rates have also remained relatively stable across all nine communities. Since the pilot project began in late 1999, four communities have had minor increases in dropout rates (Bieber, Burney, Quincy and Loyalton) and four have had minor decreases (Susanville, Westwood, Greenville and Portola). High school enrollment in these communities is small, ranging from 100 to 1,200 students. The addition or loss of one student significantly affects the dropout rate.

*The 1931 photo on left is typical of historic conditions found within the Herger-Feinstein Quincy Library Group pilot project area. Photo on right of the same forest shows the current dense conditions that often prevail before any treatment.*

# Environmental Monitoring and Effects

A key part of the HFQLG pilot project is monitoring the effects of the variety of treatments being implemented. The monitoring effort tracks adverse and beneficial impacts to the range of ecosystems in the pilot project area and recommends mitigation actions. As directed by Congress, in FY 2008 an independent scientific review panel organized by the Pinchot Institute reviewed and made recommendations on the monitoring program. HFQLG pilot project monitoring teams met during FY 2009 and made both minor changes and major overhauls to different components of the monitoring program to respond to the Pinchot Institute's recommendations for change. The following are the monitoring results for FY 2009.

## Forest Habitat

The HFQLG Record of Decision requires that suitable habitat for old forest-dependent and aquatic/riparian-dependent species not be reduced by more than 10 percent of levels originally measured in 1999 within three specific old forest vegetation types, totaling 204,770 acres across the Pilot Project. Previous habitat evaluations, based on a less accurate vegetation layer, have recognized a different assessment of baseline acres. A more accurate assessment was completed in 2009 to amend the 1999 baseline. A cumulative total of reductions in habitat are tracked to monitor loss of old forest habitat. To date, 4,365 acres (2.1 percent) have, or will have, a reduction based on projects with a signed Record of Decision. For comparison, wildfire through 2009 reduced an additional 27,513 acres (13.4 percent).

*30+ inch diameter tree to remain uncut, HFQLG project on Hat Creek Ranger District*

## Forest Structure

Treated Stand Structure Monitoring (TSSM) data collection continued in 2009, sampling a total of 7 units pre-treatment, 21 units 1 year post-treatment ("post-1 year") and 4 units 5 years post-treatment (" post-5 year"). Since data collection began in 2001, a total of 260 TSSM data sets have been collected, including 159 pre-treatment units, 91 post-1 year units, and 10 post-5 year units. Major strides were completed in consolidating monitoring results and data calculations into a comprehensive database. Additional work was done to include project objectives within the database, to serve as monitoring parameters.

This year further in-depth analysis of the TSSM data collected thus far was conducted, in coordination with the Pacific Southwest Research Station (PSW) and the University of California. TSSM analysis this year focused primarily on the achievement of objectives for fire behavior, noxious weeds, and snag (dead tree) retention. The fire behavior and noxious weed analyses are presented under separate headings in this report. The analysis of snag retention to date indicates that snag objectives are not being met in most cases. Of 91 stands that were analyzed, roughly one third (34.7 percent) either met snag objectives or at minimum retained snags at pre-treatment levels. Overall, only 12 percent of the stands met snag objectives 1 year after treatment. These statistics indicate that (1) snag numbers are frequently below objectives prior to treatments and (2) in most cases snags are not being retained at desired levels as measured 1 year after treatment. Further ongoing analysis will be conducted to determine causes and possible implications of these snag retention monitoring results.

**Summary Statistics for the Number of Snags per Acre by Zone and the Target Threshold for Snags per Acre (Transition and Westside zones have variable snag management thresholds depending upon site specific wildlife objectives)**

| Zone | Snags per acre Threshold | # of surveys | Pre-treatment Mean | Pre-treatment Standard Deviation | Post-treatment Mean | Post-treatment Standard Deviation |
|---|---|---|---|---|---|---|
| Eastside | 3 | 48 | 2.8 | 4.0 | 0.8 | 1.6 |
| Transition | 3<br>4 | 2<br>2 | 4.7<br>8.7 | 0.9<br>2.8 | 4.0<br>1.4 | 1.8<br>1.9 |
| Westside | 4<br>8 | 31<br>8 | 2.8<br>5.0 | 4.6<br>4.1 | 1.6<br>2.4 | 3.3<br>3.6 |
| **Total** | | **91** | **3.2** | **4.2** | **1.3** | **2.6** |

Further data collection and analysis of canopy cover, large logs, and spotted owl habitat attributes is planned for 2010.

*Feller buncher creating DFPZ by removing designated trees*

## Best Management Practices

Best management practices (BMPs) are special techniques used with forest management activities to protect water quality and soils. The Forest Service uses BMPs associated with stream course protection, skid trails, landings, road drainage, stream crossings, prescribed fire, and road decommissioning.

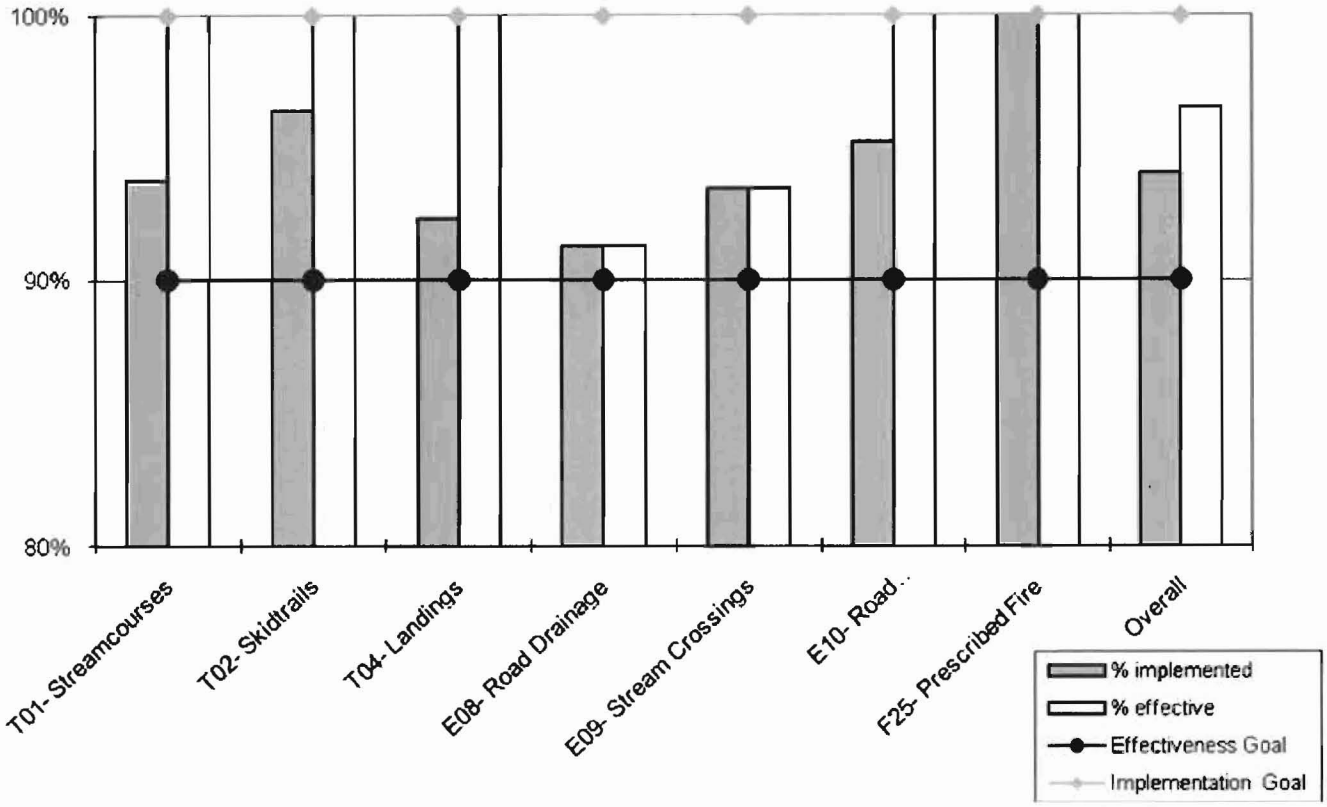
Best Management Practices were monitored using the Pacific Southwest Region protocols (BMPEP). This approach requires activity sites to have undergone at least one winter prior to evaluation. Therefore, all sites monitored were implemented in 2008 or earlier. The protocol involves a two-step process. The first step, implementation, determines whether measures to reduce risk to water quality were considered during project planning, design, and layout, and whether prescribed measures were implemented on the ground. The second step, practice effectiveness, involves field review of indicators of processes that affect water quality. These focus primarily on erosion, and include criteria such as rilling, sediment deposition and sediment transport. Results from both implementation and effectiveness are scored and weighted using several criteria, then summarized to yield a result of "implemented or not implemented" and "effective or not effective."

