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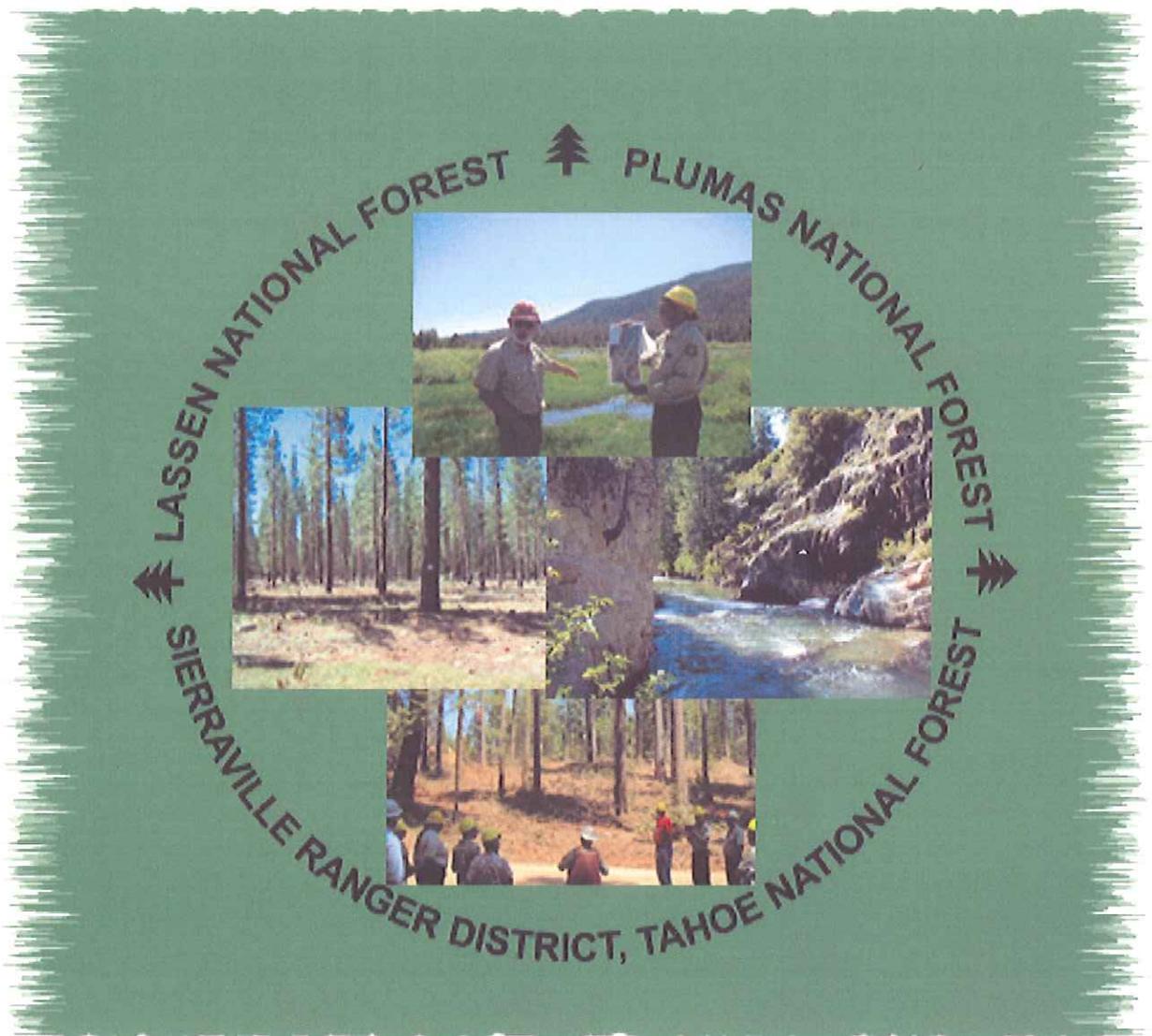
Forest Service

Pacific Southwest  
Region

February 2011

# Status Report to Congress Fiscal Year 2010

## 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 be available upon request by contacting the team.

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### Cover Photos

Clockwise from Top Center: 1) Perazzo Meadow Watershed Restoration Project, Sierraville Ranger District, Tahoe National Forest; 2) Nelson Creek, Plumas National Forest; 3) A Defensible Fuel Profile Zone unit on the Feather River Ranger District of the Plumas National Forest; 4) Fuel Reduction Treatment, Eagle Lake Ranger District, Lassen NF.

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# Introduction and Background

The Fiscal Year (FY) 2010 Herger-Feinstein Quincy Library Group (HFQLG) Forest Recovery Act Pilot Project Status Report to Congress is the eleventh 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 2010 HFQLG Monitoring Reports will be available at [www.fs.fed.us/r5/hfqlg](http://www.fs.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. Various litigation currently affecting HFQLG projects was initiated as far back as 2005. Since then, decisions and injunctions have been in effect off and on from the Federal District Court and Ninth Circuit Court of Appeals. 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. In FY 2010, the Federal District Court and Ninth Circuit Court of Appeals issued rulings that allowed some previously-enjoined projects, or portions of projects, to proceed. However, injunctions remain in effect on a few projects.

As with the rest of the nation, the market for timber products in California is depressed. In current market conditions, HFQLG timber sales planned in previous years might have to be modified to increase their economic viability, or might have to be implemented through stewardship or service contracts. Both of these options increase project cost and reduce the level of accomplishment possible with a given level of funds.

As required by the HFQLG Act, the Forest Service monitors socioeconomic and environmental effects of the pilot project. Discussion of these effects makes up much of this report. Among other things, monitoring and analysis of wildland fires continue to demonstrate that Defensible Fuel

Profile Zones (DFPZs) are effective in reducing size and intensity of fires, tree mortality, and fire suppression costs.

Monitoring efforts also continue to provide effective feedback to inform planning and implementation of current and future projects. Over the course of the pilot project, various mitigation measures have been applied to management techniques in response to issues identified through monitoring, such as soil compaction and smoke from prescribed burning. Various components of the monitoring program were modified in FY 2009, in response to recommendations from the independent scientific review panel required by the HFQLG Act.

## 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.



*Tim Holabird, aide to Congressman Tom McClintock, reviewing completed DFPZ on Eagle Lake Ranger District, Lassen National Forest*

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:

- ✓ A system of Defensible Fuel Profile Zones (DFPZs), which are corridors, ¼ to ½ mile wide, where the forest is thinned to provide shaded fuel breaks.
- ✓ Group selection (GS) timber harvesting, which creates forest openings of ½ to 2 acres where trees less than a certain diameter (30 inches under the 2004 Sierra Nevada Forest Plan Amendment) are removed.
- ✓ Individual tree selection (ITS), also known as area thinning.
- ✓ Riparian management and restoration.

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.

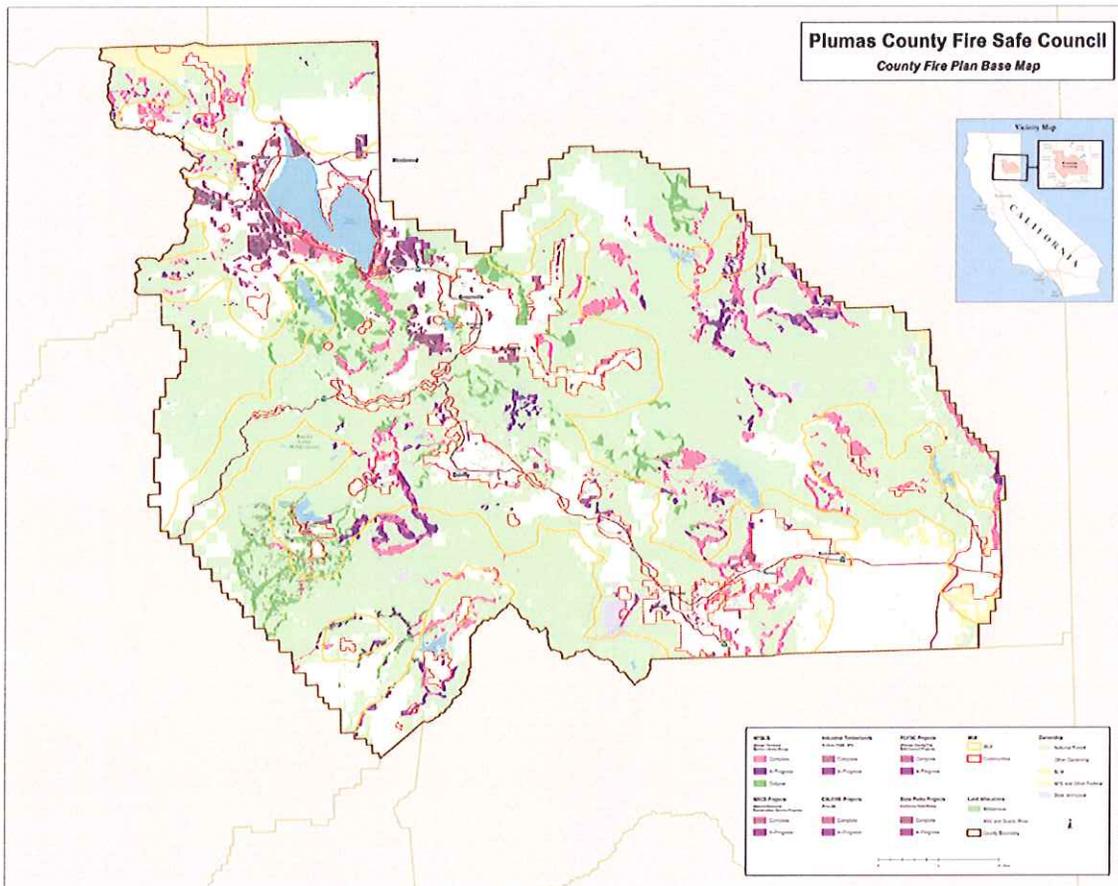
Implementation has been subject to a variety of challenges, including restrictions from previous land and resource management documents. The Sierra Nevada Forest Plan Amendment (also known as the Sierra Nevada Framework) Record of Decision, signed in January 2004, provides for full implementation of the Act, but has been affected by litigation as discussed above. Prescribed burning, an important implementation tool, may also be limited by air quality regulations.

## Collaboration across National Forest Boundaries

While the Forest Service implements the HFQLG pilot project on National Forest lands, private land owners and managers are also establishing fuel breaks on private forest lands in the area. Through county Fire Safe Councils, public and private land owners are collaborating with citizens in planning and implementing this work on thousands of acres. As an example, in FY 2010 the Forest Service and Quincy Library Group worked with the Plumas County Fire Safe Council and private land owners/managers to develop a county map showing how the HFQLG DFPZ network connects with hazardous fuel reduction projects planned and implemented on private lands under the county fire plan. This map will help leverage limited private, state and federal funds. The Plumas County Fire Safe Council has successfully competed for \$4.5 million in grants from 12 different funding sources to conduct fire protection educational programs and to carry out over 30 hazardous fuel reduction projects covering 3,500 acres on non-industrial private forest property.



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



Plumas County Fire Safe Council's Fire Plan Base Map shows connections between HFQLG DFPZ network and private land fuel breaks

## Funding

Funding and expenditures for the HFQLG pilot project over the 12 years since inception are summarized below.

Table 1. 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	25.2	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	0.3
2010	26.2	3.1	23.0	26.2	0.0	TBD
<b>Total</b>	<b>299.1</b>	<b>31.4</b>	<b>237.7</b>	<b>269.2</b>	<b>29.8</b>	<b>15.6</b>

Note: Numbers have been rounded.

FY 2010 project expenditures include:

- ✓ Administering and monitoring projects from prior years.
- ✓ Implementing projects from prior-year planning.
- ✓ Planning and implementing FY 2010 projects and planning projects for FY 2011 and beyond.
- ✓ Responding to appeals and litigation, in some cases including paying legal fees.

Three primary fund codes are used to track project expenditures:

- ✓ Wildland Fire Hazardous Fuels (WFHF). Fuels reduction project (including Defensible Fuel Profile Zone) 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 implementations.

In FY 2010, these primary fund codes were supplemented by several other fund codes for HFQLG work:

- ✓ Cooperative Work, Knutson Vandenberg, sale area projects (CWKV). Watershed and riparian restoration, fuels management.
- ✓ Cooperative Work, Knutson Vandenberg, regional projects (CWK2). Watershed restoration and fuels management.
- ✓ National Fire Plan Forest Health Management (SPS4). Forest health improvement.
- ✓ Timber salvage sales (SSSS). Post-fire recovery projects including fuels reduction.

**Table 2. FY 2010 Pilot Project Expenditures (millions)**

	WFHF	NFTM	NFVW	SPS4	CWKV	CWK2	SSSS	Total
Lassen	4.486	1.547	2.472		0.239			8.744
Plumas <sup>1</sup>	7.233	4.357	0.270	0.240	0.138	0.235	0.262	12.735
Tahoe	1.409	0.001	0.165					1.575
<b>Total</b>	<b>13.127</b>	<b>5.905</b>	<b>2.907</b>	<b>0.240</b>	<b>0.377</b>	<b>0.235</b>	<b>0.262</b>	<b>23.053</b>
12% Indirect Cost								3.144
Unobligated Balance								0.003
<b>Totals FY 2010 Budget</b>								<b>26.200</b>

<sup>1</sup>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 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.

**Table 3. Historic Revenue, Expenditures and Timber Activity for the HFQLG Pilot Project Area**

Fiscal Year	Revenue (Millions)	Expenditure (Millions)	Regeneration (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

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.

**Table 4. Revenue, Expenditures and Timber Management for HFQLG Pilot Project**

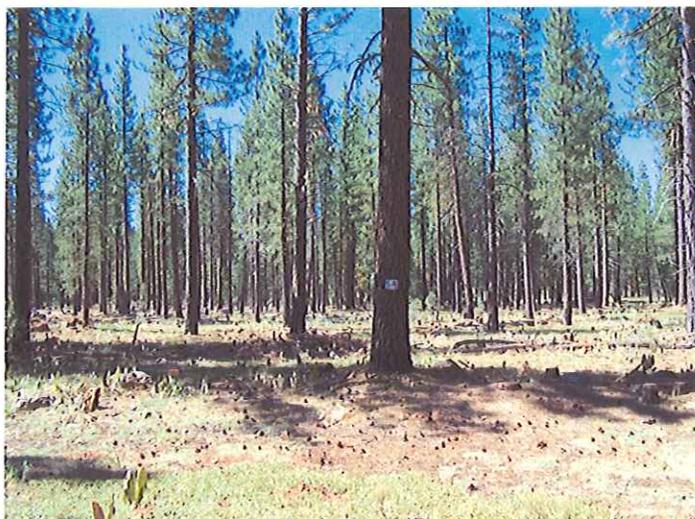
Fiscal Year	Revenue (millions)	Expenditures (millions)	Number of Projects	Sawlog Vol. Offered/Sold (CCF)	Biomass Vol. Offered/Sold (CCF)	Sawlog & Biomass Vol. Removed (CCF)
1999	0.000	1.943	1	4,785	4,278	0
2000	0.020	7.182	10	44,422	64,517	5,754
2001	0.140	28.267	34	88,802	143,117	33,151
2002	0.989	21.557	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	92,299	63,901	49,282
<b>2010</b>	<b>4.977</b>	<b>26.197</b>	<b>57</b>	<b>109,605</b>	<b>49,188</b>	<b>48,245</b>
<b>Total</b>	<b>22.114</b>	<b>269.239</b>	<b>380</b>	<b>865,556</b>	<b>853,575</b>	<b>915,203</b>
<b>Average 2001 to Present</b>	<b>2.209</b>	<b>26.011</b>	<b>36.9</b>	<b>81634.9</b>	<b>78478</b>	<b>90944.9</b>

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 Forests in the pilot project area changed with passage of the HFQLG 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)
- ✓ Individual Tree Selection (ITS)

Riparian Restoration is also an important part of the HFQLG pilot project. This includes meadow restoration and enhancement, stream channel improvement, road relocation, road closure, slope stabilization and aspen enhancement. In FY 2010, there were 18 projects restoring 4688 acres. Approximately 4 miles of road and 6 road crossings were eliminated, while 28 road crossings were restored.



