



**Ecological Restoration:**  
Engaging Partners in an All Lands Approach  
U.S. Forest Service, Pacific Southwest Region

United States  
Department of  
Agriculture

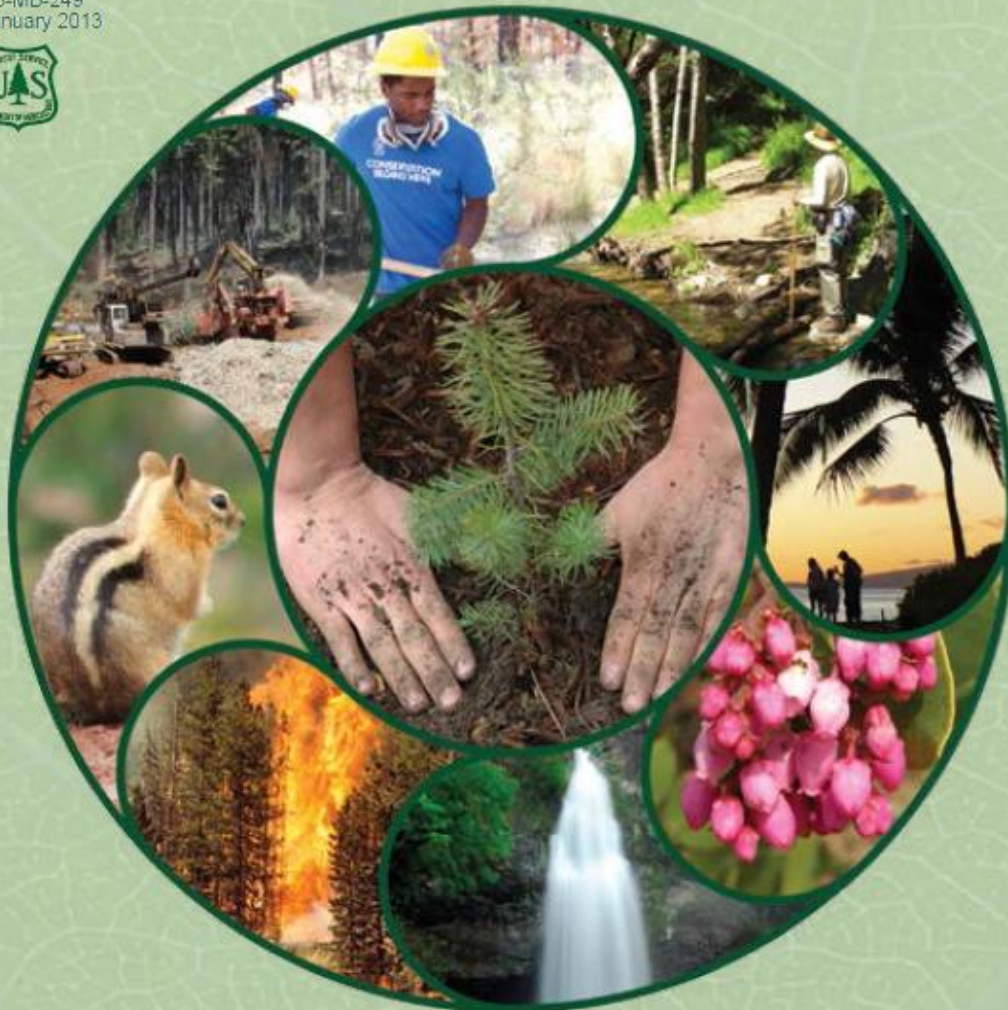
Forest Service

Pacific  
Southwest  
Region

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# Ecological Restoration Implementation Plan





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# Executive Summary

## Implementation Plan for Leadership Intent for Ecological Restoration

In March 2011 the Pacific Southwest Region of the US Forest Service released a statement of its Leadership Intent for Ecological Restoration, which laid out the Region's guiding vision and goals for its stewardship of wildland and forests for the next 15–20 years. The following draft document reflects the Regional leadership's current thinking on how the Leadership Intent will be implemented. This draft is a beginning point for discussions with employees, partners, tribes, agencies, communities of place and interest and those who care about the future of their National Forests.

Like the Leadership Intent the Implementation Plan is fluid and we expect that adjustments will be made over time as the Region continues to collaborate; follow new science; and seek out and form new alliances. These ongoing processes will reveal new and smarter ways to increase the pace and scale of restoration work while balancing the ecological, social and economic benefits of our restoration actions. Regional leadership has committed to editing and improving this document following these discussions and then reviewing and updating it at least annually in the future years. Hence we invite discussion, input and insight to ensure that the Implementation Plan reflects and is responsive to new information, partnerships, and conditions.

The Implementation Plan is organized into the following chapters:

1. **LEADERSHIP INTENT FOR ECOLOGICAL RESTORATION** (page 1) (March 2011).
2. **REGIONAL OVERARCHING STRATEGIES** (page 5) – strategies the Region will use to meet the Leadership Intent. This includes Regional methods to increase the pace and scale of restoration and to increase large scale restoration with an all lands approach.
3. **PARTNERSHIP STRATEGY** (page 13) – strategic thinking on how to increase the effectiveness of existing partnerships and to develop new partnerships to help implementation of the Leadership Intent. Both the Region's strategy and Pacific Southwest Research Station strategy is included.
4. **DIRECTORS CHAPTER** (page 29) – the Regional Directors' vision and commitment for integration of programs and budgets to improve and increase restoration actions on the ground.
5. **SOCIOECONOMIC BENEFITS OF ECOLOGICAL RESTORATION** (page 30) – a discussion of how embracing a sound restoration approach includes ecological, economic and social outcomes and a commitment to utilize and monitor this triple bottom line approach.
6. **NATIONAL FOREST CHAPTERS** (page 32) – each includes:
  - The Forest's unique niche in restoration – its need for action, ecological restoration goals, challenges, and opportunities
  - Specific Forest strategies to increase restoration work within existing resource constraints
  - Focus in coming years
  - Past accomplishments that exemplify future work
  - Partnership opportunities.

# Chapter 1

## Region 5 Ecological Restoration

### Leadership Intent

The mission of the Forest Service is to sustain the health, diversity and productivity of the Nation's forests and grasslands to meet the needs of present and future generations. It is our intent to establish a regional vision and corresponding goals for Ecological Restoration consistent with this mission and the laws, regulations and policies that guide National Forest management.

Our goal for the Pacific Southwest Region<sup>1</sup> is to retain and restore ecological resilience of the National Forest lands to achieve sustainable ecosystems that provide a broad range of services to humans and other organisms. Ecologically healthy and resilient landscapes, rich in biodiversity, will have greater capacity to adapt and thrive in the face of natural disturbances and large scale threats to sustainability, especially under changing and uncertain future environmental conditions such as those driven by climate change and increasing human use. Our goal is based on a commitment to land and resource management that is infused by the principles of Ecological Restoration and driven by policies and practices that are dedicated to make land and water ecosystems more sustainable, more resilient, and healthier under current and future conditions.

Ecosystem services are the goods and services that flow from wildlands and forests that are valued and used by people, and that directly or indirectly support human well-being. Wildlands and forests are valued for basic goods, such as wood, fiber, and water, but these ecosystems also deliver important services that are perceived to be free or limitless such as air and water purification, flood and climate regulation, biodiversity, scenic landscapes, wildlife habitat, and carbon sequestration and storage. The National Forests are important providers of ecosystem services to humans and to other inhabitants of our wildlands as well. Our commitment to restoration-based management includes a commitment to a renewed focus on the sustainable delivery of ecosystem services.

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1. The Pacific Southwest Region (also known as Region 5) includes California, Hawaii and the Pacific Islands. It also includes small portions of the state of Nevada, managed by the Inyo National Forest, and the state of Oregon, managed by the Klamath National Forest.



Meadow restoration in the Tahoe National Forest

In the 21<sup>st</sup> century, three major drivers of change define restoration needs on the National Forests of the Pacific Southwest Region: climate change and shifting hydrologic patterns; increasingly dense and unhealthy forests; and rapidly growing human populations. These synergistic sources of change are resulting in increasingly over-allocated and undervalued ecosystem services (especially water); a dramatic increase in disturbance events such as uncharacteristic large-scale wildfires, floods, and insect and disease outbreaks; new and growing threats from terrestrial and aquatic invasive species; and a growing need to revitalize rural economies in California, Hawaii and the Pacific Islands.

While sound restoration work is being conducted throughout the Region to increase forest and watershed resilience, important indicators suggest that disturbance impacts already outpace the benefits of this work, and that we will fall further behind over time. Wildland fires in California are becoming larger and more frequent. Of greatest concern is a notable increase in the area of forestland burning at high severity over the last quarter-century. Fire exclusion over many decades, in conjunction with other forest management choices, has resulted in dense, middle-aged forests over large areas of California. These forests are highly susceptible to severe wildfire, which fragments forests, emits carbon, increases erosion rates and sedimentation, negatively affects water quality and delivery, and damages old-growth forest habitats that sustain important components of the Region's biodiversity.

Dense middle-aged forests are also more susceptible to drought stress, large-scale insect outbreaks and disease epidemics.



Seedling planted after a wildfire, Lassen National Forest.

The ability of the Region’s forestlands to sequester and store carbon has become a matter of national and international significance. Human additions of greenhouse gases to the atmosphere are altering the climate, and federal land management agencies like the Forest Service are expected to play a major role in U.S. adaptation and mitigation responses to global warming. Mitigation responses revolve around the maintenance and enhancement of carbon sequestration processes on forestlands. In the Mediterranean climate that characterizes much of California, annual summer droughts and frequent fire are the norm, retention of carbon in most of the forest landscape requires stand structures and compositions that are resilient to fire. Nearly a century of fire exclusion in California, coupled with other management decisions on both private and public land, has resulted in forests that are at an increasing risk of loss due to large scale disturbances. There is an additional crisis taking place in our Southern California Forests as an unprecedented number of human-caused fires have increased fire

frequency to the extent that fire-adapted chaparral can no longer survive and is being replaced with non-native annual grasses at an alarming rate. To counter these trends, forest managers will need to significantly increase the pace and scale of the Region’s restoration work. Only an environmental restoration program of unprecedented scale can alter the direction of current trends.

From this point forward, Ecological Restoration will be the central driver of wildland and forest stewardship in the Pacific Southwest Region, across all program areas and activities. Future Land and Resource Management Plans, other strategic plans and project plans will identify Ecological Restoration as a core objective. Our Ecological Restoration work will include coordination and support for all wildlands and forests in the Region to promote an “all lands” approach to restoration. It will lead to a new way of doing business with our partners and neighbors, to coordinate work and priorities across forests and wildlands regardless of ownership. Collaboration across ownerships and jurisdictions to achieve Ecological Restoration will require active use of Forest Service State and Private Forestry authorities; an expanded effort to engage tribes, partners, and neighbors and to work in closer coordination with other agencies.

Resource program managers will have the responsibility for promoting Ecological Restoration activities including, but not limited to, management of vegetation, water, wildland fire, wildlife and recreation. Activities may include monitoring resource conditions; managing, restoring or enhancing terrestrial and aquatic ecosystems; or regulating human uses. Activities to be promoted include, among others, forest thinning and prescribed fire to decrease fuel loading and increase forest heterogeneity; meadow and riparian restoration to improve watershed function; environmentally and ecologically sensitive fire management practices; invasive species eradication; and wildlife and fish habitat improvement. Emphasis will be placed on expanding and developing partnerships to increase organizational capacity and the use of large-scale stewardship contracts operating at the landscape level to achieve restoration goals. We will expand and improve our consultation with tribal governments to utilize their traditional knowledge of stewardship and caring for the land. Emphasis will be placed on collaboration with stakeholders, communities, local government, volunteers, and citizens to facilitate dialogue and to decrease conflict in planning and implementing Ecological Restoration efforts.

With Ecological Restoration as the driving force behind the Region’s work, and with a pace and scale

sufficient to reverse current trends, it is our intent to accomplish the following in the next 15–20 years:

- Work together to achieve a collaborative and financially supported effort among forest land management agencies, private land owners, and the public to implement a large scale restoration program to accelerate the scale and pace of forest restoration activities on both public and private lands.
- Increase forest resilience through treatments (including prescribed fire and thinning) and wildfire, resulting in resource benefits to approximately 9 million acres on national forest system lands.
- Restore at least 50% of accessible, degraded forest meadows to improve their habitat function and ability to hold water longer into the summer and deliver clean water when most needed.
- Decrease the occurrence of uncharacteristically severe wildfires and their associated impacts through environmentally and ecologically sensitive vegetation treatments, fire management, and public education.



Loggy Meadow Restoration Project on the Sequoia National Forest. The project stabilized stream banks and allowed the stream to access its flood plain, returning the area to a more natural condition.

- Reforest after wildfire where appropriate and implement suitable stand maintenance activities that meet project goals and site conditions.
  - Ensure the retention and sustainability of forests, forest resources, and forest carbon over the long term, even as climates change.
  - Expand watershed improvement programs at the forest level (inventory, prioritization, and scheduling of restoration).
  - Target fuel reductions activities in key watersheds for protection of aquatic species and municipal watersheds.
  - Work with partners to increase restoration actions that will improve habitat connectivity.
  - Decrease the impacts of invasive species through preventative practices, rapid response control, management, rehabilitation and restoration, emphasizing cooperative work with federal, state, and community partners.
  - Restore landscapes affected by unmanaged recreation.
  - Identify the minimum road system needed for safe and efficient travel for administration, utilization and protection of National Forest System lands; establish priorities and a time schedule to decommission or close unneeded roads.
  - Increase conservation education, interpretation and volunteer programs to promote understanding and support for restoration actions and increase understanding of the value of healthy watersheds and the ecosystem services that they deliver.
- With a focus on Ecological Restoration, the following ecosystem services and community economic benefits will be enhanced:
- Delivery of clean water and an improved flow regime that benefits people, fish, and wildlife
  - Fish, wildlife, and plant habitat, for both common and rare species
  - Maintenance of biodiversity
  - Forest resilience in the face of climate change and changing disturbance processes
  - Carbon sequestration
- Work with key partners in Southern California to expand fire prevention efforts in order to retard the loss of native ecosystems like chaparral and coastal sage scrub.
  - Ensure vegetation and fire management efforts are grounded in concern for biodiversity and ecological process both before and after disturbances like fire.

- Air quality
- Rural economic health
- Outdoor recreation and scenic beauty
- Landscapes for health and renewal
- Wood products
- Wood biomass for energy
- Forage for wildlife and livestock
- Green economic activity



The Student Conservation Association (SCA) is one of the many partners that help restore California's National Forests. On the Angeles National Forest, SCA students restore a trail as part of a partnership called the "Angeles Wildfire Recovery Project."

As we work toward the goals outlined above, we will learn and adjust as we go. Over time there will be new science, new ideas, and new collaborations that will improve our understanding. With this new understanding, we will make course corrections in policy and practice and move even more efficiently toward our overall goal of resilient forests and wildlands.



A wood chipper processes woody biomass from a restoration thinning project, Mt. Hope Stewardship Project Plumas National Forest.



# Chapter 2

## Overarching Strategies

### Introduction

This chapter identifies the strategies that the Region and National Forests will utilize to help advance ecological restoration work. Our commitment to increasing the pace and scale is grounded in the acknowledgement that Ecological Restoration is a long-term commitment and the central driver of wildland and forest stewardship across all program areas and activities. Future Land and Resource Management Plans, other strategic plans and project plans will identify Ecological Restoration as a core objective. The Region's Ecological Restoration work will include coordination and support for all wildlands and forests in the Region to promote an "all lands" approach to restoration.

Many of our overarching strategies are designed to increase the pace and scale of restoration work even with the understanding that federal budgets are expected to remain flat or decline in the future. For the most part, our actions fall within two categories: 1) internal efficiencies that help us accomplish more restoration with the money that we have; and 2) partnerships, alliances and collaborators that will bring in new investment from partners or from beneficiaries of our forests' ecosystem services. Many of the pay-offs from our initiatives in these areas will be realized in future years.

Ongoing work to protect and maintain existing healthy forests, ecosystems and biodiversity will still be accomplished within existing programs. Each Regional and forest function has been challenged to look for ways within existing programs of work to keep their focus and priority on both maintenance of healthy ecosystems and restoration of landscapes that need repair or are at risk.

The Regional Forester's comprehensive approach to restoration embraces ecological, economic and social outcomes. This triple-bottom line approach to resource management means that economic, ecological, and social objectives are advanced together without trading off one for another. For example, managing for timber production or increasing local employment or some other aspect of community well-being will not be done to the detriment of environmental objectives, such as maintaining healthy populations of spotted owls or fishers. Similarly, management for ecological concerns

will be done in ways to improve economic, community, and other land management outcomes.

Managing for triple-bottom line outcomes requires integrative approaches and leads to integrative solutions. An integrative approach embraces the Secretary of Agriculture's "all lands" directive, as well as the new planning rule, requiring work with adjacent landowners. It also compels development of supporting contracting mechanisms that are responsive to local conditions and needs.

The Regional Office is primarily responsible for development of these overarching strategies, development and deployment of decision support tools, addressing large-scale barriers to implementation, and coordination and collaboration with bio-regional stakeholders in support of the Forests' efforts to achieve our on-the-ground ecological restoration objectives. National forests are primarily responsible for development and implementation of multiple-year Ecological Restoration Action Plans (Chapter 6), in collaboration with local partners and interest groups.

The scope of our work will be inclusive of California, Hawaii and the Pacific Islands.

### Overarching Strategies by Theme

Under most strategies we have listed specific examples of work that has been completed (**in blue text with \***) and/or work that is ongoing or that we intend to do in the future (**in green text with \*\***) to support the realization of that strategy.

#### 1. Strategic Investments of Time and Energy

- a. Complete forest plan revisions in a collaborative manner, which fully considers the balance between ecological, social and economic needs.
  - **\*Land Management Planning Regional Revision Team include skills needed to assess and support increased restoration work including balancing economic, social and environmental needs. Team now includes a social scientist, economist and ecologist.**
  - **\*\*Continue progress towards completion of the Sequoia National Monument**

Management Plan and the Lake Tahoe Basin Management Unit Land Management Plan.

By September 2013:

- \*\*Develop collaboration and communication plans to support stakeholder engagement in forest plan revision for the Inyo, Sierra, and Sequoia National Forests (i.e., the three “early adopters” in Region 5 of the new 2012 Planning Rule), engaging stakeholders in the assessment process.
  - \*\*Work closely with county, state, and federal representatives on forest plan revision.
  - \*\*Develop collaboration and communication plans to support engagement of the Native American and indigenous communities and incorporate traditional ecological knowledge (TEK) into the forest planning and Pacific Island management processes.
  - \*\*Complete bioregional assessment for the Sierra Nevada and forest assessments for the “early adopter” forests on current ecological, social, and economic conditions and trends under the provisions of the 2012 Planning Rule. Develop a bioregional assessment that guides forest plan revisions and project development, integrating the best available science from ecological, economic, and social disciplines.
  - \*\*Engage with state, county, and federal partners to coordinate all planning efforts and identify opportunities to share resources and align planning objectives. Utilize the Memorandum of Understanding (MOU) signed between the Regional Forester, State Bureau of Land Management Director, Regional Council of Rural Counties and California State Association of Counties in July 2012. Counties have expressed that they find this additional tool helpful in strengthening communication and collaborative planning.
  - \*\*Establish planning principles with ecological restoration as the guiding policy for forest plan revision.
- b. Utilize a collaborative, “all lands” approach to planning; utilize landscape scale planning, focusing on logical ecological/social units rather than administrative boundaries or ownership.
- \*\*Actively participate with collaboratives that take an “all lands” approach to restoration; work with neighbors and communities to strategically assess, plan and seek funding to complete large scale restoration work. The goal is that with time this will become a common way for forests to accomplish restoration goals. Current examples include Dinkey Creek Landscape Restoration Project, Burney-Hat Creek Basins Project, Amador-Calaveras Consensus Group, Yosemite Stanislaus Solutions, Willow Creek Collaborative, Sagehen Experimental Project, MOU with Santa Ana Watershed Project Authority, Mendocino Firescape, Monterey Firescape and others.
  - \*\*Use the Collaborative Forest Restoration Act (CFLRA) collaboratives – Burney-Hat Creek Basins Project, Amador-Calaveras Consensus Group and Dinkey Creek Landscape Restoration Project – to evaluate specific measures for: integration of natural resource management and community health and well-being; socioeconomic health and social health issues; degree of relevance to all communities, and ease of data collection.
  - \*\*Encourage collaboratives to share the successes and lessons learned with all Forests. Utilize the Sustainable Landscape Management Board of Directors (SLMBOD), a working group of Regional Directors and representative Forest Supervisors, to devise and implement methods for this sharing.
  - \*\*Work closely with county governments – implement MOUs where counties want, fully engage counties early in planning processes.
  - \*\*Continue the Sierra Cascade Dialogs. Look for opportunities in the Cascades and Southern California to create similar venues for “dialog” on restoration issues.
  - \*\*Recognize outstanding forest work in engaging with collaboratives through the

- Regional Forester’s Ecological Restoration awards.
- \*\*Support the development of Ecological Unit Inventories on the Inyo, Los Padres and Mendocino National Forests.
  - \*\*Continue to encourage Forests to participate in local Integrated Water Management Program (IRWMP) so that upper watersheds are considered in regional watershed planning. Partner with members of these groups to obtain funding for multiple objectives in the watershed including upper watershed restoration. A successful example includes Sierra National Forest partnering with Madera County and local irrigation districts to receive Prop 84 funds. The San Bernardino National Forest is currently partnering and applying for a Prop 84 Grant as part of Santa Ana River Partnership Authority, One Water, One Watershed IRWMP.
  - \*\*Continue to assist states (CA, HI) and Pacific Island partner governments with the formulation and execution of their Forest Action Plans (formerly State-Wide Forest Resource Assessment and Resource Strategies).
  - \*\*Support the Hawaiian Watershed Initiative (The Rain Follows the Forest) and Watershed Alliance activities.
- c. Seek to learn and to incorporate TEK into all aspects of the Implementation Plan. Building successful tribal relations will play a significant role in the collection, incorporation and use of TEK.
- \*\*Continue to participate in the Hawaii Conservation Alliance and Coordinated Group Against Alien Pest Species.
- d. Develop organizational focus at all levels to achieve our current and future ecological restoration goals.
- \*Reorganized three leadership positions to lead and support Regional focus on ecological restoration through Regional efficiencies and large-scale partnerships; Chris Nota, Regional Office/Sacramento, Jerry K. Bird, Sacramento and Marty Dumpis, Southern California.
  - \*Established and filled the Assistant Regional Ecologist position to increase our capacity to support restoration objectives.
- \*Established position to lead Sustainability of Operations. This has resulted in significant savings in operations costs, which frees up money for restoration actions. For example R5 employed a “Strike Team” approach to conducting Utility Bill Cleanup (i.e., a process to analyze Forest-level billing in order to identify and correct billing errors resulting in duplicate or erroneous payments). By assigning this work to a core group of employees, the Region prevented duplication of effort at the Forest-level. Savings identified from Cleanup (estimated at \$50–\$75 thousand) will be redirected from Unit overhead to field needs in support of restoration objectives.
  - \*The 13 R5 Sustainable Operations Microgrant Projects implemented in FY12 assisted Units in meeting federally mandated sustainability and energy management goals. Net 5-year cumulative cost-savings from these projects will total \$71,533. This was a 218 percent return on the \$22,500 invested. Five-year cumulative resource savings from these projects are estimated at 2,748,760 gallons of water, 16,700 gallons of waste, 108,809 kWh of electricity, and 200 gallons of gasoline.
  - \*\*Consider ecological restoration skill needs in current and future Forest reorganizations.
- e. Strengthen and expand partnerships with key groups, organizations, entities and businesses, both locally and regionally, to enhance our ability to achieve work through partner and beneficiary investment. Please see Chapter 2A to learn about several examples of how we are accomplishing this strategy.
- f. Support existing and new biomass, wood processing, energy production and value-added wood processing infrastructure. Please see Chapter 2B to learn about several examples of how we are accomplishing this strategy.
- g. Inform and work with key regulatory and partner agencies on the implications of policies, regulations, and positions that have the potential to affect the accomplishment of

restoration goals (water, carbon, biomass, air quality, climate and ecosystem trends, for example) and on restoration opportunities and funding sources.