*Aspen Restoration Project with stream course protection on Sierraville Ranger District*

As indicated by this year's monitoring results, BMPs continue to be an effective method for protecting and preserving water on National Forests. As shown in the following table, implementation and effectiveness of the various BMPs ranged from 90 to 100 percent.

*Riparian Zone in Blakeless Project on Beckwourth Ranger District with underburn completed to reduce potential for stand replacing fire event while simultaneously retaining sufficient ground cover to prevent erosion*

**Summary Results of 2009 BMP Implementation and Effectiveness, by Activity Type**

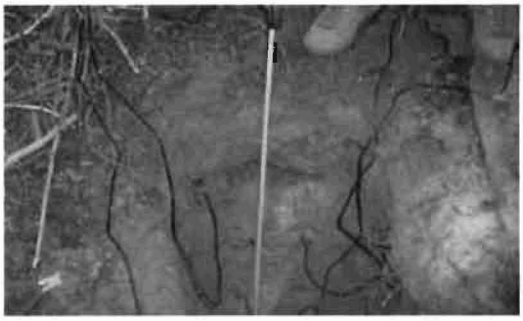



The target goal is to achieve 90 percent or better in effectiveness and 100 percent in implementation. While the target was exceeded for effectiveness, implementation fell short of the goal. Areas where improvement in effectiveness can be realized are focused on road drainage and crossings. General recommendations are listed below:

- ✓ Continue the prescription, application and monitoring of BMPs across the HFQLG pilot project area
- ✓ Strive to achieve 100 percent implementation
- ✓ Continue to achieve at least 90 percent effectiveness for all BMPs.
- ✓ Build upon 2009 success for BMPs associated with stream courses, skid trails, landings, road decommissioning and prescribed fire.
- ✓ Continue to designate Stream Management Zones (SMZs) for prescribed fire and all timber sale activities.
- ✓ Maintain proper drainage on all roads, which includes the maintenance of culverts and ditches.
- ✓ Stabilize erodible (unstable) areas, where roads are located.
- ✓ Identify unstable areas and drainage problems associated with roads during the NEPA process.
- ✓ Investigate reasons for failure to implement and find solutions to avoid failures in the future.
- ✓ Increase watershed funding allocation to implement road improvements identified in NEPA documents that are not economically feasible to include in particular timber sales.

# Soils

This year 2009 soil monitoring data (25 units) were added to the data set analyzed for previous annual monitoring reports, and the combined data were re-analyzed for overall synthesis of status and trend. Only units with pre- and post-treatment data were included in the analysis. A total of 77 units with pre- and post-treatment data sampled between 2001 and 2009 are represented in the data shown in this summary.



*Soil moisture probes*

In response to the statistical analysis of previous soil monitoring data conducted in 2007, all units monitored in 2008 and 2009 had 200 sample points, as opposed to the 60 sample points in thinning units and 21 sample points in group selection units done previously, to increase precision of the data. Because the increase in sample plots was relatively small (8 units 2008 and 25 units 2009) and overall results are not appreciably different that previously reported, new statistical analyses were not completed.

## Soil Compaction

Soil compaction (loss of soil porosity) has been viewed as a major factor affecting soil productivity. Compacted soil can have lower water infiltration rates, higher or lower water holding capacity (depending on soil texture), and increases in soil strength that can restrict root growth.

Forest Plan soil quality standards generally require detrimental compaction to occupy less than 15 percent of a unit. Overall, 52 percent of the units meet this standard post-activity, including 45 percent of DFPZ commercial thinning units (hereafter thinning units) and 67 percent of group selection units. However, only 58 percent of units overall met the standard pre-activity (53 percent of thinning units and 71 percent of group selection units). Therefore, most of the detrimental compaction existed prior to HFQLG treatment. More pertinent to current activities, there were 9 units (5 thinning, 4 group selection, 12 percent) that met the standard pre-treatment and exceeded it post-treatment; the rest either exceeded the standard pre-treatment or met the standard post-treatment.

The comparison of pre- and post-treatment sampling continues to indicate an overall trend that harvest operations can add some compaction to the treated area. The amount of compaction added is influenced by the silvicultural prescription, the location of trees to be removed, the soil type, the soil moisture at time of harvest and the kinds of logging equipment used. This year's data indicates that thinning or group selection treatments have an incremental increase in compaction. The treatments, unless taken cumulatively with past treatments, do not exceed the Forest Service standards and guidelines in one entry.

Post-treatment compaction within units that were subsoiled (tilled or otherwise broken up to mitigate past compaction) versus not subsoiled show on average no beneficial difference of treatment at the unit scale. Because subsoiling usually only occurs on the current operation's main skid trails and/or landings this could be due to legacy compaction between current skid trails. A further evaluation of subsoiling effectiveness is needed.

Recent research findings (Powers and others 2005) indicate that the effect of increased compaction on total biomass productivity varies with soil type. Soil textures on units monitored in 2009 were classified as "loamy," a soil type which does not show significant changes in productivity when compacted. Consequently, though some units do not meet the 15 percent standard for compaction, a decrease in soil productivity (total biomass productivity) is not expected.

## Soil Ground Cover

Forest Plan soil quality standards generally require 50 percent effective soil cover to avoid soil erosion. Soil cover can be duff, litter, large wood, vegetation or rock, all of which prevent bare soil from eroding. Overall, 90 percent of the units meet this standard, with the problem areas being predominantly group selection units from a particular sale area.

Thinning units on average have 80 percent effective soil cover post-activity; only 1 unit (2 percent) has less than 50 percent cover. Group selection units have on average about 60 percent effective cover; ground cover is much more reduced in group selection units. Seven group selection units (29 percent) have less than 50 percent cover. Districts will be asked to improve efforts to work with contractors to streamline activities in group selection units to reduce disturbance and leave more ground cover. The two mastication units both exceeded 85 percent cover.

## Large Woody Material

Forest Plan soil quality standards generally require three or more logs per acre to be left on the ground post-treatment to help maintain long-term soil productivity, maintain soil moisture and for wildlife purposes. Thinning units as a group meet the standard with an average of four logs per acre post-activity. More specifically, 30 units (59 percent) have at least 3 logs per acre, 15 units (29 percent) have 1 to 2 logs per acre, and 6 units (12 percent) have no large wood. Group selection units as a group do not meet the standard with an average of 1.2 logs per acre post-activity. More specifically, 4 units (17 percent) have at least 3 logs per acre, 4 units (17 percent) have 1 to 2 logs per acre, and 16 units (67 percent) have no large wood. It is worth noting that some units had no large wood prior to treatment. Of the two mastication units, one meets the standard both pre- and post-treatment, and one does not.