*A mechanically thinned DFPZ on the Eagle Lake Ranger District*

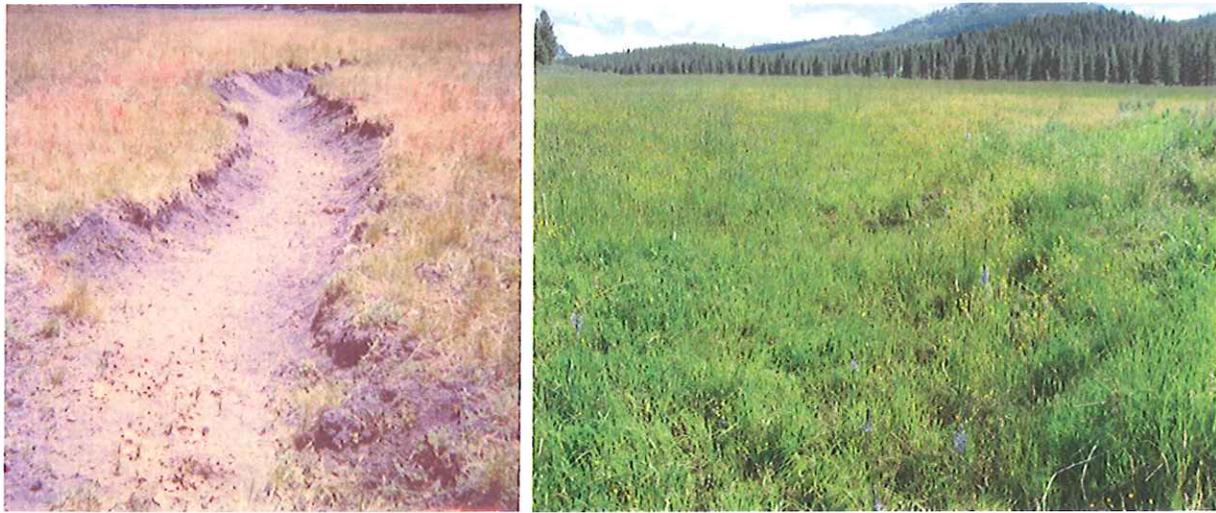
Prescribed fire is a valuable tool for thinning underbrush to restore a fire-resilient forest, and may be used to create, enhance, or maintain DFPZs. Various follow-up treatments, including mastication, piling, chipping and/or burning of brush or slash, are also used to reduce forest fuels hazards.

HFQLG acres accomplished each year are shown in table 5. 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 appealed or 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. Beginning in FY 2009, some of these previously-advertised projects began to move forward again. In FY 2009 one project was redesigned in a way that avoided further appeal or litigation, resulting in one timber sale being reoffered and sold that year and several others scheduled for subsequent years. In FY 2010, court rulings were issued on long-running litigation that allowed several other previously-enjoined projects, or portions of projects, to proceed. Several previously-advertised timber sales were reoffered and sold in FY 2010. Acreage for these projects reoffered and sold in FY 2009 and FY 2010 are shown in table 6, and are not included in table 5.

**Table 5. Acres Accomplished per Fiscal Year**

Fiscal Year	DPFZ (Mechanical)	DPFZ (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
2010	9,057 <sup>1</sup>	4,694	236	718	4,741 <sup>1</sup>	19,446 <sup>1</sup>
<b>Total</b>	<b>164,686</b>	<b>40,196</b>	<b>7,755</b>	<b>9,032</b>	<b>10,101</b>	<b>231,770</b>

<sup>1</sup>includes projects funded through the American Recovery and Reinvestment Act



Before and after photos of riparian restoration treatment on Beckwourth Ranger District. Treatment filled in gully and restored water table in meadow.

**Table 6. Acres Shown as Accomplished in Previous HFQLG Annual Reports that were Reoffered and Sold**

Fiscal Year	DFPZ (Mechanical)	DFPZ (Fire)	GS	ITS	Riparian Restoration	Total
2009	751		136	286		1,173
2010	2,235		709	702		3,646

Table 7 shows the actual numbers of acres treated on the ground each year. Most projects, though reported as accomplished, have contracts that extend for several years, so that actual on-the-ground work may not be completed until one or more years after the accomplishment was reported. Additionally, in some locations an initial treatment, such as a DFPZ, may be followed up in subsequent years by another treatment in the same location, such as a prescribed burn, in order to optimize or maintain desired vegetation conditions. Consequently, the number of acres treated on the ground each year through the activities of harvest, prescribed fire, etc. is not the same as the acres reported as accomplished annually in table 5. Table 7 includes acreage of both initial treatments and follow-up treatments. In FY 2010, 6,538 acres of follow-up treatments were completed, including 3,134 acres of mechanical treatments and 3,404 acres of DFPZ/burn treatments.

**Table 7. Acres Treated on the Ground per Fiscal Year**

Fiscal Year	DFPZ (Mechanical)	DFPZ (Fire)	GS	ITS	Total Acres Treated <sup>1</sup>
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
2010	9,229	9,737	55	63	19,084
<b>Total</b>	<b>116,076</b>	<b>66,024</b>	<b>4,129</b>	<b>2,719</b>	<b>188,948</b>

<sup>1</sup>does not include riparian restoration

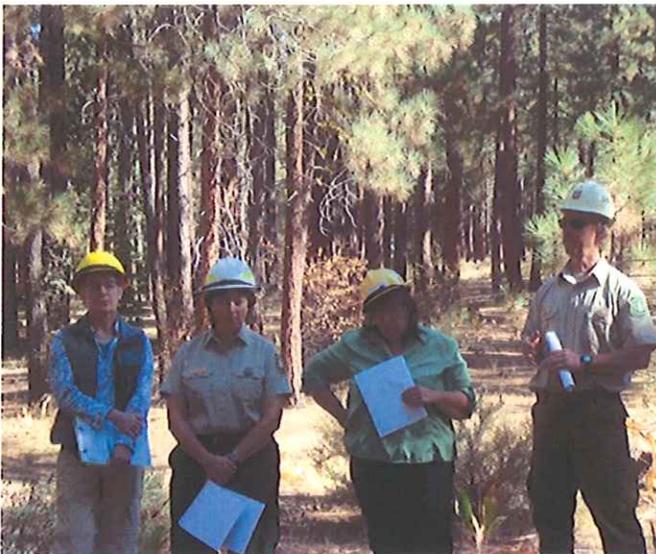
# FY 2011 Program of Work

The FY 2011 enacted budget is estimated to be approximately \$ 26.2 million. The following activities are planned in FY 2011:

- ✓ Number of Projects: 45
- ✓ Sawlog Volume (CCF): 115,000
- ✓ Biomass Volume (CCF): 74,000
- ✓ DFPZ Acres: 18,500
- ✓ GS Acres: 900
- ✓ ITS Acres: 2900
- ✓ Riparian Restoration Acres: 700
- ✓ Total Planned Acres: 23,000

Activities planned for FY 2011 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



*Plumas County Supervisor Lori Simpson discusses smoke management issues on Beckwourth Ranger District in an effort to help complete implementation of DFPZ network*

# 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 2010 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 2010 HFQLG Socioeconomic Monitoring Report*.

## Pilot Project Area Employment

**Total Payroll Jobs Impacts:** Analysis of the most recent U.S. Census data shows that from the pilot project’s initiation in 1999 through 2008, the estimated number of total private sector payroll jobs decreased 4.34 percent. From 2007 to 2008, the estimated number of private sector payroll jobs decreased by 8.8 percent. Job losses occurred in all project area communities except Greenville and Westwood, which experienced growth in the tourism sector. Census data for 2009 will be released in 2011. Employment data released over the next 2 years will continue to reflect the impact of the recession and forest

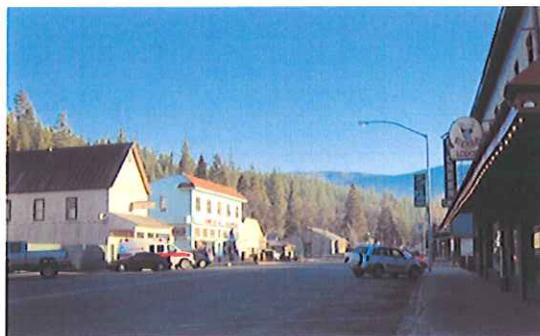
products industry closures, including the 2009-2010 temporary closure of the Sierra Pacific small-log sawmill operation in Quincy and the 2010 closure of the Sierra Pacific cogeneration plant in Loyalton.

**Forest Products Industry Job Impacts:** The pilot project has not offset the downturn in forest products industry employment within the project area. (Editor's note: the pilot project has not been implemented at the pace and scale originally envisioned, due to appeals/litigation, market conditions, and various other issues.) 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. Table 8 shows that from 2007 to 2008 the estimated total number of forest products industry jobs decreased by 6.8 percent in the pilot project area. Since implementation of the pilot project in 1999, forest product industry jobs have decreased approximately 40 percent. (Note that the sharp decrease in the Greenville area between 2005 and 2006 is the result of a 2005 Census data reporting anomaly. Data for 2006 is more consistent with the historical trend.)



*Delimber preparing logs from Eagle Lake District DFPZ project for haul to sawmill*

**Tourism Industry Job Impacts:** The number of tourism industry jobs has grown throughout the project area since implementation of the project. The number of tourism jobs grew by approximately 20 percent from 1999 to 2008 (table 9). However, the pilot project area experienced an 8.8 percent contraction in tourism related



*Downtown Greenville*

jobs from 2007 to 2008. Closures of food service and accommodation establishments occurred in all project areas communities, except Greenville and Loyalton. Growth in the Greenville community is attributed to new hires at a small limited service restaurant in the City of Greenville and one new accommodation establishment opening in Canyon Dam, an unincorporated portion of Plumas County. Growth in the Loyalton community stems from new hires at small hotels in Sierraville, an unincorporated area of Sierra County.

Job growth in the tourism sector consistently outpaced the growth in the forest products industry sector throughout the pilot project area. 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 one job in the tourism sector. In 2001, the balance began to tip toward the tourism sector. Despite the decline in the estimated number of tourism jobs from 2007 to 2008, there were still at least 2.2 tourism sector jobs for every one job in the forest products sector. This indicates a significant diversification in the local economy since the implementation of the pilot project.

Although tourism job growth is a positive sign, it should be noted that these jobs are often seasonal and the wages are lower than those in the forest products industry. According to the 2008 Occupational Employment and Wage Estimates published by the U.S. Bureau of Labor Statistics, the average annual wage for workers in the forest product industry is approximately \$35,010. This is significantly higher than the \$21,350 average annual wage for tourism industry workers.

Table 8. Total Forest Products Industry Jobs (Estimated)

Community	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Change '07 to '08
Bieber	268	160	126	182	251	158	158	45	34	33	56	34	36	34	-5.6%
Burney	437	425	409	361	376	360	361	300	266	342	317	344	344	365	6.1%
Susanville	305	342	267	262	269	260	245	240	257	193	205	31	34	20	-41.2%
Westwood	23	20	54	36	26	24	27	31	49	44	28	13	12	16	33.3%
Chester	212	277	197	209	185	166	169	43	146	152	150	143	152	143	-5.9%
Greenville	20	27	50	37	46	48	19	6	16	6	85	24	41	58	41.5%
Quincy	304	434	426	382	373	329	347	324	296	332	321	329	323	236	-26.9%
Portola	25	23	36	13	20	40	54	7	16	43	39	23	10	16	60.0%
Loyalton	222	224	216	210	195	216	105	42	41	42	27	35	18	16	-11.1%
<b>Total Pilot Project Area</b>	<b>1,548</b>	<b>1,772</b>	<b>1,655</b>	<b>1,510</b>	<b>1,490</b>	<b>1,443</b>	<b>1,327</b>	<b>993</b>	<b>1,087</b>	<b>1,154</b>	<b>1,228</b>	<b>976</b>	<b>970</b>	<b>904</b>	<b>-6.8%</b>

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

Table 9. Tourism Industry Jobs (Estimated)

Community	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Change '07 to '08
Bieber	13	5	7	2	2	2	2	0	0	0	0	0	0	0	0%
Burney	197	216	261	199	241	241	264	208	263	314	298	287	300	288	-4.0%
Susanville	560	562	549	613	579	627	526	680	818	811	752	908	888	774	-12.8%
Westwood	54	68	205	215	213	194	207	217	211	251	186	187	164	151	-7.9%
Chester	110	99	148	142	135	147	142	127	102	109	95	111	141	136	-3.5%
Greenville	39	47	37	46	45	38	59	40	35	38	45	31	25	38	52.0%
Quincy	232	226	262	267	276	224	261	268	281	265	313	328	299	262	-12.4%
Portola	104	112	121	134	133	154	157	161	306	297	396	347	338	304	-10.1%
Loyalton	14	28	30	20	35	26	16	32	36	36	28	33	36	45	25.0%
<b>Pilot Project Area Total</b>	<b>1,323</b>	<b>1,363</b>	<b>1,620</b>	<b>1,38</b>	<b>1,659</b>	<b>1,653</b>	<b>1,634</b>	<b>1,733</b>	<b>2,052</b>	<b>2,121</b>	<b>2,113</b>	<b>2,232</b>	<b>2,191</b>	<b>1,998</b>	<b>-8.8%</b>

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

**Non-employer Establishments:** Nonemployers are typically small family-owned and owner-operator businesses. Nonemployer 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 table 10, shows that the number of all nonemployers and nonemployers in the forest products industry began to rebound after 2001. The total number of nonemployer establishments in all sectors rose by approximately 21 percent from 2,810 in 1999 to 3,338 in 2008. Despite the recent contraction between 2007 and 2008, the number of non-employer establishments has consistently surpassed pre-project implementation levels.

Nonemployers 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 333 firms or over 9 percent from 1999 to 2008. Overall growth in the number of these firms indicates stability among family-owned, owner-operator and other small businesses. Data for FY 2009 will be available in mid-2011 to gauge effects of the recent recession.



*Logs and biomass being prepared for delivery, Feather River Ranger District*

## **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 FY 2006 through FY 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.

The volume of sawlogs sold increased over two-fold from FY 2008 to FY 2009. The surge in FY 2009 is attributed in part to the abnormally low volume sold in FY 2008. As shown in table 11, the volume of saw logs sold continued to rise from FY 2009 to FY 2010. The Forest Service sold 109,605 CCF (hundred cubic feet) up from 92,299 CCF, an increase of nearly 19 percent.

From FY 2009 to FY 2010, the volume of biomass sold fell from 63,901 to 49,188 CCF, a decrease of 23 percent. The decline is consistent with the decreased demand associated with recession. According to the U.S. Energy Information Administration (EIA), electricity markets were affected by economic and environmental developments. In 2009, electricity generation was down 4.1 percent, reaching its lowest level since 2003. The decrease in power demand nationwide reflects a 2.6 percent decline in economic activity (GDP)<sup>1</sup>.