- \*September 2012 field trip with Public Utilities Commissioner and key staff and advisors to look at fire and fuels issues along infrastructure, risk from increasing wildfires and how this relates to the need for additional biomass facilities. Viewed on the ground costs and benefits.
- \*\*The Region is working in collaboration with the California Air Resources Board, other land management agencies, and NGOs to identify and quantify mitigation actions that could improve or protect forest carbon. The joint goal is to inform decision makers about the potential benefits of using carbon auction mitigation funds for forest restoration work.
- \*\*Prescribed burning is an essential tool for ecological restoration, yet the potential air quality impacts from burns often prevent their use. The Boulder Burn is a partnership with the US Environmental Protection Agency (EPA), the California Air Resources Board (ARB), the San Joaquin Valley Air Pollution Control District, and interested scientists and NGOs to conduct a large-scale controlled burn on the Sequoia National Forest. The goal is to develop smoke management strategies that will allow increased forest restoration while mitigating air quality impacts.
- \*\*Work in partnership with National Marine Fisheries Service (NMFS) and others on potential recovery of salmon above dams. Stable populations above dams may ease Sacramento/San Joaquin water use restrictions and may become a source of restoration funds in national forest targeted habitat.
- \*\*November 2012 field trip being planned to inform California Energy Commission and California Air Resources Board members and staff to look at fire and fuels issues and how this relates to carbon and the need for additional biomass facilities. View on-the-ground costs and benefits.

- \*\*Ongoing agreement with California Energy Commission to study the effects of forest thinning for biomass on ecological variables such as species diversity, soil cover, long-term tree mortality, etc.

## 2. Efficiencies

- a. Develop a cohesive NEPA strategy that streamlines project planning and supports effective analysis of larger landscapes: identify local/regional barriers and develop actions to resolve them, develop scientifically sound ecological restoration language for purpose and need statements, make full use of existing and future NEPA efficiencies (categorical exclusions, Herger Feinstein Restoration Act, etc.).
  - \*\*A workshop with all forest NEPA planners is being planned for Feb 2013 to develop ways to increase pace and scale through NEPA efficiency.
- b. Maximize the integration of programs and actions on the ground; identify priority landscapes to focus integrated activities.
  - \*\*Utilize California's Forest Action Plan to identify issues and priority landscapes to focus resources where meaningful outcomes can be achieved.
  - \*\*Support the development of the National Terrestrial Condition Framework for identification of priority landscapes.
  - \*\*SLMBOD to seek examples of well integrated projects to share among Forests.
- c. Design projects that consider and are responsive to market conditions and budgets.
  - \*\*Provide logging systems and sale preparation training to the southern Sierra forests.
  - \*\*Work with the Washington Office to develop revised national direction on appraisal points; resulting in contract appraisals more reflective of current market conditions.
- d. Expand use of stewardship contracts and agreements; provide training and templates where needed.
  - \*Provided Stewardship Contracting training (focused on Integrated Resource

Service Contracts) throughout the Region in FY12.

- \*Provided external training for potential stewardship contractors on developing a successful stewardship contract proposal.

### 3. Ecological Focus

a. Continue to foster partnerships with research, academia and nonprofit public interest groups to expand our scientific knowledge base; integrate science into larger landscape project design.

- \*Regional Ecologist co-edited and was author on five chapters in important new USFS and Nature Conservancy-funded book on the use of historical ecological information in resource management, conservation, and restoration in an age of global change.
- \*The Ecology program approximately doubled its budget through grants, funded proposals and in-kind contributions in 2012.
- \*\*Continue to utilize the Ecology and State and Private Forestry programs as regional leaders in level of partnership and collaboration with research, academia and nonprofit public interest groups.
- \*\*Planned webinar (October 2012) with Forest Recreation/Lands leadership on innovative ways to engage permittees and concessionaires and recreation interests in restoration work. Effort being led by the Regional Office and Lake Tahoe Basin Management Unit.

b. Continue to focus on key ecological questions, including species of concern, essential habitats, water, and climate change effects.

- \*Climate change trend assessments completed for R5 national forests; updates to be completed in FY13.
- \*Analysis of climate change and fire projections for habitat of Pacific fisher and marten published.
- \*Major scientific publication completed summarizing the scientific, regulatory and ethical challenges to managed relocation of species threatened by climate change.
- \*Postfire tree regeneration inventory and monitoring protocol revised to include

additional sampling to address natural regeneration.

- \*Postfire tree regeneration data collected from multiple fires to inform postfire planting and other restoration practices.
- \*\*Continued support for the Sierra Nevada Adaptive Management Partnership both financially and with staff time and expertise. Integrate what we learn about both positive and negative treatment impacts for water, species of concern, and fire and fuels with a real emphasis on collaboration and learning and adapting.
- \*\*Continuing to provide technical support to project planning for ecological restoration projects to restore habitat focusing on the concepts in Pacific Southwest Research Station (PSW) General Technical Reports (GTRs) 220<sup>2</sup> and 237.<sup>3</sup>
- \*\*Chaparral Initiative will be led by new Southern California Ecological Restoration position. In FY13 he will bring together partners, interest groups, academia and the PSW to learn more together about chaparral restoration and possibly initiate collaborative approaches to restoration.
- \*\*Expansion of the Template for Assessing Climate Change Impacts and Management Options (TACCIMO) Tool to include R5-specific literature provides a consistent analysis tool to guide integration of climate change in project planning. By utilizing TACCIMO, Forests will build resiliency into resources and ecosystems through project implementation.
- \*\*Collaboratively designed an all-lands climate change vulnerability assessment and adaptation strategies project in the Sierra Nevada, with \$100k in funding from the California Landscape Conservation Cooperative (LCC) and contributions from numerous other partners.

2. [Available for download at  
http://www.fsw.fed.us/psw/publications/documents/psw\\_gtr220/](http://www.fsw.fed.us/psw/publications/documents/psw_gtr220/)

3. [Available for download at  
http://www.fsw.fed.us/psw/publications/documents/psw\\_gtr237/](http://www.fsw.fed.us/psw/publications/documents/psw_gtr237/)

- \*\*Continue the implementation of the Sierra Nevada meadow assessment project, in partnership with the National Fish and Wildlife Foundation and the California Department of Water Resources. This work will assess and quantify water holding capacity of hundreds of Sierran meadows. It will identify priorities for restoration actions with associated water benefits and will be an important step in obtaining future funding.
  - \*\*Continue partnership monitoring of Management Indicator Species across the Sierra Nevada, working with Institute for Bird Populations, Point Blue, and California Department of Fish and Game.
  - \*\*Designed, obtained funding for, and are implementing Sierra Nevada Red Fox monitoring and administrative study in the Southern Sierra Nevada in partnership with the State of California Off-Highway Motor Vehicle Division, University of Davis, and California Department of Fish and Game. Assessing population status and effects from snowmobile use.
  - \*\*Draw conclusions from existing monitoring activities; adapt, refocus monitoring activities where needed.
  - \*\*Results of fuel treatment effectiveness monitoring published, which included recommendations for desired levels of canopy mortality in prescribed fires and wildfires.
  - \*\*Monitoring effects of pine beetle mortality on subalpine pines in the southern Sierra Nevada.
  - \*\*Monitoring effects of fire restoration on sensitive plant species in northern California.
  - \*\*Paper published summarizing 25 years of fire severity monitoring in the Northern Province Forests.
- c. Develop GTRs for key ecological restoration challenges including chaparral ecosystems, Klamath Siskiyou Mountains, others.
- \*Climate change trends incorporated into GTR-237, which expands on GTR-220 guidance for Sierra Nevada mixed conifer restoration.
- d. Provide guidance to support the development of specific restoration strategies and plans for landscapes affected by drought, insects and diseases, catastrophic events and uncharacteristically high intensity fire.
- \*Regional Ecologist completed manuscript summarizing modern departures of fire frequency from pre-settlement frequencies across California and lessons for management and restoration; will be published as GTR in 2013.
  - \*\*Literature review of restoration-related publications in chaparral ecosystems in development.
  - \*\*Work with PSW to explore GTRs for Klamath Cascades and chaparral.
  - \*\*Regional Ecologist is working with Eldorado NF to complete a template/model Restoration Plan for post fire recovery. The framework of this restoration plan should be transferrable to other Forests.
  - \*\*The Region will continue to collaborate with national forests and PSW to meet the goal of answering “Yes” to at least 7 of 10 questions in four dimensions (organizational capacity, engagement, adaptation, and mitigation and sustainable consumption) of climate change response by the end of FY2015 as detailed in the national Climate Change Scorecard. The Region’s Climate Change Action Plan is available upon request from Lara Polansky (707-562-8937; lpolansky@fs.fed.us).
  - \*\*The R5 Climate Change Integration Team continues to foster strategic partnerships at multiple landscape scales (e.g., CA LCC, CA Climate Change Stakeholder Group, TAC-CIMO) to access relevant climate research and decision-support tools, complete vulnerability assessments and develop adaptation strategies.
  - \*\*The R5 Climate Change Integration Team is working to collaboratively develop and pilot a standardized process for carrying out climate change vulnerability assessment and adaptation strategy development at the project-level in the interim before Land Management

- Plan revisions to promote resistance and resilience, and to facilitate the transition of habitat and species.
  - \*\*In partnership with the Institute for Bird Populations and other scientific and land management agencies and organizations, gathering more management-related information for black-backed woodpecker and creating a Conservation Strategy that summarizes the known information, identifies information needs, and proposes interim conservation recommendations, including recommendations for post-fire restoration strategies.
  - \*\*Continue to partner with the PSW-Hilo Research Station and the Pacific Island Climate Change Cooperative to address climate change impacts in the Hawaiian Islands.
- e. Continue to provide services to the public in ways that are supportive of restoration. Please see Chapter 2C to learn about several examples of how we are accomplishing this strategy.

#### 4. Communication

- a. Tell our story; identify and communicate our short and long term restoration needs, where we intend to focus our work, the strategies we plan to use and to ask for help.
- \*\*Complete draft of Implementation Plan and use it as a beginning point to share current thinking and to then discuss and receive input from interest groups, partners and public. Use discussions and input to improve the Plan by summer 2013.
  - \*\*Complete the Leadership Intent – Hawaiian Style document to communicate the Region’s priorities and approach for work in the Hawaiian Islands.

#### External communication examples:

- \*Region 5 restoration communication tools have included podcasts, talking points, posters, videos, etc. Conducted a focus group of forest employees in 2012 to learn which tools are being used and which are the most effective. Consider additional focus groups in 2013.
- \*Nevada Public Radio (KNPR) interview regarding restoration of post fire landscapes.
- \*USFS educational video about fire restoration and air quality in frequent-fire forests.
- \*Conducted webinar for the California Fire Science Consortium concerning reference conditions and restoration in California forests and shrub lands.
- \*Presentation at major international conference on climate change and restoration of fire in California ecosystems.
- \*Presentation regarding restoration of the California national forests to incoming ecology graduate students at UC-Davis.
- \*The R5 Climate Change Integration Team initiated a bi-monthly webinar series in FY12 (to be continued in FY13) to build Unit Climate Change Scorecard success and raise awareness about how climate change adaptation and mitigation principles may be integrated into our place-based, restoration-focused work. Webinars were accessible internally and externally. Webinar topics covered in FY12 included: Climate Change 101; Climate Change Guidance, Training, and Plans of Work; Climate Change and Forest Management: The Connections to Restoration and NEPA; and TACCIMO and the Climate Change Silviculture Tool.
- \*Asked forests to produce amateur videos suitable for YouTube, website, etc., highlighting ecological restoration projects.
- \*Developed external brochure for partners and future partners to attract funding for ecological restoration. Brochure will also highlight existing projects.
- \*Developed scrolling window on external website that links to individual ecological restoration project information in the Region.
- \*\*Seeking credentialed reporter to follow the Region on its ecological restoration journey.

- \*\*Ongoing communications with the National Forest Foundation to highlight projects and partnerships through their agency publications.
- b. Highlight our accomplishments; share our successes, knowledge, lessons learned, and best practices both internally and externally. The SLMBOD will be tasked with making this a focus in 2013.
- c. Showcase examples of innovative, integrated planning and implementation and adaptive management processes, with monitoring as a key component. This will also be a SLMBOD focus in 2013.
- \*Interagency and multi-partner field trip to Long Fire on Eldorado National Forest to discuss restoration of naturally ignited fire to Sierra Nevada national forests.
  - \*Interagency and multi-partner field trip to Stanislaus-Tuolumne Experimental Forest to discuss forest reference conditions for restoration and field methods for implementing GTR-220 guidance.
  - \*\*Work closely with the Sierra Nevada forests and Communities Working Group, which is identifying examples of smart planning and integration, with good outcomes for ecological, social and economic aspects. Look for other opportunities in the Cascades and Southern California.
- d. Connect employees' core values and everyday work to the goals outlined in the Leadership Intent.
- \*Completed video and audio podcasts, an all-employee video by the Regional

Forester, focus groups to identify how well communications products are working, and a page of links on intranet page to all communications products.

- \*\*Regional Leadership Team Communication Working Group, with the Public Affairs Staff, have initiated a variety of different communication tools and methods to engage employees in being part of the Leadership Intent goals and actions. In 2013 the team will continue to try new and different ways to engage employees and assess effectiveness. For example, internal communications will focus on fire employees and non-field-going employees to increase their identification with ecological restoration goals.
- \*\*In support of increasing cross-unit collaborations, leadership capacity and day-to-day capabilities to implement sustainable consumption patterns at and between all levels, R5 is an active and contributing member of the Sustainable Operations Western Collective.

Our goal is to implement these Overarching Strategies through a process of adaptive management and continuous learning. We recognize that realization of the Leadership Intent and Implementation Plan will require us to learn as we go and make adjustments accordingly. We welcome and look forward to the feedback from our partners, collaborators, and numerous interested publics that will inform this adaptive process.



## Chapter 2A: Partnership Examples

**Strategy: Strengthen and expand partnerships with key groups, organizations, entities and businesses, both locally and regionally, to enhance our ability to achieve work through partner and beneficiary investment.**

The Region has been actively expanding existing partnerships and building new ones. These will eventually result in new restoration investment and will help increase the pace and scale of restoration work. A few examples of partnerships that began in 2012 and will continue in 2013 include:

- Watersheds within California’s national forests deliver 50 percent of the State’s water and most of its hydroelectric power. The Region is working with power and water utilities throughout the State to identify opportunities for joint investment in watershed health. These investments will ensure that clean water delivery is protected and enhanced, and mitigates the potential effects of climate change on timing of delivery. Some examples of this kind of work include:
  - The Region is focusing some significant work in the Upper Mokelumne River watershed, a large proportion of which is managed by the Eldorado and Stanislaus National Forests. The Mokelumne is the source of 90 percent of the water captured by the East Bay Municipal Utility District (EBMUD) and delivered to their 1.5 million customers. Pacific Gas & Electric (PG&E) also utilizes this water for hydroelectric production. The Region is a key partner in an “avoided cost analysis” that is being developed by a number of interested entities including EBMUD, PG&E, Sierra Nevada Conservancy, and The Nature Conservancy. The group is developing an analytical framework for future decision-making by utilities about smart restoration investment to minimize risks from wildfire and sedimentation and hence future maintenance costs. This effort is connected with, and supported by, the Amador Calaveras Consensus Group (AGCC) of the Upper Watershed, and with the Environmental Markets Working Group in the mid-watershed. The Region also plans to host a “roundtable” with East Bay businesses and corporations who are major users of Mokelumne water. This roundtable will foster an understanding for the East Bay business community of their water source and in return give the Region, the National Forest Foundation (NFF) and ACCG a better understanding of what is important to these East Bay businesses. We hope that the roundtable will be the beginning of a mutually productive relationship and that it could eventually bring more potential investment to the watershed.
  - We have a new partnership with the Coca Cola Corporation, the National Fish and Wildlife Foundation, American Rivers and various NGOs to restore Indian Valley Meadow, a high alpine meadow within the Mokelumne Watershed on the Eldorado National Forest. Due to prior channel head cutting and incision the meadow has a lowered water table, increased in-channel sedimentation, and a related replacement of willows and other riparian vegetation with dryland species such as sagebrush. Restoring this meadow will benefit not only water delivery but improve wildlife habitat and biodiversity. It also helps Coca Cola meet their company sustainability goal of “replenishing to nature” all the water they use in their operations by 2020. We hope to expand this mutually beneficial partnership in 2013.
  - The Region has a Memorandum of Understanding with the Santa Ana Watershed Project Authority (SAWPA) that agrees to explore joint investment in the Santa Ana River Watershed. As part of the One Water, One Watershed Program and the Integrated Regional Watershed Group, the San Bernardino National Forest and its watershed partners will be applying for CA Proposition 84 funds to implement restoration work in the upper watershed.
  - The Sierra National Forest, in partnership with Madera County and local irrigation districts through their Integrated Regional Water Management Plan (IRWMP), applied for and were granted bond funds under CA Proposition 84 to reduce fire risk on 4,000 acres over 4–5 years. The Forest is responsible for working in the Upper Willow Creek Watershed while the county and

- irrigation districts will work in the mid-watershed.
- The Region is developing a partnership with the Bureau of Reclamation (BOR) to engage in their “Watersmart Basin Plans,” a large scale planning effort in three key California watersheds: the Truckee Basin, the Sacramento/San Joaquin Basin, and the Klamath Basin. The Region and partners will conduct avoided cost analyses to identify risks, costs and mitigations for water delivery related to fires and sedimentation. Discussions about the Truckee Basin Study are in progress and discussions about the other two Basins will occur when these are started.
  - The Region has created a new leadership position to focus on the Chaparral Initiative. In 2013 this individual will work with the Southern California national forests, the Pacific Southwest Research Station (PSW), and interested entities with hopes of forming a large-scale partnership to reverse the widespread type conversion of chaparral habitat in Southern California.
  - The Region with partner agencies has held two meetings with the National Aeronautics & Space Administration (NASA) to explore technologies that could help the Region better manage watersheds and increase restoration within existing budgets.
  - The Region continues to collaborate with the University of California, California State University, and the University of Montana in conducting inventory and monitoring of forest conditions and trends in areas burned by wildfire. Data collected and lessons learned are intended to provide the basis for post-fire restoration.
  - Continued strengthening involvement and partnering with the California Landscape Conservation Cooperative.
  - The National Competitive Forest Landscape Restoration Act (CFLRA) Program encourages collaborative, science-based ecosystem restoration of priority forest landscapes by offering competitive grants to worthy projects. Despite tough competition Region 5 had three projects selected nationally for funding and implementation: Dinkey Creek, Amador Calaveras Consensus Group and Burney Hat Creek Watershed Group. The success of these partnerships will translate into new knowledge that will assist in project implementation Region-wide. We will actively seek additional resources from
- new partners to support this work such as the Coca Cola partnership and the outreach being conducted with East Bay businesses.
- The National Forest Foundation (NFF) has initiated a campaign called “Treasured Landscapes,” whose goal is to revitalize our forests and strengthen people’s connection to the land by engaging them in either volunteer opportunities or through actual investment in restoration projects in key locations that are loved by people. Fourteen Treasured Landscapes have been identified nationwide with two in California: the area affected by the Station Fire on the Angeles NF, and the newly selected Truckee River Watershed on the Tahoe NF. The following work is already underway on the Angeles National Forest:
    - A partnership between the Los Angeles River Ranger District, the National Forest Foundation (NFF) and Alcoa Fastening Systems Carson Operations was implemented this year. Alcoa has adopted the Vogel Flat Picnic Area and is contributing volunteer days at the site to address damage caused by the Station Fire and subsequent winter flooding. Funding for the work days was provided by Recreational Equipment Incorporated (REI), the Student Conservation Association (SCA) and Alcoa.
    - SCA is also working on restoring trails in the Station Fire closure area.
    - NFF brokered contributions as Voluntary Carbon Offsets with the Disney Corporation to replant 900 acres within the Station Fire Restoration area.
    - The Forest and NFF also utilized Air District mitigation funds for additional planting.
  - The RO Public Services Staff will initiate “Trees and Trails,” a program that focuses on the restoration of key recreation settings and scenery that have been ecologically impaired due to unmanaged recreation and other past management activities. Through the aid of key outdoor-recreation stakeholders and interested citizens, Trees and Trails will demonstrate how recreation’s sustainable-recreation practices contribute to the Region’s ecological restoration emphasis. Trees and Trails will promote the development of “Citizen Stewards,” a corps of volunteers dedicated to assisting forest staff in completing a series of sustainable-recreation projects over a multi-year period.

- Renewed a five year agreement with the Transmission Agency of Northern CA (TANC) to implement fuels reduction projects and increase fire preparedness near important transmission lines at risk from wildfire impacts on the Modoc and Shasta-Trinity National Forests. TANC provides funding for fuels treatments and increased fire

station staffing near these transmission lines while the forests focus existing funding in those locations and complete the work. This helps TANC avoid future costs from wildfire impacts and increases the forests' restoration accomplishments within existing budgets.

## Chapter 2B: Biomass and Wood Processing Examples

**Strategy: Support existing and new biomass, wood processing, energy production and value-added wood processing infrastructure.**

The Region must increase the pace and scale of its restoration work if it is to make a difference in improving forest resilience so that California forests can withstand the pressures of climate change and population increases. This cannot be achieved without biomass facilities distributed throughout the state. Where facilities exist, more restoration work can be completed within existing budgets. Because of the lack of favorable pricing and conditions, biomass infrastructure in California, which once numbered over 60 facilities, has dwindled to about 35 facilities. Current pricing and regulation does not incentivize new development and consequently there are large areas of the State where no biomass infrastructure exists to support increased restoration work.

- The Region's biomass work is focused in two areas, 1) technical and financial support for existing and new infrastructure and, 2) collaborative work with partners at policy level.

### Technical and financial support work

#### Existing Infrastructure, Wood Processing

1. Grants were awarded to assist removal and transportation of excess wood and logs from hazardous fuels and roadside hazard projects to Sierra Forest Products, Terra Bella. This is the last sawmill remaining in the Southern Sierras and considered critical to help accomplish ecosystem restoration objectives in this region. Over 200 direct and indirect jobs were also retained.
2. Grants were awarded to improve efficiencies and economic viability of two small sawmills in Northern California, Trinity River (Weaverville) and Shasta Green (Burney). The grants also help maintain competition in the area for excess

biomass and logs from ecosystem restoration projects, and retain more than 240 jobs.

#### Existing Infrastructure, Biomass Energy

3. Grants were awarded to help re-open mothballed biomass power plants in areas where national forests and private landowners needed outlets for excess woody biomass created by ecosystem restoration and hazardous fuels reduction projects. Reopened plants included those in Ione and Anderson, and we hope to see the plant in Loyaltan reopen soon. The reopening of the plants was strongly supported by community collaborative organizations and created over 70 jobs and retained an additional 60 jobs.

#### New Infrastructure, Biomass Energy

4. Grants were awarded to complete the engineering design for wood-burning institutional boilers at two CalFire conservation camps in Northern California: Devils Garden and Trinity. These will be the first modern wood-burning institutional boilers in California in at least 30–40 years and a model for other potential conversions.
5. Grants were awarded to complete the engineering design for two small-scale biomass power installations, one near Truckee (Placer County) and one in North Fork (Yosemite-Sequoia Resource Conservation & Development District (RC&D)). These will be models for implementation of SB 1122, which requires public utilities to purchase up to 50 MW of renewable power from biomass power units that are less than 3 MW and utilize material from hazardous fuels reduction projects.