## Soil Displacement

Soil is considered displaced when either 2 inches of duff or half of the depth of the humus-enriched topsoil (A horizon) is removed from an area 1 meter square or larger. Although Forest Plan soil quality standards and guidelines do not have a minimum area considered significant, or a permissible extent within units, minimizing soil displacement is a management objective. Soil displacement was compared from pre- to post-treatment. Thinning units generally have an average of 5 percent displacement, with only two units (4 percent) barely exceeding 15 percent. Group selection units average about 10 percent displacement, with six units (25 percent) exceeding 15 percent and two units just exceeding 20 percent. For the two mastication units, data shows large variation because the two units were very different; one unit increased from 0 to 8 percent pre- to post-treatment and the other unit increased from 23 to 35 percent pre- to post- treatment.

## Finding Summary

Prior to treatment, legacy compaction (pre-HFQLG) is commonly above threshold levels in both group selection and thinning units. Each treatment in these units increases compaction a small amount, sometimes causing a unit to change from meeting the standard to not meeting the standard. Some units stay under the standard. Group selection units continue to show lower ground cover and higher disturbance than thinning units. Post-treatment large woody material standards were only met in 17 percent of group selection units and 59 percent of thinning units. Group selection units showed a trend of large wood loss.

# Botany

## Sensitive Plant Protection

Out of the 15 threatened, endangered or sensitive (TES) plant protection/control areas monitored in 2009, 14 (93 percent) were protected as planned during HFQLG treatments. The minimum level of protection considered successful would be to have 90 percent of control areas protected as planned (though 100 percent would be optimum). Therefore, this objective was met in 2009. One site on the Feather River Ranger District on the Plumas NF was not protected. Miscommunication between project staff appears to be the cause of the failure. Achievement of the optimum protection level (100 percent of control areas protected during treatment) will require continuing improvements in communication between botanists and contract administrators, to ensure effective marking, awareness and avoidance of control areas.

## Sensitive Plant Response to Management Activities

Cover of closed-lip penstemon, *Penstemon personatus*, following hand-thinning, mechanical thinning and group selection treatments, was analyzed. The analysis did not demonstrate any significant decreases in cover. In fact a significant increase in closed-lip penstemon cover was observed following treatments in some mechanical thinning and group selection units. Increases in cover occurring in the first year after treatment are unusual. A large amount of ground disturbance occurred during the harvest activities and yet the species seemed to do quite well. Both the control unit and another group selection unit had some apparent decrease in cover. However, these decreases were not significant.

Data collected to evaluate the effect of hand thinning on Webber's milk vetch and prescribed burning on Layne's butterweed found that both species were positively affected by these treatments. Small Webber's milk vetch plants increased in density after hand thinning, suggesting an increase in germination rates post-treatment. The number of Layne's butterweed plant stems increased after the prescribed burn. Layne's butterweed density was higher in areas with more exposed bare ground; prescribed burning increased the amount of bare ground exposed. Webber's milk vetch density was higher in plots with lower overstory canopy closure. Hand thinning reduced overstory canopy closure relative to the control plots.

Data collected to evaluate the effect of prescribed fire on Butte County fritillary was analyzed. There was

*Plant sampling, Webber's milk vetch*

no statistical difference in the number of basal leaves, or in the number of flowering stems, before and after the prescribed fire. Prescribed fires conducted in the fall, when there is sufficient moisture in the fuel to maintain some ground cover, can reduce fuel loading and enhance habitat for the rare Butte County fritillary.

Monitoring also looks for new occurrences of TES plants species during and after HFQLG project implementation. No new occurrences were found this year in 91 monitored units.

*Butte County fritillary*

### Noxious Weeds

Monitoring examines the effect of HFQLG activities and associated weed control and prevention measures on the establishment, eradication and spread of noxious weeds. There were 11 sites with weeds evaluated in 2009 to determine if mitigation measures were properly implemented. All of the occurrences were either treated and/or avoided during HFQLG management activities. The HFQLG project area has done well in implementing the contract specifications of equipment cleaning to prevent the spread of noxious weeds. Seventeen projects were reviewed in 2009 for equipment cleaning documentation. All projects had equipment cleaning documentation in the project files.

There were 42 sites with weeds evaluated in 2009 to determine if existing weed populations were eliminated or contained. Aggressive action prior to and through project implementation has generally been successful in eradicating small populations of noxious weeds. Less success has been realized in larger populations or species more difficult to eradicate. There was a 95 percent success rate in eliminating or containing the weed populations in 2009. For example, careful annual hand-pulling treatment of the musk thistle (*Carduus nutans*) populations on the Sierraville Ranger District appears to eliminate small populations. One large occurrence over 30 acres, containing hundreds of individuals, appears to have been successfully eradicated. The key to successful musk thistle control is to prevent seed production, which is the only form of reproduction. High intensity of control appears to be warranted. These efforts appear to be limiting noxious weed spread on the Lassen, Plumas and Tahoe National Forests. Additional efforts are needed particularly with Medusahead, Dalmatian toadflax, musk thistle and yellow starthistle.

Twenty-two (22) of 91 units monitored (24 percent) had substantial new populations of invasive species 1 to 5 years after treatment, and populations seem to expand once established. Klamath weed is on the California Department of Agriculture (2003) noxious weed list; however cheat grass and bull thistle are not. Regardless, all of these species are highly invasive and potentially threatened ecosystem health and function.

## Wildfire, Fuels and Air Quality

### Predicted Wildfire Effects

To predict the effects of HFQLG treatments on wildfire characteristics, field data from 79 DFPZs, both pre- and post-treatment, were used in the Fire and Fuels Extension to the Forest Vegetation Simulator (FFE) model to predict fire behavior and effects, based on vegetation, 90$^{th}$ percentile weather conditions, and fuel loading. For fire intensities, HFQLG treatments (Defensible Fuel Profile Zones or DFPZs) are intended to reduce intensities to a level at which fire suppression activities can be effective. One criterion for fuel treatment effectiveness is predicted surface flame lengths of less than 4 feet. The model predicted a reduction in mean flame lengths from 4.5 feet to 3.2 feet after DFPZ construction, indicating that this criterion would be met. When data are available, the effects of understory prescribed burn treatments will also be modeled. For tree mortality, the model predicted a decline in mortality rate from wildfire, from 91 percent to 77 percent after DFPZ treatment, thereby meeting an HFQLG silvicultural objective.

### Air Quality and Smoke

The Forest Service monitors the effects of HFQLG prescribed burns related to air quality and smoke. In FY 2009 there were no reported violations of local Smoke Management Plans or air quality standards, no impacts to Class I airsheds, and no formal smoke complaints to local Air Quality Districts resulting from HFQLG prescribed burn activities. The absence of violations or complaints can be attributed in part to extensive coordination and communication of prescribed burn activities between the Forest Service, Air Quality Districts, and the public.