<sup>1</sup> "Electric Power Annual - Electric Power Industry 2009: Year in Review," U.S. Energy Information Administration, November 23, 2010. [http://www.eia.doe.gov/cneaf/electricity/epa/epa\\_sum.html](http://www.eia.doe.gov/cneaf/electricity/epa/epa_sum.html)

Table 10. Non-employer Firms in the Pilot Project Area

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
All Nonemployers	2,786	2,740	2,810	2,823	2,924	3,134	3,304	3,370	3,438	3,397	3,581	3,388
Forest Products Industry	290	302	305	290	290	331	353	353	340	329	339	333

Source: U.S. Census Non-employer Statistics 1997 through 2008

Table 11. HFQLG Timber Sale Activity per Fiscal Year – Volume and Value by Type

Item	2000 <sup>1</sup>	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Change FY '09 to '10
Volume of Sawlogs Sold (CCF) <sup>2</sup>	10,935	35,527	39,938	4,495	30,521	87,983	75,005	57,904	27,718	92,299	109,605	18.7%
Volume of Biomass Sold (CCF)	21,867	71,213	31,993	11,198	47,902	83,359	77,758	68,818	31,777	63,901	49,188	-23.0%
Value of Sawlogs Removed (\$)	\$12,933	\$83,981	\$619,057	\$664,594	\$744,918	\$1,740,091	\$3,657,627	\$1,770,445	\$401,487	\$248,188	\$465,463	87.5%
Value of Biomass Removed (\$)	\$2,843	\$197,177	\$352,522	\$275,690	\$532,744	\$1,174,285	\$955,394	\$277,936	\$114,633	\$90,031	\$19,319	-78.5%
Volume of Sawlogs Removed (CCF)	1,410	5,524	35,288	32,811	31,769	67,310	107,230	53,603	31,608	21,666	36,156	66.9%
Volume of Biomass Removed (CCF)	4,343	28,876	57,592	26,801	30,023	155,460	84,645	28,932	35,930	27,616	12,089	-56.2%

Source: USDA Forest Service, Timber Sales Activity Statements

<sup>1</sup>Data represents both 1999 and 2000. The data were combined due to minimal HFQLG timber sale activity in 1999.

<sup>2</sup>The abbreviation CCF stands for hundred cubic feet.

Table 12. Service Contracts, Amount Awarded by Location of Awardees (millions of dollars, rounded) per Fiscal Year

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total FY '00 to '10	Share FY '10	Share FY '00 to '10
Pilot Project	\$0.29	\$2.68	\$1.46	\$3.88	\$1.50	\$1.79	\$0.68	\$0.22	\$0.51	\$0.76	\$1.38	\$14.87	55.8%	24.8%
Remainder of Sierra Cascade Province	\$0.29	\$7.00	\$3.68	\$1.20	\$4.33	\$2.27	\$1.12	\$0.68	\$1.80	\$ .65	\$0.39	\$24.42	15.6%	40.7%
Other/Non-local	\$0.47	\$4.58	\$1.99	\$3.80	\$3.52	\$2.04	\$1.33	\$0.95	\$0.27	\$1.04	\$0.71	\$20.70	28.6%	34.5%
<b>TOTAL</b>	<b>\$1.05</b>	<b>\$14.26</b>	<b>\$7.12</b>	<b>\$8.88</b>	<b>\$9.36</b>	<b>\$6.11</b>	<b>\$3.13</b>	<b>\$1.85</b>	<b>\$2.59</b>	<b>\$3.45</b>	<b>2.48</b>	<b>\$59.98</b>	<b>100.0%</b>	<b>100.0%</b>

Source: USDA Forest Service, HFQLG FY 2000 through FY 2010 Contractor Lists

**Timber and Biomass Removal:** From FY 2009 to FY 2010, the volume of sawlogs removed increased by nearly 67 percent while the volume of biomass removed decreased 56 percent. The total volumes of sawlogs and biomass removed in FY 2010 HFQLG projects were 36,156 CCF (hundred cubic feet) and 12,089 CCF respectively. The increase in sawlogs removed is attributed to improved demand and high market price. Of the sawlogs removed from the pilot project area, approximately 60 percent were from Lassen National Forest, 25 percent from Plumas National Forest, and 15 percent from Tahoe National Forest. For biomass volume removed the percentages were allocated as follows: Plumas: 64 percent and Tahoe: 36 percent.

**Service Contracts:** One of the goals of the 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 2010 was 71.4 percent (pilot project area: 55.8 percent plus Sierra Cascade Province Contracting Area: 15.6 percent). Overall (FY 2000 through FY 2010), 65.5 percent of contract value has been awarded to local contractors (pilot project area: 24.8 percent plus Sierra Cascade Province Contracting Area: 40.7 percent). This data indicates the majority of HFQLG contract dollars are being captured by local businesses.

**Survey of QLG Contractors:** Study staff conducted a survey targeted at businesses awarded contracts under the pilot project in FY 2010. The objective of this survey is to quantify the program’s direct impact on employment and identify local forest products industry economic outlook perspectives. Out of approximately 30 contractors contacted, 10 agreed to respond to the survey. In total, the survey identified 187 full-time, 28 part-time, and 48 seasonal workers employed by firms awarded pilot project

contracts. In addition to employment data, contractors were asked to provide an estimate of how much of their business is linked to the pilot project. Responses showed a range from 0 to 100 percent. The mean percentage is 42 percent. The general comments received on the economic impact of the pilot project on the local forest products industry were positive. Particularly, small businesses and family-owned businesses indicated they are significantly benefitting from the pilot project activities. This is consistent with the analysis of historical pilot project contract activity data that shows the majority of pilot project contracts have been awarded to local firms.



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

**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 exceed its 1999 peak in 2008 even though the sawmill has produced less woodwaste 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 the company<sup>2</sup>. However, a decrease in electricity generation from this plant is

<sup>2</sup> Interview with Representative of Sierra Pacific Industries’ power plant. January 5th, 2010.

expected to materialize in next year's California Energy Commission (CEC) data release because Sierra Pacific Industries' small-log sawmill operation in Quincy, a key feedstock provider for the plant, was closed from May 2009 to May 2010. Another biomass power plant, the Loyalton Sierra Pacific facility, suspended operations in 2010. CEC data for FY 2009 activity will be available in 2011.

## **Local Business Environment**

**Jobs in Locally-Owned Businesses:** Locally-owned businesses help keep dollars circulating within the community since business owners are residents and residents tend to spend locally. Examining the mix of business ownership and shares of employment between locally- and non-locally-owned businesses provides a good indicator of the economic health of the pilot project area communities. 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. In contrast, the retail and services sector in most pilot project area communities exhibit a decrease in the percentage of workers employed by locally owned businesses from 1998 to 2009.

**Establishments by Age:** Business age statistics illustrate two points. First, increasing numbers of new businesses indicate a growing economy with positive activity in business investment. Second, for an economically isolated region such as the pilot project area, decreasing numbers of established businesses can signify a loss of local support for existing businesses or increased competition from new businesses.

Data collected from Dun and Bradstreet (D&B) data for 1998 through 2008 indicates significant growth in the number of businesses in the 0 to 5 and 6 to 15 years old age brackets in the pilot project area. However, recent changes in D&B's data collection methodology have artificially inflated these figures. In 2008, corresponding growth did not occur in the over 15 year old age bracket. In addition, statistics from 2009 fluctuate significantly from the historical pattern. This data anomaly limits the study team's ability to determine a trend until D&B completes its database revision initiative. Therefore, a trend analysis will be available after several years of more consistent data are collected through this monitoring effort.

Despite the data quality issue concerning businesses 0 to 5 and 6 to 17 years old, the decline in the number of establishments in both age brackets may be an early indicator of the impact of the recession in the pilot project area. In fact, for the first time since 1998, the number of establishments 15 or more years old declined from 1,209 to 1,191 or 1.4 percent. Data for these older establishments are more reliable since the growth trends have been consistent over the study period.

## **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 10.54 percent from FY 2008-2009 to FY 2009-2010. 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.

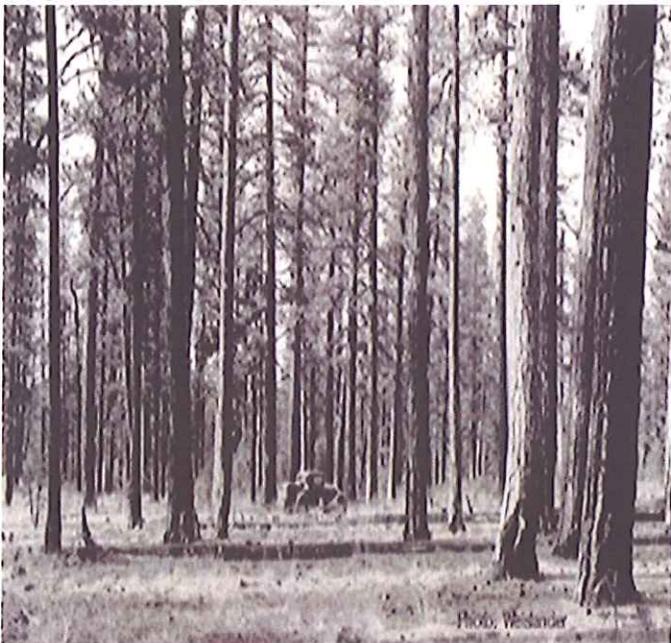
## Retail Business Activity

Taxable transactions are an indicator of personal and business consumption in a given jurisdiction. As economic activity in an area increases, residents and businesses increase their purchases of tangible personal property that are subject to sales tax. As the economy contracts, taxable transactions decrease or expand more slowly. The most recent data published by the California Board of Equalization shows that from 2007 to 2008 taxable sales transactions in the pilot project area declined significantly. All pilot project communities, except the City of Susanville, experienced larger taxable sales declines than that of California as a whole. From 2007 to 2008, taxable sales at the state level decreased by 8.75 percent. In the project area, percentage declines ranged from 5.17 percent (City of Susanville) to 29.04 percent (City of Loyalton).

## Social Health: Family Poverty and Population Age Structure

This study measures social health using statistics published by the California Department of Education on high school dropouts and participation in free and reduced lunch programs. Region-wide free and reduced lunch program participation has increased since the 2007-2008 school year. In the 2009-2010 school year, participation jumped to 44.85 percent - its highest point since the beginning of the pilot project. This illustrates the significant impact of the recession on family poverty levels in the pilot project area.

Research shows little statistical connection between implementation of the pilot project and youth education. There is also no single reason why students drop out of high school. High school dropout rates have remained relatively stable across all nine communities since the pilot project began in late 1999. 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 of 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. The following are the monitoring results for FY 2010.

## Old 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. These three old forest vegetation types are the most important nesting habitat for the California spotted owl, classified as a Forest Service sensitive species.

A cumulative total of reductions in habitat are tracked to monitor loss of old forest habitat. To date, 4,518 acres (2.2 percent) have, or will have, a reduction based on projects with a signed record of decision. For comparison, wildfire through 2010 reduced an additional 25,953 acres (12.7 percent). There was an error in the 2009 report to Congress in the acres reduced by wildfire, which is corrected here.

## Forest Structure

Tree, understory vegetation and fuel data has been collected in permanent plots across the HFQLG pilot project area both before and after treatment. Data (termed treated stand structure monitoring or TSSM) collection continued in 2010, sampling a total of 11 units pre-treatment, 15 units 1 year post-treatment (“post-1 year”) and 5 units 5 years post-treatment (“post-5 year”). Since data collection began in 2001, a total of 292 TSSM data sets have been collected, including 170 pre-treatment units, 107 post-1 year units, and 15 post-5 year units. Work continued on incorporating data calculations and project objectives into a comprehensive TSSM database.



*Large diameter pine on Mt Hough Ranger District*

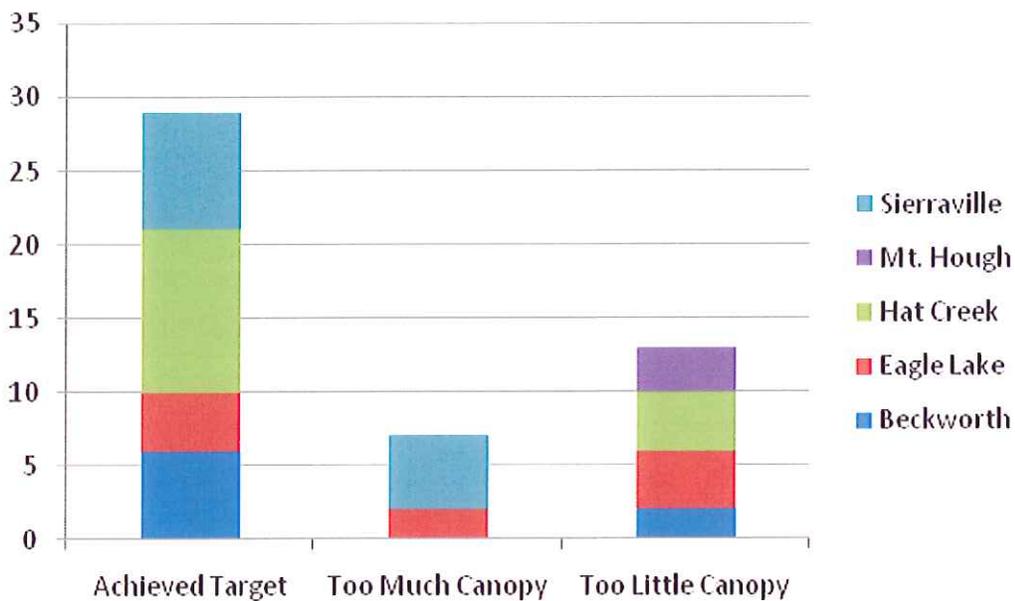
TSSM analyses this year focused on the achievement of canopy cover objectives at post-1 year of treatment, as identified at the project and stand levels. These objectives are tied to questions 1 and 3 of the HFQLG monitoring plan:

Question 1): Do silviculture and fuel treatments meet California Spotted Owl interim direction, fuels, and other stand objectives?

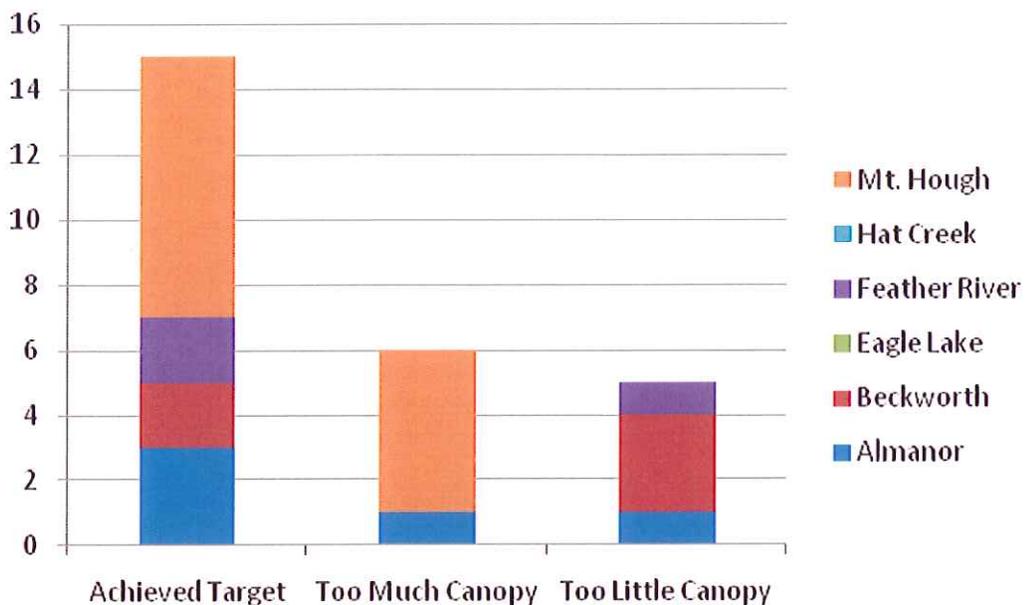
Question 3): Does the implementation of silvicultural prescriptions produce or retain desired stand elements such as logs, canopy cover, large trees, and early seral stage?