#### Regional work at a policy level

The Region has invested significant staff time working with partners to support policies and regulations that would incentivize new forest biomass infrastructure and help support and maintain existing infrastructure. The Region has learned that in the complex world of renewable energy policy and pricing there is no silver

bullet. To improve conditions for forest biomass facilities, the Region must engage in a multitude of proceedings and venues. These include the State Legislature, California Public Utilities Commission (PUC), California Energy Commission (CEC), Air Resources Board (ARB) and the Governor’s Office. Current progress:

- The Region is an active member of the diverse, well-connected, and well-informed California Biomass Working Group (BWG), which is advocating for more favorable biomass energy policy. The BWG meets monthly and has targeted numerous actions, proceedings and policymakers that might make a difference in favorable conditions and pricing for biomass infrastructure. Once actions are identified, the BWG sends the most appropriate subset of working group members to provide information, attend hearings, send letters and meet with policymakers.
- Over multiple visits the Region and partners provided information to PUC Commissioners and staff on how forest fires, suppression costs, utility fire liability insurance rates, and fire damage settlements all translated into electricity ratepayer costs, safety risks and liability, and how restored forests would reduce this liability. The Region worked with others to host a field trip for policymakers and staff to view forest health, fuels, and biomass connections with risks and benefits.
- Regional staff and the BWG eventually identified two PUC proceedings where progress might be made. The first is a “Feed in Tariff” (FIT) proceeding which sets special pricing mechanisms for renewable energy facilities generating less than 3MW. The Region provided important data and helped support parties that advocated for higher pricing for biomass facilities in high fire danger areas. The second PUC proceeding is exploring fire danger and risks to California’s transmission infrastructure.
- Regional staff and BWG members have had additional meetings with CEC Commissioners and staff and have been engaged in two proceedings. The Region and BWG are currently planning a field trip for CEC and ARB board members and staff.
- The Region and partners provided information that supported SB 1122, which requires 50 MW of small forest-related biomass to be purchased by PG&E, Southern California Edison and San Diego Gas and Electric in high fire danger areas. The bill has been signed by the Governor. This will create a favorable economic environment for many small emerging biomass plants throughout forested areas at high risk for wildfire.
- The Region is engaged in California’s Greenhouse Gas Cap and Trade Revenues considerations to explain the capability of forest restoration to sequester greenhouse gasses. One of the Deputy Regional Foresters presented testimony before a Cap and Trade proceedings hearing on forest condition, trends and opportunities to conduct further restoration work. The Region is helping co-lead a working group of other land management agencies and NGOs with similar interests to document, educate and quantify how forest restoration will protect and enhance carbon sequestration.

## Chapter 2C: Public Services Program Contributions to Ecological Restoration

### Special Uses Program

Proper management of the Region’s 15,000 special-use authorizations has profound implications for ecological restoration. One example is seen in the thousands of miles of roadway surfaces that are used to access infrastructure, communication sites, ski resorts, recreation residences, and property in-holdings. Without frequent and thorough inspections to ensure compliance with authorization terms, including road maintenance requirements, destructive sediment erosion into streams and waterways may result. Similarly, sufficient oversight of permits is necessary to ensure public safety, sustain critical habitat, protect endangered species and cultural resources and prevent resource degradation. Ecosystem restoration may occur by leveraging permit operations and maintenance activities with Forest operations within priority watersheds. For instance, hazard reductions within power transmission rights-of-way not only results in fewer fires, but also contributes to vegetation management targets and improved suppression activities during fire events. In addition, by prioritizing the permitting of infrastructure necessary for renewable energy, contributions to global ecological restoration results by facilitating sustainable energy generation that does not accelerate climate change.

### Land Adjustment Program

Through land acquisition, we achieve unbroken land connectivity. This allows restoration efforts to focus on logical ecological units rather than administrative boundaries or ownerships. Increasing conservation lands protects healthy watersheds and delivers environmental and economic benefits to people through the restoration of natural resources and protecting the services they provide. These unified landscapes also improve and increase access for recreation opportunities, protect valued scenery and natural settings, all of which contribute to human health.

### Hydropower Relicensing Program

The hydropower relicensing program contributes to ecological restoration by positively affecting many attributes of the forest ecosystem. Appropriate relicensing conditions may increase the function and habitat of aquatic ecosystems, improve water quality, and improve the management of noxious and invasive weeds, hazardous fuels, cultural resource protection,

and threatened, endangered, and sensitive plant and animal species, including aquatic species. Restoration or expansion of project related road and recreational facilities improves management of public access and recreation use. Each project’s contribution to ecological restoration depends upon the specific project footprint and its ability to affect the aquatic ecosystem. Restoration of ecosystem functions associated with these projects is extremely important in achieving ecological restoration at the watershed scale.

### Trails Program

The establishment of trails and motorized designations facilitates the desired access and recreation outlet for the visiting public thereby preventing unauthorized or social trails that affect species, watersheds and soils. Implementation of travel management increases the pace and scale of ecological restoration by facilitating the direct and active restoration of routes that were not added to the transportation system as roads or trails. In addition, travel analysis will examine the national forest road system and yield recommendations for improvements or changes to that system, leading to on-the-ground projects that result in watershed improvement and overall ecological resilience.

The Pacific Crest National Scenic Trail (PCT) affords large landscape connectivity that provides habitat for migratory birds and bats, in addition to land-based species, across the Sierra and Cascade Mountain Ranges. The management of the PCT corridor and associated private land acquisitions mitigates the impacts of climate change by providing open space opportunities and heat island mitigation by restricting development on private lands the trail passes through.

### Wilderness & Wild and Scenic Rivers Program

Wilderness areas and Wild and Scenic Rivers provide long-term protection for upland and riparian vegetation, helping to mitigate the production of greenhouse gases through carbon sequestration. Maintaining and protecting these undisturbed landscapes provides clean air, clean water, and biodiversity within habitats that support wildlife and fisheries.

## **Recreation Planning, Developed Sites, and Landscape Management Programs**

Recreation planning establishes the framework for the implementation of projects that are sustainable and ensures that ecological degradation does not occur. Appropriate planning for operation and maintenance of heavily used recreation facilities prevents and restores ecological impacts from recreational use. Utilizing leadership in energy and environmental design for both recreation-developed and administrative sites ensures structures are designed in harmony with the environment, capturing cultural and historic architectural elements, while maintaining energy efficiency and reducing the Agency's carbon footprint and contribution to climate change. Applying landscape management practices that maintain scenic

integrity and stability ensure that ecological degradation of landscapes does not occur below an acceptable threshold and put at risk forest landscapes that are highly susceptible to unplanned events and are identified for prioritized ecological restoration treatment.

## **Conservation Education & Interpretive Services Program**

Conservation education and interpretive services develops social learning and provides a broader public understanding of the need to balance resource use and production with resource conservation to achieve long term sustainability. Educating the community at large facilitates the emotional and intellectual connections between the interests of the public and the goals of the Agency to achieve common restoration and sustainability objectives.

# Chapter 3

## Pacific Southwest Region Partnership

### Partnership Summary

#### Introduction

The Pacific Southwest Region and Pacific Southwest Research Station have drafted partnership strategies that recommit our organizations to broader and more successful collaborations with external partners. In particular, both organizations want to increase partnerships around watershed restoration and forest resiliency. While our goals are the same, the strategic actions we plan to use to increase partnerships are different, as outlined below:

The Research Station intends to focus on developing partnerships that increase our scientific knowledge and understanding of (1) watershed restoration and water quality improvements, (2) urban natural resources stewardship, (3) wildland fire and fuels, and (4) forest resiliency. Among other methods, the Station will do this through sharing best practices with other research stations, tracking partnerships and their outcomes, establishing an incentives program to promote large-scale partnerships, creatively marketing the station's successes and willingness to engage in partnerships, and including partnerships in performance management standards for leaders.

The Region plans to expand the number, quality, and scope of partnerships throughout California and the Pacific Islands, especially in the areas of water and watershed management, healthy forests, engaging youth, recreation, and volunteerism. The Region intends to do this through increased focus on building partnership competencies within our workforce, promoting a collaborative culture at every level and through every line officer, prioritizing strategic alliances with large partners at the regional level, and fully maximizing the use of the partnership authorities we have available.

### Public-Private Partnership Strategy

Achieving our Mission with Shared Stewardship of the Nation's Forests and Grasslands

#### Background & Context

The Pacific Southwest Region has long recognized that investing in strategically chosen and well nurtured partnerships will increase the amount of work we can accomplish on the land.

The public has long recognized that forests provide many benefits, from water and clean air to rural jobs and recreation. Now there is growing recognition of how climate change, population increases, and other threats to forest health will impinge on those ecosystem services. This presents an exciting opportunity for our agency to focus on restoration actions and to engage the public, community groups, and businesses in the work that needs to be done to sustain the health, diversity, and productivity of our lands.

Region 5 articulated these values, threats, and a vision for healthy, resilient ecosystems in its "Leadership Intent for Ecological Restoration." This declaration speaks to the convergence of stakeholder interests and puts forth a call to action that is inspiring Forest Service employees, existing partners, and new, non-traditional partners. Businesses that rely on ecosystem services—water utilities or outdoor retailers, for example—may see an opportunity to make investments in restoration actions that protect those benefits.

There is widespread recognition within our region that, in order to do a good job caring for the land and serving the people, we need to employ partnership and collaboration skills. This Regional Public-Private Partnership Strategy is informed by the Region's 2003 Partnership Plan, the 2011 National Strategy, and conversations and interviews with hundreds of Forest Service employees, partners, and members of the public from 2010 to 2012. The region offers this plan to establish a vision of expanded use and quality of strategic partnerships and to agree upon the focus areas that require our investment in order to reach that vision.

#### Vision

Forest Service Pacific Southwest Region employees cultivate relationships with outside organizations and engage in partnerships as second nature in getting work done to accomplish our mission. The Region takes advantage of all useful authorities and promotes and rewards collaboration with external people and organizations at every turn. This results in better services for the American public and the best possible stewardship of ecosystems on public and private lands.

These partnerships significantly help the Region achieve the goals outlined in the R5 Leadership Intent for Ecological Restoration. Partners make investments of capital, resources, and time that they feel are

wise investments to protect the land that they love and the ecosystem services they value as a citizens or businesses.

### Renewed Partnership Focus

The mission of the Forest Service is to “sustain the health, diversity, and productivity of the Nation’s forests and grasslands to meet the needs of present and future generations.” Partnerships are essential to carrying out our mission today, and, fortunately, there are hundreds or thousands of organizations in California and the Pacific Islands whose missions overlap in some way with ours. They could have a mission focused on reaching inner-city youth, or restoring chaparral habitat, or providing clean water to consumers, or creating rural jobs, or maintaining great trails for recreation. Wherever another organization’s mission and ours overlap, there is potential for us to work together toward bigger, better outcomes than we each might achieve on our own.

The Region recognizes the value of continuing to develop effective partnerships wherein we invite public participation, embrace stakeholder proposals, and successfully leverage our resources by working together. Following are focus areas where we believe renewed attention and investment will yield progress. Even though the success of partnerships in the agency will ultimately depend upon relationships developed at the field level, the leadership, policy, and support provided from upper management levels are imperative for success. The Regional Leadership Team is committed to enhancing partnerships across the region through supporting the focus areas in this plan.

### Key Strategies

We will expand the number, quality, and scope of public-private partnerships across the region, with an emphasis on water and watershed management, healthy forests, engaging youth, recreation, and volunteerism. To achieve this, we will direct resources and attention to the following focus areas:

1. Capacity and Competencies
2. Collaborative Culture
3. Strategic Alliances
4. Law and Policy

### Capacity and Competencies

We intend to build and maintain partner and employee understanding and ability to engage in rewarding and high impact partnerships that achieve shared goals.

Achieving this vision will require transitioning to become an agency where every staff office—from Ecosystem Management and Public Services to Human

Resources and Law Enforcement—routinely employs partnerships in their work and use the partnership authorities available to them. This will take investment in capacity and employee competency through training opportunities.

We can do this by holding in-person and webinar trainings: we can make broader use of national trainings such as “Managing By Network,” and/or bring courses like that to regional employees in partnership with other federal agencies in California and the Pacific Islands. We can also replicate the successful model started by National Forest Foundation with our Region and Region 6 by hosting peer-learning conferences on the topics of collaboration and partnerships.

### Collaborative Culture

We recognize the importance of including the public in the development of strategies for land stewardship and in the implementation of those strategies. In many cases, we may build our programs of work collaboratively from the beginning with our partners.

We will foster a collaborative culture from all levels of our organization, from Regional Office to Ranger District. For individual employees and for units, becoming better collaborators means focusing on and sharing our end goals with partners and the public, while keeping an open mind and listening to our partners about how we might reach those goals.

We will recognize and support successful existing landscape scale, communities based collaboratives and empower them to share their lessons with others. Examples of successful existing collaboratives include Santa Ana Watershed Project Authority, Dinkey Creek CFLR, Burney Hat Creek All Lands Project, and Amador Calaveras Consensus Group (Mokelumne Watershed). We would like to see these types of collaboratives become the most common way we do business.

The Regional Office, Supervisors Offices, and Ranger Districts will support a collaborative culture by being open to discussions with externals early and often, and by bringing in internal or external facilitators to help collaborative discussions go well. Regionally, one way to support this may be to relaunch a small version of the Region’s past internal facilitator training program. Under this program, certain employees take facilitator skill training courses and may be added to a roster of facilitators available to any staff or unit that requested one for a project or process.

### Strategic Alliances

We will identify and develop priority relationships with particular organizations by giving significant



consideration to shared goals and potential accomplishment. In essence, we will reach our goals through partnerships.

To take advantage of partnerships at every opportunity, we must practice being opportunistic when we are approached by potential partners to do work together. But we are also engaged in thoughtfully cultivating and deepening existing relationships while purposefully targeting new partners. That is what makes partnerships strategic.

We can do this by strengthening our relationship and coordination with the National Forest Foundation and the National Fish and Wildlife Foundation, our Congressionally-chartered fundraising partners. We may also further these alliances by tapping our agency and Department leadership to spearhead discussions with potential strategic partners, to signal our deep commitment to shared goals. By supporting a Yammer account, the Forest Service supports the idea-sharing and creativity required for employees to imagine new potential partners and projects. But we could do even more (e.g., supporting region-wide “communities of practice”) to encourage this kind of professional networking and brainstorming across the region that would lead to the big-landscape, big-partner, high-impact projects that result from strategic alliances.

## Law and Policy

We recognize the need to more instinctively employ available authorities for engaging external organizations at all levels of the organization. Regional Partnership staff will work toward the enhancement and broader interpretation of existing authorities through collaborating with the Washington Office and the Department of Agriculture.

Formalizing partnerships can be challenging and time-consuming due to the diversity of partnership authorities, various ways to interpret those authorities, and complicated processes required for grants and agreements. There are no easy ways around this besides employee training and increased practice. Making our trainings for partnerships, grants, and agreements more interactive, more peer-to-peer and less dependent on powerpoint texts may help this information truly stick with and help more Forest Service workers.

There is also an opportunity to explore expansion and broader interpretation of authorities and policies that advance partnerships. Regional staff has recorded questions and requests from R5 forests concerning partnership authorities, and we now have an opportunity to collaborate with the Washington Office and the Department to explore administrative changes

in FS policy and perhaps even different interpretations of existing policy at the Departmental level.

## Examples of High Priority Projects that Exemplify the Region’s Partnerships

### 1. Dinkey Creek Landscape Restoration

Supported by the Collaborative Forest Landscape Restoration program, a group of about 30 individuals representing a broad range of interests has been developing, implementing, and monitoring restoration projects on 154,000 acres of public and private lands in the High Sierra Ranger District of the Sierra National Forest.

### 2. Mokelumne Watershed Restoration

Eighty five percent of the water that East Bay Municipal Utility District (EBMUD) provides to its customers begins in the Mokelumne watershed on National Forest System land. R5 is in early stages of working with EBMUD, other landowners, and non-profits in the Sierras to quantify the value of ecological restoration projects in that watershed, with hopes for then educating water consumers in the East Bay and implementing restoration projects together in the future. This work will also be implemented in cooperation with the community-based Amador-Calaveras Consensus Group and with the support of the National Forest Foundation.

### 3. Station Fire Treasured Landscape

The National Forest Foundation (NFF) is supporting the Angeles National Forest by raising funds and mobilizing volunteers to restore the areas of the forest affected by the 2009 Station Fire. As the nation’s most urban forest, the Angeles attracts millions of visitors who have seen their outdoor recreation opportunities severely impacted. In choosing the Angeles as a site in its “Treasured Landscapes” campaign, NFF plans to help coordinate existing volunteer groups and to help implement reforestation, invasive species management, and watershed restoration projects within the burned area.

### 4. Burney-Hat Creek

The Lassen National Forest is collaborating with the Fall River Resource Conservation District, Sierra Institute for Community and Environment, the Lassen Volcanic National Park, private timber companies, Pacific Gas & Electric, recreation enthusiasts, and others to develop and implement restoration projects in the Burney-Hat Creek Basin. These projects will reduce fire risk and protect nearby communities, improve ecosystem function and wildlife habitat in

degraded streams and meadows, and provide wood biomass for three co-generation plants.

#### **5. Santa Ana Watershed**

National forests host the headwaters of the Santa Ana River, and this important watershed provides water for over five million residents in Southern California. The Santa Ana Watershed Project Authority (SAWPA) coordinates the watershed’s five major water districts

and began partnering with the San Bernardino and Cleveland National Forests after the 2003 fires to help protect the headwaters and conduct ecosystem restoration projects. The initial collaboration has inspired a Memorandum of Understanding between SAWPA and the Cleveland and San Bernardino National Forests to ensure that water concerns are being communicated, shared, and addressed together to achieve mutually beneficial goals.

# Pacific Southwest Research Station Public-Private Partnership Strategy

## *Science That Makes a Difference*

### Introduction

The Pacific Southwest Research Station (PSW) provides a strong scientific foundation for resource management decisions by drawing from natural resource expertise, decades of data obtained from its experimental areas, and a network of strong and productive partnerships. Engagement of cooperators, communities, private landowners, non-profit organizations, citizens and private interests in these partnerships is critical in the provision of world-class forest research and development. Through participation in partnerships, PSW is able to develop science and technology solutions for partners' priority issues in ways they find effective and useful for sustainably managing forests and grasslands. By working with partners, PSW also expands its capability to participate in conservation through stewardship, research, and intergovernmental coordination. In the contemporary environment of increased economic changes and pressures, PSW must continue to develop effective partnerships where we successfully leverage our resources with stakeholders by working together.

The PSW Public-Private Partnership Strategy ascribes to the vision and principles outlined by the US Forest Service national strategy. PSW invites prospective partners to contribute to its mission of developing and communicating science needed to sustain forest ecosystems and their benefits to society. Following the national strategy, the PSW strategy provides a roadmap for expanding partnerships, broadening strategic alliances, and strengthening collaboration, thereby increasing the potential for exciting new social and capital investments towards communities, ecosystems and outdoor experiences.

### The strategy organizes objectives in four main sections:

1. **“The What”**: Key Focus Areas Key issues upon which PSW partnerships and shared-stewardship will be focused.
2. **“The Who”**: Targeted Partners PSW will strengthen current alliances that are proven-successful, and develop new partnerships with organizations and sectors that are most likely to help PSW maintain relevancy with respect to the four key focal areas.
3. **“The How”**: Partnership Growth Strategies Specific tactics PSW will utilize to foster and advance current and future partnerships in California, Hawaii and the US-affiliated Pacific Islands.
4. **“The Why”**: PSW Partnership Successes Highlighting ten of PSW’s high-profile partnerships and projects in California, Hawaii and the US-affiliated Pacific Islands to illustrate the value of effective collaboration in forest and rangeland research and development.

### “The What”: Key Focus Areas

PSW will remain focused on four key research areas as it activates its partnership strategy

#### Create Strategic Opportunities in Water Management and Restoration

PSW plans to maintain alignment with the “Water Management and Restoration” Forest Service R&D Emerging Research Area by engendering partnerships that focus on water resources. Partnerships in California, Hawaii and the U.S.-affiliated Pacific Islands that are invested in water research will enhance the region’s ability to provide clean water, air, and water-related ecosystem services, conserve water-dependent species and ecosystems, improve management of watersheds, and plan for and manage changes in water and its associated resources under changing climates and landscapes. Similar to the goals and objectives of the Service-wide partnership strategy, PSW will expand collaboration and partnerships with water utilities, private landowners, and other organizations and sectors to provide scientific information and tools that support watershed restoration and water quality improvement work in priority watersheds, spotlighting the direct connection between healthy forests and clean and consistent supplies of fresh water. As an example of effort in this focus area, PSW is an official member and participant of the California Water Plan “Update 2013” Federal Agency Network.

#### Promote Increased Partnership in Urban Natural Resources Stewardship

PSW envisions healthy, sustainable urban ecosystems for the benefit of all. PSW and collaborative partners

play a significant role in development of science and technology transfer for the advancement of ecosystem services in urban landscapes. PSW will continue to work with partners from socioeconomically diverse communities in California, Hawaii and the US-affiliated Pacific Islands to educate the public, and develop scientific tools that guide appropriate land management. PSW and partners will also expand their efforts to reach out to minority and underserved communities and youth to encourage spending time in nature, promote health, and nurture land stewardship.

### **Strengthen Collaboration in Wildland Fire & Fuels Research**

Managing fire and the vegetation conditions that fuel fire to accomplish multiple land management objectives is a paramount challenge to communities throughout most of California, Hawai'i and the U.S. affiliated Pacific Islands. PSW and partners will work together to measure, model and predict wildland fire and weather phenomena; determine the ecological effects of fire and fire removal on landscapes; and describe and quantify uncertainty and risk in a science-based decision-making framework for fire and land management planning.

### **Promote Increased Partnership in Restoring Forest Resiliency**

PSW and partners in California, Hawai'i and the U.S. affiliated Pacific Islands will collaborate to more fully understand and describe the effects of climate change, invasive species, pollution and other threats on carbon sequestration, ecosystem health and biodiversity in forests. PSW will work together with strategic partners to provide scientific knowledge, develop tools, and evaluate management options for restoring, sustaining and enhancing forest function, productivity and resiliency.

### **“The Who”: Targeted Partners**

PSW will strengthen current alliances that are proven successful, and develop new partnerships with organizations that are most likely to help PSW continue its emphasis on the four key focal areas

High-success partnerships will be distinguished by long-term involvement and a high degree of mutual and community benefit and shared ownership of the partnered efforts.

- Improve partnership between research and management by increased engagement with Forest Service Region 5 PSW will increase and enhance communication and collaboration with the Regional Office in Vallejo, California to further the success of such initiatives as the Region's

Landscape Conservation Plan; the preferred alternative for the new planning rule; and the expansion of job growth in local communities.

- Strengthen and expand opportunities with Native American, American Indian, Pacific Islander and other Tribal Organizations, and effectively engage with Tribes through the use of the USDA Tribal Consultation Policy. In succession with the Service-wide partnership strategy and in adherence with the USDA Tribal Consultation Policy, PSW will increase outreach to Tribal organizations to identify and collaborate on common resource goals and interests.
- Strengthen and expand opportunities with international partners. PSW will build upon its solid foundation of partnerships with international sectors and organizations to leverage scientific knowledge and conduct collaborative research on pressing natural resource issues. PSW will pay particular attention to issues affecting Micronesia and the other US-affiliated Pacific Islands.
- Fully activate our federal, state, and local partnerships, including partners such as USDA agencies, the Department of Interior and its component agencies, CalFIRE, and local power and water utilities.
- Broaden and increase partnerships with Universities, particularly those in California and Hawaii, in order to stimulate local economies, encourage student interest in the Forest Service, and continue tradition of scholarly excellence in the region.
- Strengthen and expand Memorandums of Understanding (MOUs) with minority-serving institutions and professional organizations. To further our outreach efforts, honor and respect the concepts of diversity and inclusion, and increase interest and knowledge of natural resource science in local communities.