## Large Fire Frequency Trend

To evaluate the trend in large fire frequency within the HFQLG pilot project area, the California Department of Forestry and Fire Protection 2007 fire atlas and the ARIMA time domain regression program were used. ARIMA analysis found a significant increasing linear trend in mean fire size since 1900. The number of acres burned also indicated a linear increase, although this trend was not significant at the 0.05 level (p=0.09). On the other hand, the number of fires per year since 1900 has not increased. These data agree with other larger scale analyses conducted for the entire Sierra Nevada and southern Cascade ranges (Miller et al. 2008, Miller and Safford 2008) showing a linear increase in fire size over the past century. Because the HFQLG pilot project has not yet been implemented in its entirety, it is difficult to determine the potential effect of HFQLG treatments on large fire frequency at this time.

## Large Fire Severity Trend

To evaluate the trend in large fire severity, Forest Service fire severity mapping was used to calculate the percentage of fire acreage that burned with high severity in fires greater than 100 acres within the HFQLG pilot project area. The ARIMA program was then used to evaluate the trend over time. ARIMA found a significant linear increase in the percent of area burning at high severity across the HFQLG pilot project area since 1984. A pattern of increasing fire severity has also been documented for the entire Sierra Nevada and the southern Cascade mountains (Miller et al. 2008, Miller and Safford 2008). Because the HFQLG pilot project has not been implemented in its entirety, it is difficult to determine the potential effect of HFQLG treatments on fire severity at this time.

*Prescribed fire is used to remove ground fuels and reduce future wildfire intensity*

## Effects of HFQLG Treatments on Fire Behavior and Suppression

A number of fires have burned within fuel treatments in the pilot project area since 1999. The effects have been documented in various reports of individual fires, and a forthcoming report (Murphy et al., *in review*) compiles summaries of about ten fires. Fire behavior and effects within fuel treatments have varied somewhat from fire to fire, but may include reductions in flame length, fire intensity, tree mortality, and/or rate of spread. Two additional wildfires impacted fuel treatment areas in 2008,

*Moonlight Fire burning towards Antelope Lake*

the Peterson and Rich fires. Fuel treatment effectiveness studies were completed on both of these fires. Findings indicate that the defensible fuel profile zone (DFPZ) fuel breaks slowed the fires, enabling firefighters to concentrate their efforts on higher priority areas closer to communities and to defer suppression efforts within the fuel breaks. In addition, the intensity of the fires was lower in the treated areas, and preliminary reconnaissance indicates greater tree survival in the treated versus untreated areas.

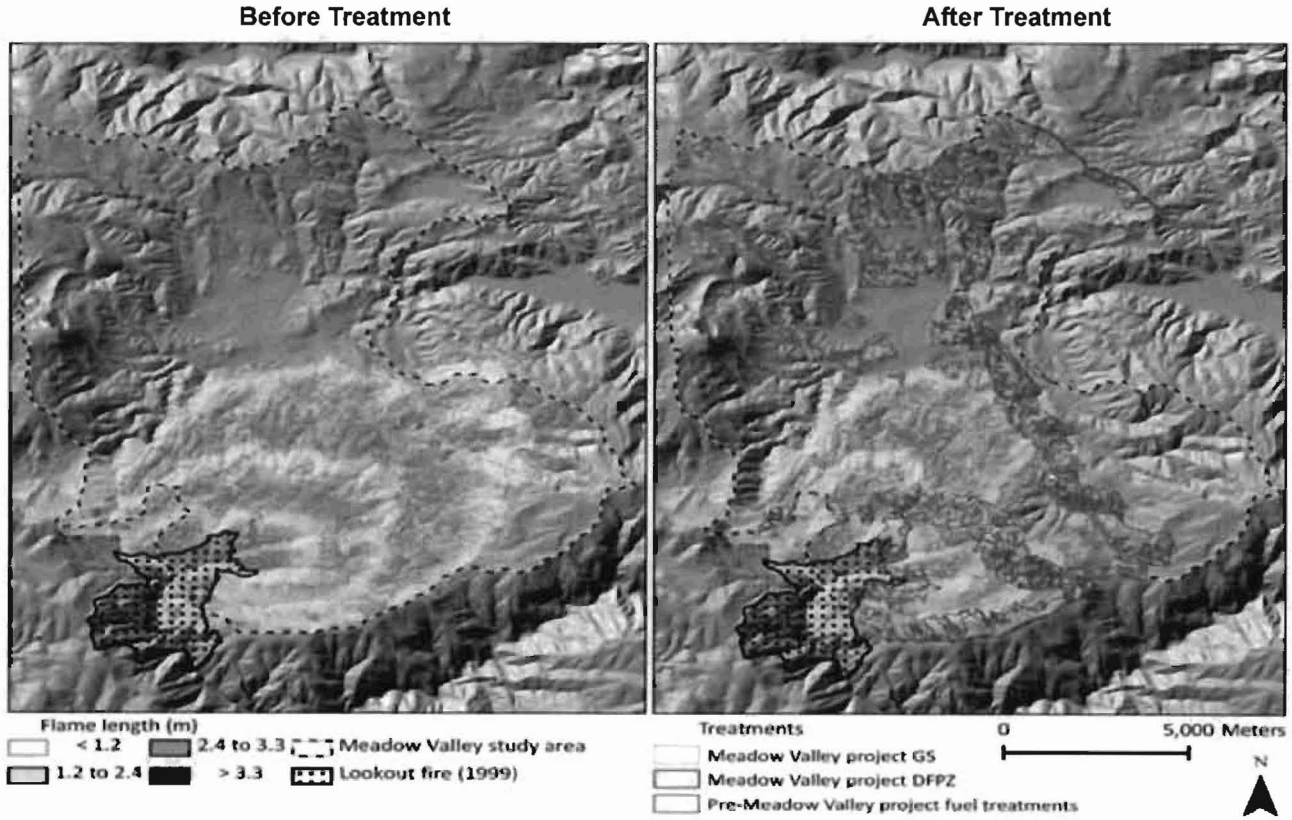
In addition to the examples from actual fires, a computer simulation was used to model fire spread, fire behavior, and fire occurrence before and after HFQLG treatments in a 45,000 acre study area in Meadow Valley (Plumas NF), within the pilot project area. Results demonstrate substantial reduction in both fire size and area burned at higher flame lengths (see the following table and figure). Across the Meadow Valley study area burning probability was reduced as a result of HFQLG treatments, particularly towards the northeast, or down-wind, portion of the study area (Moghaddas et al., *in review*).

Further analysis of HFQLG treatments is underway. It involves modeling the Meadow Valley landscape several decades into the future to assess HFQLG treatment longevity, estimate potential wildfire vulnerability across the Meadow Valley study area before and after HFQLG treatments, and predict habitat alteration from fire.

**Characteristics of a Modeled "Problem Fire" for the Pre- and Post-treatment Meadow Valley Landscape (Area burned is summarized using two flame length break values. These flame length values are based on operational constraints for fire suppression activities.)**

| Treatment phase | Fire size (ac) | Average flame length (ft) | Area burned > 8 ft flame length (ac) (proportion of burned area) | Area burned > 11 ft flame length (ac) (proportion of burned area) |
|---|---|---|---|---|
| Pre | 22,674 | 3.1 | 9321 (0.41) | 7149 (0.31) |
| Post | 13,761 | 2.7 | 5127 (0.37) | 3820 (0.28) |

**Predicted Wildfire Size and Average Flame Length, Meadow Valley Area, Before and After HFQLG Treatments**



## Marten

The marten (*Martes americana*) is currently designated as a sensitive species for the Pacific Southwest Region of the Forest Service and is of concern due to historic trapping, loss of habitat, and subsequent declines in both population and distribution (USDA 2004).

*Marten Monitoring*

Marten were historically distributed throughout the Sierra Nevada, including the HFQLG pilot project area. Surveys since the 1990s have detected marten within the Lakes Basin area on the Plumas National Forest, throughout the west side of the Lassen National Forest above 5,500 feet, and in portions of the Sierraville ranger district.