Figures 1 and 2 reflect the numbers of stands that did or did not meet project-specific canopy objectives within one year of treatments. Results are divided between east side and west side habitat and reflect only those stands that had canopy cover objectives in place.

**Figure 1. Eastside Canopy Cover Objective Results at Post-1-year**



**Figure 2. Westside Canopy Cover Objective Results at Post-1-year**



In stands with canopy cover objectives, 59 percent of stands met objectives, 24 percent of stands had canopy cover below objectives and 17 percent had canopy cover greater than objectives. Of those stands not meeting objectives, the difference of actual canopy cover from objectives averaged 14 percent canopy cover.

Virtually all canopy objectives were single values, for example 40 percent, as opposed to a range of canopy cover values. Stands were considered to meet the objective if they fell within 7 percent of the target canopy. This accounts for the level of measurement precision possible in the field, and allows for a small margin of error to reflect the imprecise nature of canopy cover objectives.

By itself, canopy cover is not a strong “stand alone” measurement to indicate the achievement of overall silviculture objectives nor does canopy directly indicate stand health conditions or overall fuels conditions. Silvicultural concerns such as stand density are more reliably measured by indicators such as basal area. When considered as part of the larger picture of project objectives, canopy cover can be a useful monitoring tool before and after treatments to help indicate if objectives have been met, and to describe forest stand conditions.

## Best Management Practices

Best management practices (BMPs) are measures 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 2009 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

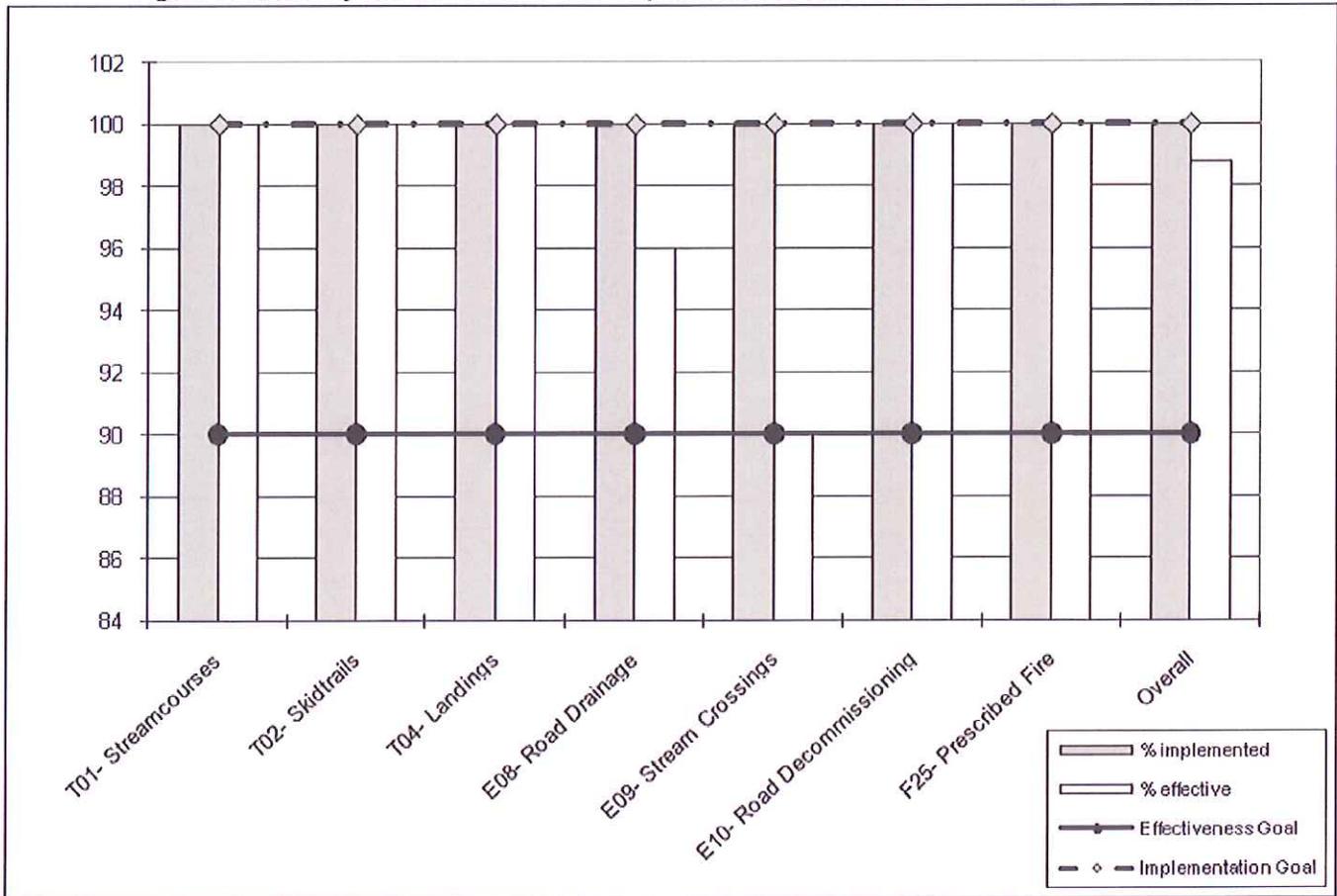


*Skid trail with logging debris crushed into surface to prevent erosion, Hat Creek Ranger District*

planning, design and layout, and if 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 summarized to yield a result of “implemented or not implemented” and “effective or not effective.”

This year’s monitoring results mark the culmination of a team effort on the part of sale administrators, engineers, soils scientists and hydrologists to meet or surpass the goal of 100 percent BMP implementation and 90 percent BMP effectiveness. Through the BMP monitoring program, staff have identified problem areas and focused on improving results in those areas in order to protect and preserve the water resources on HFQLG National Forests. Out of 163 evaluations, all 163 BMPs were fully implemented and only two were not effective. For the two ineffective sites, only one site showed evidence of sediment delivery to a stream and the stream was a small ephemeral drainage. The average effectiveness of 99 percent indicates that diligent implementation and monitoring of BMPs is an effective method for preserving water quality.

Figure 3. Summary Results of 2010 BMP Implementation and Effectiveness, by Activity Type



The target goal is to achieve 90 percent or better in effectiveness and 100 percent in implementation (figure 4). The target was exceeded for effectiveness and implementation. 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.
- ✓ Continue to strive to achieve 100 percent implementation.
- ✓ Continue to achieve at least 90 percent effectiveness for all BMPs.
- ✓ Build upon 2010 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.
- ✓ Increase watershed funding allocation to implement road improvements identified in NEPA documents that are not economically feasible to include in the timber sale.



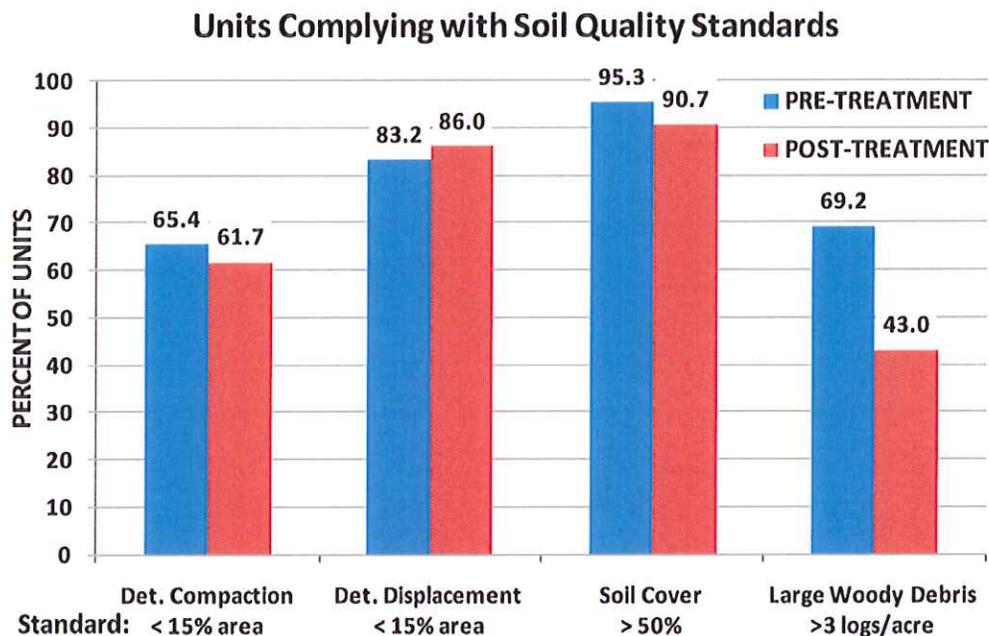
Group discusses proposed Riparian Zone Management at Dry Hills Project on Almanor Ranger District

## Soils

Soil monitoring data for 2010 (22 treatment units) were added to the cumulative soils data set, which was 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 107 units with pre- and post-treatment data sampled between 2001 and 2010 are represented in the data shown in this summary.

Since 2008, sample sizes have been increased to 200 sample points per treatment unit, to provide higher statistical precision. Pre-2008 data, which includes all pre-treatment data and about half of the post-treatment data, used smaller sample sizes.

Figure 4. Percentages of Units Meeting Various Soil Quality Conditions, Pre- and Post-Activity



Forest Plan soil quality standards involve four metrics: soil compaction, soil displacement, soil cover, and retention of large woody material. Overall results are shown in figure 4, and may be generalized as follows:

1. 85 to 90 percent of activity units are meeting soil quality standards for soil displacement and cover retention, both pre- and post-activity.
2. 62 percent of activity units are meeting soil quality standards for compaction; compaction levels were similar pre-activity, apparently persisting from legacy (pre-HFQLG) activities.
3. 43 percent of activity units are meeting soil quality standards for large wood retention; HFQLG activities are affecting this parameter in a number of group selection units, as reported previously.



*Installing Soil Monitoring Probes on Mt Hough Ranger District*

## **Soil Compaction**

Soil compaction is loss of soil porosity due to the physical force of heavy equipment traffic. Forest Plan soil quality standards define compaction as “detrimental” when more than 10 percent of the total porosity is lost (severity of compaction), and require that detrimental condition not occupy more than 15 percent of an activity’s surface area post-activity (extent of compaction). Small amounts of detrimental compaction commonly occur, and are not of concern unless they exceed 15 percent of the area.

Overall, 62 percent of treatment units meet this standard post-activity, including 55 percent of thinning units and 73 percent of group selection units. However, only 65 percent of the overall units met the standard before HFQLG activity (59 percent of thinning units and 76 percent of group selection units), indicating that most of the detrimental compaction existed prior to HFQLG activity. For HFQLG activities, 10 units of 107 monitored (6 thinning, 4 group, 9 percent) met the standard pre-treatment and exceeded it post-treatment; the rest either exceeded the standard pre-treatment or met the standard post-treatment.

Soils monitoring continues to indicate an overall trend that harvest operations can add some compaction to the treated area, varying with site and treatment characteristics. This year’s data indicates an incremental increase in compaction in a few units. However, unless taken cumulatively with past (pre-HFQLG) treatments, these conditions do not exceed Forest Service standards and guidelines.

Post-treatment compaction within units that were subsoiled (tilled or otherwise broken up to mitigate past compaction) versus not subsoiled shows on average no substantial benefit of this mitigation. Because subsoiling usually only occurs on the current operation’s main skid trails and/or landings, this could be due to pre-HFQLG compaction between current skid trails. A further evaluation of subsoiling effectiveness is needed.

## **Soil Ground Cover**

Forest Plan soil quality standards generally require effective soil cover on 50 percent of the surface area of a treatment unit to avoid soil erosion. Effective cover can be duff, litter, large wood, vegetation or rock, all of which help protect otherwise bare soil from eroding. This standard was met overall in 95 percent of units pre-activity and 91 percent of units post-activity. Average soil cover was quite similar between treatment units pre-activity, with 70 to 75 percent duff cover and 10 to 15 percent bare; differences between silvicultural methods became apparent post-activity.

Thinning units averaged 90 percent effective soil cover pre-activity and 82 percent post-activity; only one unit had less than 50 percent cover post-activity. Group Selection units averaged 83 percent cover pre-activity and 64 percent post-activity; 9 of the 37 units (24 percent) resulted with less than 50 percent cover. Duff, which is the most effective cover in preventing erosion, was more reduced in group selection units. Mastication and combined thin/group selection units all exceeded 80 percent cover post-activity.

## Large Woody Material

Downed woody debris is described as large logs (at least 10 feet long and 20 inches diameter). Forest Plan soil quality standards generally require 3 or more logs per acre to be left on site post-treatment, to help maintain soil productivity and provide habitat for wildlife, arthropods, and microbes, which in turn contribute to long-term soil productivity. Overall, units average 3.4 logs per acre, but only 43 percent of units actually meet the standard post-activity; 69 percent of the units met the standard pre-activity, and 20 percent had no down wood at all pre-activity. From pre- to post-activity, both the average logs per acre and the number of units complying with the standard are decreasing, particularly for group selection units.

The average for thinning units meets the standard, with 4.3 logs per acre post-activity. More specifically, 38 units (58 percent) have at least 3 logs per acre, 22 units (33 percent) have 1 to 2 logs per acre, and 6 units (9 percent) have no large wood. The average for group selection units did not meet the standard, with 1.4 logs per acre post-activity. Only 5 units (14 percent) have at least 3 logs per acre, 10 units (27 percent) have 1 to 2 logs per acre, and 22 units (60 percent) have no large wood. However, 40 percent of the group selection units had no large wood prior to treatment. Both of the combined thin/group selection units met the standard post-treatment, and one of the two mastication units did not meet the standard either pre- or post-activity.

Variability in these data was large, particularly pre-activity but also post-activity. Some units had no large wood; some had copious amounts, as much as 35 to 45 logs per acre pre-activity and 15 to 20 logs per acre post-activity. Both of these conditions affect overall means substantially. Operations were conducted in part for fuel reduction objectives, so managers would have aimed to remove most “extra” down wood, retaining just above 3 logs per acre when present to begin with. Individual unit results are highly variable.

## Soil Displacement

Forest Plan soil quality standards and guidelines do not have a minimum area of displaced soil considered significant, or a permissible extent within units, but minimizing soil displacement is an implicit management objective. According to the HFQLG monitoring protocol, soil is considered detrimentally displaced when either 2 inches or half the total thickness (whichever is less) of the humus-enriched topsoil (A horizon) is removed from an area of 1 square meter or larger. Overall, treatment units average 7 percent detrimental displacement, with 86 percent of units having less than 15 percent. Thinning units average 5 percent displacement, with 3 units (5 percent) exceeding 15 percent. Group selection units average 10 percent displacement, with 10 units (27 percent) exceeding 15 percent and 2 of these exceeding 25 percent. Detrimental displacement exceeded 15 percent in one of the two combined thin/group selection units (18 percent area), and one of the two mastication units (35 percent area). Displacement averages overall were quite similar pre-activity, but individual unit results varied greatly.