### **“The How”: Partnership Growth Strategies**

Specific, internal strategies and methods for strengthening and increasing collaboration and partnerships in California, Hawaii and the Pacific Islands

- Continue integration of partnership strategies within existing and new Station strategic plans.
- Comply with the RSA rapid strategic partner assessment outlined by the national partnership strategy, through a SWOT or ROI analysis of

PSW’s current partnership and collaboration data, and an informal survey of existing investors/partners.

- More accurately track and manage partnerships and their outcomes through a more centralized information system, and ensure smooth transition through better use of “handover memos”
- Benchmarking-activities with other Forest Service Research Stations to collect best practices.
- Prospect research: explore options for establishing new strategic partners. Perform assessments of new strategic partners and establish investment strategies for those with strong potential.
- Assist with implementation of the US Forest Service 2011 Empowering Collaborative Stewardship Initiative (currently under development) to enhance the Forest Service’s capacity for community and citizen engagement.
- Establish incentives and program requirements to encourage large-scale public-private partnerships. As the Forest Service further implements the “all lands” concept of natural resource management, there is driving need to invest and build new capacity towards large-scale partnership efforts. The broad and diverse scale of such projects promotes the engagement of the full spectrum of partners and the potential leverage of investments for both the federal government and the private sector.
- Use creative media, marketing and communication tools to market PSW’s accomplishments and value as a strategic partner.
- Make partnerships part of leadership Performance Management standards to ensure that members of the Senior Leadership Team envision outreach and collaboration as essential components of job success.

## “The Why”: PSW Partnership Successes

Up-to-date examples of effective and fruitful collaboration between PSW and partner organizations

In fiscal year (FY) 2011, PSW’s partners contributed \$8.25 million through grants and agreements; when leveraged by the Station’s \$10.3 million in contributions, the total value of these partnerships exceeded \$18.5 million. PSW has chosen to highlight ten high-profile partnerships and projects in California, Hawaii and the US-affiliated Pacific Islands, which illustrate the value of effective collaboration in forest and rangeland research and development. These

innovations in shared stewardship are in alignment with the four key focus areas, and bring PSW and Forest Service R&D to greater light as an organization worthy of investment.

## Water Management and Restoration

**50 Years of Hydrologic Data at Caspar Creek:** For nearly half a century, the California Department of Forestry and Fire Protection (CDF) and PSW have cooperated in a comprehensive watershed study at the Caspar Creek Experimental Watersheds on Jackson Demonstration State Forest near Fort Bragg. When formal cooperation began in 1962 (Phase 1), the objective was to document hydrologic changes, erosion impacts, and sediment production resulting from road construction and logging second-growth forests. In the 1980s, Phase 2 began, with the principal objective to investigate potential cumulative watershed effects resulting from even-age (clear-cut) silvicultural activities using cable yarding techniques. Supplemental studies were designed to evaluate various flow routing and sediment transport processes, water quality, fisheries and other biological community responses. A third phase, which commenced in 2011, is comparing sediment projection from legacy sources with and without watershed rehabilitation and harvest. The Caspar Creek data represent the only long-term hydrologic information from managed second-growth conifer forests in the western U.S. Because of its long record and unique conditions, information from Caspar Creek will continue to be valuable to both the research and the land management communities as second- and third-growth forests are increasingly re-entered.

This long-term cooperation between CDF and PSW has been a productive division of labors. The two agencies have jointly decided which studies to undertake, with CDF supervising the construction and maintenance of research facilities and managing the experimental watersheds, and PSW designing the experiments and analyzing the data. Together, CDF and PSW have authored over 150 technical publications as a result of this joint effort. Results from the cooperative Caspar Creek research are being used by state and federal agencies charged with regulating how forestry practices affect flooding, water supply, water quality, riparian condition, aquatic habitat including endangered fish. Such a long-term research and management venture between a state and federal agency is unique. The results to date and a continuation of this cooperation will be priceless to future generations. Consequently, the Department of Forestry and Fire Protection and Pacific Southwest Research Station have agreed to continue cooperative research at the Caspar Creek Experimental Watersheds for the next 100 years.

**Improvement of the Salmon Life-Cycle Framework Model (inSALMO):** Spatially explicit, individual-based models hold great promise for evaluating the influence of physical and biological regimes on the dynamics of animal populations of special concern. Such models can address a variety of key management issues such as prioritization of habitat restoration, analysis of cumulative effects, impacts of invasive species and consequences of climate change. These models are also uniquely capable of evaluating the combined effects on populations of multiple environmental changes, such as habitat restoration, streamflow regulation and climate change. PSW scientists are collaborating with natural resource consultants Lang, Railsback and Associates to produce a spatially explicit, individual-based model for resident salmonid fishes. The objectives of the project are to increase the usability and broaden the applicability of a salmon lifecycle model (inSalmo), apply the model to evaluate habitat restoration, and identify future directions for productive application of the approach. The overall intent of the project is to increase the ability to link physical conditions and processes with salmon population dynamics. The project is expected to yield a model useful for the management of anadromous fishes, such as Chinook salmon in the Central Valley of California.

### Urban Natural Resources Stewardship

**Youth Outreach: The Richmond Edible Forest Project and the “Starts with a Seed” Program:** The city of Richmond represents one of the most diverse populations in Contra Costa County, California. It also has a high poverty rate: it is estimated that more than 13 percent of the residents live below the federal poverty level. But the Richmond Edible Forest Project hopes to help change those statistics by teaching local youth how to garden and produce a healthy food source for themselves and their communities. The Richmond Edible Forest Project is a joint venture between PSW and Urban Tilth, a nonprofit organization in West Contra Costa County. The partnership engages 700 underserved youth in education programs to learn how to install “edible forests” in Richmond parks and school areas. The edible forests are also environmental education sites where PSW scientists and Forest Service land managers can teach kids about the benefits of trees and forested landscapes. After the first edible forest garden is installed, the project will offer a series of 3-hour edible forest garden workshops for school and community gardeners and parks and recreation department staffs from across the Bay area. The Richmond Edible Forest Project continues to provide invaluable resources and training to employ youth to create, maintain and use gardens at multiple sites on public lands throughout the greater Richmond area.

The “Starts with a Seed” program is the result of a partnership between PSW and two State of Hawai’i public charter schools, with the intent of increasing environmental literacy and providing information for thoughtful life-style choices. The program provides a source of native plants for local restoration efforts and helps connect communities throughout Northeast Hawai’i and urban Oahu. The Hawaii charter schools provide greenhouses, locations for workshops, vans and buses for field/service learning trips, cultural knowledge, and time and energy to build and refurbish greenhouses. PSW and watershed partners contribute scientific knowledge, access to forests, and forest restoration sites. The program demonstrates increased “grow” literacy for participants through field-based learning, and workshops which reinforce and integrate current forest restoration practices with Hawaiian culture.

**Urban Forestry: Replicating the “Million Trees” Project in Denver and San Jose:** In 2006, Los Angeles Mayor Villaraigosa called upon PSW scientists to help determine if space exists in the city for one million additional trees, to identify potential tree planting sites, and to estimate future benefits from planting. Using geographic information systems, aerial photographs and remote sensing data, the PSW team found 2.4 million potential tree sites and estimated that over 35 years, one million new trees could capture 14-21 billion gallons of stormwater, reduce air pollution by up to 10,000 tons, and save about 1 million mega-watt hours of electricity. Needless to say, the Mayor was thrilled. The “Million Trees LA” Project has planted over 300,000 trees to date, and PSW has helped the program target residential neighborhoods and commercial areas with the least tree canopy cover. The City and County of Denver and the City of San Jose (with support from the CalFIRE Urban Forestry Leading Edge Grant) are now partnering with PSW to replicate the success of Million trees LA and design healthy urban forests in their communities.

### Wildland Fire & Fuels Research

**Reducing Fire Risk and Restoring Native Forests in Hawaii:** Over the past century, wildfire frequency and size have increased dramatically in Hawaii as a result of invasion by fire-promoting alien grasses. These grasses increase fine fuel loads and alter fuel structure in ways that multiply the likelihood of fire ignition and spread. Furthermore, fire effects and post-fire environmental conditions promote recruitment of alien grasses and inhibit recruitment of native woody species. These changes in community structure and composition result in fuel and microclimate conditions that further increase the likelihood of subsequent fire. In this way, alien grass invasion initiates a grass/fire

cycle that converts native forest to alien-dominated grassland. This cycle is now considered the primary agent of forest to grassland conversion in dry and mesic plant communities in Hawaii and elsewhere in the tropics.

The Department of Defense Strategic Environmental Research and Development Program (DoD SERDP) and PSW have created a collaborative research partnership to attend to the following ongoing project objectives: (1) further define the current condition and historical changes to tropical dry forest ecosystems in Hawaii, (2) develop technology for regional restoration planning and ecosystem monitoring, (3) quantify restoration potential and develop restoration prescriptions for remnant Hawaiian dry forests and shrublands, and (4) develop effective fuel and fire risk reduction measures that initiate succession of degraded grasslands into native woody communities.

Components of the field studies include addressing the major barriers to restoration—grazing by non-native ungulates, invasion of non-native grasses, lack of native species seed and/or propagules, and absence of suitable microhabitat for native species—in a sequential manner across native community types, and developing and testing the effectiveness of a firebreak design that incorporates traditional fuel breaks grading into “greenstrips” planted with fire-resistant native species. PSW researchers are working directly with the Pohakuloa Training Area Environmental Crew. Efforts to reduce fine fuel loading through restoration and greenstripping directly support fire management objectives for military training installations in dry forest regions. Results will jointly benefit a number of land management agencies in Hawaii and the Pacific, including DoD and the State of Hawaii Department of Land and Natural Resources.

**Evaluating the Utilization of Woody Biomass:** Biomass resources have the potential to serve as feed stock for alternative low-carbon transportation fuels such as compressed natural gas (CNG) and ethanol. A key policy concern is to determine how to procure these resources in a sustainable manner. California Assembly Bill (AB) 118 authorized public investment in research that evaluates the sustainability of forest biomass utilization, and required the California Energy Commission (CEC) to develop sustainability standards for projects funded through AB 118. PSW is partnering with CEC to find out where, when and how woody biomass utilization is sustainable. This research project will evaluate the impact of biomass utilization on fire behavior and carbon sequestration, and the resulting ecological and environmental impact on both treated and untreated stands, with and without wildfire. PSW and CEC will investigate the role of California Forest Practice regulations in addressing the sustainability of

forest biomass utilization. In addition, the economics of biomass utilization will be analyzed to identify dynamic interactions among biomass project design characteristics.

## Restoring Forest Resiliency

**The Tahoe Science Program: Helping to Restore Ecosystems in the Lake Tahoe Basin:** Historical land use activities in the Sierra Nevada region, including the Lake Tahoe Basin, have created ecosystems that are less resilient and less resistant to disturbances such as wildfire and insect and disease outbreaks. These ecosystems are also potentially vulnerable to climate change and its associated impacts. SNPLMA, enacted in 1998, specifically allowed for funding from the sale of public lands by the Bureau of Land Management (BLM) to be set aside in support of Lake Tahoe Restoration projects.

In 2006, PSW became the sole federal agency sponsor and assumed responsibility of administering SNPLMA funding as it related to research projects in the Lake Tahoe Basin. This resulted in the creation of the Tahoe Science Program, which identifies and facilitates funding of research projects high in technical merit and relevant to land management and regulatory agencies working in the Tahoe Basin. As part of the grant award program, the Tahoe Science Consortium (TSC) coordinates a competitive review process. The TSC and PSW work closely with one another throughout the review process to ensure that the review process is fair and that the research projects recommended for funding represent high quality science while addressing priority issues identified by agencies. Thus, through the Tahoe Science Program, PSW has an important role as the liaison between researchers and agencies working in the basin. In addition, PSW and the TSC work to promote outreach, synthesis, and integration activities to ensure that research supported by the Tahoe Science Program addresses key management questions, includes input from agencies, produces tools that are useful and accessible, fosters collaboration and communication, builds on previous research, and ultimately addresses the science needs identified in the Environmental Improvement Program.

**Monitor Air Quality in Canada:** The Wood Buffalo Environmental Association (WBEA) manages the largest airshed in the largest municipality in Canada. They operate the most extensive ambient air network in Alberta, with 15 air monitoring stations and 20 passive monitoring stations to date. WBEA programs include air, land and human exposure monitoring, in an area where the main industry is oil sands development. They developed an ongoing partnership with PSW scientists to determine the levels and extent of air pollutants, nitric acid and ammonia in the Athabasca

Oil Sands Region, for evaluation of their spatial and temporal distribution. Thus far, results of the study have shown that concentrations of both nitric acid and ammonia are elevated, particularly in the vicinity of major mining and oil extraction activities. Ammonia is of particular concern from a perspective of possible biological effects, because of its potential for direct toxic effect on lichens and its contribution to the elevated N dry deposition with possible negative consequences for forests and other ecosystems. The WBEA and PSW are continuing this important partnership to gather additional information that will allow researchers to increase their understanding of the effects of emissions on forests.

**The Effects of Forest Fragmentation and Nonnative Rats on Food Webs in Hawaii:** Ecologists have long sought to understand the role of predators as drivers of food web structure, with particular modern emphasis on omnivorous predators in complex communities. Ecologists have also attempted to elucidate the role of ecosystem size as another primary determinant of food web structure, with growing attention to habitat complexity and productivity for mechanistic explanations. However, despite advances within these areas, little is known about whether and how predators and ecosystem size interact to jointly influence food webs at landscape scales. PSW is partnering with Stanford University and the University of Hawaii, Hilo (U of H), to investigate the interactive effects of nonnative omnivorous rats and forest fragment size on arboreal arthropod food webs. Investigators are testing their hypothesis using a combination of i) experimental removal of rats, ii) experimental exclusion of insectivorous birds, iii) remote sensing analysis of ecosystem size, complexity and productivity, and iv) stable isotope analysis of food webs. They are conducting their research across a size gradient of naturally fragmented forests in Hawaii. This collaborative project is unique in that it enables the investigators to train 20 undergraduate summer interns from Stanford and U of H, which is an institution with

a successful record of training underrepresented and Native Hawaiian students in environmental sciences. Findings from the study will have immediate relevance for the conservation and restoration of upper elevation Hawaiian forests, most of which have been fragmented by pastoral land-use and development and impacted by introduction of rats and other nonnative predators. The investigation will improve the scientific basis for making effective management decisions, especially with regards to understanding how rat removal can be used to restore native-dominated food webs.

**Research Stations Working Together with the White Mountain Apache Tribe of Arizona:** Staff scientists from the Rocky Mountain Research Station and Pacific Southwest Research Station have engaged in a collaborative research partnership with the White Mountain Apache Tribe of Arizona for two decades. This partnership has resulted in on-the-ground restoration of dozens of culturally and ecologically significant wetland and spring ecosystems on tribal lands, expanded scientific knowledge as documented in dozens of research publications including peer-reviewed journal articles, and enhanced capacity within the tribal community to assess site conditions and design and implement restoration treatments. The broad and lasting impacts resulting from this unique partnership have been recognized in a forthcoming book on the Tribe's restoration efforts and in the Tribe's National Fire Plan Award for Excellence in Rehabilitation and Restoration. This collaborative effort represents significant progress in meeting priorities of the Chief of the Forest Service by promoting inclusiveness, fire-related research, restoration, and community engagement. Support for this effort has included a variety of grants from federal, state, and tribal entities, including the Tribe's Land Restoration Fund and a Forest Service Chief's grant. Sustained investment in this partnership and replication in other communities would continue to yield these important scientific, ecological, and community benefits.



# Chapter 4

## Pacific Southwest Regional Directors’ Integrated Action Plan

### Purpose

The Director team will work together to move the Region towards the goals outlined in the Ecological Restoration Intent statement. The team will utilize the following components of this action plan to create a common focus, a transparent and integrated decision process, and clear communication among employees so all understand their role is assisting the region in enhancing the ecological conditions of our landscapes.

**Success will be based on reaching our goals as a Region.**

**In support of this, the RO Directors will:**

1. **Instill team dynamics and performance measures.**
  - a. Will work across administrative boundaries and utilize skills wherever they reside.
  - b. Assist and provide guidance to forests to effectively develop their 5-year action plans in an interdisciplinary manner. The Directors will establish out-year planning processes and emphasize criteria that:
    1. Are outcome based, integrated, and focused on priority landscapes;
    2. Integrate ecological, economic, and social objectives;
    3. Increase resilience in ecological processes and demonstrate measurable watershed improvement, while assisting while addressing local and regional social and economic needs.
2. **Establish a budget strategy that aligns with ecological restoration.**
  - a. The overall concept is to see how we contribute to Ecological Restoration. Our overall goal should be to ensure our regional allocation is prioritized consistent with the Leader’s Intent of Ecological Restoration.
  - b. Management responsibilities include sustaining ecological health and resiliency to avoid ecological degradation.
3. **Establish clear expectations that projects will improve or sustain ecosystem function. Our task is to move from single resource/staff focus to a regional focus on ecological restoration**
4. **Some ongoing/next steps:**
  - a. Facilitate and support region-wide partnerships and raise the visibility of ecological restoration partnership opportunities through showcasing of successful partnership projects;
  - b. Provide key messaging for internals and capture communication opportunities to highlight/showcase examples of restoration work with internals and externals;
  - c. Provide forests with the best available science and current integrated data to develop plans;
  - d. Develop regional programs of work to support this action plan.

# Chapter 5

## Socioeconomic Dimensions of Restoration

A triple-bottom line approach to restoration means that in addition to ensuring restoration of forests for ecological concerns, land managers actively work to improve economic and social outcomes in local communities. For years, forest legislation and policies have recognized the importance of sustaining rural communities, but clear steps and management of forests to directly improve community well-being has been limited or lacking altogether.

Restoration-focused land management will be done in ways that contribute to the wellbeing of communities within, adjacent to, and dependent upon the forest. A restoration focus does not play off environmental concerns against economic and community interests. Restoration forestry aims to restore the biophysical landscape and, with a triple-bottom line focus, simultaneously improve local well-being and socioeconomic health of rural communities.

Improving economic, community and environmental land management outcomes is consistent with current Forest Service direction. The Region 5 Ecological Restoration Leadership Intent (March, 2011) includes a focus on "...ecosystem services and community economic benefits..." Nationally, Secretary of Agriculture Vilsack emphasized, "We must work towards a shared vision—a vision that conserves our forests and the vital resources important to our survival while wisely respecting the need for a forest economy that creates jobs and vibrant rural communities."

The USDA Strategic Plan for fiscal years 2010-2015 further clarifies the Secretary's vision by identifying key policy priorities, including Goal 1, which states: "Assist rural communities to create prosperity so they are self-sustaining, re-populating, and economically thriving." The Forest Service 2012 Planning Rule also supports vibrant communities and rural job opportunities. As stated in the preamble, the Planning Rule "is designed to ensure that plans...provide jobs and contribute to the economic and social sustainability of communities."

Creating vibrant, prosperous, and socially sustainable rural communities means improving local well-being and socioeconomic health of rural communities. It means being responsive to diverse elements of communities, including economic conditions, social conditions involving health of residents and local law and justice; and educational conditions that include social and job training services. It also involves

working with local entities, particularly local collaboratives that are vital to maintaining and building community capacity and essential to effective agency work.

Forest Service contribution to local well-being is typically viewed as taking place through natural resource management activities that directly produce jobs or lead to job creation in related or secondary sectors. While the Agency creates jobs through its resource management and services it provides, as well as through direct employment of its workers, it can and must do more. For example, jobs are important, but there must be consideration of whether jobs are local and whether jobs as well as broad outcomes of the work contribute to local well-being and the diverse elements listed above.

A triple-bottom line approach encompassing community wellbeing is necessary to achieve the leadership intent. Incorporation of the triple-bottom line recognizes that managing for forest products and habitat improvement requires local investment and local engagement to succeed.

An initial step towards improving economic and social outcomes in local communities involves determining local conditions by monitoring social and economic conditions and trends. It also involves identifying how management activities and forest work can contribute to supporting vibrant and prosperous rural communities. Monitoring these conditions and trends is consistent with the new USDA Strategic Plan and the New 2012 Planning Rule. Such work is essential to development of activities that address key conditions and trends, and directly improve community health and well-being.

Monitoring social and economic conditions and trends involves the Agency working with partners to understand what data need to be collected, as well as collection and analyses of the data itself. Measures like median income, unemployment rate, elementary school student participation in Free and Reduced Priced Meals, job training enrollment and success, and crime rates, to mention just a few, are common to all areas and will be collected and analyzed. Some measures evaluated will be unique, tailored to specific locales and circumstances. It is not, however, the responsibility of the Agency to do all of this work; the agency will work with local counties and other partners, including

experts and collaborative groups, to identify and collect needed information, and identify optimal next steps.

The three Collaborative Forest Landscape Restoration Projects (CFLRPs) in the Region (the Basins Project on the Lassen National Forest, the Cornerstone Project on the Eldorado and Stanislaus National Forests, and the Dinkey Landscape Restoration Project on the Sierra National Forest) coupled with launch of the new Planning Rule and Forest Plan revision on the Sequoia, Sierra, and Inyo National Forests, provide opportunity to pilot implementation of the triple-bottom approach and associated work. Collection of data for measures will form a basis for understanding of local conditions and trends. These data also represent the foundation on which forests can develop a program of work that addresses ecological restoration, along with improvement in social and economic outcomes in local and other affected communities. Triple-bottom line data are an essential foundation on which a forest's program of work is advanced, and to the extent feasible, linked with land management by adjacent landowners.

The pilot work with the CFLRP projects along with implementation of the new Planning Rule will be documented to help us understand how to effectively do this work. This documentation will also identify how forest work is adaptively modified as subsequent data and lessons are developed and inform management. New contracting arrangements will likely be needed to assure benefits from this work are shared locally. Development and documentation of these and other lessons will pave the way for implementation of triple-bottom line work across forests in the Region that improves local communities.

This is exciting work. Implementing the triple-bottom line requires more partnering than some are used to, and perhaps more than some are comfortable with. But after years of pitched battles in which more often than not, few benefitted, or important work was held up, it is a positive way forward. Ensuring that social and economic benefits flow from the forest is a fundamental part of the integrative restoration vision that encompasses the land, and the rural communities and people reliant on it.

# Chapter 6

## National Forest Ecological Restoration Implementation Plan

### Angeles National Forest

#### Vision Statement

Ecological Restoration on the Angeles National Forest will be a lens through which ongoing programs, projects, and activities are viewed, as opposed to a separate or distinct program. It will provide a holistic framework that is complementary to interdisciplinary analysis. An emphasis will be placed on integration of major Forest programs and working across boundaries with our partners to enhance forest capacity and leverage opportunities for sustaining the health, diversity and productivity of the Angeles National Forest.

The large population of Los Angeles County places intense demands on forest resources, but also presents an opportunity to partner with a highly diverse range of potential interested groups, with correspondingly diverse skills. The year round wildfire season is an enormous challenge, but can also provide opportunities to rebuild or relocate facilities in a manner that retains and re-establishes ecological resilience of the land. Climate change may have unique manifestations given the juxtaposition of coastal and desert influences. Wildfires, rapid changes associated with climate change, and a traditional focus on continually meeting an ever expanding public demand combine to create potential for the forest to experience negative, irreversible trends in ecological sustainability. An Ecological Restoration lens is needed to move the Angeles National Forest towards healthy and resilient landscapes that will have a greater capacity to survive natural disturbances and large scale threats to sustainability.

#### Comprehensive Goals

1. Maintain and restore ecosystem resilience so that key ecological processes and functions persist in the face of catastrophic events, disturbance processes, and intense public use;
2. Implement an All Lands Approach to facilitate and improve coordination and relationships focusing on paramount influences that affect ecological restoration;
3. Quantify and identify the economic and social value of natural assets (ecosystem services) on the Angeles National Forest to promote ecological restoration, informed decision-making, and collaboration that stimulates market-based conservation and stewardship; and
4. Implement monitoring and adaptive management to evaluate the effectiveness of the Ecological Restoration Plan, facilitate responses to short-term and long-term environmental change, and new ecological information and management tools.