A series of events over the last 5 years has lead to current research on the Lassen National Forest (LNF) concerning seasonal variability of marten detection in field surveys:

- ✓ Zielinski, Kirk, and others (Redwood Sciences Lab, RSL) conducted carnivore surveys in Sierra Nevada forests, including the HFQLG pilot project area, between 1999 and 2002.
- ✓ The report on this work (Zielinski et al. 2005), which used historic museum and fur trapping records as well as field surveys, showed a lack of marten detections in locations where the Lassen National Forest had successfully detected martens.
- ✓ Kirk and others (Kirk and Zielinski 2009, Kirk 2007) designed a marten habitat model. However, marten locations predicted by the model did not correspond well with the Lassen NF actual marten detections.
- ✓ A study investigating the seasonality of detection occurred between 2007 and 2008 which showed higher detections in the winter months despite a similar probability of detection (as described in MacKenzie et al. 2006).
- ✓ The final report prepared for the above study (Zielinski et al 2009) recommended several next steps, including radio telemetry (tracking marten with radio collars) and snow tracking, to understand the difference in detections between summer and winter seasons and to resolve the question of whether marten reside year-round in the HFQLG pilot project area outside of Lassen Volcanic National Park (LVNP).
- ✓ As directed by Congress, in 2008 an independent scientific review panel organized by the Pinchot Institute reviewed and made recommendations on the HFQLG monitoring program. For marten, the panel's recommendations related to discerning marten occupancy within the pilot project area, refining the predictive model, defining suitable habitat, and being prepared to assess the effects of HFQLG implementation on martens, including on marten movement and habitat connectivity.

In FY 2009, the Lassen National Forest, supported by the HFQLG project and the Pacific Southwest Research Station, worked with RSL and Oregon State University (OSU) to arrange a long-term study with three specific goals:

1. Determine the year-round occupancy of marten within the study area through radio telemetry and monitoring,
2. Determine which habitats (and habitat elements) marten prefer, for foraging as well as resting and reproduction, and develop a habitat predictive model, and
3. Assess and monitor the effects of HFQLG treatments on marten.

The study will begin in FY 2010 with trapping, radio-collaring, and snow tracking of marten in two discrete study areas. In addition to this data, two separate observations of a marten den site and marten adult (both in summer 2009), as well as prior studies (Ellis 1998), suggest that marten may occupy areas outside LVNP year-round. Subsequent work will investigate marten movement in and near HFQLG treatment areas as well as natural openings. Researchers will use snow tracking and radio telemetry to analyze whether and how martens use and/or travel across managed areas (DFPZs, group selections, etc).

Another objective of the HFQLG marten monitoring program is to develop a more site-specific predictive model for marten. Understanding of seasonal variations in detection from the ongoing study, along with analysis of winter detection locations, vegetation and other habitat elements, will be incorporated into a regional marten habitat suitability model. This model can then be used for future HFQLG project planning and impact assessment.

## Songbirds

Point Reyes Bird Observatory Conservation Science has been conducting songbird monitoring in the Northern Sierra since 1997. Monitoring included compilation of information on a suite of HFQLG treatments (defensible fuel profile zone (DFPZ), group selection, pre-commercial thinning, mastication, prescribed fire, aspen, oak and pine enhancement treatments) across the Plumas and Lassen National Forests, and analysis of the short-term response of the avian community. The response to the different treatments varied among species, with some showing positive effects (increased abundance and species diversity) and others negative effects from most treatments. For example, three species, olive-sided flycatcher, Audubon's warbler, and chipping sparrow all increased in abundance following DFPZ treatment. Contrastingly, dusky flycatcher, golden-crowned kinglet, Nashville warbler, and hermit warbler decreased in abundance. Prescribed fire had positive effects on the greatest number of species while mastication and pre-commercial thinning affected the most species negatively.

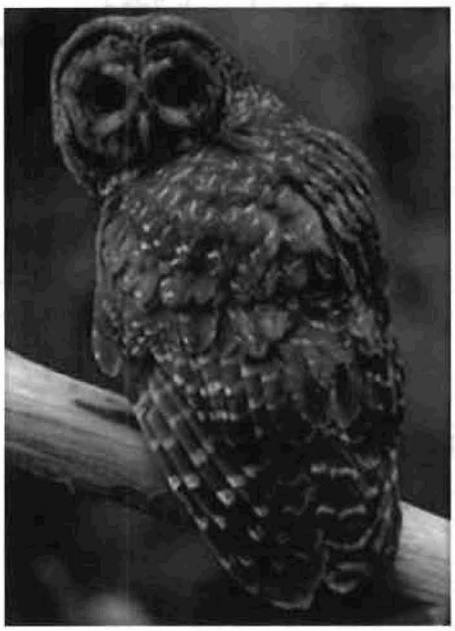
Long-term (since 2004) monitoring continued on aspen enhancement treatments on the Lassen National Forest. Comparison of treated and untreated aspen stands showed that treated aspen stands support greater total abundance of birds and abundance of key species such as mountain bluebird, chipping sparrow, and red-breasted sapsucker, but these initial benefits may be short-lived for some species. Total bird abundance was significantly greater at treated sites than untreated sites: 5.98 versus 4.50 birds per station per visit respectively. Species richness at treated sites averaged 7.28 species per station compared to 6.33 at untreated sites.

In 2009, monitoring of HFQLG fuel treatments was expanded to increase the sample of treated sites on the Lassen National Forest. Additionally, a new study began investigating avian communities in post-fire habitats in the Cub, Moonlight, and Storrie fires. The goal of this study will be to better understand the importance of disturbance dependent habitats (e.g. snags, shrub habitats) as well as the differences in avian populations between habitats dominated by natural disturbance, HFQLG treatments (anthropogenic disturbance), and untreated forest.

*Mountain Bluebird. Photo by Elaine R. Wilson*

## California Spotted Owl

Knowledge regarding the effects of fuels and vegetation management on California spotted owls (CSO) and their habitat is a primary information need in addressing conservation and management objectives in Sierra Nevada forests. Specific research objectives of the CSO module are identified and described in the Plumas-Lassen Administrative Study (PLAS) Plan.



*California spotted owl*

Current information on the distribution and density of CSOs across the HFQLG study area is required to provide the data necessary to build predictive habitat models and provide baseline population information against which to assess post-treatment changes in CSO populations and habitat. Continued monitoring in the Lassen Demographic Study Area is critical for estimating long-term CSO population trends and status. The focus in 2009 was to conduct landscape inventories of CSO distribution and abundance and continue banding to provide demographic data and baseline information. Efforts were made to monitor the pair and reproductive status of each owl, and to capture, uniquely color mark and collect blood samples from each individual owl. Capture and color marking are necessary to estimate survival and population trend, and to assess exposure to West Nile Virus. All barred and hybrid barred-spotted owls encountered in the study area were also recorded and synthesized to all existing barred owl records for the northern Sierra Nevada.

Of note, the 2009 work continued the second year of case studies within the PLAS to assess the distribution and abundance of CSOs across a landscape that had been fully treated under the HFQLG program (Meadow Valley Project Area) and across a landscape that has experienced high severity wildfire (Moonlight-Antelope Complex Fire Area). Additionally, the first year of CSO surveys were conducted across a landscape that had experienced moderate-low severity wildfire (Cub-Onion Fire). Thus, the study is positioned to monitor CSO response across the gradient of landscape conditions that are at the core of the CSO-wildfire-forest management monitoring questions (untreated, treated with fuels treatments, high severity wildfire, and moderate-low severity wildfire landscapes).