## Conclusions

For three of the four soil quality metrics, pre-treatment (pre-HFQLG) values for treatment units are quite similar to post-treatment values. Compaction was incrementally increased in a number of units, but only 10 units were found that met standards pre-activity while exceeding them post-activity. Soil displacement and soil cover retention standards are met in 85 to 90 percent of units, and are rarely problematic. Large woody debris retention continues to be somewhat problematic, particularly for group selection units; standards were met in only 16 percent of group selection units and 57 percent of thinning units. HFQLG Forests are working to continue to improve compliance with soil standards.

## Botany

Botany monitoring includes both implementation and effectiveness monitoring. Implementation monitoring of units treated in 2009 was conducted to determine if recommended mitigations and treatments were accomplished as planned. Effectiveness monitoring was completed to determine responses of threatened, endangered or sensitive (TES) or noxious weed species to mitigations and treatments, or if new occurrences were found in project areas after treatment. The intent of the monitoring was to identify what worked, what needs improvement for future projects, and to provide documentation for internal Forest Service review as well as to the public. Monitoring methodologies are described in the HFQLG Monitoring Plan.

### Sensitive Plant Protection

Out of the 15 threatened, endangered or sensitive (TES) plant protection/control areas monitored in 2010, 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 2010. One site was not protected. Though mitigation measures were followed for a prescribed fire (mapping and flagging control areas; lighting the fire over 50 feet from the sensitive plant occurrence), the fire left planned containment lines and eliminated the plants. 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

The first year after treatment, response of long-stiped campion to mechanical thinning was evaluated using a census method. Post-treatment monitoring determined that the 2010 flowering population (104 plants) was between the lower count (61 in 2009) and upper count (118 in 2007) of pre-treatment population counts. Therefore, preliminary results indicate that the mechanical thin treatment caused no change to the population.

The response of lens-pod milk vetch to hand thin and mechanical thin treatments was evaluated using plot based plant counts. Populations of lens-pod milk-vetch remained stable in mechanical thin and hand thin treatments over time (years 1 through 6 post-treatment) and there was not a significant change in numbers.

Follett's wild mint showed no difference between the plots that were treated with group selection harvest and the control plots. There was also no significant interaction between the treatments and time.

The response of closed-lip penstemon following a variety of past forest harvest treatments was analyzed using frequency data collected on historical treatments with similar on-the-ground effects to mechanical group selection and DFPZ thinning. High intensity treatments, such as clearcutting and shelterwood harvest, resulted in



*Closed-lip Penstemon plant after implementation of Group Selection Treatment on the Mt. Hough Ranger District*

a significant decline in closed-lip penstemon frequency. Moderate intensity treatments, such as mechanical thinning and overstory removal, did not result in a significant decline in closed-lip penstemon frequency. Closed-lip penstemon frequency is most likely to decline in the first year or two following treatment; however it may rebound after year three to pre-treatment levels.

Monitoring also looks for new occurrences of TES plants species after HFQLG project implementation. No new occurrences have been found in the 107 units surveyed before and after project implementation through the past 10 years.

### 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 19 sites with weeds evaluated in 2010. All of the occurrences except one were treated and/or avoided during management activities. The inadequate treatment of the one weed site was due to an oversight during contract preparation: the weed mitigation measures were not properly inserted into the contract. Eleven projects were reviewed in 2010 for equipment cleaning documentation. All projects had equipment cleaning documentation in the project files.



*Prescribed fire is used to remove ground fuels, reduce future wildfire intensity, and prevent negative impacts to forests*

There were 11 sites with weeds evaluated in 2010 to determine if existing weed populations were eliminated or contained. There was a 91 percent success rate in eliminating or containing the weed populations in 2010, although all of these would be considered small, relatively easy sites to treat. For example, careful annual hand-pulling treatment of the musk thistle (*Carduus nutans*) populations on the Sierraville Ranger District appears to eliminate small populations. 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. With these species or populations, high intensity of control, with multiple treatments per year and possibly including treatments other than hand pulling, appears to be warranted HFQLG weed control 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-five (25) of 107 units monitored (23 percent) had substantial new populations of invasive species 1 to 5 years after treatment, and populations seem to expand once established. New populations include Klamath weed, which is on the California Department of Agriculture (2003) noxious weed list, and cheat grass and bull thistle, which are not. Regardless, all of these species are highly invasive and potentially threatened ecosystem health and function.

## Wildland Fire and Fuels

Several analyses of effects of HFQLG activities on wildland fire and fuels were completed in 2010.

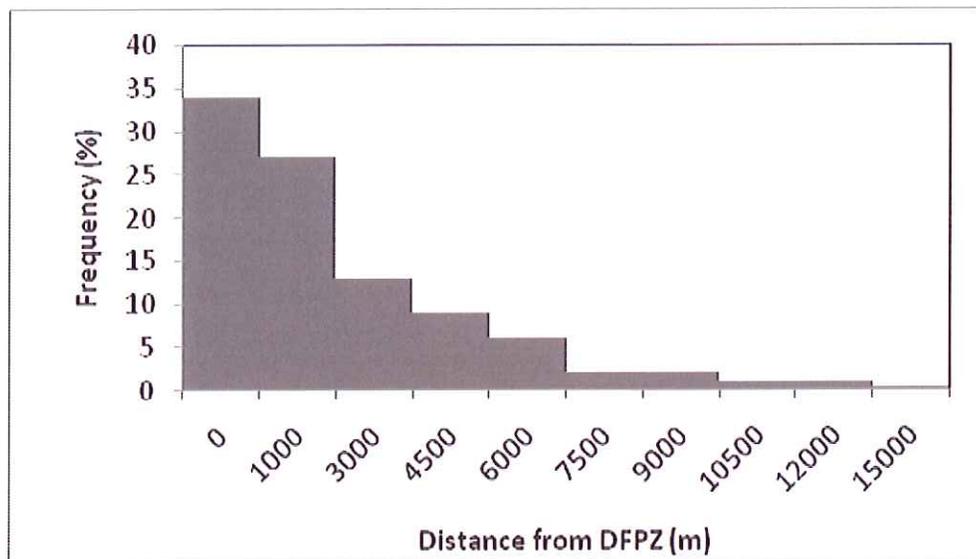
### Effects of HFQLG Treatments on Fire Size and Fire Suppression

The effect of HFQLG treatments on fire size and number were evaluated using fire perimeters (California Department of Forestry and Fire Protection 2010), HFQLG treatments, and fire starts (USDA FS 2010) from 2008 and 2009.

Of 32 fire starts that occurred within Defensible Fuel Profile Zone (DFPZ) boundaries in 2008 and 2009, all fires were contained at less than 10 acres. On the other hand, of 346 starts recorded outside of DFPZs in 2008 and 2009, 11 percent (39 starts) grew into fires greater than 10 acres.

Fire starts that were closer to DFPZ boundaries were significantly less likely to escape initial attack and develop into fires greater than 10 acres. Over 60 percent of starts that were contained by initial attack were less than two kilometers from a DFPZ (figure 5). By contrast, only 30 percent of starts that escaped initial attack were less than 2 kilometers (1.24 miles) from a DFPZ.

**Figure 5. Percentage of Starts That Did Not Grow Into Fires Over 10 Acres, as a Function of Start Distance From DFPZ**

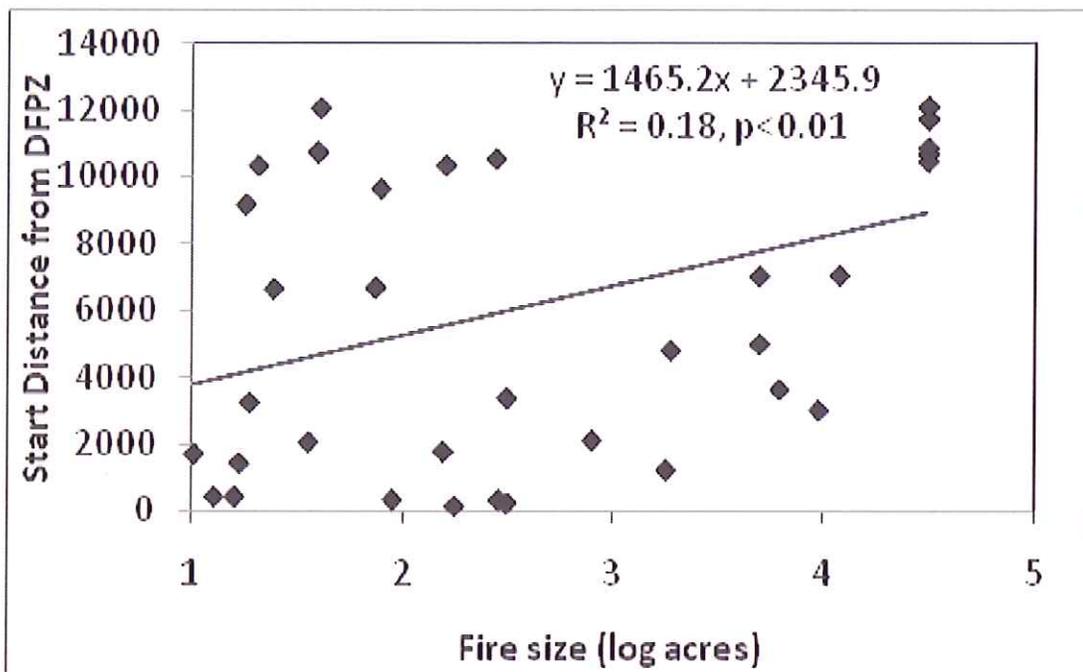


To determine if the distance of a fire start from a DFPZ boundary influenced the ultimate size of the fire, the start distance from the DFPZ boundary was computed for every start that grew into a fire over 10 acres in size. Results showed that as start distance from the DFPZ boundary increased, the final size of the fire resulting from that start also increased significantly (figure 6).



*Hat Creek Rim overlook after the Sugarloaf Fire burned at high severity, Lassen National Forest*

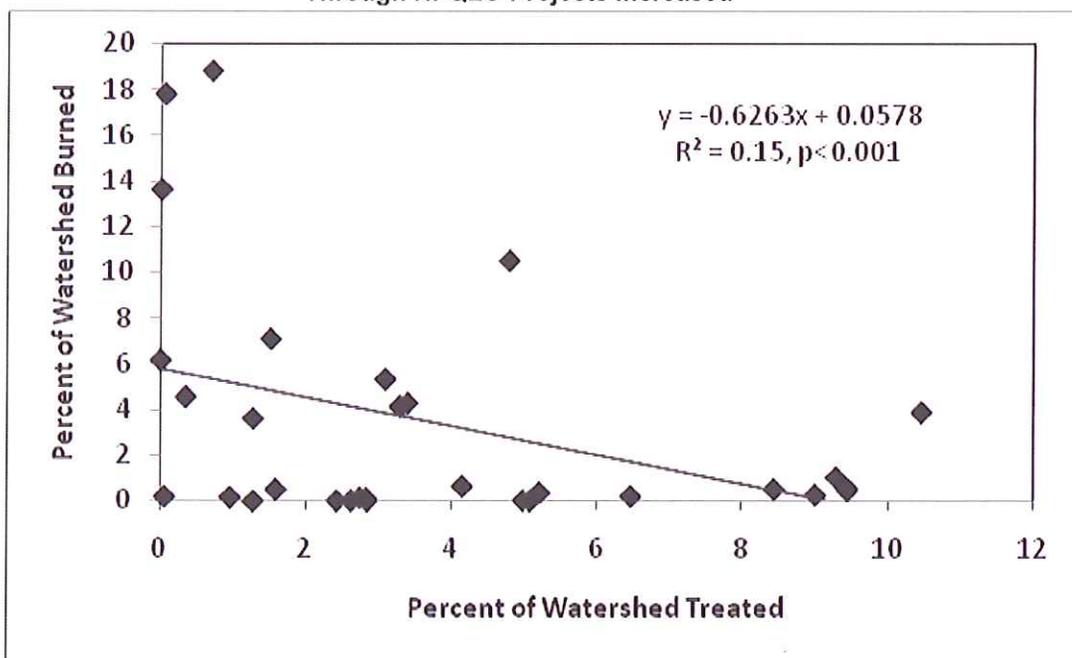
Figure 6. Linear Regression of Fire Size (Shown On Logarithmic Scale) and Distance of Fire Start from DFPZ Boundary; As Distance (Shown In Meters) From the DFPZ Boundary Increased So Did the Final Size of the Fire



### Effects of DFPZ Treatments at Watershed Scale

To evaluate the effect of DFPZ treatments at a landscape scale, 31 watersheds were evaluated where fires had occurred in either 2008 or 2009 within the HFQLG project area. Tenth field hydrologic units (watersheds) were used, averaging 10,000 acres in size. For each watershed, the percentage of area treated by DFPZs through 2008 and 2009 was compared with the percentage burned by wildland fires during those same years (figure 7). Linear regression found a significant decrease in fire size as the percentage of the watershed treated through HFQLG projects increased.

Figure 7. Linear Regression Found a Significant Decrease in Fire Size as the Percent of the Watershed Treated Through HFQLG Projects Increased



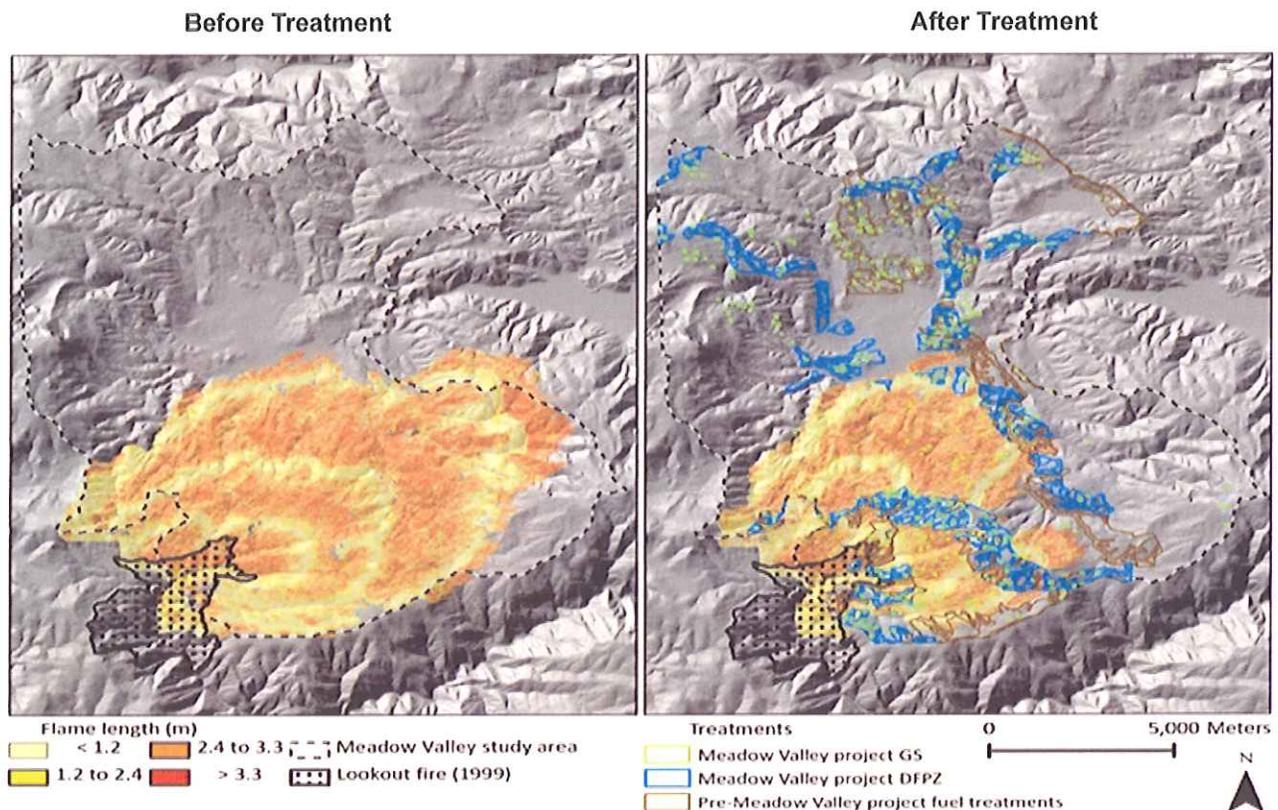
## Effects of HFQLG Treatments on Fire Behavior, Suppression, and Safety

Murphy et al. (2010) completed an analysis of 20 wildland fire reports that intersected DFPZs in the HFQLG pilot project area. They found that fuel treatments were effective in modifying fire behavior, resulting in a reduction in final fire size and reduced suppression costs. Thinning and prescribed fire used in combination modified fire behavior more effectively than thinning alone and with less tree mortality than mastication techniques. Smoke volume was reduced significantly when fires reached treated areas. Treated areas increased fire suppression options and enhanced opportunities for safe, low-severity burnout operations with reduced potential for spotting and torching. Treated areas modified extreme fire behavior and produced lower flame lengths. Treated areas retained ecological values represented by intact forests. Treated areas are places where firefighters can more safely and effectively perform suppression actions.