#### Short-Term Approach and Strategy

The intent of this initial effort is to identify short-term (1–3 years) strategies and actions that will be taken to move us towards meeting the comprehensive ecological restoration goals. This document is intended to provide the framework for long-term plan development and it is envisioned to be a living document that will need to remain flexible in order to respond effectively to unanticipated events. The ANF will continue to update and expand our strategies and actions as new information is collected, a better understanding of the environmental conditions are known, and improved integration of Forest programs occurs as part of developing Programs of Work. The following is not intended to be comprehensive prioritized list of strategies and actions, but rather it is an initial effort to identify several key strategies and supporting actions that are reasonably achievable over the next few years:

#### Goal 1 - Strategies and Actions

**Strategy 1A:** Focus management attention on degraded lands that have experienced repeated disturbance.

- **Action 1A1:** Identify, assess, and restore areas (based on best available information) of NF lands that have been determined to be type-converted. Conduct a retrospective analysis of scientific literature on restoration of type converted landscapes, with a focus on identifying viable management options. Engage the Pacific

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Southwest Research Station leadership to address knowledge deficiencies. Identify priority treatment techniques and areas.

- **Action 1A2:** Assess former administrative facilities where partial decommissioning has occurred and implement additional actions necessary to implement ecological restoration.
- **Action 1A3:** Identify and assess areas impacted by marijuana plantations and implement actions to remediate and restore affected areas.

**Strategy 1B:** Complete and adopt the Invasive Management Strategy and Action Plan.

- **Action 1B1:** Implement comprehensive surveys and treatment of high priority weed infestations in strategic locations to improve watershed function and value, restore native vegetation, improve hydrological processes, and improve habitat.

**Strategy 1C:** Complete and adopt the Aquatics Resources Management Plan.

- **Action 1C1:** Collaborate with our partners to implement Mountain Yellow Legged Frog Translocations and establish a captive breeding program to recover the species.
- **Action 1C2:** Install Stream Condition Inventory Sites along key watersheds to collect real-time baseline data.
- **Action 1C3:** Implement in-stream barrier removal and education program to discourage construction of rock dams along key watersheds to restore hydrological processes, improve water quality conditions, and enhance aquatic habitat.
- **Action 1C4:** Conduct multi-year fisheries inventories and assessments of key watersheds on a forest-wide basis.
- **Action 1C5:** Conduct Aquatic Organism Passage Inventory and Improvements.

**Strategy 1D:** Conduct integrated resource planning after large wildfires to determine restoration needs that complement the BAER program, or to identify areas that are unlikely to return to desired ecological conditions without active intervention.

- **Action 1D1:** Continue implementation of the Station Fire Reforestation Project.
- **Action 1D2:** Establish a standing interdisciplinary team of key specialists to develop post fire restoration plans.

**Strategy 1E:** Foster and promote integration of major Forest programs to maximize the use of limited funds

to achieve the desired increased pace and scale of ecological restoration work.

- **Action 1E1:** Foster and support collaboration at the Forest Leadership level to develop annual integrated Programs of Work to move the Angeles National Forest towards healthy and resilient landscapes that will have a greater capacity to survive natural disturbances and large scale threats to sustainability.
- **Action 1E2:** Continue the collaborative project planning and implementation efforts of the Fuels and Vegetation Management Team and establish other similar integrated multi-resource management teams.

## Goal 2 - Strategies and Actions

**Strategy 2A:** Proactively engage permittees with the largest facilities and infrastructure on the forest to improve or restore ecological processes and ecosystem functions affected by their facilities and activities.

- **Action 2A1:** Complete the development and implementation of restoration plans associated with the three electrical transmission projects that have occurred over the last five years.
- **Action 2A2:** Collaborate with LA County on the development of their Los Angeles Basin Stormwater Conservation Study.
- **Action 2A3:** Collaborate with LA County's Sediment Management Task Force, and on individual sediment removal projects, including other regulatory agencies.
- **Action 2A4:** Collaborate with LA County Department of Public Works to finalize Operation and Maintenance Plan and implement guidelines to protect and enhance ecosystem function and species and their habitats.
- **Action 2A5:** Coordinate with partners to prevent and control Quagga mussels.

**Strategy 2B:** Use existing authorities to formalize partnerships, expand efforts to engage partners and volunteers leveraging opportunities, and develop closer coordination with other agencies.

- **Action 2B1:** Pursue opportunities to enter into Service First Agreements with the National Park Service and other interested land managing or regulatory agencies with the goal of expanding restoration efforts to lands adjacent to the ANF.
- **Action 2B2:** Participate on the Federal Executive Board and encourage coordination among federal

agencies to partner and leverage ecological restoration opportunities.

### Goal 3 - Strategies and Actions

**Strategy 3A:** Maximize funding resulting from wildland fire investigations and court proceedings, and establish accurate monetary values for purposes of restoring natural resources damaged by wildfire. Begin implementation of restoration projects with funds already received through this process.

- **Action 3A1:** Conduct a retrospective analysis to determine costs of restoring fire damaged resources, including a comprehensive review of existing court cases, ecosystem services literature, and successful restoration projects across different ecosystems. Consider both natural and social values.
- **Action 3A2:** Implement ecological restoration actions with funds received from the Burro Fire (RIRI).

**Strategy 3B:** Encourage broader thinking and collaboration that stimulates market-based conservation and stewardship.

- **Action 3B1:** Participate in regional efforts to evaluate restoration techniques for shrub dominated ecosystems, determine their potential to sequester carbon, and identify potential funding opportunities associated with the State of California’s carbon market.

**Strategy 3C:** Identify and integrate opportunities to enhance aesthetics and visual resources in a manner that improves and restores ecosystem function along water corridors.

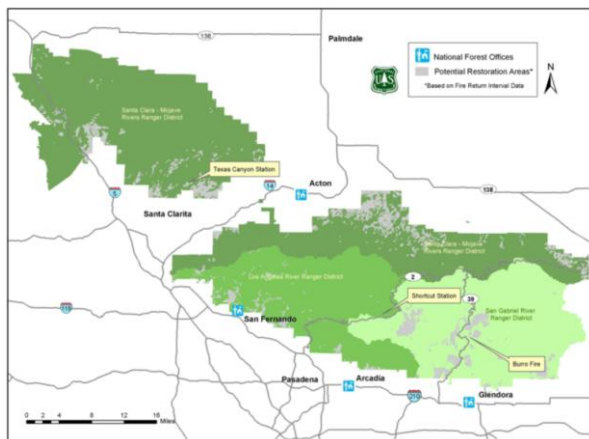
- **Action 3C1:** Maximize funding to identify and mitigate the impacts of dispersed recreation use on the Angeles National Forest.
- **Action 3C2:** Maximize funds to develop ways to educate the public on the impact of dispersed recreation use on the natural environment.

### Goal 4 - Strategies and Actions

**Strategy 4A:** Establish metrics to adaptively manage strategies and actions and track accomplishments.

**Action 4A1:** Continue with implementation of the Land Management Plan Monitoring and Evaluation report required as part of the Forest Plan.

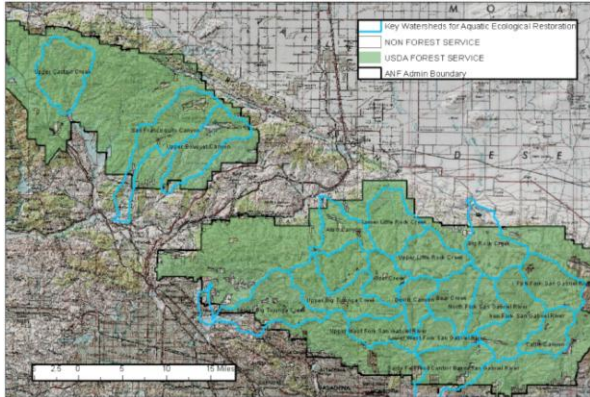
**Strategy 1A, Actions 1A1 and 1A2; and Strategy 3A, Action 3A2- Implement Restoration Projects in Areas Affected by repeated disturbance and fire.**



Map 1: Potential restoration sites and areas.

**Strategy 1C, Actions 1C1-1C5, Action 1B1- Implement Actions/Projects from the Angeles National Forest Aquatics Resources Management Plan and Invasive Management Strategy and Action Plan, including but not limited to:**

- Conduct mountain yellow-legged frog translocations;
- Remove in-stream barriers for aquatic passage;
- Implement invasive removal including aquatic and terrestrial species;
- Conduct multi-year fisheries inventories and assessments of key watersheds on a forest-wide basis;
- Implement Aquatic Organism Passage Inventory and Improvement;
- Conduct Stream Condition Inventory and Monitoring to identify restoration opportunities;
- Implement comprehensive surveys and treatment of high priority weed infestations in strategic locations; and
- Coordinate with Dam operators to provide for base flows for aquatic species



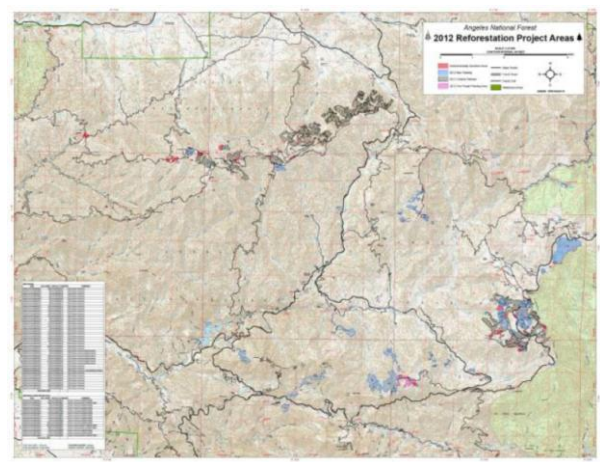
Map 2: Watersheds benefiting from the Aquatic Resources Program.



Map 3: Areas restored by the Reforestation Project in 2011.

**Strategy 1D, Action 1D1 - Implementation of the Station Fire Reforestation Project:**

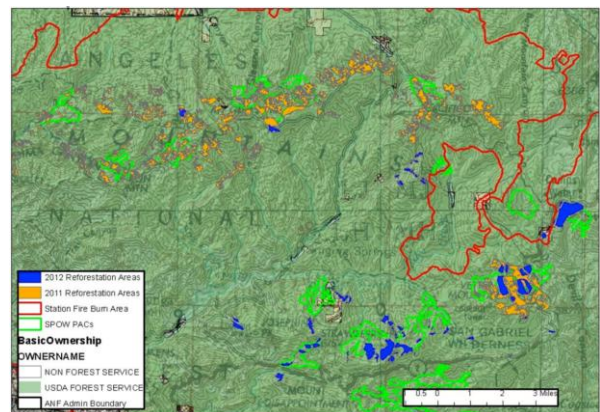
- Reforestation Project – Ecological Restoration Goals include:
- Accelerate establishment of ecological appropriate forest cover through planting of areas that will not regenerate naturally;
- Establish a minimum of 75-100 trees per acre depending on the site and forest type and sequester carbon over the next 100 years;
- Over the five year project horizon, plant trees to mimic tree species diversity and composition that occurs naturally in the area;
- Allow for natural regeneration to take place in areas that were not determined to be in a deforested condition;
- Protect and enhance priority watersheds and improve watershed condition; and
- Re-establish California spotted owl habitat (Protected Activity Centers)



Map 4: Areas restored by the Reforestation Project in 2012.

**Ecological Restoration Accomplishments ANF Post-Station Fire Reforestation Project**

The ANF is restoring approximately 5,400 acres through replanting of mixed conifer forests. The overall need for this project is to establish ecologically appropriate forest cover in areas affected by the 2009 Station Fire. The specific purpose of this project is to rapidly establish forest cover in fire affected native stands within 5 years of the burn. If no action were taken the reestablishment of forest cover will be delayed by decades. In some instances, conversion from forest type to shrub/hardwood type or non-native grassland would have occurred if no action was taken.



Map 5: California Spotted Owl Habitat that will be re-established by the Reforestation Project.

The Reforestation Project Ecological Restoration Goals include:

- Accelerate establishment of ecological appropriate forest cover through planting of areas that will not regenerate naturally;

- Establish a minimum of 75–100 trees per acre depending on the site and forest type and sequester carbon over the next 100 years;
- Over the five year project horizon, plant trees to mimic tree species diversity and composition that occurs naturally in the area;
- Allow for natural regeneration to take place in areas that were not determined to be in a deforested condition;
- Protect and enhance priority watersheds and improve watershed condition; and
- Re-establish California spotted owl habitat (Protected Activity Centers).



Photo 1: Unit 84 of the Station Fire Restoration Project, after the fire and before planting.



Photo 2: Contract planter reforesting in Unit 100 of Station Fire Restoration Project.



Photo 3: Coulter pine seedling from the USFS Placerville nursery, planted in Unit 100 of the Station Fire Restoration Project.



Photo 4: Volunteer from Tree People planting in Barley Flats Unit 246.



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## Ecological Restoration by Special Use Permittees

The ANF has been very active over the last 4-5 years in seeking to include realistic and meaningful restoration goals in approvals for projects proposed and implemented by special use permittees. The focus has been on permittees with the largest footprint on the forest, including electrical utilities, oil and gas pipelines, state and county highways, and flood control dams. Projects have been approved with provisions for long term monitoring of erosion, invasive plant removal, re-seeding using native seed material collected on the forest, barriers to control illegal

access, and temporary recreational closures. These standards are site specific, take into account pre-project conditions, and ultimately promote the desired conditions in the LMP. Coordination and dialog have occurred with the permittees prior to adopting restoration standards to ensure that they are realistic and achievable, and recognize their interests. The paradigm shift has been away from treating post-disturbance restoration as a one-time event, and towards a longer term commitment to maintain and monitor effectiveness, drawing on the skills and resources of both the permittee and the agency to achieve goals.



Top left photograph shows a temporary disturbance site that was grubbed of vegetation during construction of Southern California's Antelope Pardee Transmission Line. Top right photograph shows recontoured site being revegetated. Bottom photographs (left to right) show site immediately after revegetation and approximately six months later.

## Charlton/Chilao Vegetation Improvement

This project is located within the Charlton-Chilao Recreation Area and administrative site. The area is approximately 8,500 acres of mixed conifer, ponderosa pine, Coulter pine, canyon live oak, and mixed chaparral at 3,650 to 6,200 feet in elevation.

The treatment area encompasses a variety of national forest picnic areas, campgrounds, a visitor center, several hiking trails (including the Pacific Crest Trail), a scenic byway, and five youth organizational camps. These facilities receive extremely high recreational use, drawing tens of thousands of visitors from the city, especially on summer weekends. They are also deemed at risk from catastrophic fire. A Cal-Trans maintenance

yard, an observatory, Forest Service fire station, helicopter base, and a parcel of private property are also within the project area.

The activities during the treatments include hand cutting/piling, pile burning, broadcast burning, mechanical treatments (mastication) and public education. The treatments are designed to improve forest health and vigor in plantations as well as natural tree stands for a greater resistance to fire, insect attack, and disease.

### NEPA Ready Projects

1. Removal of idle transmission line in Aliso Canyon and restoration of tower sites and access road (SCE to implement).



Photographs show Charlton Picnic area pre-treatment and post-treatment.

2. Full restoration of the old Fire Stations, including Shortcut and Texas Canyon. Restoration of Shortcut would complement over 2 miles of road along Tu-junga Creek that SCE will be decommissioning.
3. Identify, assess, and restore areas of NF lands that have been determined to be type-converted.
4. Assess former administrative facilities where partial traditional decommissioning has occurred and implement additional actions necessary to implement ecological restoration.
5. Identify and assess areas impacted by marijuana plantations and implement actions to remediate and restore affected areas.



Photographs are from the Chilao area, where mastication was the primary treatment method.

# Ecological Restoration, Cleveland National Forest Leadership Intent

This leadership intent for the Cleveland National Forest is intended to inform interested parties of the need for Ecological Restoration on the Forest, and our unique approach to meeting our goals. The Forest has identified its proposed Ecological Restoration workload for Fiscal year 2012 and 2013, and is proud of the accomplishments regarding Ecological Restoration on the Forest to date.

## The Compelling Need for Ecological Restoration on the Cleveland National Forest

The compelling need to retain and restore the ecological resilience of the Cleveland National Forest is based on the need for greater capacity to adapt and thrive in the face of the natural disturbances such as wildfire that is prevalent within the Forest, and to address large scale threats to sustainability brought on by the ever increasing demand for human based uses. As the Forest is surrounded by a population of over 12 million people, and given the fact that wildfire is a natural disturbance of our Mediterranean ecosystem, the demands on the Forest are greater now than ever before, and will only continue to grow.

## Leadership Goals

1. Retain and restore ecological resilience of the Cleveland National Forest to achieve sustainable ecosystems that provide a broad range of services to humans and other organisms.
2. Ensure that our Forest is focused on Ecological Restoration in all stewardship actions we plan and implement across all program areas and activities.
3. Ensure that an “All Lands” approach is being taken regarding the planning of and implementation of projects so that restoration does not stop at the Forest boundary.
4. Utilize all authorities, and expand our efforts with tribes, partners and private land owners.

## Challenges on the Cleveland National Forest

The Cleveland National Forest has both internal and external challenges concerning expectations that must be surmounted in order to reach our goals. Through

due diligence, proactive work, and collaboration, the Forest will capitalize on these challenges by creating opportunities.

### Internal Expectations:

- Competing desires.
- Having the knowledge that the Forest must significantly increase the pace and scale of restoration work, but knowing that limitations do exist.

### External expectations:

- The rapidly growing population in southern California brings the expectation that goods and services should be available to everyone, and that this availability is immediate!
- The lack of understanding that restoration takes time and resources, and that disturbances have tended to outpace the restoration work.

## Our Targeted Accomplishments

The Forest has had a great deal of success in implementing an “All-Lands” approach to ecological restoration. The Goldspotted Oak Borer and the feral pig issues on the Forest have involved all levels of government, tribes and private land owners in a collaborative process to address these issues across the entire landscape. Additionally, the management of raptor habitat on the Forest was a collaborative process involving user groups and environmental organizations, and has proved to be a success. Our future work at the Orosco Ridge Shooting Area to restore it to a productive part of the ecosystem while striving to provide for multiple use will involve close collaboration with multi user groups, county, state and federal officials.

Through projects like these, Forest will strive to balance the demand for ecosystems services that flow from our Forest. Clean water and air, flood and climate regulation, biodiversity, scenic landscapes, wildlife habitat and carbon sequestration and storage are valued and used by people either directly or indirectly. The Forest will make a full commitment to restoration-based management of our watersheds. In order to do so, the following watershed ecological restoration projects are planned and will be implemented over the next fiscal year:

**CLEVELAND NATIONAL FOREST ECOLOGICAL RESTORATION PROJECTS FY 2013**

Project Watershed	Project
Boden Canyon/ Santa Ysabel	Orosco Ridge Shooting Area Site Characterization Study and NEPA
All	CNF Recurrent Watershed: Water rights, Clean Water Act actions, Watershed Condition Framework, Coordination
All	CNF Recurrent Veg program: Nursery coordination, Cone Collection, Collect and process acorns for out-year oak restoration
All	CNF Recurrent grazing: Permit administration, rangeland improvement
All	Species recovery actions and implementation of Biological Opinion terms and conditions
Multiple	NEPA for large scale weed removal for Hauser Creek, Pine Creek, Boulder Creek, Cedar Creek, and Kitchen Creek
Pine Valley/ Kitchen/ Cottonwood	Goldspotted Oak Borer actions
Multiple	Raptor and recreation monitoring/closure project
Upper San Diego	Feral pig resource damage reduction on DRD and PRD
Arroyo Seco Ck	Agua Tibia air monitoring (R5 work -- funded by Angeles)
Multiple	Fish survey and action strategy development
Upper San Diego	NEPA - Pine Hills allotment range EA
Multiple	Managed Recreation: Trail Maintenance
Ritchie/SD River	SD River Gorge Trail-West Side (Improve user-created trail)

**Measureable Results**

The results of all of our action must have positive effects on vegetation, water, wildlife and recreation, while limiting disturbance impacts from wildland fire. The Forest is making a renewed emphasis on monitoring of our actions, then following up with further management.

**Emphasis Areas**

- We will regulate as necessary to retain the values our Forest currently maintains.
- We will make a renewed emphasis on the appropriate use of prescribed fire.
- We will focus our efforts on the restoration of meadowland and riparian areas.
- Invasive species will be eradicated.
- Wildlife and fish habitat will be improved.
- We will decrease conflict in working with our working partner agencies.

**Specific Measurable Outcomes:**

- Accelerating the scale and pace of forest restoration activities.
- Working together to achieve a collaborative and financially supported effort.
- Restoration activities taking place on private lands as well as NFS lands.

- Increasing forest resilience through treatments resulting in resource benefits.
- Retaining or restoring 50% of accessible and degraded meadowlands to improve their habitat function and ability to hold water and deliver clean water when needed.
- Affecting the occurrence of large severe wildfires and reducing their associated impacts through treatments, fire management and public education.
- Expanding wildfire prevention efforts by working with key partners, with the focus on retarding the loss of native ecosystems such as chaparral and coastal sage scrub.
- Grounding our wildfire management efforts in the concern for biodiversity and ecological processes before, during and after wildfire events.
- Conducting reforestation efforts where appropriate and implementing suitable vegetation maintenance activities to meet the conditions.
- Ensuring the sustainability of forest resources, over the long term.
- Expanding watershed improvement programs at the forest level (inventory, prioritization, and scheduling of restoration).
- Targeting fuel reduction activities in key watersheds for protection of aquatic species and municipal watersheds.

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- Working to increase restoration actions that will improve habitat connectivity.
  - Decreasing the impacts of invasive species through preventative practices, and rapid response control by emphasizing cooperative work.
  - Restoring landscapes affected by unmanaged recreation.
  - Identifying the minimum road system needed for safe and efficient travel for administration of National Forest System lands, and establishing priorities and a time schedule to decommission or close unneeded roads.
  - Increasing conservation education, interpretation and volunteer programs to promote understanding and support for restoration actions, and increasing understanding of the value of healthy watersheds and the ecosystem services that they deliver.

# Eldorado National Forest Ecological Restoration Implementation Strategy



Looking north into Sopiago Creek watershed and the Middle Fork Cosumnes River, from Forest Service Highway 88 Scenic Byway.

## Overview

Located within the Sacramento River basin, the Eldorado National Forest (Forest) manages approximately 600,000 acres of land in 4 counties. Most of the Forest lies in El Dorado County. In descending order of land area the other counties are: Amador, Alpine and Placer Counties in California. Water is a major resource on the Forest. The Forest produces roughly 1.5 million acre feet of water per year to California's residents. This amount is equivalent to the amount of water used by over 5 million households for an entire year. There are over 600 miles of fishable streams in four major drainage systems. The Forest has 297 lakes and reservoirs (including both public and private land). Water from these lakes and reservoirs is used for recreation, irrigation, agriculture, power generation, environmental and wildlife conservation, as well as municipal and industrial needs.