### CSO Numbers, Reproductive Success, Density and Population Trends

A total of 73 territorial CSO sites were documented in 2009 across the study area. This total consisted of 63 confirmed pairs, 5 unconfirmed pairs and 5 territorial single CSOs. Thirty pairs successfully reproduced in 2009 (47.6 percent of confirmed/unconfirmed pairs). A total of 47 fledged young were documented in 2009 (1.57 young per successful nest). Across the 6 years of the study, CSO reproduction has varied annually in percentages of CSO pairs that successfully reproduced, and to lesser degrees in the number of young fledged per successful nest. Approximately 50 percent of CSO pairs successfully reproduced in 2004, 2007 and 2009 while only 14 to 18 percent were successful in 2005, 2006 and 2008. Annual CSO reproduction is known to vary with both spring weather and variation in prey numbers.

**California Spotted Owl Reproduction on the Plumas and Lassen National Forests 2004 to 2009**

| Year | Percent of confirmed/ unconfirmed pairs with successful nests | Young fledged per successful nest |
|---|---|---|
| 2004 | 49.4 | 1.68 |
| 2005 | 17.7 | 1.47 |
| 2006 | 13.8 | 1.50 |
| 2007 | 55.4 | 1.81 |
| 2008 | 16.4 | 1.70 |
| 2009 | 47.6 | 1.57 |

The crude density of CSOs was estimated based on the numbers of territorial owls detected across nine survey areas during 2009 surveys. The estimated crude density across the overall study area in 2009 was 0.069 territorial owls per $km^2$. Overall study area crude densities are not directly comparable across years because different total areas were surveyed in each year. However, crude density estimates within individual survey areas on the Plumas NF indicate similar densities and numbers of territorial sites (pair sites plus territorial single sites) between 2004 and 2008, with a slight drop in numbers in 2009. In contrast, numbers appear to have declined somewhat on the Lassen NF survey areas between 2005 and 2008, and then increased slightly in 2009.

## Vegetation Sampling – Nest Plots

Vegetation plot sampling was conducted at approximately 100 CSO territories from 2005 through 2009. Approximately 230 Forest Inventory and Assessment (FIA) vegetation plots have been measured for development of CSO habitat models that can be used as adaptive management planning tools. Habitat models are currently being evaluated that can be used to assess projected changes in CSO nesting and foraging habitat suitability under varying fuels and vegetation treatment scenarios.

## Banding, Blood Sampling, West Nile Virus Monitoring

Eighty-two (82) CSOs were captured and banded in 2009. Blood samples were collected from 17 individuals in 2009 and have not been analyzed to date. None of the 154 individual samples tested at the University of California, Davis for West Nile Virus antibodies tested positive from 2004 to 2007.

## Barred and Sparred (spotted-barred hybrid) Distributional Records

Barred owls have been linked to the continuing decline of the northern spotted owl and are considered a primary threat. They are likely to present a similar threat to the California spotted owl. Barred owls, a recent invader in the region, were first reported in 1989. Four barred owls and three sparred owls were detected during 2009 surveys within the study area. The synthesis and update of barred-sparred owl records through 2009 based on Forest Service and California Department of Fish and Game databases indicates that there are a minimum of 53 individual site records across the Sierra Nevada. This includes 19 records that have been documented within the HFQLG intensively surveyed study area and 39 records across the broader HFQLG Project Area. The pattern of records suggests that barred-sparred owls have been increasing in the northern Sierra Nevada between 1989 and 2008.

## Meadow Valley Project Area, Moonlight-Antelope Fire Area, and Cub-Onion Fire Area Case Studies

The Meadow Valley project area is the first area within the PLAS where full implementation of HFQLG treatments has occurred. Annual monitoring of CSOs between 2003 and 2009 suggests that CSO numbers have been fairly stable across the survey period with the number of pairs ranging between six and nine across years. However, seven to nine territorial CSO sites were documented each year between 2003 and 2007, whereas six territorial sites were located in each of the first 2 years (2008 and 2009) following full implementation of the treatments across the MVPA landscape. Additionally, results suggest that treatments may be associated with the movement of two territorial sites within the landscape. Detailed information on the spatial locations, timing, and effects on the post-treatment vegetation are needed to more fully explore the effects of treatments on CSOs. Further, continued monitoring is necessary to assess the longer-term responses of CSOs to treatments that may not be apparent

from the acute, short-term responses observed in 2008 through 2009.

The Moonlight Antelope fire area landscape encompassed approximately 88,000 acres that burned in 2007. These high-severity fires resulted in significant change to the vegetation, with the landscape experiencing about 60 percent high severity fire and 25 percent moderate intensity fire. Suitable CSO habitat decreased from 70.1 percent of the pre-fire landscape to 5.8 percent in the post-fire landscape. Twenty-three CSO Protected Activity Centers (PACs, 300 acre management areas) were located in the pre-fire landscape but it is unknown what proportion of these PACs was actually occupied by CSOs in 2007. In 2008 surveys we documented a single pair of territorial CSOs within the 88,000 acres, plus ten detections of single, apparently non-territorial, male CSOs spread out across the area. In 2009 surveys we detected the same single pair of territorial CSOs and no other CSOs. These results indicate that these high-severity fires have had negative effects on CSOs distribution, abundance, and habitat.

The Cub Onion Fire landscape encompassed approximately 21,000 acres that burned in 2008. These were largely low to moderate intensity fires, with the landscape experiencing about 10 percent high severity, 20 percent moderate severity, and 70 percent low severity fire. In the initial year of CSO surveys, 2009, we detected six territorial pairs, one unconfirmed territorial pair, and two territorial single CSOs within the fire perimeter area. These results suggest that CSOs are able to persist within landscapes that experience predominantly low to moderate severity wildfire. Surveys to be conducted in 2010 are necessary to confirm these patterns. Additionally, information on the post-fire vegetation and habitat conditions are needed to fully assess the response of CSOs and their habitat to wildfire.

*Antelope Fire burned area with smoke plume from Moonlight Fire burning in the distance*