## Modeled Fuel Treatment Effects on Wildland Fires at Landscape Level

Moghaddas et al. (2010) modeled fuel treatment effects on landscape-level fire behavior for a portion of the HFQLG pilot project area. They compared modeled burning probabilities for pre- and post-DFPZ implementation under modeled severe (97th percentile) weather conditions. Their findings demonstrated that the probability of a given point on the landscape burning, both within and outside of DFPZ boundaries, was reduced substantially for the post-treatment landscape, and that this reduction became more pronounced on the downwind portion of the landscape. A more detailed simulation of a hypothetical fire burning under fairly severe fire weather revealed a 39 percent reduction in final fire size for the treated landscape (Meadow Valley project area) relative to the pre-treatment condition. The multiple layers of DFPZs that the modeled problem fire intersected, combined with the orientation of the DFPZs relative to the ‘problem’ wind direction, resulted in a “speed bump” type reduction in

**Figure 8. Predicted Wildfire Size and Average Flame Length, Meadow Valley Area, Before and After HFQLG Treatments**



fire spread where the fire intersected and was slowed by the first set of treatments, and before it could fully regain momentum, the fire intersected another layer or row of treatments.

These five analyses have all produced similar results: the HFQLG pilot project DFPZ network has been proven effective. The analyses represented in figures 5 through 7 are extremely important in that this is the first time that the HFQLG network has been analyzed at the landscape level with actual fire data. In contrast to the modeling effort, actual fire data incorporates fire suppression efforts and fires under all weather scenarios. The DFPZ network established in the HFQLG pilot project area, which is approximately 60 percent complete, is having a significant influence on the number and size of wildland fires at the landscape level.

## Air Quality and Smoke

The Forest Service monitors the effects of HFQLG prescribed burns related to air quality and smoke. Approximately 9,737 acres of prescribed burning were implemented across the HFQLG pilot project area in FY 2010 with no reported violations of smoke management plans, air quality standards and no official complaints (table 13). The absence of violations or complaints in the past 4 years can be explained by implementation of an adaptive management strategy outlined in the 2006 report to Congress. Extensive coordination and communication of prescribed burn activities between ranger districts, air districts and the public was initiated to address the large increase in smoke issues culminating in 2005. This included public contact, which consisted of phone calls, press releases, door-to-door visits, and public information booths set up near burn project sites to directly answer questions and address concerns from the public. This strategy has been shown to be very effective in addressing smoke management issues in the HFQLG pilot project area.



*Field trip to Beckwourth Ranger District to review Mabie DFPZ project and discuss issues with smoke management*

**Table 13. Numbers of Smoke Management and Air Quality Violations and Complaints Related To HFQLG Related Burning Activities**

Year	Forest Reporting	# Violations of Smoke Mgmt Plans (Question 9)	# Violations of Air Quality Standards (Question 26)	Number of Complaints (Question 27)
2001	All HFQLG	0	0	2
2002	Plumas	2	0	3
2003	Plumas	0	0	0
2004	All HFQLG	0	0	0
2005	All HFQLG	1	2	16
2006	All HFQLG	0	2	7
2007	All HFQLG	0	0	0
2008	All HFQLG	0	0	0
2009	All HFQLG	0	0	0
2010	All HFQLG	0	0	0

## American Marten

The American marten (*Martes americana*) is currently designated as a sensitive species by the Forest Service Pacific Southwest Region and is of concern due to historic trapping, loss of habitat, and subsequent declines in both population and distribution (USDA FS 2004). The monitoring objective for this forest carnivore is to document any changes in the amount and distribution of suitable marten habitat. Field studies for determining seasonality of detection were completed during the summer of 2010; a final report will be submitted 2011. Several other monitoring and habitat modeling projects have been initiated to meet this objective.



*American Marten fitted with Global Positioning System collar*

## Predicting Habitat Suitability

Habitat suitability modeling was conducted by Conservation Biology Institute of Corvallis, OR. The objective of this project was to generate a habitat suitability model for marten on Lassen National Forest to assist with project site planning. Modeling results suggest that summer habitat may be more limiting to martens, and that during winter, (1) martens may shift or expand their home ranges down slope into a broader range of habitat conditions, or (2) winter habitat use represents dispersing juveniles that were unable to establish a home range in higher elevation habitats that are occupied year-round by breeding adults.

## Habitat Connectivity Modeling and Reproductive Habitat Analysis

Pacific Southwest Region researchers Kirk and Zielinski used GIS based “Least-cost Corridors,” based on habitat preference data, which represent the most effective movement pathways available for martens. The functional habitat connectivity model assigned habitat “resistance values” based on the marten’s use or avoidance of different vegetation or cover types. Modeling results showed that primary dispersal corridors cross through the HFQLG pilot project area. Applied use of this modeling suggests that ongoing HFQLG projects have not significantly altered or diminished these least-cost corridors between occupied high-value habitats.

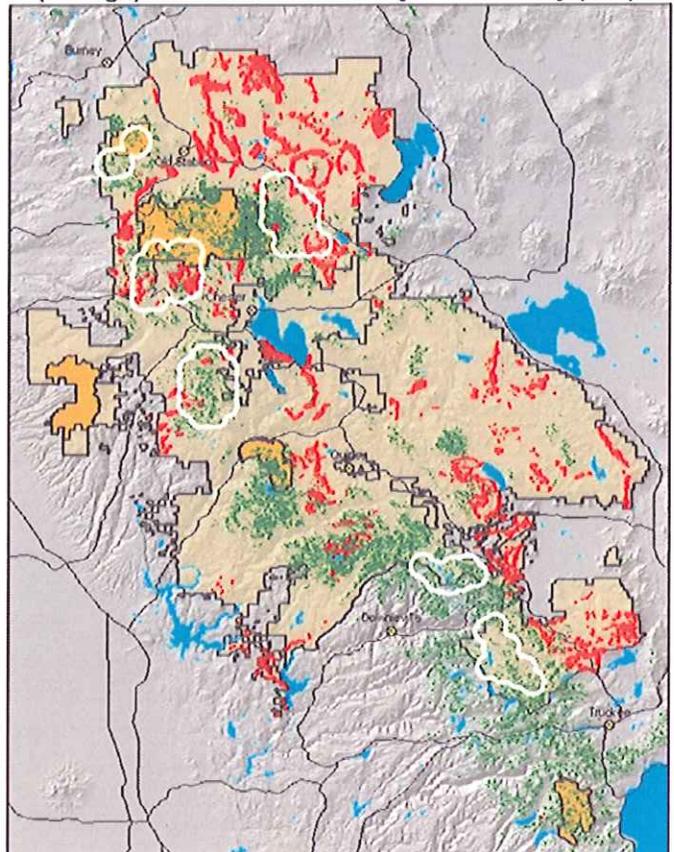
Biologists used the California Wildlife Habitat Relationships (CWHR) system to identify vegetation types associated with marten reproductive habitat, and assessed that high-value habitat's distribution across the HFQLG pilot project area. The habitat distribution was contrasted against vegetation and fuels treatments to determine the extent to which mature and late-mature forest stands may have been altered. This analysis focused primarily on specific areas with known high marten population densities (figure 9). Results show that suitable reproductive habitat, although fragmented into smaller patches, is widespread across the western portion of the HFQLG project area and at higher elevations. The majority of treatments occur outside marten population centers, limiting their impact. The habitat connectivity analysis and this reproductive habitat analysis are complementary, in that they point out the importance of maintaining both sufficient late seral habitat suitable for reproduction and the connections between occupied habitat patches.

### Marten Movement Ecology

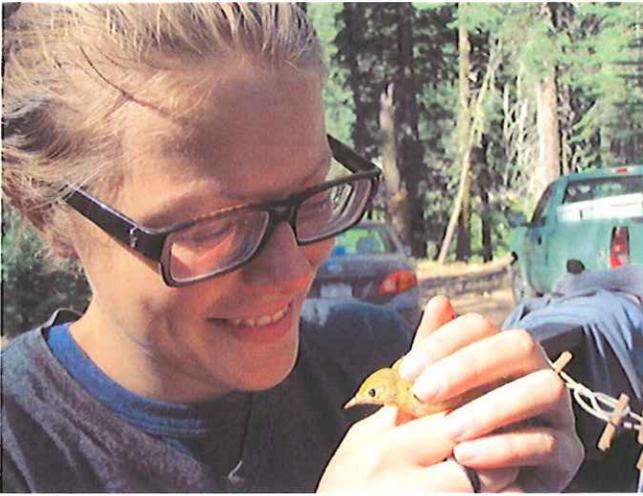
Oregon State PhD student Katie Moriarty is conducting a field study titled *Habitat use and movement behavior of American martens (Martes americana) in response to forest management practices on the Lassen National Forest*. This cooperative research project has begun evaluating movement patterns of adult martens within and between forest patch types that vary in structural diversity. The intent is to gain new insights on the effects of habitat fragmentation and potential barriers to marten movement on managed forest landscapes.

Objectives of the study are to (1) evaluate the effectiveness of existing habitat models that predict marten occurrence, (2) quantify the type, size and configuration of openings in managed forests through which martens are willing to move, (3) determine thresholds of "openness" that act as barriers to marten movement, and (4) evaluate the importance of specific micro-site features and potential interspecific interactions that may influence marten movement.

**Figure 9. American Marten Population Centers (White) and Reproductive Habitat (Green) Relative to Treatments (Red), Designated Wilderness Areas (Orange) and HFQLG Pilot Project Boundary (Tan)**



The study is using a variety of observational and experimental methods, including standard (VHF) radio telemetry, satellite (GPS) telemetry, and non-invasive techniques such as snow tracking and track plates. GPS collars used in the study are the smallest made for mammals; this is the first study project to use the collars to track marten, and it will provide new information on marten movement and behavior. Researchers are also using food-titration experiments, which quantify potential predation risk and energetic costs in order to assess marten willingness to travel into contrasting habitat patch types. Through this research improved prescriptions for management are anticipated with respect to size of habitat gaps, presence of large wood material, and undergrowth vegetation structure. Forest managers will have a better understanding regarding what types of habitat patches are conducive to marten movement.



*Yellow Warbler, netted, banded and ready for release, Almanor Ranger District*

## Songbirds

PRBO Conservation Science (founded as the Point Reyes Bird Observatory) has been conducting songbird monitoring in the Northern Sierra since 1997. In 2010 monitoring included compilation of information on a suite of HFQLG treatments (DFPZ, group selection, pre-commercial thinning, mastication, prescribed fire, aspen, oak and pine enhancement treatments) as well as post-fire habitat across the Plumas and Lassen National Forests.

There are two different categories of data collected in HFQLG treatment areas: data from pairs of treated and adjacent untreated sites, and unpaired data from sites where the planned treatment has not yet occurred or where no untreated reference site was available. Paired data is more likely to show accurate results because of the reduced environmental variation when paired sites are compared only to each other, as opposed to when data from all sites are combined. With paired transects only, in green forest of the Lassen National Forest, a general pattern was observed of higher abundance and diversity values at the untreated sites than in DFPZ treatments (figure 10). With all data combined (paired and unpaired), higher index values were found at DFPZ sites than reference (untreated) sites, as shown in figure 11. Combined data also showed that prescribed burns had the highest (statistically significant) index values of any

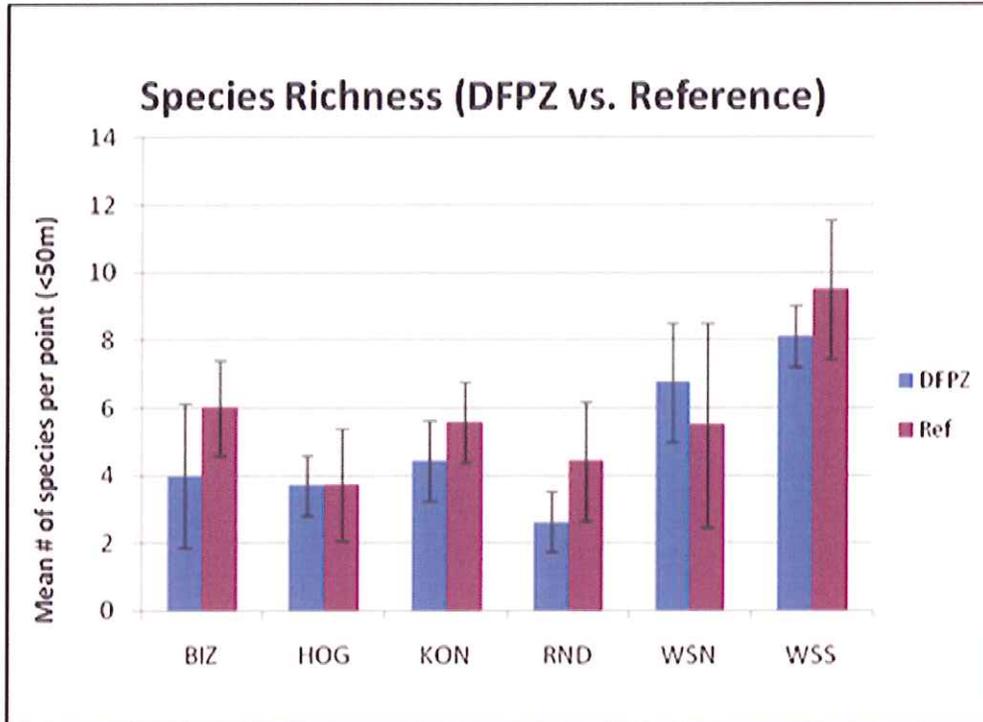
treatment type, followed by DFPZs; mastication and group selection had the lowest. Bird species more associated with trees and canopy (e.g., Mountain Chickadee, Hermit Warbler, and Western Tanager), as well as those associated with open understory (Oregon Junco) were most common at the treated DFPZ points. Species associated with a shrub understory were most common in the burn treatment category. Treatments that retain variable canopy cover and target areas of lower overall avian diversity (for example overly dense second growth white fir forest) will likely have the greatest positive impact on the landbird community. A more robust analysis of paired and reference sites for all HFQLG treatments across the Lassen and Plumas is being completed in 2011 and will be published later.