Functioning watersheds are critical to the sustainability of a clean water supply necessary to sustain a healthy environment, economic viability, and strong communities. The primary goal for the Forest is to

implement ecological restoration with watershed health in mind. Fire is an important ecological function on the Forest. The presence or absence of fire in these ecosystems affects the structure and function of forest habitats influencing the health and resiliency of these watersheds. Additional goals include:

- Maintain healthy and well-distributed populations of native species through sustaining habitats associated with those species
- Use ecological strategies for post-fire restoration
- Apply best science to make restoration decisions
- Involve the public through collaborative partnerships that build trust among diverse interest groups
- Create additional funding sources through partnerships
- Incorporate the "Triple Bottom Line" into our restoration strategy: emphasizing social, economic and ecological objectives

- Implement an “All lands approach” for restoring landscapes
- Establish a sustainable level of recreational activities and restore landscapes affected by unmanaged recreation
- Implement an effective conservation education and interpretation program that promotes understanding the value of healthy watersheds and ecosystem services they deliver and support for restoration actions.
- Improve the function of streams and meadows
- Restore resilience of the Forests to wildfire, insects and disease
- Integrate program funding and priorities to create effective and efficient implementation of restoration activities
- Reduce the spread of non-native invasive species

## Challenges

Implementation of this suite of restoration goals will collectively restore resilience and sustainable ecosystems on the forest under current and future conditions. However, there are a number of challenges the forest must overcome to fully achieve our ecological restoration goals. The most critical of these challenges include:

- Our organizational capacity to increase or maintain the pace and scale of activities is being negatively impacted by reduced budgets. Current downsizing our organization, specifically in the areas of forest and fuels management, will directly affect how quickly we restore forest ecological function. Reduced budgets also impact our ability to retain and maintain employees with experience and expertise.
- Funding sources, in particular from outside sources such as Partnerships, emphasize implementation rather than planning. Our ability to complete required environmental planning and analysis is more constrained due to reduced budgets and limitations on use of partnership funds.
- Although there is emphasis for integrating ecological restoration for some programs, current program funding guidance does not support integration of funding and priority setting for ALL programs needed for efficient and effective ecological restoration. Low levels of funding for soil and watershed improvement continue, compounded by a need to develop technical capacity for restoration work.

- While local communities may recognize the benefits of implementing ecological restoration for ecosystem services, there is a need to increase the understanding and support from downstream water users, including Sacramento and East Bay communities.

## Strategies for Ecological Restoration

The Forest is implementing out-year strategic planning between all programs involved in ecological restoration activities. Integration affords being more efficient in planning investments, and affords effectiveness of restoration activities on a landscape basis, as well as fostering collaborative partnerships. Out-year strategic planning across programs (multi-year program of work) allows planners, resource specialists and collaborative partnerships to know where the Forest’s priorities are located for management activities. The Forest is also employing Best Science approach to ecological restoration. The recommendations and guidance described in the recent General Technical Reports 220/237, “An Ecosystem Management Strategy for Sierran Mixed Conifer Forests” is being applied to all thinning and fuels treatment projects occurring in mixed conifer stands. There are currently several complimentary integrated strategic planning efforts addressing ecological restoration goals on the Forest.

## Watershed Restoration Strategy

- The Forest will continue to implement the Watershed Condition Framework (WCF) resulting in a more strategic approach to watershed restoration on the Forest. The Forest currently has Watershed Restoration Action Plans for two Priority watersheds: Union Valley Reservoir-Silver Creek and Caples Creek. Essential Projects within the Union Valley-Silver Creek Priority Watershed are: Van Vleck Area Restoration Planning & Implementation and N. Union/McKinstry Meadow/Jones Fork OHV Restoration.
- The Forest is also engaged in projects outside of Priority Watersheds, including the South Fork Rubicon River OHV Restoration project, Cody Meadow restoration in the South Fork American River watershed, Callegat watershed restoration projects in the Cosumnes River basin, and the forest-wide Road-Sediment Survey Project Planning.
- Meadow and riparian restoration work, including planning and implementation of restoration projects, will continue to be a watershed program emphasis. Meadow restoration identified in the Regional Forester’s Leadership Intent is a

component of the National Strategic Plan for watershed restoration and is also a priority for multiple Forest Service partners.

- Roads will continue to be an emphasis for watershed restoration. The Forest will continue to pursue opportunities to remediate effects to aquatic resources through the Legacy Road Program and other available means. The Forest has identified high risk road segments through four years of road sediment surveys conducted in 2008-2011. Addressing outcomes of Travel Management may be a priority in the near future.

### Integrated Vegetation and Fuels Management Strategy

The Eldorado led the region with integration of vegetation management and fuels management. Planning for all vegetation and fuels management projects incorporate activities that work together to restore forest health and include prescribed fire to manage fuels at levels that meet goals for maintaining wildlife habitat in a healthy forest where remaining fuel presents a low potential for catastrophic wildfire. Table 1 at the end of our chapter shows the activities planned for integrated vegetation and fuels management.

### Invasive Species Management Strategy

- The forest collaborates with various partners to control or eradicate invasive species on the forest. Priority species for management on the forest include spotted knapweed, yellow starthistle, purple loosestrife, perennial pepperweed, medusahead, and Canada thistle.
- In 2011 the Eldorado National Forest collaborated with various outside partners to accomplish 340 acres of invasive plant control on NFS lands. Partnerships included El Dorado County, El Dorado Irrigation District and PG&E.
- In 2012 two seasonal employees increased capacity and are treating high priority infestations across the forest using a combination of funding sources including Eldorado and Amador County RAC, Fred's restoration dollars, and NFWW. Approximately 400 acres of invasive plant control accomplishment are expected using integrated pest management. Species include: yellow starthistle with Eldorado County (250 acres), spotted knapweed control, invasive species at ranger stations, admin, and recreation sites. Surveys include recent wildfire and other project areas for new infestations.

- An EA for using Integrated Pest Management (IPM) to treat invasive plants across the forest is in progress. With the EA in place the forest expects to increase invasive species management to approximately 460 acres.

### Tactics for Increasing Restoration

There are currently several tactics being implemented on the Forest to increase the pace and scale of ecological restoration.

- The Forest has successfully integrated the fuels and vegetation management programs focusing on the integration of budgets and seamless organizational planning and implementation. Landscape scale planning will include restoration activities proposed from a suite of program areas in addition to fuels and vegetation activities to increase planning and implementation efficiencies.
- The Forest is a regional and national leader in the use of Stewardship Contracting to increase monetary investments leveraged with appropriated funds. Fuels and vegetation projects are planned at the landscape scale to use economies of scale.
- The Forest has begun the use of managed fire for resource benefits to achieve ecological restoration.
- The Forest has increased opportunities for partnerships and grants. Partnerships include entities such as Coca Cola, Trout Unlimited (El Dorado Chapter), Amador-Calaveras Consensus Group, and Friends of the Rubicon. Grant funds from the State of California Division of Off-Highway Vehicles and Sierra Nevada Conservancy have contributed to projects such as trail reconstruction and decommissioning, and project planning. Increased use of partnerships, grants, and Stewardship Contracting will aid in increasing the pace and scale of restoration treatments across all program areas on the Forest.

### Recent Accomplishments

The Forest has recently planned or implemented numerous projects relating to ecological restoration. Examples of some of these projects include aquatic organism passage, reforestation, trail rehabilitation, improved aspen health, decreased road densities, increased fire resilience and forest health, decreased erosion and decreased sediment in streams. Several of these projects are highlighted below.

### Cornerstone Restoration Project

The Cornerstone Restoration Landscape Project is an integrated approach to restoring ecological function for



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a large portion of the Mokelumne River basin stretching across the Eldorado and Stanislaus National Forests. The Forest, in collaboration with the Amador Calaveras Consensus Group (ACCG) have developed an 8-year schedule of restoration activities focusing on projects that improve forest health and watershed conditions, creating fire-safe communities, and sustaining local economies.

Because of this collaborative effort, one of 10 nationwide Collaborative Forest Landscape Restoration Program (CFLRP) grants was awarded to the Cornerstone Project. The CFLRP provides matching funding for a wide variety of ecological projects including meadow and stream restoration, restoration of cultural sites, enhancing forest vegetation resiliency, and reducing the risk of catastrophic wildfire with threats to lives and property. The Stanislaus and Eldorado Forests in collaboration with ACCG are developing a Master Stewardship Agreement. The Agreement is intended to memorialize and formalize the mutually beneficial collaborative relationship between the Forests and ACCG. Collaborative project design within the Mokelumne watershed spanning the “cornerstone” where both Forests meet at the Mokelumne River is ongoing.

### **Raintree Restoration Project**

The Raintree Restoration Project is an integrated approach to restoring ecological function covering approximately 9,000 acres of Sierran Mixed Conifer forest. This project restores forest health and resiliency to insect and disease and wildland fire by:

Incorporating the principles outlined in the GTR-220 and 237; treating fuels and overly dense forested stands; enhancing montane hardwood communities by removing competing vegetation; enhancing quaking aspen aggregations through removal of competing overstory vegetation; closing/decommissioning of approximately 47 miles of non-system roads; restoring dispersed recreation areas impacted by motor vehicle use; placement of large woody debris (LWD) in LWD deficient stream channels; and reforesting areas affected by root disease. Prescribed fire will be applied throughout the project area in the future to maintain low fire behavior potential and maintain resilience to the effects of future wildland fire, insects and disease.

The Raintree Restoration Project employed a robust community outreach and collaborative approach to building a proposed action. Collaboration resulted in the formulation of new ideas and capturing the issues, concerns and opportunities provided during collaborative process. A series of meetings were held, including visits to the project area to begin fostering partnerships and development of the project framework. Collaborators included representatives

from the Sierra Forest Legacy, El Dorado Fire safe Counsel, California Forestry Association, Trout Unlimited (El Dorado Chapter), El Dorado County Board of Supervisors, and the Pacific Southwest Research Station.

The Forest used the Stewardship Contracting authority to implement the project, thus increasing the monetary investment to complete the integrated restoration work. The Forest leads the Region in the use of Stewardship Contracting, which has increased the Forest’s pace and scale of restoration treatments by retaining more timber receipts locally for implementing restoration activities.

### **Woods Lake Recreation Area Restoration Project**

Woods Lake Recreation Area Access (Woods Lake) project is an example of an integrated project to improve stream and aquatic species connectivity while providing safe public access to a popular campground, picnic area, trailhead, and recreation residence area. The existing access road includes a culvert over a tributary to Woods Lake Creek that is misaligned, undersized and is losing structural integrity. Along with an overly sharp turn and misalignment, the culvert has been overtopped and culvert headwall erosion has narrowed the road to an effective width of only 10 ft. over the culvert, too narrow for recreational vehicles. A serious public safety concern exists, and further deterioration of this stream crossing could result in the closure of the Woods Lake recreation area. In addition to the public safety concern, this deteriorating culvert presents a serious risk to aquatic habitat and water quality. Failure of the culvert crossing during a large streamflow event would release several cubic yards of sediment into the east fork of Woods Lake Creek, sufficient to damage over 1.6 miles of pristine aquatic habitat, including partial or complete filling in of pools with sediment, lateral and/or channel erosion, and partial burial of wet meadow areas next to the stream.

Replacement of the existing hazardous culvert by a standard bridge will improve and protect stream function as well as improve public safety for the popular Woods Lake recreation facilities that are in proximity to the well-traveled Forest Service Scenic Highway 88 Byway. The Woods Lake project will remove the existing culvert with its constriction in stream flow and erosion sediment delivery, reshape the streambanks to match the upstream and downstream streambanks, and restore stream function for the east fork of Woods Lake Creek. Streambank restoration includes replanting native riparian and upland vegetation to stabilize the reshaped streambanks and filter sediment to protect water quality. This is an Alpine County RAC and legacy road funded project.

The project was proposed through collaboration between the Alpine County Resource Advisory Committee (RAC) and the Amador Ranger District of the Eldorado National Forest. A series of meetings were held, with visits to the project site to foster partnerships and development of project objectives. Alpine County's RAC provided sufficient funding to complete NEPA and site survey and design, with the understanding that the Forest would apply for Legacy Road program funding to complete the project. Additional funding for implementation was obtained from the Forest Service Legacy Road program. The project is scheduled for completion in summer of 2012.

### **Freds Fire Restoration Project**

The Freds fire ignited along Highway 50 on October 13, 2004 and burned approximately 7,700 acres in mixed ownerships; 4,600 acres of Eldorado National Forest (ENF), 2,830 acres of Sierra Pacific Industries, and 280 acres of other private landowners until October 17, 2004 when a winter storm helped contain the fire. The fire burned westerly in steep terrain (3,920 – 6,966 feet in elevation) into the Cleveland Fire on the west and the Wrights Fire on the east. The area burned by Freds Fire on the Eldorado National Forest supported the last significant stands of old forest along a 30 mile stretch of the South Fork American River Canyon. Most of those stands burned at high intensity, and the impacts of this loss for forest structure, habitat connectivity, wildlife habitat,

watershed, and aesthetics spread beyond the fire boundary.

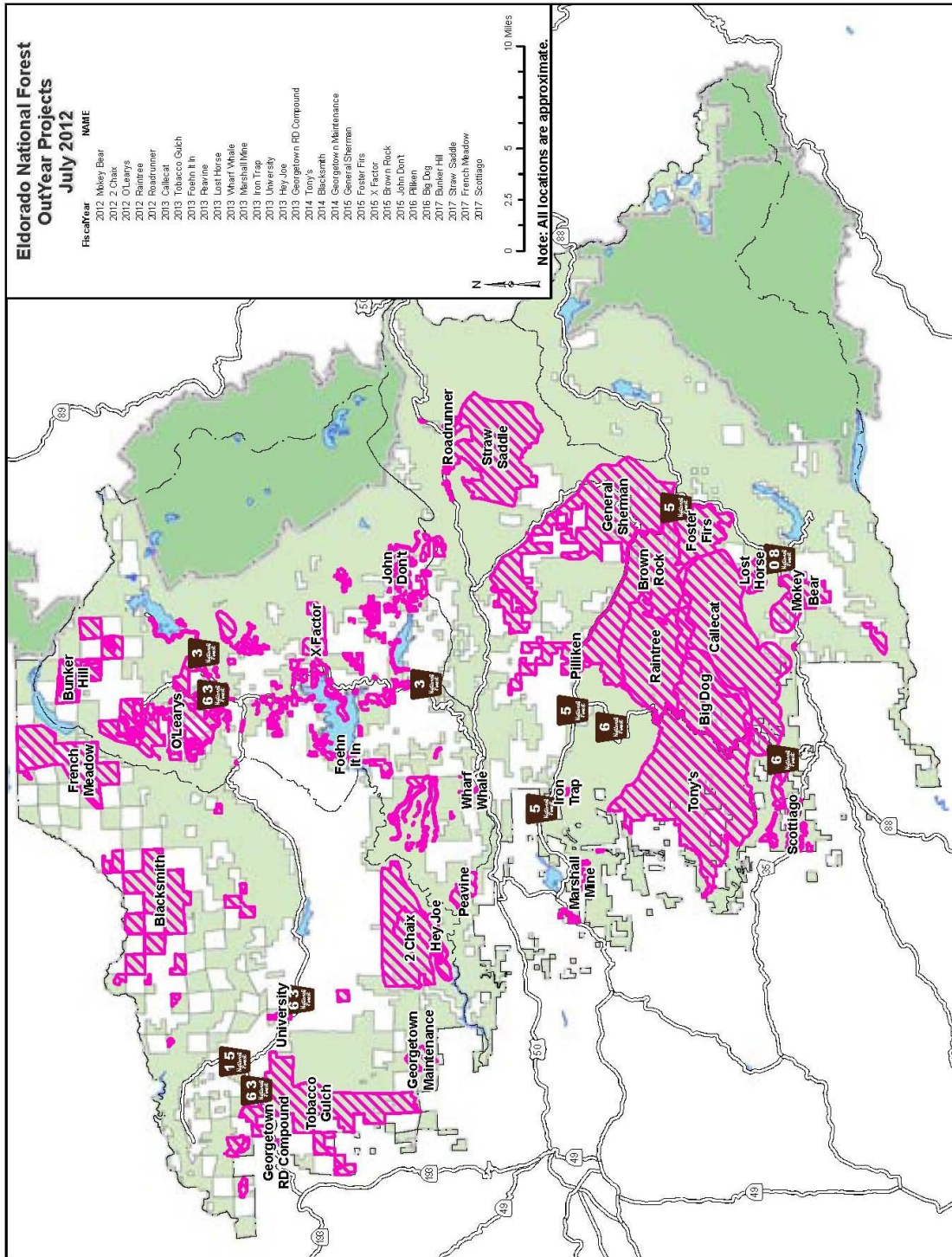
The Forest received a settlement of \$10,640,000 for damage caused by the Freds Fire. Fire settlement funds for the restoration of the area affected by the Freds Fire provide a unique opportunity to reverse ecosystem degradation, restore ecosystem health and resilience, rehabilitate damaged infrastructure, and prepare the impacted landscape for the effects of changing climates and human use patterns. The Natural Resources Damages Statute 16 579 states use of these funds are... "to cover the cost to the United States of any improvement, protection, or rehabilitation work on lands under the administration of the Forest Service rendered necessary by the action which led to the ... settlement."

The Forest is currently cooperating with the RO to design a post-fire restoration strategy utilizing settlement funds both for the Freds Fire and to produce a template for use by other forests for fire landscape restoration. The Freds Fire Restoration strategy includes priorities for activities to increase the pace and scale of restoration in the Freds Fire landscape. For 2012, projects for invasive species treatments and reforestation are funded and underway from the previous Freds Fire Restoration EIS decision. Implementation of the Freds Fire Restoration Strategy is expected to begin in FY 2013.

**TABLE 1: INTEGRATED VEGETATION AND FUELS MANAGEMENT STRATEGY**

	Ranger District	Quarter Implement	CCF* Sawtimber	CCF* Non-Sawtimber	Commercial Acres	Biomass Acres	Prescribed Burn (RxB) and Mechanical Surface Fuel Treat Acres
<b>FY 2013</b>							
Meiss Trap (Raintree 2) IRC	PVL	1st Qtr	10,000		923	923	
Tobacco Gulch IRSC/IRTC	GTN	2nd Qtr	3,000		500	500	
Callie Cat IRC	AMA	3rd Qtr	23,000		1,915	1,915	
Permits/Addon							
South Zone Rx Burn	PVL/AMA						
North Zone Rx Burn	PAC/GTN						
<b>Total FY13:</b>			<b>36,000</b>	<b>4,000</b>	<b>3,338</b>	<b>3,338</b>	<b>5,000</b>
<b>FY 2014</b>							
Blacksmith Tractor/Skyline IRC	GTN	3rd Qtr	20,000		2,500	2,500	2,500
Tony's IRC	PVL	4th Qtr	20,000		4,000	4,000	1,000
Copy Cat IRC (Callecat2)	AMA	1st Qtr	7,000		600	600	
Permits/Addon				4,000			
South Zone Rx Burn	PVL/AMA						2,500
North Zone Rx Burn	PAC/GTN						2,500
<b>Total FY14:</b>			<b>47,000</b>	<b>4,000</b>	<b>7,100</b>	<b>7,100</b>	<b>8,500</b>
<b>FY 2015</b>							
Foster Firs IRC	AMA	3rd Qtr	15,000	1,500	1,500		500
X Factor/John Don't IRC	PAC	1st Qtr	3,500	900	900		900
General Sherman/Brown Rock IRC	PVL	4th Qtr	30,000	3,000	3,000		3,000
Permits/Addon				4,000			
South Zone Rx Burn	PVL/AMA						2,500
North Zone Rx Burn	PAC/GTN						2,500
<b>Total FY15:</b>			<b>48,500</b>	<b>4,000</b>	<b>5,400</b>	<b>5,400</b>	<b>9,400</b>
<b>FY 2016</b>							
Western Gtn Fuels Reduction IRC	GTN	1st Qtr	10,000		1,500		
Pilliken Plantation IRC	PVL	1st Qtr	4,000		2,000	2,000	2,000
Big Dog IRC	PVL	4th Qtr	6,000		1,000	1,000	1,000
Permits/Addon				4,000			
<b>Total FY16:</b>			<b>20,000</b>	<b>4,000</b>	<b>4,500</b>	<b>3,000</b>	<b>3,000</b>
<b>Total FY17</b>							
Straw Saddle IRC	PVL	4th Qtr	3,000		300	300	300
Bunker Hill Forest Health Tractor/Skyline	PAC	1st Qtr	9,000		900		1,000
French Mdw Tractor/Skyline IRC	GTN	4th Qtr	6,000		1,000	1,000	400
Scottiago IRC	AMA	1st Qtr	10,000		1,000	800	
Permits/Addon							
<b>Total FY17:</b>			<b>28,000</b>	<b>4,000</b>	<b>3,200</b>	<b>2,100</b>	<b>1,700</b>

\* CCF = Hundred Cubic Feet



# Ecological Restoration – Inyo National Forest

## Overarching Goals

- Reduce fuel loading especially around communities and other areas of high visitor use
  - Stabilize stream banks and riparian areas
  - Restore Meadow function and resilience
  - Reduce offsite erosion and stream sedimentation associated with visitor use
  - Restore T&E species habitat (Mountain Yellow Legged Frog, Whitebark Pine, Sage Grouse, Tui Chub)
  - Improving water quality and stabilize (attenuate) flood flows
  - Control or eradicate non-native plants
1. **Goal:** To retain and store ecological resilience and provide a broad range of services to organisms and humans (4+ million visitors/year). Provide clean water and natural landscapes.  
**Challenges/Opportunities:** A. Managing visitor access while providing for needed ecological services. B. Reducing fuel loading around communities and other high visitor use areas.  
**Need:** Most landscapes (watersheds) are in relatively good condition (as displayed in the Watershed Condition Assessment completed in 2011). The need is to keep our landscapes in good condition to provide necessary ecological services. An additional need is to repair/restore damaged landscapes to proper functioning condition to provide satisfactory ecological services.
  2. The Forest has a variety of projects designed to meet ecological restoration goals in FY12-13. These include:
    - Red's meadow blowdown repair (fuel reduction, road and campground repair and trail tread repair) (Planning and implementation in FY12-13 and likely beyond)
    - Mt. Whitney trail repair and watershed stabilization (Implementation in FY12)
    - Roads/OHV – route closure, and mitigation (on-going implementation of 2009 TM EIS decision FY12-13 and beyond)
    - Unauthorized route decommissioning (Planning in FY12-13, Implement in FY13 and beyond)
    - Deadman Road – watershed repair including treatment of hydrologically connected segments (Implementation in FY12)
    - June Mountain Vegetation Management implementation (Implementation in late FY12 and beyond)
    - June Lake Loop fuel reduction project (Planning completed in FY12, Implementation in FY13 and beyond)
    - Sherwin- Scenic Loop fuels reduction (Planning completed in FY12, Implementation in FY13 and beyond)
    - Mammoth Lakes Basin Fuel Reduction (Planning completed in FY12, Implementation in FY13 and beyond)
    - New Jeffery Pine Healthy Forest Fuel Reduction (Planning completed in FY13, Implementation in FY13 and beyond)
    - Crowley Communities fuels reduction, (Planning completed in FY13, Implementation in FY13 and beyond)
    - Portals fuels Reduction, (Planning completed in FY13, Implementation in FY13 and beyond)
    - Kern Plateau Meadow restoration and stabilization (Implementation in FY12-13 and beyond)
    - Mammoth Meadows meadow restoration (Implementation in FY12)
    - Mountain Yellow Legged Frog Habitat Restoration and fish removal (Planning and Implementation in FY12-13)
    - Forest Wide noxious and Invasive Weed environmental assessment (Finalize planning in FY13, Implementation in FY13 and beyond)
    - Aspen Enhancement Environmental Assessment (Finalize planning in FY13, Implementation in FY14 and beyond)
    - Black Canyon OHV watershed repair (Finalize planning in FY12, Implement in FY13 and beyond)
    - Sage grouse habitat restoration (Planning FY12, implementation in FY12-13 and beyond)

- Hilton Lakes Trail/watershed repair and decommissioning (Finalize planning in FY12, Implement in FY13 and beyond)
- Golden Trout Conservation Strategy (FY12-13 and beyond)
- Glass Mountains meadow restoration (update NEPA in FY12-13, Implement in FY13 and beyond)
- Oak Creek gully stabilization planning (Planning in FY12-13, Implementation in FY13 and beyond)
- Lamarck Lakes trail/watershed repair and stabilization (Inventory and planning in FY13, Implementation in FY14 and beyond)

### Tactics to increase restoration

The Forest has been steadily increasing and/or maintaining a high level of restoration work in recent years. Internal capacity constrains our ability to take on additional partnerships. To further increase restoration capacity, the Forest is working with partners and partners are taking on a greater role of writing grants to fund and complete priority work on Forest land. (Examples include Americorps and Student Conservation Association applying for National Forest Foundation grants and the Inyo/Mono Integrated Regional Water Management Group (IRWMG) and Ft. Independence Tribe applying for Prop. 50 funds for planning the restoration of Oak Creek gully).