## Amphibians

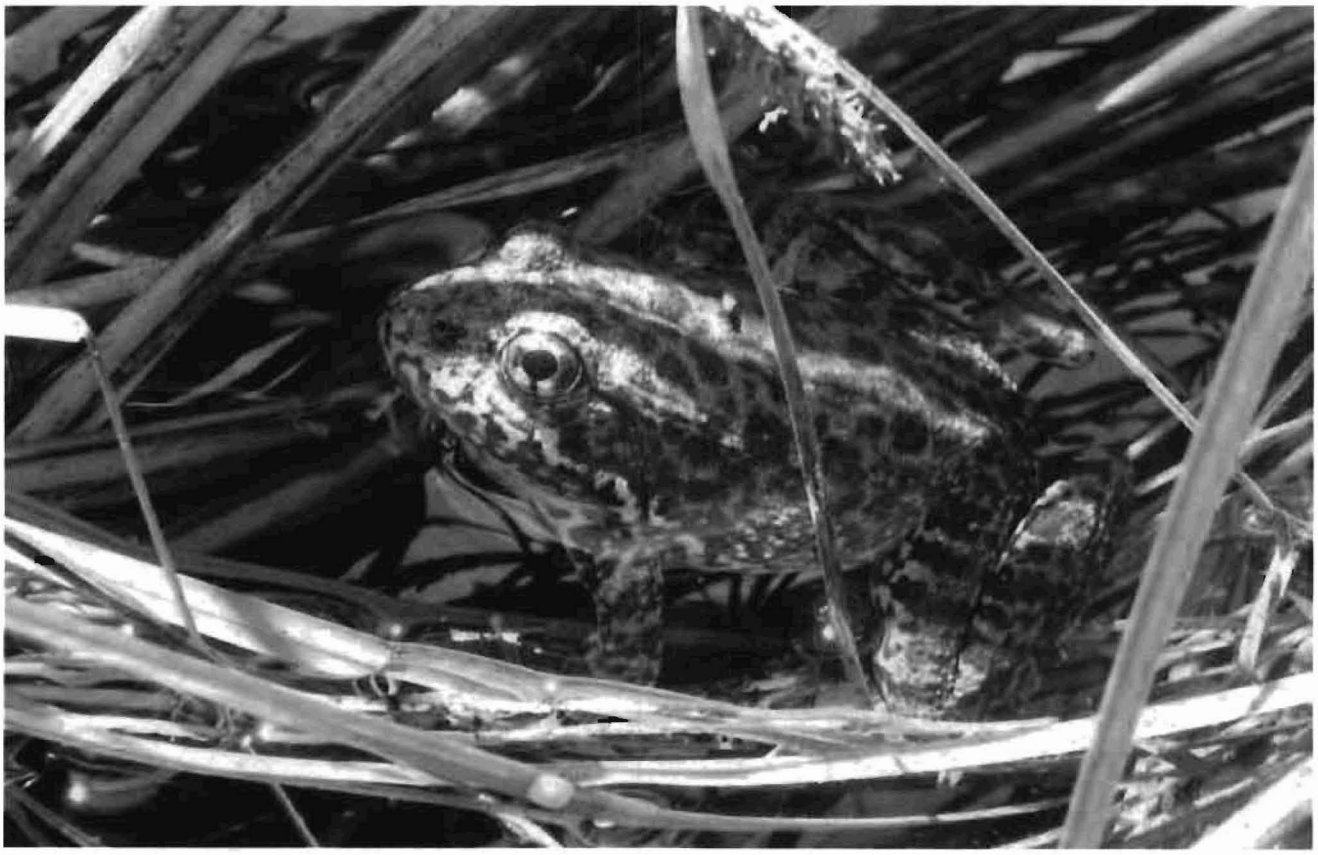
Monitoring was conducted to determine potential effects on amphibians within habitats that may be affected by projects implemented under the HFQLG pilot project. New methodology was developed in 2009 to establish base line data for habitat and species presence and abundance. In 2009 HFQLG amphibian monitoring accomplished both habitat and species surveys at five monitoring sites on the Tahoe and Plumas National Forests. The five sites selected for 2009 include Independence Creek (Tahoe), Potosi Creek (Plumas), South Fork Rock Creek (Plumas), Lone Rock Creek (Plumas), and Boulder Creek (Plumas). The five sites were selected based on two primary criteria; (1) presence of existing sensitive amphibian populations or individuals, and (2) HFQLG projects that had treatments located within or adjacent to the presence of sensitive amphibians and where treatments would occur within the next 2 years. Habitat monitoring showed that all five sites contained suitable habitat for one or more of the following species: mountain yellow-legged frog (*Rana muscosa*), Pacific tree frog (*Hyla regila),* and long-toed salamander (*Ambystoma macrodactylum).* Although data was collected on an extensive set of habitat attributes, three key attributes have been identified as having the highest probability of being affected by HFQLG treatments and have been selected for closer analysis: percent shade, sediment as measured by pool tail fines, and bank stability. Percent shade was variable, showing the lowest, 36.2 percent shade, at Boulder Creek, and the highest, 66.2 percent, at Potosi Creek. Percent stable banks

was relatively consistent at 87 to 100 percent. Sediment data indicated that pool tail fines had the greatest range of variability with measurements ranging from 1 percent at Independence Creek to 100 percent at Boulder Creek. Though variability between reaches can be expected, it is a goal to compare the changes in key attributes before and after HFQLG implementation to determine if actions are affecting amphibian habitat. These results will be included in future monitoring reports.

Species surveys were conducted at all five sites. Independence Creek species surveys found the most mountain yellow-legged frogs (MYLF) with 42 individuals, followed by Lone Rock Creek with 15 MYLF and 5 MYLF at South Fork Rock Creek. Of the MYLF found, a total of seven were large enough (SVL >45mm) for the mark and recapture technique to estimate abundance. Potosi Creek and Boulder Creek were the only two sites where MYLF were not found. However, Potosi and Boulder Creeks did have Pacific tree frogs present, and one western toad was found at Boulder Creek. Salamander larvae were found at three sites, Potosi Creek, Lone Rock Creek and Boulder Creek.

After HFQLG project implementation, post-project surveys will be conducted to compare habitat components and amphibian population estimates to pre-project conditions.

Additional monitoring was completed to determine how pond and plug watershed restoration treatments may affect bullfrog (*Rana catesbeiana*) relative abundance. Bullfrogs are undesirable non-native frogs that compete with and prey on native species. Three transects were established on Last Chance Creek with a total of 54 stations to listen for singing adult bullfrogs in areas that had been either restored with pond and plug projects or were untreated. Stations were visited twice during the breeding season. The ponds created by the watershed restoration projects create suitable breeding habitat, which is otherwise less abundant in these eastside stream systems. Bullfrog relative abundance was significantly greater at treated sites than untreated sites.



*Female Sierra Nevada yellow-legged frog found along the edge of Lone Rock Creek*

## Watershed Condition

For watershed condition, the effect of HFQLG project activities is monitored using data compiled by hydrologists for their project level NEPA analyses. Only vegetation management projects that have had at least some on the ground implementation are included in the monitoring pool. In 2009, many recent NEPA decisions for HFQLG projects were encumbered by litigation. Consequently, very few projects were initiated on the ground in 2009 and watershed condition results are very similar to those reported in 2008.

**Summary of HFQLG Watershed Condition Monitoring Plan Results (2009)**

| Watershed Condition Indicator | Total acreage of sub-watersheds reporting | Unit of Measure | Pre-project Condition | Post-project Condition | Percent Change |
|---|---|---|---|---|---|
| Road Density | 788,000 acres | miles per square mile | 2.97 | 2.88 | - 3.0% |
| Near-stream Road Density | 308,000 acres | miles per square mile | 3.62 | 3.42 | - 5.5% |
| Equivalent Roaded Acres (ERA) | 1,220,000 acres | equivalent roaded acres | 62,100 (5.1% of basin area) | 79,500 (6.5% of basin area) | + 28% |
| Near-stream ERA | 17,700 acres | equivalent roaded acres | 472 | 489 | + 3.6% |
| Number of Road / Stream Crossings | 571,000 acres | number | 3,108 | 3,051 | - 1.8% |

Published research consistently recognizes that roads are typically the primary anthropogenic source of water quality impacts in forested watersheds. Road obliterations account for the 3 percent decrease in road density presented above. Results from another facet of the HFQLG Monitoring Plan, Stream Condition Inventory (SCI) monitoring, indicate that one HFQLG project with a reduction in road density due to road obliterations likely resulted in a measurable decrease of fine sediment delivery to a local stream. For the Panther Creek reach, pre- and post-project results for one of the three SCI protocol measures used to assess changes in fine sediment delivery demonstrated a statistically significant decrease in the mean percentage of pool tail fines (from 34.3 percent pre-project to 11.7 percent post-project).