Monitoring of aspen restoration on the Lassen National Forest continued to show that treated aspen stands support greater total abundance of birds and abundance of aspen associated species such as Mountain Bluebird, Chipping Sparrow, and Red-breasted Sapsucker. Total bird abundance and species richness were higher at treated sites compared to untreated sites between 2006 and 2009. Across this 4-year period, total bird abundance was statistically higher at treated sites than untreated sites. This result likely reflects the benefits of treatment as well as the poor overall quality of the habitat in untreated aspen. The initial benefits of aspen treatments may be short-lived for some species as avian abundance and richness indices showed a decline at treated sites for the second consecutive year. Promoting aspen regeneration at treated sites through fencing to avoid grazing and browsing and use of fire to stimulate regeneration are important for sustaining increases in avian diversity.

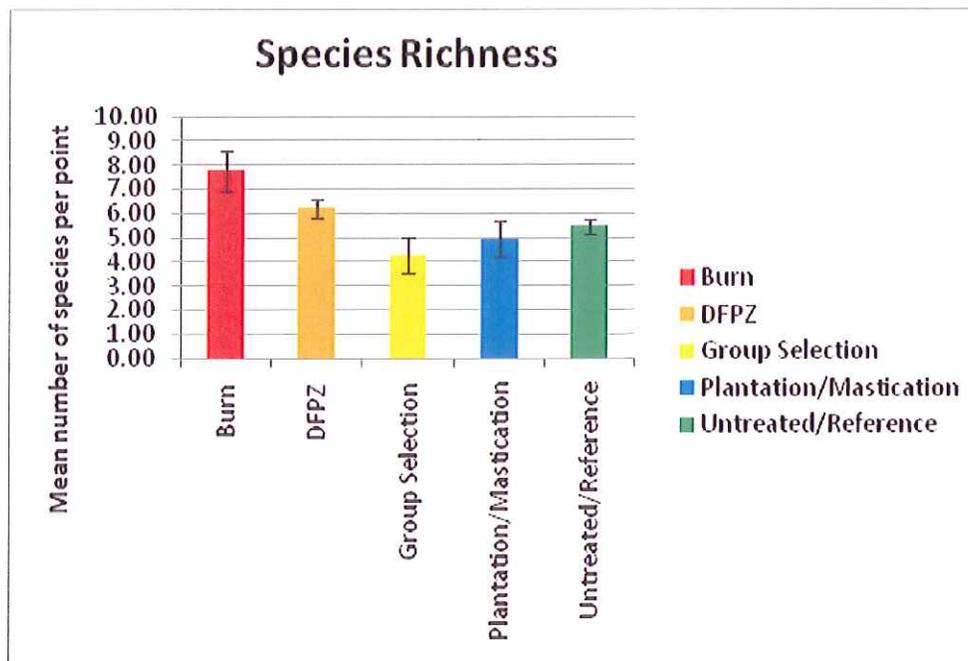
Monitoring of mountain meadow habitat in the Feather River watershed found that many sites still support diverse and abundant bird populations including several species of conservation concern. However, a number of sites have suppressed avian communities, which is likely a result of various past management activities. Restoration

of meadow habitat is part of the watershed restoration component of the HFQLG Act. Management actions that restore hydrologic and ecological function and minimize the negative impacts created through past management actions (e.g. overgrazing) will likely benefit a number of avian species including several that are of conservation concern.

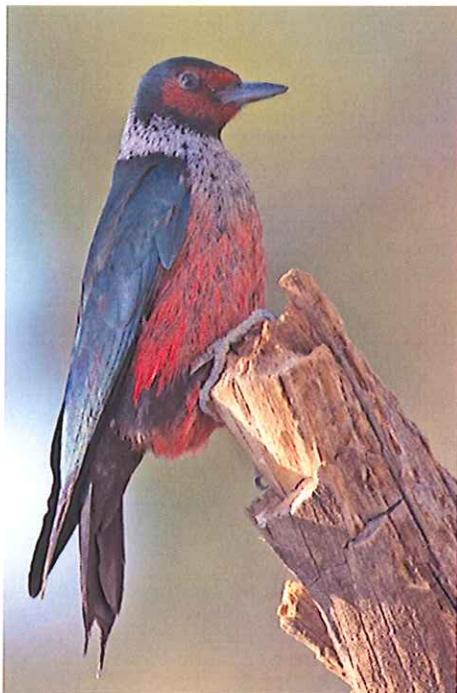
**Figure 10. Mean Per Point Richness Values for Paired DFPZ Versus Untreated Reference Point Count Stations, Lassen National Forest 2009. Error Bars Represent 95 Percent Confidence Intervals. Three-Letter Codes Indicate Abbreviations for 6 Different DFPZ Treatment Sites on the Lassen National Forest**



**Figure 11. Species Richness (Mean Number Of Species Per Point Per Visit Within 50m) for Lassen National Forest Fuel Treatment Point Counts 2009. Error Bars Represent 95 Percent Confidence Interval**



The primary objective of the post-fire habitat study is to assess the influence of post-fire conditions on spatial and temporal variation in bird abundance, and to use this information to inform forest management practices that can maintain avian diversity across multiple spatial scales. We sampled three areas affected by fire within the boundaries of the original Plumas Lassen Administrative Study (PLAS) study: the Storrie, Moonlight and Cub fires. The abundance of avian species in post-fire habitat was considerably different than green forest in the study area. Eight species were significantly more abundant in post-fire habitat whereas eleven were more abundant in green forests of the PLAS. A number of cavity nesting species showed a preference for certain tree species and large diameter trees (including Lewis's Woodpecker, photo below). Cavity nesting species showed a preference for decayed snags which were not readily available in both of the younger fires (Cub and Moonlight) regardless of the severity at which a plot burned; suggesting snag densities prior to burning are important for determining the use after fire. Nesting densities of cavity nesting species increased as the portion of overstory mortality in sample plots increased. Our results are consistent with those found elsewhere in western forests that post-fire habitat supports



*Lewis's woodpecker*

a unique and diverse avian community and is an important part of managing for biodiversity in the Sierra Nevada.

## 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 study are identified and described in the Plumas-Lassen Administrative Study (PLAS) Plan.

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 long term Demographic Study Area is critical for estimating long term CSO population trends and status. The focus in 2010 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 ("spurred") owls encountered in the study area were also recorded, and data was synthesized to all existing barred owl records for the northern Sierra Nevada.

Of note, the 2010 work continued the third 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). Researchers also completed a second year of surveys across a landscape that had experienced moderate to low severity wildfire (Cub-Onion Fire). This work complements surveys completed in 2008 through

2009 across a landscape that has experienced high severity wildfire (Moonlight-Antelope Complex Fire Area). 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 71 territorial CSO sites were documented in 2010 across the study area. This total consisted of 58 confirmed pairs, 3 unconfirmed pairs and 10 territorial single CSOs. Thirty-one (31) pairs successfully reproduced in 2010 (49.9 percent of confirmed/unconfirmed pairs). A total of 54 fledged young were documented in 2010 (1.74 young per successful nest). Across the 7 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, 2009 and 2010 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.

**Table 14. California Spotted Owl Reproduction on the Plumas and Lassen National Forests 2004 to 2010**

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
2010	49.9%	1.74

The crude density of CSOs was estimated based on the numbers of territorial owls detected across nine survey areas during 2010 surveys. The estimated crude density across the overall study area in 2010 was 0.070 territorial owls per square kilometer. 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 National Forest indicate similar densities and numbers of territorial sites (pair sites plus territorial single sites) between 2004 and 2010. Numbers appear to have declined somewhat on the Lassen National Forest survey areas between 2005 and 2008, and then increased slightly in 2009-2010.

### Lassen Demographic Study Results

Dedicated monitoring of owls on the Lassen Demographic study continues to provide critically valuable demographic and population trend information for determining the status of owls. Analyses of the demographic data through 2010 continue to suggest that the owl population on the Lassen study area declined over the 20-year study period, similar to the results through 2005 reported in Blakesley et al. (2010). The estimated mean population growth (where a stable population = 1.0) for the Lassen Demographic Study between 1990 and 2010 was 0.979 (standard error = 0.0097), with 95 percent confidence limits ranging from 0.959 to 0.999 (Scherer et al 2010). Estimates of realized population change, based on the time series of population growth estimates generated from modeling efforts, suggests that there have been declines in the number of territory-holding owls within the study area (Scherer et al. 2010). These results warrant close continued monitoring of the status of owls within the study area, along with continued management focus on providing high-quality owl habitat during the planning and implementation of HFQLG treatments. Similar long-term demographic data is lacking for the Plumas National Forest study areas, but baseline information on owl distribution and abundance suggests that numbers of territorial owls and sites have been similar year to year across 2004 to 2010.



*California spotted owl*

### **Vegetation Sampling – Nest Plots**

Vegetation plot sampling was conducted at approximately 100 CSO territories from 2005 through 2010. 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**

Sixty-three (63) CSOs were captured and banded in 2010. Blood samples were collected from 11 individuals in 2010. None of the 141 individual samples tested at the University of California, Davis for West Nile Virus antibodies tested positive from 2004 to 2008.

### **Barred and Spurred (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. Recent invaders to the region, barred owls were first reported in 1989. Seven barred owls and three spurred owls were detected during 2010 surveys within the study area. The synthesis and update of barred-spurred owl records through 2010 based on Forest Service and California Department of Fish and Game databases indicates that there are a minimum of 57 individual site records across the Sierra Nevada. This includes 24 records that have been documented within the HFQLG intensively surveyed study area and 44 records across the broader HFQLG project area. The pattern of records suggests that barred-spurred owls have been increasing in the northern Sierra Nevada between 1989 and 2010. This issue warrants continued monitoring.

### **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 2010 suggests that CSO numbers have been fairly stable across the survey period with the number of pairs ranging between six and nine across years. 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 project area landscape. In 2010, seven territorial sites were documented in the project area landscape. These results to date suggest that CSOs are able to persist in the post-treatment landscape, although movements of individual sites have been documented in areas that have experienced treatments, as well as in areas that have not experienced treatments, across the overall Meadow Valley project area. Additionally, radio-telemetry work completed in 2010 indicates that CSOs avoid using recently treated Defensible Fuel Profile Zone treatments. Collectively,

results are documenting the acute responses of CSOs to treatments at landscape, home range, and within home range scales. However, detailed information on the post-treatment vegetation responses are needed to more fully explore the effects of treatments on CSOs.

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 severity 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 researchers 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 researchers 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, researchers detected six territorial pairs, one unconfirmed territorial pair, and two territorial single CSOs within the fire perimeter area. In 2010 researchers attempted to repeat the complete landscape survey coverage of the Cub Onion Fire area. However, access to the entire landscape area was precluded by law enforcement personnel due to safety concerns for field crews because of extensive marijuana growing operations protected by armed guards. Due to this limitation, researchers instead conducted focused

surveys within approximately 1 to 2 miles surrounding each site occupied by CSOs in 2009. Although surveyors may have missed new sites colonized in 2010 outside focused survey areas, these efforts provided evidence to determine if the 2009 sites were still occupied in 2010. In 2010 surveys documented two confirmed territorial pairs and one unconfirmed territorial pair of CSOs within the fire perimeter, and two confirmed territorial pairs and one unconfirmed territorial pair within the 1-mile buffer. These results suggest that CSOs are able to persist within landscapes that experience predominantly low to moderate severity wildfire. To fully assess the response of CSOs and their habitat to wildfire, researchers are developing and analyzing information on the succession of post-fire vegetation conditions.

## **Amphibians**

### **Mountain Yellow-legged Frogs in Treatment Areas**

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 to establish baseline data developed in 2009 was continued in 2010 in five areas: Independence Creek on the Tahoe National Forest, South Fork Rock Creek, Lone Rock Creek, Potosi Creek, and Boulder Creek on the Plumas National Forest. Survey areas were modified in the two sites where mountain yellow-legged frogs (MYLF) were not found in 2009 (Potosi Creek and Boulder Creek), in an attempt to document the species presence. At all five areas, additional effort was made to document reproduction and some nearby areas with prior locality data were surveyed. Visual encounter surveys were conducted at all sites and all adult MYLF were tagged. Where sufficient numbers of frogs were present, population abundances of adult mountain yellow-legged frogs were estimated using mark-recapture analyses. Funnel traps were used to capture tadpoles in two locations.



*Mountain yellow-legged frog found along the edge of Lone Rock Creek, Mt Hough Ranger District*

Survey results showed that Independence Creek had the most MYLF for a second year in a row, and that population estimates for 2010 (8 to 16 adult MYLF in June and 7 to 9 adult MYLF in August) were similar to adult population estimates made in 2009 (6 to 11 adult MYLF). 2010 MYLF numbers at Lone Rock and South Fork Rock Creeks were low and similar to those in 2009: eight adult MYLF were found at Lone Rock Creek, and three adult MYLF were found at South Fork Rock Creek. In the vicinity of South Fork Rock Creek, two additional adult MYLF were found in 2010 in a tributary where the species has been found in the past. Three adult MYLF were found on Boulder Creek in 2010, upstream of the reach that was surveyed in 2009. No MYLF were found at Boulder Creek in 2009. MYLF were not found in the vicinity of Potosi Creek in 2010 or 2009. Other amphibian and reptile species found in the surveyed areas included Pacific chorus frogs, Western Toad, Long-toed Salamander, three species of Garter Snakes, and Rubber Boa.

Survey sites were affected by the following activities and events. Lone Rock Creek was affected by the Moonlight Fire and subsequent timber salvage harvest. South Fork Rock Creek was affected by the Meadow Valley project, completed in 2008, which included DFPZs, group selection, and individual tree selection. No pre-treatment data was collected at South Fork Rock Creek

because the Meadow Valley project was completed prior to the initiation of amphibian surveys. Treatments affecting Boulder Creek, Potosi Creek, and Independence Creek have not been completed to date. Analysis of the effects of treatments will be completed in 2012.

### **Bullfrogs in Watershed Restoration Projects**

Monitoring was also completed to determine how pond and plug watershed restoration treatments may affect bullfrog presence. Bullfrogs are undesirable non-native frogs that compete with and prey on native species. The ponds created by the

watershed restoration projects create suitable breeding habitat, which is otherwise less abundant in these eastside stream systems. Seven transects were established on Last Chance Creek, Red Clover Creek, Long Valley Creek and Clark's Creek, with a total of 123 stations for field staff to listen for singing adult bullfrogs in pond and plug restoration areas or untreated sites. This data suggests a 16 percent mean increase in the probability of bullfrog presence after pond and plug treatment; the 95 percent confidence interval ranges from about 1 percent to 32 percent increase in bullfrog probability after treatment.

**Table 15. Estimates for the Percentage of Stations with Bullfrog Presence for Each Watershed Restoration Site and Treatment Combinations**

Site	Treated?	
	No	Yes
Alkali Flat	74.1%	58.9%
Clark's Creek	20.1%	100.0%
Lower Last Chance	0.0%	
Long Valley Meadow		19.2%
Red Clover Dotta	0.0%	
Red Clover McReynolds	0.0%	0.0%
Red Clover Poco <sup>1</sup>	0.0%	0.0%

<sup>1</sup>Red Clover Poco transect includes a portion of the treated Red Clover McReynolds project area.