The Forest is working on maintaining existing partnerships for successful restoration efforts now and into the future.

To increase ecological restoration the Forest needs to continue to develop a long-term strategic “vision” of ecological restoration needs to assist in developing needs and securing funding.

The Forest is working with the BLM in an “all-lands” approach to fuels/vegetation management projects. This is facilitated by two interagency fuels planners and interagency vegetation management specialists.

The Forest is beginning analysis of Oak Creek gully with the Natural Resources Conservation Service, Bureau of Reclamation, and the Ft. Independence Tribe (among other stakeholders) to determine suitable restoration techniques.

The Forest manages the majority of land in the headwaters and throughout the watershed in the East Sierra and the part of the Forest that is in Nevada. There are comparatively few opportunities to work with other land managers with similar restoration objectives. This presents challenges for the Forest.

### Integration of Program Budgets

For FY12 integrated projects and targets were identified and will be funded through a variety of funding authorities. The Forest has also acquired outside funding to accomplish planning and implementation of vegetation management projects. Examples include: Funding from June Mountain to complete a vegetation management plan and Environmental Assessment and funding from the Sierra Nevada Conservancy (SNC) to implement a fuels reduction project.

### Ecological Restoration Projects:

- **Stream crossing hardening in the Coyote area:** This project implemented stream crossing hardening treatments as specified in the Travel Management EIS (2009) in the Coyote area. The Forest utilized State of California OHV grant monies as well as Legacy Roads and Trails to fund this project. The Forest utilized partners and volunteers such as Friends of the Inyo to implement this project. This project will limit the amount of sediment entering perennial and intermittent stream channels and stabilize adjacent meadow systems.
- **Route Closures (Forest Wide):** This project implemented route blocking and closures as specified in the Travel Management EIS (2009). The Forest utilized State of California OHV grant monies as well as Legacy Roads and Trails and other appropriated funds to fund this project. The Forest is working closely with Friends of the Inyo as well as other volunteers to implement this project. This project closes and partially restores routes that were identified as causing risks to watershed function, aquatic and terrestrial wildlife habitat, Wilderness values and heritage resource sites among other reasons.
- **Horton Creek Mud bog:** This project implemented hardening of a wet meadow/bog area adjacent to Horton Creek. The Forest utilized Legacy Roads and Trails as well as appropriated funds to complete this project. This project protects water quality, enhances and protects wet meadow habitat and vegetation.

### NEPA ready projects:

- Aspen Enhancement – The Forest would likely pick a discrete geographic area like the Glass Mountains area to finalize NEPA.
- Hilton Lakes Trail stabilization/meadow restoration project – NEPA is complete. The Forest is currently identifying partners (such as Americorps and Friends of the Inyo) and funding

sources to implement this project in FY13 and beyond.

- Lamarck Lake Trail/Watershed stabilization: Additional money and/or partnerships would allow the Forest to inventory and plan this project in FY13.
- Glass Mountains Meadow Restoration: The Forest is in the process of updating the NEPA. Additional resources are needed to implement this project. The Forest is in the process of identifying partners and applying for grants to help implement this project.
- Weed EA – Additional money and/or partnerships would allow the Forest to treat additional acres.
- Fuels projects: The Forest has several on-going fuels/vegetation management projects. Additional resources would allow the Forest to complete the projects in a timely manner.

The following projects do not yet have NEPA completed but are important for achieving ecological restoration goals:

- Lee Vining campground evaluation – Several campgrounds and associated infrastructure are impacting meadow and stream habitat. There needs to be a comprehensive evaluation of the campgrounds to determine opportunities for moving and/or decommissioning sites and improving watershed function.

- Monache Meadow – South Fork Kern River – The River is severely downcut through the majority of Monache Meadow (approximately 5 miles) impacting meadow and aquatic habitats. A large scale planning effort is needed to determine suitable restoration techniques compatible with existing range management and recreation uses.
- Oak Creek Gully – Both the North Fork and South Fork of Oak Creek suffered damage and downcutting during a 2008 thunderstorm. The Forest is engaged with the Ft. Independence Tribe, Bureau of Reclamation and the Inyo/Mono Integrated Regional Water Management Group (IRWMG) in acquiring funding and assistance with collaborative planning to address restoration needs.
- Forestwide Weed EA – Supplement – This project would update the existing Weed EA and allow the Forest to treat additional acres of invasive and noxious weeds.
- Kern Plateau Grazing management EIS – This project is looking at four grazing allotments on the Kern Plateau. We are currently engaged in a collaborative public process and the ID Team is developing a draft proposed action.



Mud Bog on Bishop Analysis Area, pre-implementation site visit and final project design.



Project near completion with an extra layer of cobble on top of the crush to facilitate proper drainage.



Smoothing the road for drivability.



Completed rock causeway project to protect water quality, riparian resource and provide for a sustainable driving surface.





Putting the final touches on a seasonal closure gate near the Boy Scout Mine on the Mono Lake District (Road #02N135 ).



Finished seasonal gate on Road # 02N135. The closed gate will prevent wet weather traffic on the road, minimizing rutting and potential off-road erosion and stream sedimentation.



Pre-implementation site visit on Trail #31E301.



Drainage hardening at seasonal stream crossing to prevent erosion and further headcutting on Trail #31E301.

# Klamath National Forest Ecological Restoration

The Klamath Physiographic Province is recognized as a globally significant bioregion. This region supports a large number of endemic, rare, and sensitive flora and fauna, has the largest strongholds of low elevation temperate forest in the nation, as well a high concentration of wild and scenic rivers. The Klamath Basin is also well known for its past legendary salmon and steelhead runs.

Reference conditions based on fire return intervals for the Forest indicate that most of the area is moderately to severely departed from historic conditions under which the vegetation and riparian conditions developed. The consequences from this include a higher percentage of closed canopy conifer stands, conifer encroachment within meadows and hardwoods stands, and an increasing fuel hazard. The Klamath has a recent history of large expensive and destructive fires which have had a negative effect on many of our forested environments, communities, and watersheds.

The Forest has been working with our partners to design and implement integrated vegetation management projects designed to restore historical conditions and processes. The Forest has steep rugged terrain where fire played a very important role. There is also a need to reintroduce fire back into the ecosystem by strategically planning and implementing prescribed burns and allowing “managed wildfires” to play its role as appropriate will expedite this ecological process. These efforts will require working closely with cooperators, local government, landowners and fire safe councils by planning restoration projects across boundaries and strategically placing projects around communities reducing the threat of wildfires. To achieve these objectives, the Forest is currently preparing an Integrated Program of Work (iPOW). This process will delineate high priority areas on the Forest where treatments are needed and will help use to prioritize projects. iPOW will create an out year program of work with emphasis on the first five years and will display the results spatially. Past wildfires will also be considered so we can take advantage of these areas where maintenance burns can be applied creating a more natural fire regime in that area. Protecting communities is a high priority and projects with in the defense zone will be critical in this process.

Our budget process and program of work contain multi-funded large projects that include fuel, vegetation, watershed, and wildlife treatments. During the budget and planning process we take a long term look at funding and priorities. The iPOW process will streamline the selection of projects, identify

opportunities for cost savings, help us collaborate with our partners, and meet our targets. The map at the end of this chapter shows the current program of work on the Forest. The following projects are an example of the projects that have been designed to restore these fire dependent ecosystems to a sustainable condition. Much work remains to be accomplished.

## Happy Camp Fire Protection Strategy

This strategy was developed to protect the Happy Camp community from wildfire encroaching from the surrounding Klamath National Forest system lands. This was to be accomplished by linking existing Forest Service roads with constructed fuel breaks (Little Grider Fuel break project) and making use of recent under-burn and wildfire burn areas. The Forest Service collaborated with the Firesafe Council, Karuk Tribe, adjacent landowners, Siskiyou County, town of Happy Camp, and Mid-Klamath Watershed Council on fuel-break projects under the strategy.

The goals of the Happy Camp Fire Protection Strategy are:

1. Protection of life and property from wildland fire.
2. Restore fire-adapted ecosystems.
3. Protect high priority watersheds and significant values at risk.

Across a 90,000-acre area, fire protection defense zones were identified based on issues and values threatened, such as municipal watersheds, conifer plantations less than 35 years old, percentage of area contained in community threat zone, historic fire areas, and areas in late successional reserves or sensitive wildlife habitat. From those general rankings, analysis areas called Happy Camp Fire Protection Defense zones were delineated.

## Indian Creek Zone

This watershed provides surface domestic water to private landholders within its boundaries. Approximately 5,000 acres were burned in the 1987 fires and previously the Indian Ridge burn of 1967 had burned close to 10,000 acres, consequently there are large areas of plantations. Land managers expect high intensity fire behavior that local forces would not be able to contain without extra resources in extreme weather conditions over much of the southern zone. Access would be an issue during fire suppression activities.



Underburn pre-treatment



Underburn during treatment

### Happy Camp Zone

Outside the actual community there are clusters of homes along the main drainages. Elk Creek is the municipal watershed for Happy Camp. Elk Creek has had 3 large fires (4000+ acres) in the past five years; previously about 25,000 acres had burned during 1987. Fire intensity in untreated areas through the Elk Creek and Cade Mountain sections would be expected to be high. In the Little Grider and Benjamin areas mixed intensity is likely and all would be potentially beyond district resources to contain due to access. To date the Forest has completed 2,195 acres underburn, 941 acres commercial thin, 1,343 acres of pile burning and 1,055 acres pre-commercial thinning.

## North Fork Salmon River Road Restoration

The Salmon River watershed is a 751 square mile tributary of the Klamath River in Siskiyou County, California. The United State Environmental Protection Agency (USEPA) listed the Salmon River as 303(d) impaired for elevated water temperature in 1992. Temperature impairment in the Salmon River has resulted in non-support of beneficial uses and water quality objectives. Beneficial uses that are adversely effected by temperature impairment in the Salmon River include: Commercial or Sport Fishing (COMM); Cold Freshwater Habitat (COLD); Rare, Threatened, or Endangered Species (RARE); Migration of Aquatic Organisms (MIGR); Spawning, Reproduction, and/or Early Development (SPWN); Native American Culture (CUL). The impairment is especially significant in that the Salmon River supports a threatened Coho salmon population under the California and federal endangered species act.

A series of storm events caused large fill failures and debris flows in the North Fork Salmon River. The Forest completed a roads assessment that documented the results of these events and concluded that the Little North Fork was the highest priority for road-related sediment source reduction treatments due to following reasons:

1. There is a well-documented history of road-related sedimentation on the 40N51 and 40N33 roads in the Little North Fork, beginning early in the 1970s and continuing through 2006.
2. Road-related sedimentation has been primarily from the failure of sandy granitic fills placed in streams, dry swales, and on steep hillslopes. This area is unique in that **many of the fill failures occurred in dry swales that do not flow surface water.**
3. Many of the fill failures generated debris flows which traveled down small streams, stripped them of vegetation, and conveyed sediment directly to the Little North Fork.
4. Road inventories have identified a large number of high risk fills which could be stormproofed and made more stable.
5. The unique landslide and erosion processes which occur in the granitic terrain of the Little North Fork can be effectively controlled with state of the art geotechnical engineering practices.

The goals of this road restoration project were to help meet the Salmon River TMDL Action Plan requirements by: (1) improving roads to reduce chronic and catastrophic failures which deliver sediment into the Salmon River system and (2) reducing the amount of fine sediment available to fill pools with fines, therefore creating more thermal refugia for spawning and rearing of Salmonids. The project implemented road stormproofing treatments on approximately 25 miles of road draining to the Little North Fork and North Fork Salmon River main stem. The “stormproofing” treatments were designed to reduce chronic erosion and the risk of catastrophic failures. The roads provide access for trailheads, vegetation and

fuels management, hunting and fishing, and fuelwood cutting.

The project’s sediment load reduction from chronic sources (road cutslope, surface, ditch and fillslope erosion) was an estimated 3.68 tons/year/road miles. However these load reduction estimates do not include the nearly 24,000 yd<sup>3</sup> of fill volume (or 36,000 tons assuming 1 yd<sup>3</sup> equals 1.5 tons) estimated to be saved from entering the stream system during the next major flood event. The project’s reduction in catastrophic fill failures is nearly 400 times (1,448 versus 6.68 tons/year/road miles) the amount of chronic sediment saved on a yearly basis.



Pre-project photo of fill failure on road 40N51



Post-project photo of retaining wall



Pre-project photo of Kanaka Creek flowing over road



Post-project photo of Kanaka Creek crossing

## Black Rock Aspen Restoration Project

Aspen stands in the project area are in a state of decline and are likely to continue their decline without restorative management actions to stimulate aspen growth and protect saplings as they develop into established small trees. After a century of fire suppression, grazing and browsing pressure, high elevation meadows and aspen populations are threatened by conifer encroachment. Without treatment, these high elevation meadow and aspen systems will likely continue to be replaced by conifer forests. Dense coniferous forests in the project area now contain hazardous fuel conditions, which in the event of a wildfire may result in damage to important large-tree wildfire habitat components and already weakened aspen clones.

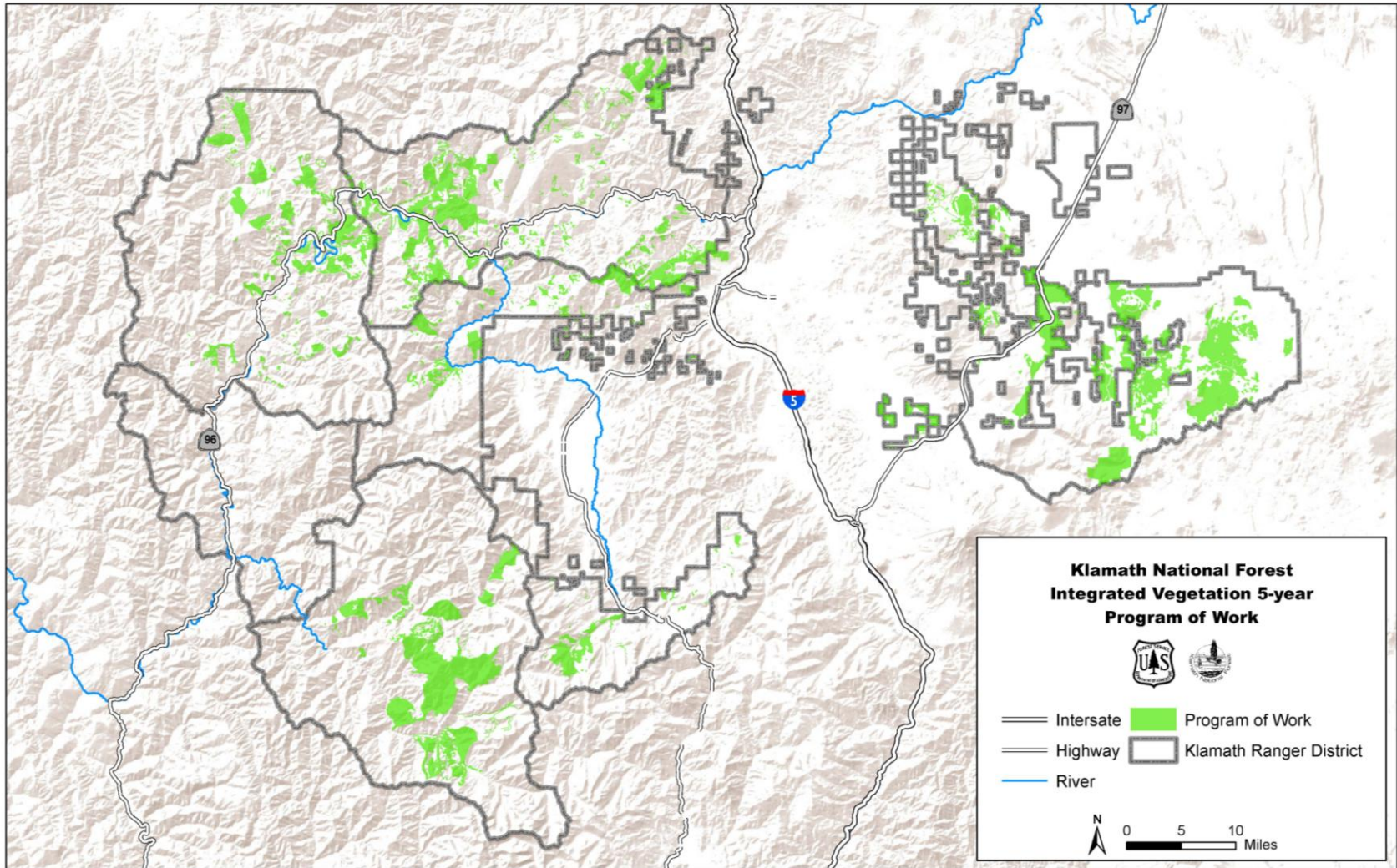
The Black Rock Aspen Restoration project has been developed to address these forest conditions through the following objectives: (1) increase aspen cover in historically occupied areas; (2) enhance meadows to move them closer to historic conditions; (3) reduce the amount of off-site trees (planted Jeffrey pine and ponderosa pine which did not occur in the project areas historically) from within plantations to move species compositions closer to historic conditions; and (4) create strategic fuel management zones for improving fire suppression effectiveness.



**PLANNED ACTIVITIES WITH NEPA COMPLETED AND PROJECTED COSTS**

Project Name	Underburn			PCT			Roadside/Community Fuels Reduction			Mowing/Mastication/Thin & HP			Road Decommissioning			Meadow Restoration/Biomass		
	Acres	Cost/ Acre	Total Cost (1,000s)	Acres	Cost/ Acre	Total Cost (1,000s)	Acres	Cost/ Acre	Total Cost (1,000s)	Acres	Cost Acre	Total Cost (1,000s)	Acres	Cost Acre	Total Cost (1,000s)	Acres	Cost/ Acre	Total Cost (1,000s)
Thom-Seider	22000	\$200	\$4,400	430	\$900	\$387	8800	\$900	\$7,920									
Two Bit	7250	\$200	\$1,450	120	\$900	\$108							4.1	\$75,000	\$307.5	160	\$450	\$72
Johnny O'	6389	\$200	\$1,277.8	1374	\$900	\$1,236.6	238	\$900	\$214.2	736	\$2,000	\$1,472						
Round Valley	7380	\$200	\$1,476	4138	\$200	\$827.6	2980	\$300	\$894	238	\$100	\$23.8						
Goosenest LSR	400	\$200	\$80															
Van Bremmer	1715	\$200	\$343	209	\$200	\$41.8				841	\$100	\$84.1						
Hi-Grouse	1537	\$200	\$307.4	50	\$200	\$10	120	\$300	\$36	1074	\$100	\$107.4						
Big Pony	29	\$200	\$5.8	200	\$200	\$40	789	\$300	\$236.7	75	\$100	\$7.5						
Deep										169	\$350	\$59.15				183	\$2,500	\$457.5
Petersburg Stew	2826	\$200	\$565.2							1700	\$750	\$1,275				2467	\$850	\$2096.95
Straddle				34	\$350	\$11.9				38	\$750	\$28.5				33	\$2,500	\$82.5
Eddy LSR	22630	\$200	\$4,526				2290	\$850	\$1,946.5	931	\$655	\$609.85				2070	\$850	\$1,759.5
<b>Total</b>	<b>72,156</b>		<b>\$14,431.2</b>	<b>6,555</b>		<b>\$2,662.9</b>	<b>15,217</b>		<b>\$11,247.4</b>	<b>5,802</b>		<b>\$3,667.3</b>	<b>4.1</b>		<b>\$307.5</b>	<b>4,913</b>		<b>\$4,468.45</b>

**CURRENT FOREST PROGRAM OF WORK**



# The Lake Tahoe Basin Management Unit

Ecological Restoration is the central driver of wildland and forest stewardship in the Lake Tahoe Basin Management Unit (LTBMU), across all program areas and activities. Our Land and Resource Management Plan, watershed assessments, and individual project plans identify Ecological Restoration as a core objective. The Ecological Restoration work we do is accomplished through an “all lands” approach, in which we play a major role in supporting restoration and conservation of wildlands and forests throughout the Basin, regardless of ownership. We approach each project with an “all resources” multi-user ethic that considers the many different needs of the land at each location. Further, we consider the long-term changes that may occur in climate and how those may affect ecosystem services<sup>4</sup> upon which Basin residents and visitors depend. This way of doing business is the culmination of decades of ongoing coordination and collaboration with Basin stakeholders, agencies, and the public, within the Basin’s Environmental Improvement Program (EIP).<sup>5</sup> The EIP has consistently focused on returning the famed clarity of the water of Lake Tahoe to historical levels through addressing the many contributing causes of its loss, including the poor watershed conditions that have resulted from lack of fire and general choking of stream zones with excessive vegetation.

The 63 streams in the Basin that feed Lake Tahoe flow freely across land ownerships and governmental jurisdictions of all kinds, so coordination and collaboration are essential to gaining economies of scale and to minimizing redundancy; the collective recognition of this being the EIP. In 1969, Congress’ ratification of a bi-state compact between California and Nevada authorized the formation of the Tahoe Regional Planning Agency (TRPA) and gave it authority to impose protective land use ordinances

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4. “Ecosystem services are the benefits people obtain from ecosystems. These include provisioning services such as food, water, timber, and fiber; regulating services that affect climate, floods, disease, wastes, and water quality; cultural services that provide recreational, aesthetic, and spiritual benefits; and supporting services such as soil formation, photosynthesis, and nutrient cycling. (See Figure A.) The human species, while buffered against environmental changes by culture and technology, is fundamentally dependent on the flow of ecosystem services.” Millennium Ecosystem Assessment, 2005. Ecosystems and Human Well-being: Synthesis. Available at [www.millenniumassessment.org/documents/document.356.aspx.pdf](http://www.millenniumassessment.org/documents/document.356.aspx.pdf)

5. The history of the EIP is succinctly captured in A Federal Vision for the Environmental Improvement Program at Lake Tahoe (TRPA; June, 2006), which can be found at: [www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/fsm9\\_046280.pdf](http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsm9_046280.pdf) )

Basin-wide. Only a few years later, in 1973, the Forest Service created the LTBMU to better serve the Basin communities. TRPA created a Regional Plan, in which it established Environmental Thresholds Carrying Capacities (“Thresholds”). The EIP is the framework within which TRPA organizes the efforts of the Basin’s many stakeholders and agencies to meet these Thresholds. Our unwavering support for the EIP has expanded and developed partnerships within the Basin that have given us increased organizational capacity and flexibility. We have been able to quickly shift the mix of contracted, in-house, and volunteer labor needed to most effectively collaborate with city, county, state, federal, and private partners and the public, on projects large and small. Key categories of activities in which we engage our partners and the public include monitoring resource conditions, managing and restoring or enhancing terrestrial and aquatic ecosystems, and regulating human uses.

Among the specific activities we coordinate and/or accomplish collaboratively are:

- installing Best Management Practices (BMPs) to minimize erosion and consequent sediment input to Lake Tahoe,
- “greening” facilities and improving our transportation energy footprint,
- forest thinning and prescribed fire to decrease fuel loading, increase forest heterogeneity and improve forest habitat for wildlife,
- implementing environmentally and ecologically sensitive uses of prescribed fire, including restoring fire-adapted character to meadows,
- meadow and riparian restorations to improve watershed function, species habitat and diversity,
- eradication of weeds and invasive plant species,
- protection measures, conservation strategies, and recovery actions for Threatened and Endangered species,
- prevention and control of aquatic invasive species infestations, and
- adaptive management, where the collaborative development and implementation of projects is strongly integrated with science.