Equivalent Roaded Acres (ERA) is a measurement for quantifying the amount of land disturbance (which can alter a watershed's surface runoff patterns and timing) associated with different vegetation management activities. For example, one acre of tractor clearcut may count as 0.30 to 0.35 ERA. Fine sediment delivery to streams is typically the primary threat to water quality associated with timber projects. Modest increases in land disturbance due to HFQLG project activities, as modeled by ERA analysis, do not necessarily indicate that stream health and watershed condition would be degraded by sediment delivery from the project area. Results (described elsewhere in this report) from monitoring of stream condition inventory and Best Management Practices (BMP) indicate that, despite modeled increases in ERAs for project watersheds, project BMPs and protective streamside management zones effectively prevent delivery of project-generated sediment.

In 2007 and 2008, the SCI protocol was applied to 15 streams where pre-project data had been measured. For all of these streams, none of the three fine sediment measures were significantly different when compared with the pre-project data, indicating that project activities did not result in increased sediment delivery. From 2005 through 2009, 792 site-specific BMP effectiveness evaluations (focusing on stream sedimentation and bank disturbance impacts) were conducted to assess practices associated with stream course protection, skid trails, landings and prescribed burns. Sixty-two (62) of these 792 evaluations were rated as ineffective, resulting in a 92 percent BMP effectiveness rating.

*Rock Creek (Lassen NF)*

In contrast, SCI monitoring results from a severely burned watershed on the Plumas NF verified an increase in the delivery of fine sediment to streams after severe fire. The Moonlight Fire burned over 46,000 acres of National Forest System lands in September 2007, with roughly three-fourths of the ground experiencing moderate or high soil burn severity. An SCI survey had been performed on Moonlight Creek in 2005, within a 5600-acre basin that experienced high burn severity in 2007 over more than 65 percent of the watershed. The wildfire resulted in an increase in ERA from 1.3 percent of the total watershed area before the fire to 13.3 percent afterward, just over the threshold of concern of 13 percent. (The threshold of concern, expressed as the ERA percentage for each subwatershed, serves as a "yellow flag" indicator of increased risk of detrimental watershed effects.) This nine fold increase far exceeds the average increase in ERA caused by HFQLG timber projects quoted above. SCI monitoring results for 2005 and 2008 also demonstrated a large and statistically significant increase in pool tail fines, from 4.2 percent to 15.7 percent, for Moonlight Creek.

## Stream Condition Inventory

Stream condition inventory tracks the trend of selected channel attributes of streams before and after implementation of HFQLG project activities. Over 20 streams were monitored during the summer and fall of 2009. Monitored streams included pre-project, post-project, reference, and post-fire reaches.

Monitoring crews used the Forest Service Pacific Southwest Region Stream Condition Inventory protocol (Frazier et al. 2005). The protocol includes parameters important in classifying and assessing condition of channel morphology, fish habitat and water quality. Because a reduction in shade and increase in stream sediment are the primary concerns associated with HFQLG projects for aquatic systems, data evaluation focused on a measure of stream shading and three measures of channel sediment (percent pool tail fines, percent of particles less than 2 mm, and residual pool depth). Treatments located within streamside areas would be expected to reduce the amount of shade in the short term, while increased erosion and sediment delivery from projects would be expected to increase both pool tail fines and the percentage of particles less than 2mm. Increased sediment delivery might also increase deposition of sediment in pools, thereby reducing residual pool depth. All three changes are considered detrimental to fish habitat.

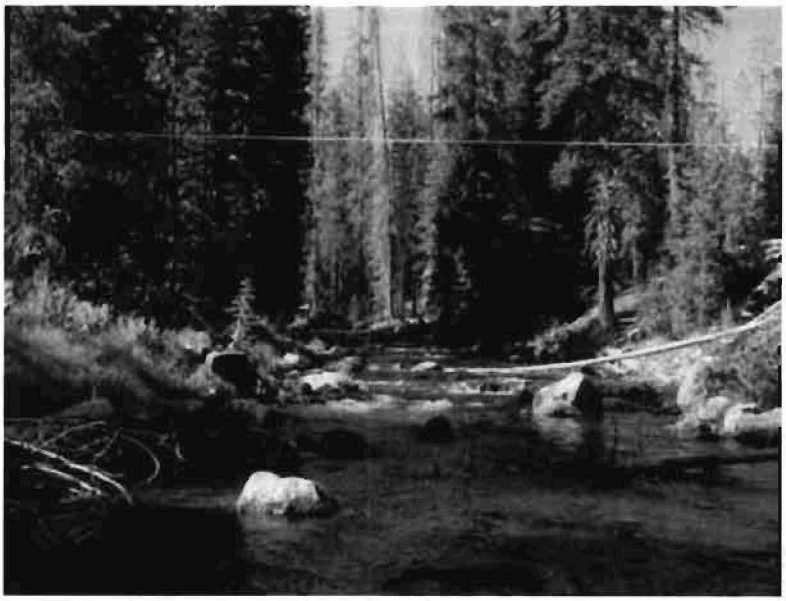
A total of nine pre-post surveys were conducted in 2009. Of these, five assessed potential impacts resulting from recent HFQLG vegetation management activities, two assessed potential impacts resulting from large wildfires, and the remaining two are part of a long-term monitoring effort assessing HFQLG activities that happened more than 5 years ago. Additionally, six reference streams were monitored for long-term comparison purposes. Reference stream annual variation was relatively low for most attributes in the six streams where repeat measurements were taken in 2009.

In general, comparisons of reaches monitored before and after implementation of HFQLG projects indicate a lack of adverse impacts. Though some HFQLG projects resulted in a slight increase in sediment to aquatic habitats, this increase was not significant, nor detected within all three measurements of fine sediment included in the SCI survey. For those reaches where significant differences were detected (North Carman Creek, Negro Run Ravine), pool tail fines actually decreased compared to pre project conditions. The HFQLG projects associated with these two reaches were not designed with the goal of reducing fine sediment in stream channels. This decrease is likely due to healing of existing natural (wildfire, bank erosion, etc) or management-caused (past logging, roads, grazing) sediment sources within the watershed over time. The 2009 survey of North Carman Creek was completed to assess potential impacts of the Mabie Project where approximately 200 acres of treatment occurred within the riparian management zone. Results showed that even with extensive management within the riparian management zone, shade measurements were nearly identical to those collected prior to implementation.

Aspen management in the Jones Creek stream management zone caused significant reductions in channel shade. Shade decreased from 80.2 percent before treatment to 70.7 percent after treatment. Associated stream temperature data has not yet been analyzed.

Cub Creek monitoring was conducted to examine the effects from the 2008 Cub Wildfire. Increases in pool tail fines and particles less than 2 mm, and reductions in residual pool depths and shade, were evident. Moonlight Creek was monitored to assess potential changes caused by the Moonlight Wildfire and subsequent salvage logging. In 2008, measurements indicated increased sediment and decreased shade attributable to the wildfire. In 2009, analysis revealed that sediment measurements had returned to levels similar to pre-fire conditions.

A potential explanation for the reduction in channel sediment is the input of large woody debris to the channel, which may assist the channel with temporarily storing sediment. Shade continued to decline and large wood recruitment was high, nearly doubling the amount of large logs to 122 pieces in 2009. The loss of stream channel shade will have long-lasting effects to the burned reaches. However, it appears that this system is trending back towards pre-fire conditions in a relatively short time frame with regard to sediment, even with the implementation of salvage projects on both private and National Forest System lands.



***Rice Creek SCI (Lassen NF)***

Plumas & Lassen National Forests

Sierraville Ranger District, Tahoe National Forest

USDA Forest Service

Pacific Southwest Region — February 2010