**Table 16. Summary of HFQLG Watershed Condition Monitoring Plan Results (2010)**

Watershed Condition Indicator	Total acreage of sub-watersheds reporting	Unit of Measure	Pre-project Condition	Post-project Condition	Percent Change
Road Density	886,000 acres	miles per square mile	3.26	3.14	- 3.7%
Near-Stream Road Density	629,000 acres	miles per square mile	3.84	3.67	- 4.4%
Equivalent Roded Acres (ERA)	1,433,000 acres	equivalent roded acres	75,600 (5.3% of basin area)	95,200 (6.6% of basin area)	+ 26%
Near-Stream ERA	380,000 acres	equivalent roded acres	2,680	2,860	+ 6.7%
Number of Road / Stream Crossings	642,000 acres	number	4,323	4,249	- 1.7%

## Watershed Condition

For watershed condition, the effects of HFQLG project activities are 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. New HFQLG projects added to the implementation pool for this 2010 report include Grays Peak on the Lassen National Forest, Canyon Dam, Empire and Slapjack on the Plumas National Forest, and Phoenix on the Tahoe National Forest.

Published research consistently recognizes that roads are typically the primary anthropogenic source of water quality impacts in forested watersheds. Road obliterations account for the 3.7 percent decrease in road density presented above. Results from another facet of the HFQLG Monitoring Plan, namely Stream Condition Inventory (SCI) monitoring, indicate that one HFQLG project with a reduction in road density due to road obliterations also had 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 Roded Acres” 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, 1.0 acre of tractor thinning may count as 0.20 equivalent roded acre. 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 imply that stream health and watershed condition would be degraded by sediment delivery from the project area. Results (described elsewhere in this report) from SCI monitoring and Best Management Practice (BMP) monitoring 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 2008, 2009 and 2010, the SCI protocol was applied to eleven different streams where pre-project data had been measured. Statistical analysis indicated that post-project means for the two fine sediment parameters measured under the SCI protocol were not significantly different from pre-project means for these streams, indicating that HFQLG vegetation treatment activities did not result in increased sediment delivery. For BMPs, effectiveness evaluations focus on whether or not project-generated



*Perazzo Meadow Watershed Restoration Field Trip, Sierraville Ranger District*

sediment is delivered to streams or whether channel banks are disturbed. In 2005 through 2010, 955 site-specific BMP effectiveness evaluations were conducted to assess practices associated with stream course protection, skid trails, landings and prescribed burns. Sixty-four (64) of these 955 evaluations were rated as ineffective, resulting in a 93 percent BMP effectiveness rating.

In contrast, SCI monitoring results from a severely burned watershed on the Plumas National Forest verified that an increase in the delivery of fine sediment to streams may occur in a watershed with fire-related increases in ERA. The Moonlight Fire burned over 46,000 acres of Forest Service land in September 2007, with roughly three-fourths of the ground experiencing moderate or high soil burn severity. The wildfire resulted in an increase in ERA to 13.3 percent of the total watershed area, compared to the pre-fire condition of 1.3 percent. This ninefold increase far exceeds the average increase in ERA caused by HFQLG timber projects quoted above. The post-fire ERA of 13.3 percent of the watershed area exceeds 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.) An SCI survey had been performed on Moonlight Creek in

2005, within a 5600-acre basin that later experienced high burn severity in 2007 over more than 65 percent of the watershed. A comparison of the SCI monitoring results for 2005 (pre-fire) and 2008 (post-fire) demonstrated a large and statistically significant ( $p < 0.000001$ ) 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 stream channel attributes in a series of reference streams and treatment streams before and after implementation of HFQLG project activities, in accordance with the HFQLG monitoring plan. Eighteen streams were monitored during 2010. One stream reach each from the Lassen, Plumas and Tahoe National Forests was selected for data quality control and surveyed twice in 2010 to assess variability associated with the field crews and monitoring protocols.

Field crews used the Forest Service Pacific Southwest Region Stream Condition Inventory protocol (Frazier et al. 2005) (including the macroinvertebrate protocol), to collect stream reach data. The protocol includes measurement of parameters important in classifying and assessing condition of channel morphology, fish habitat,

and water quality.

Data quality control measurements, collected for three streams, indicated that crews and protocol were accurately measuring stream conditions.

To provide a gauge for natural variation in the attributes measured, surveys are conducted annually of streams from watersheds with relatively low levels of watershed and streamside disturbance. In 2010 nine reference reaches were surveyed. The most notable variations this year were in Rice, Rock, and Sagehen Creeks, which showed significant decreases in percent pool tail fines between 2009 and 2010. These reaches are considered response-type streams, which typically exhibit high variability between years, and 2010 data reflect this variability.

The 2010 monitoring effort includes seven comparisons of stream condition as assessed by the SCI protocols before or after implementation of HFQLG activities, or following wildfires within the HFQLG planning area. Pre-project data was collected from 2003 to 2007. Data analysis focused on attributes that would reflect sediment input resulting from project activities, and on stream channel shade. Key findings for these reaches follow.

Post-project monitoring efforts on the Little Truckee River showed a dramatic increase in pool tail fines, from 3 percent in 2006 to 34.3 percent in summer 2010. This increase in sediment may be due to pond-and-plug activities that took place in this area during the 2009 phase of the Perazzo Restoration Project directly upstream of the monitoring reach. The monitoring reach on the Little Truckee River was essentially wiped out during fall 2010 due to pond-and-plug operations that extended downstream through the monitoring reach, thus eliminating this reach from future SCI monitoring efforts. Furthermore, the newly restored channel in the project area is unsuitable for a new SCI monitoring reach due to beaver activity. A study conducted by Herbst and Kane (2009) on a stream that

underwent project activities similar to those implemented in the Perazzo Restoration Project found that sediment and macroinvertebrate assemblages returned to pre-project conditions two years after project implementation. It is recommended that a new, long-term SCI monitoring reach be established downstream of all Perazzo Restoration Project activities to monitor for changes in sediment and macroinvertebrate assemblages.

Post-project monitoring efforts on Hat Creek showed a statistically significant decrease in stream shade compared to pre-project conditions in 2009. This decrease was expected due to thinning of conifers within the RHCA of Hat Creek. Since the average decrease in stream shading was only about 6.5 percent, it is unlikely that the decrease in stream shade within the SCI reach will adversely impact aquatic organisms within Hat Creek.

Long-term post-project monitoring efforts on Fourth Water and Summit Creeks showed a statistically significant increase in stream shade for both streams when compared to pre-project conditions. The monitoring reach on Fourth Water Creek showed shade measurements actually exceeding pre-project measurements, from 63 percent average shade cover pre-project to 73 percent average shade cover in 2010. Likewise, the monitoring reach on Summit Creek exhibited an eight percent increase in average stream shade compared to pre-project conditions. In addition, pool tail fines have significantly decreased from pre-project levels on Summit Creek, from an average of 3.9 percent fines in 2003 to 1.2 percent fines in 2010. Since an increase in stream shade and decrease in pool tail sediment are positive attributes for stream health, it can be said that these streams have returned to or exceeded pre-project conditions.

Post-fire monitoring efforts on Moonlight and Cub Creeks indicated significant decreases in stream shade for both creeks compared to pre-fire conditions, which were 78 and 97 percent shade, respectively. The SCI reach on Moonlight Creek experienced high-severity burning, and shade measurements in 2010 (28 percent

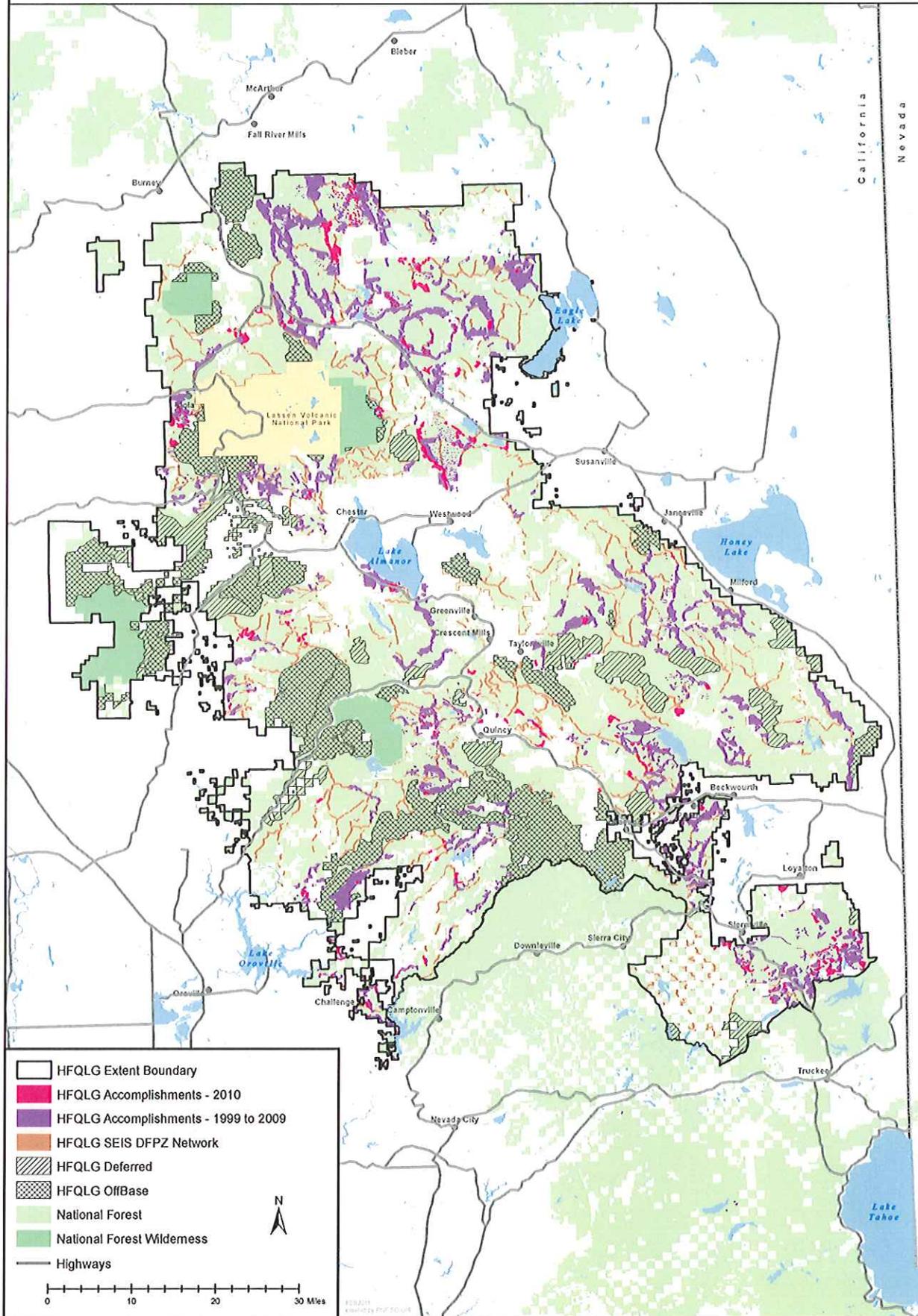
shade) are very similar to those measured in 2009 (29 percent shade) with no sign of shade recovery between the two years. The reach on Cub Creek was exposed to wildfire, but did not burn as severely as upland areas in the watershed. Stream shade measurements taken in 2010 within the Cub Creek monitoring reach remain slightly lower than pre-fire shade measurements (96.5 percent

shade pre-fire, versus 92.5 percent in 2010). No significant change in shade measurements was observed between 2009 and 2010 within the Cub Creek monitoring reach, indicating that streamside vegetation has yet to return to pre-fire conditions of 2007. Future monitoring efforts will be required to assess streamside vegetation recovery on Moonlight and Cub Creeks.



*Lower North Fork Middle Fork Feather River stream condition inventory reach on Plumas National Forest*

# Herger - Feinstein Quincy Library Group FY99 Through FY10 Vegetation Management Accomplishments



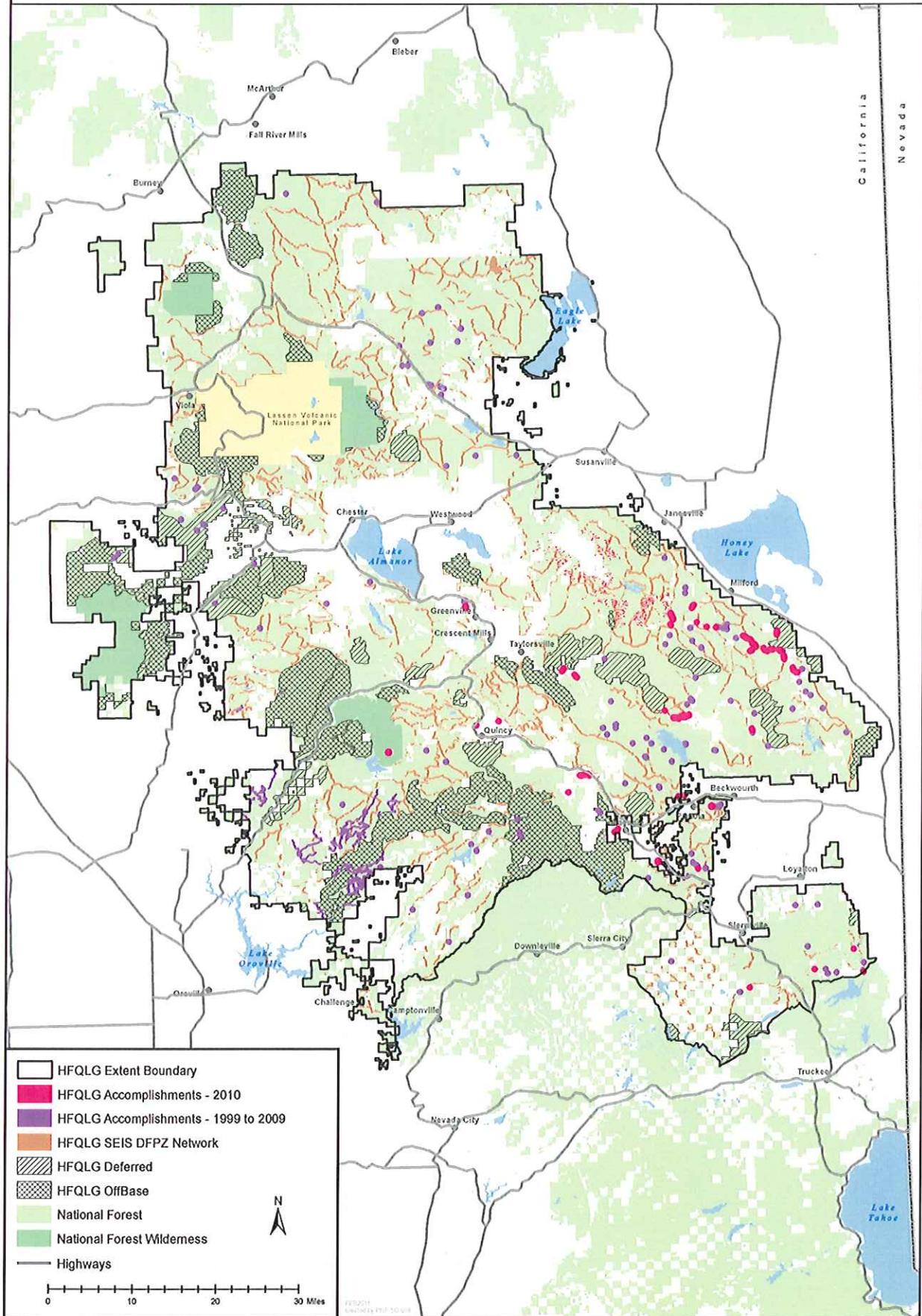
	HFQLG Extent Boundary
	HFQLG Accomplishments - 2010
	HFQLG Accomplishments - 1999 to 2009
	HFQLG SEIS DFPZ Network
	HFQLG Deferred
	HFQLG OffBase
	National Forest
	National Forest Wilderness
	Highways

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0 10 20 30 Miles

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Plumas & Lassen National Forests  
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Pacific Southwest Region — February 2011