Many of these activities are integrated into individual projects, as most projects have multiple objectives. Not



all of the projects fly under the banner of ecological restoration, however. Ecological restoration objectives are accomplished routinely in the Basin by a wide variety of activities and programs that do not fit the traditional view that only stream and meadow restoration work is ecological restoration. For example, all of our fuels reduction projects are attentive to reaching desired conditions for habitat improvement; we know overgrown fuel-laden forests support a much lower diversity of wildlife. Likewise, we've greatly minimized sediment loading to Lake Tahoe by decommissioning poorly-maintained roads and trails, installing BMPs and changing pavement designs at facilities and campgrounds, and passing through substantial funding to other jurisdictions for urban erosion control projects. And our routine review of requests to renew or expand special use permits for commercial permittees and recreational cabins have afforded opportunities to conduct detailed analyses of the potential impacts to flowing springs, ground-water dependent ecosystems, and riparian zones; we modified the permits where needed to strengthen environmental protections. Careful attention to opportunities for prevention helps us avoid the need for more ecological restoration in future years.

We track and annually seek to improve our efforts to make our facilities and activities more energy efficient and sustainable. Our recent "greening" accomplishments include major renovation of the Meyers Work Center buildings, where more than 100 employees report for duty every day of the field season, which put those buildings well on the way to earning LEED Certification. We have a proactive Green Team on the Unit, a journeyman-level ecologist enthusiastically serving as our Climate Change Coordinator, frequent webinars on climate change that are attended by staff from various departments, forward-looking narrative within our draft revised forest plan (Final Plan is due December 2012), and specific climate change assessments already done in some projects (e.g., Incline Fuels Project and Meeks Bay BMP Project). We are keenly aware that, in California, water will be the most pivotal resource affected by climate change.

In honoring our agency ethic "Caring for the Land and Serving People" we follow the corporate concept of the triple bottom line: we see sustainable solutions only at the intersection of the economic, social, and environmental needs. We believe that our role in shaping and implementing the EIP has provided us the best opportunities to reach sustainable solutions to the Basin's many challenges.

We have been mindful of the need for science to inform management, too. Approximately \$30 million

has been allocated to science projects from federal funding in the Basin since 2005. Our strong participation in the Basin's Science Management Integration Team, its annual Relevancy Reviews of science proposals, and numerous working groups and committees, is partly a result of our need to work with nearly 100 funded science projects to date; we issue dozens of research permits annually. Research on ecosystem services in the Basin is focused on valuing ecosystem services, measuring and monitoring ecosystem service indicators, and mapping changes in supply across a landscape. Research scientists are also studying key drivers of ecosystem change and the loss of ecosystem services, including climate change, droughts and floods, habitat loss, recreational opportunity spectrum losses, fire and forest health issues, invasive species, and land use change resulting in loss of open space. Our own specialists are highly educated, experienced scientists who frequently contribute to science in the Basin. More than 20 of our employees participated in the Tahoe Science Conference held May 2012, and several also gave presentations and/or moderated sessions; the conference focus was on environmental challenges in a changing climate and LTBMU was a major sponsor, along with TRPA, the USGS, the EPA, and various Basin agencies and stakeholders.

Five Years from now, we expect to have implemented nearly all of the projects for which we currently have secured funding under the Southern Nevada Public Lands Management Act (SNPLMA), which have a present value of nearly \$130 million. These include:

- Angora Creek Channel and Gardner Mountain Meadow Restoration (\$2.87 million)
- Aspen Communities Restoration (\$1.6 million)
- Big Meadow Watershed Fire Regime Restoration (\$1.6 million)
- Blackwood Creek Phase 3B Stream Restoration (\$1.95 million)
- Camp Richardson Resort Campground & Vehicle Circulation BMP Retrofit (\$3 million)
- Carnellian Hazardous Fuels Reduction and Healthy Forest Restoration (\$10.1 million)
- Erosion Control Grants Program (\$30 million)
- Fallen Leaf ATM (\$0.5 million)
- Fire-Adapted Meadows Restorations (\$1.59 million)
- High Meadows / Cold Creek Restoration (\$2.77 million)

- Incline Hazardous Fuels Reduction and Healthy Forest Restoration (\$8.84 million)
- Incline Lake Dam Restoration (\$5.5 million)
- Meeks Meadow Restoration (\$2.1 million)
- South Shore Ecosystem Restoration Fuels Reduction (\$27 million)
- Spooner Hazardous Fuels Reduction and Healthy Forest Restoration (\$6 million)
- Tallac Historic Sites BMP Retrofit (\$0.75 million)
- Upper Truckee River Reaches 5 and 6 Restoration (\$12.5 million)
- West Shore WUI Fuels Reduction and Ecosystem Restoration (\$10.8 million)

The majority of these funds will flow through the local economy using local contractors, supporting sustainable operations, and providing world-class recreational experiences.

Most of the projects scheduled to be implemented in the Basin during the next five years focus on the two priority watersheds (the Upper Truckee River watershed and the Ward Range watershed that includes both Ward Creek and Blackwood Creek) that we identified in our initial Action Plan for the Watershed Condition Framework. Many projects will be implemented elsewhere in the Basin, in part due to the need to treat excessive fuel loadings in the Wildland Urban Interface (WUI, shown on Map 1, page 63).

Vegetation treatments to improve forest health also occur Basin-wide annually and are coordinated with our fuels reduction projects. In FY12, the combined fuels target for LTBMU was 1,262 acres, evenly split between 631 acres specifically for fuels reduction and 631 acres of forest health improvement thinning (Timber Stand Improvement). We integrate these two programmatic functions under a single contract to reduce the overall cost of completing these treatments, which would be greater if done separately. In addition to accomplishing fuels reduction goals, these projects also contribute substantially to aspen stand restoration, wildlife habitat improvement, restoring meadow/riparian function, and improving water quality.

Recent Accomplishments that illustrate our “all lands” and “all resources” approaches include ongoing work on the Angora Fire Burn Area, the Meyers Landfill, and High Meadows:

**Angora Fire Burn Area** contains intermingled private, city, county, state, and federal lands (Photo 1), and our restoration planning benefitted where multi-jurisdictional coordination was possible. We have enlisted the help of the community in planting thousands of trees (Photo 2). The vegetation and fuels treatments are on track to be completed this year and the 100% design for the stream channel restoration has been received.

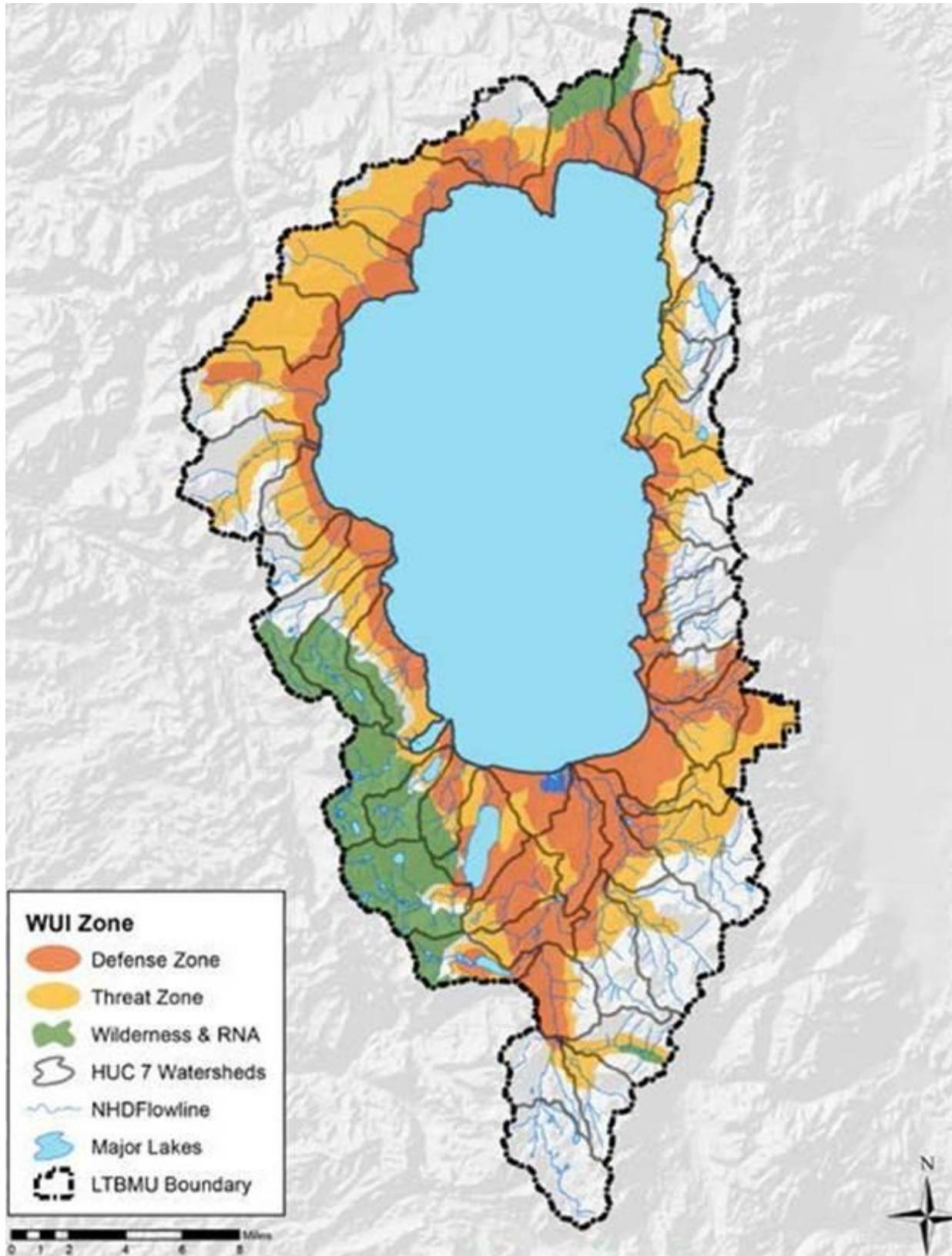


Photo 1: One of the 254 homes lost in the Angora Fire.



Photo 2: LTBMU hydrologist Stephanie Heller speaks to the hydrologic and vegetation response within the burn area one year after the fire.

### WILDLAND URBAN INTERFACE IN THE LAKE TAHOE BASIN



**Meyers County Landfill Remedial Action** (Photo 3) included closing and removing onsite trails and roads, felling trees from bordering areas, and installing drainage systems; then capping the landfill with protective materials and top-dressing it with vegetated soil that closely matches natural soil and vegetation (Photo 4). Assuming reasonable evidence of established vegetation this fall, recreational use of the area will be allowed to return. Aquatic Organism Passage concerns in adjoining Saxon Creek are being addressed, too.



Photo 3:(Top) Initial removal of the vegetation and topsoil overlying the buried waste in Meyers Landfill began in 2010. (Bottom): Abandoned automobiles were found in the trees bordering the landfill and removed.



Photo 4: The last steps of the Meyers landfill restoration prepare the surface soils for seeding.

**High Meadows / Cold Creek Restoration** includes major improvements made to the access road (3 miles), re-routing of popular trails (3 miles), filling of deeply incised stream channels (1/2 mile) and replacement with properly shaped stream channels (1 mile; Photos 5 and 6), thinning of conifers from the meadow and adjacent stands (300 acres), and burning the meadow (200 acres).



Photo 5: Cutting a new stream channel for Cold Creek in High Meadows.



Photo 6: Irrigating the new channel for the North Fork of Cold Creek to help fully re-establish meadow vegetation.

Many Opportunities for ecological restoration within the LTBMU are NEPA-ready and partially funded by SNPLMA, with which we intend to leverage requests for the additional funding needed in each case, including:

- Aspen Communities (thin conifers from aspen stands, underburn to improve vigor)
- Big Meadow (thinning & Rx pile burns, meadow burns, trail work)
- Fire-Adapted Meadows (thinning & Rx pile burns, meadow burns, trail work)
- Lahontan Cutthroat Trout (LCT habitat removal of nonnative fish)

- LEED Certification of Meyers Work Center retrofit (certification)
- Meeks Meadow (thinning & Rx pile burns, meadow burns, trail work)
- Tahoe Yellow Cress development of updated Conservation Strategy (TES action)
- Upper Truckee River (reshaping channel and floodplains; 1.2 miles)

As the Basin transitions over the next five years away from SNPLMA, we will be leveraging the appropriated funds received with that of partnership and grant opportunities (such as for Native Fisheries & Bring Back the Natives). We will continue to initiate and implement ecological restoration activities and projects on invasive species (aquatic and terrestrial plants), continue recovery actions on Lahontan cutthroat trout and soon to be listed species like Sierra Nevada (mountain) yellow-legged frog and Tahoe yellow-cress. We'll continue to emphasize projects with multiple program area and target completion (for stream miles improved, lake acres enhanced, terrestrial habitat enhanced, and invasive species treatments from projects). In addition, we will continue to coordinate with adjacent forests in seeking Collaborative Landscape Restoration Funds (CLRF). All of these support the leadership intent on ecological restoration expressed previously by Region 5.

# Ecological Restoration on the Lassen National Forest

The Forest has been implementing ecological restoration for the past 12 years as part of Herger-Feinstein Quincy Library Group (HFQLG) Forest Recovery Act. This Act seeks to address forest health issues and limit the spread of wildland fire by treating large scale areas and returning them to historic conditions. Primary landscape treatments include fuels reduction, restoration of sustainable forest structure and size/age diversity, and various riparian restoration projects. While these projects focus largely on conifer health and restoration, significant progress has been made that restore oak, aspen, and other vegetation species. In addition, the Lassen has been planning and implementing projects that integrate multiple BLI's to accomplish treatments that meet ecological restoration goals and multiple resource objectives for at least the last five years.

As an example, the Lassen is a leader in restoration of declining aspen stands, a key habitat component for many wildlife species, through removal of encroaching conifers. We have demonstrated that selective removal of the conifers stimulates some aspen regeneration while providing valuable forest products. The Lassen has been establishing partnerships to accomplish restoration work, including the Arbor Day Foundation and others to reforest areas damaged by wildfire.

## Burney-Hat Creek Basins Project

The Burney-Hat Creek Basins Project is a collaborative forest landscape restoration program proposal that was selected for implementation on the Lassen National Forest. The current plan is that restoration projects under this umbrella will be implemented over the next 10 years as funding allows.

The landscape of the Burney-Hat Creek Basins Project is complex in its geography, ecology, and ownership with considerable public forestland currently at high risk from high-intensity wildfire that could severely impact landscape integrity and community safety. The Basins area is in need of restoration to increase the resiliency of the landscape, reduce extreme fire risk, and improve forest health and diversity that sustains habitats necessary for a variety of wildlife species including the California spotted owl. This project will also improve degraded streams and meadows that have

reduced ability to buffer flood flows, produce clean water, and provide vital aquatic habitat to a diminished yet prized and economically-important fishery.

This project is focused on a 400,000 acre landscape and the communities dependent on it, and involves federal and private land, and a dynamic and diverse collaborative partnership group. Restoration of national forests and wetlands in the project area will protect public and private assets (e.g., timber products, homes), provide a sustainable supply of raw material to local mills and co-generation plants, sustain and increase needed jobs, improve local community health and well-being, and reduce future fire and management costs by 11 million dollars.

## Tracking our Accomplishments

The Forest has been a leader in the Region at recording core and integrated accomplishments for at least the last five years. For example, the Swains Mountain project was developed in conjunction with the Redding lab of the Pacific Southwest Research Station. This project will provide valuable research results while yielding commercial forest products, biomass, reduce fuel loading and enhance habitat for several wildlife species. These varying accomplishments will be reported as either core or contributed depending upon the funding source used to implement the project.

The Lassen routinely develops purpose and need statements and proposed actions that incorporate ecological restoration objectives. For example, the objectives of the Campbell Project are to trend conditions towards the desired conditions. The desired conditions for the project include:

1. Healthy forest conditions that are characterized by a more open forest dominated by fire-resistant tree species, and reduced surface fuel loads and ladder fuels where periodic low-intensity surface fires can be reintroduced;
2. Forest areas with reduced tree densities that decrease risk of mortality from insects, drought, disease, and fire; and
3. Restoration of functioning meadow and riparian systems that contributes to landscape biodiversity.

# Ecological Restoration and Partnerships

## Los Padres National Forest

Los Padres National Forest plays an important role in the lives of millions of Central and Southern Californians. The Forest encompasses 1.75 million acres of the Central Coast, stretching from Big Sur south to Santa Barbara and inland to Ojai and Frazier Park. The Forest ranges in elevation from sea level to almost 9,000 feet. These National Forest System lands include critical watersheds that sustain adjacent communities and farmlands. As one of the nation's most populous regions, Central and Southern California is home to 27 million people representing nearly 60 percent of the State's population.

Agriculture plays a prominent role along the Central Coast, with an emphasis on crops that flourish in cool coastal climates. Los Padres tributaries are an important source of water for farming communities, including the Carmel, Salinas, Cuyama, Sisquoc, Santa Ynez, Sespe, and Piru rivers. The Forest is home to 468 different types of fish and wildlife, as well as, many threatened and endangered plant and animal species. Much of Los Padres is primitive and nearly half the Forest's land base is comprised of 10 designated wilderness areas: Ventana, San Rafael, Matilija, Chumash, Dick Smith, Machesna, Santa Lucia, Garcia, Sespe, and Silver Peak. The Forest has 1,200 miles of trails, including two designated National Recreation Trails: the Piedra Blanca and Santo Cruz/Aliso trails, and 1,100 miles of roads.

Los Padres has prehistoric and historic Native American sites, properties related to the practice of Indian and non-Indian religion, historic properties and districts. Interpretation of cultural resources meets a growing demand for information concerning heritage and history. The Forest contains some of the most extraordinary native rock art to be found anywhere in the world. Created by ancestral Native Americans, these complex and intriguing pictographs are found on numerous rock outcroppings and in caves. Forest archaeologists work closely with the academic community, volunteer site-stewards, and local Native American groups to inventory, study, interpret and protect these sites.

The Forest currently has one large-scale Ecological Restoration project—FIRESCAPE Monterey—and several small-scale projects. Within the FIRESCAPE Monterey planning area, we selected two priority watersheds under the Watershed Condition Framework (WCF) process. Our goals for these two watersheds are:

### 1. Big Sur WCF priority watershed

- a. Reconfigure campgrounds along the Big Sur River to increase setback and upgrade sanitation facilities to improve water quality (2013);
- b. Seasonal restrictions on wood fires and dispersed concentrations of visitors among the campsites and potential visitor quotas to lessen impacts on riparian vegetation and soils (ongoing);
- c. Map and inventory invasive weed infestations, and organize group eradication efforts (ongoing).

### 2. Danish Creek/Carmel River WCF priority watershed

- a. Conduct Proper Functioning Condition Assessments along the main stem to determine the riparian/wetland vegetation condition (2012);
- b. Analyze and plan with appropriate NEPA prioritized fuels treatments addressing fire effects and regime condition (2013);
- c. Implement and monitor fuels treatments to address fire effects and regime condition (2014).

FIRESCAPE Monterey will help foster discussion among Los Padres land managers, private land owners, and the public to accelerate the scale and pace of forest restoration and adaptation strategies on both public and private lands. The goal is to retain and restore ecologically healthy and resilient landscapes that have the capacity to adapt and thrive in the face of natural disturbances and large-scale threats to sustainability.

While there is considerable risk of wildfire resulting from climate conditions, decadent vegetation, steep terrain and human use, most fires on Los Padres are human-caused. Intense wildfires cause substantial resource and property damage and are difficult and expensive to suppress. Since 1912, wildfires have burned more than 2.3 million acres in the Forest for an historical average of 25,000 acres per year. Most wildfires are human-caused with the balance resulting from lightning strikes. Some of the largest wildfires in California history occurred on the Los Padres National Forest, including the Matilija (1932/220,000 acres),

Marble Cone (1977/177,866), the Day (2006/162,702), the Zaca (2007/240,000), and the Basin Complex (2008/162,818).

The Forest has developed a 5-year plan for Ecosystems, which includes fuels, reforestation, and thinning projects dependent on available funding. With its limited workforce, the Forest is addressing these smaller-scale fuels treatment projects:

- a. Santa Barbara Front Country Project
- b. Wheeler Gorge Fuelbreak
- c. Alamo Fuelbreak
- d. Sierra Madre Fuelbreak
- e. Tamarisk EIS (removal of tamarisk noxious species using herbicides)
- f. Reforestation treatments in Zaca, Piru, and Day Fire areas

We have one NEPA ready project called the Frazier Mtn. project.

Work occurring across private forest lands and within communities is a critical link to the restoration work occurring on National Forests Service System lands. Public engagement is essential to raising awareness, building consensus, and achieving shared outcomes. By working collaboratively to accomplish mutual goals we can affect tremendous positive benefits. Only with the participation of the public can we truly manage and protect these valuable resources. We have the federally-funded community partnerships:

1. Mt. Pinos Communities Phase1 – Challenge Cost Share Agreement 2010
2. Mt. Pinos Communities Phase2 – Challenge Cost Share Agreement 2011
3. Ojai Community Defense Zone Project – Ojai Valley Land Conservancy Challenge Cost Share Agreement 2011
4. Painted Cave project – Local Landowners Challenge Cost Share Agreement 2011

Currently, we have the following Firesafe Council Grants:

1. 2012 WUI What Kind of Fuel AM I - Highlands Community Fire Safe Committee
2. Mission Canyon Defensible Space Project - Mission Canyon Association
3. San Luis Obispo County 2012 Hazardous Fuel Reduction Program - San Luis Obispo County Community Fire Safe Council, Inc.

4. South Coast Community Fuel Hazard Reduction Project – Big Sur Volunteer Fire Brigade

Last year, we had the following Firesafe Council Grants:

1. Carmel Highlands Community Organization, Education & CWPP Project
2. Carmel Highlands Residential Chipper Program
3. Palo Colorado Fuels Reduction - Glen Deven Ranch - Monterey/Big Sur coast
4. White Rock Strategic Fuel Break Project North of Monterey Ranger District
5. San Luis Obispo Countywide Risk Assessment, CWPP and Environmental Assessment
6. Community Alert Radio - Wildland Residents of Painted Cave
7. Santa Barbara 2010 Community Fuels Hazard Reduction Project
8. Digier Canyon Community Roadside Defensible Space - Mt Pinos community
9. Mil Potrero Communities Interagency Escape Route - Mt Pinos community
10. Girl Scouts Fire Force: Taking Action to be Fire Safe - Ventura County
11. Ojai Valley Wildfire Prevention and Safety Education Project

Last year, we completed the following ecological restoration projects:

1. Day Fire Reforestation
2. Ojai Community Defense Zone
3. Pine Mountain Club Fuel Reduction Project
4. Figueroa Mountain Prescribed Fire understory, pile burning, and thinning
5. Annual Routine Fuel Reduction projects and understory Rx burning and thinning
6. Oversight of non-federal lands partners fuel reduction project activities

If you have questions or would like more information on the Los Padres Ecological Restoration, please contact Public Affairs Officer Andrew Madsen at 805-961-5759.



# Mendocino National Forest Ecological Restoration Plan

## Overview

### Ecological Restoration (ER)

The proclaimed boundaries of the Mendocino National Forest (MNF) encompass 1,079,850 acres, of which, 894,399 (83%) are National Forest System lands, 181,708 (17%) are private lands, and 3,864 (.4%) are owned by other public agencies. A third of the area within the MNF boundaries is federally-designated Wilderness: Snow Mountain Wilderness (37,679 acres), Yolla Bolly-Middle Wilderness (147,070 acres), Yuki Wilderness (53,887 acres), and Sanhedrin Wilderness areas (10,571 acres).

Our mission is to contribute to a sustainable resilient ecosystem, by restoring and improving watersheds and creating fire-adapted landscapes, while providing for a safe, inclusive and diverse environment for employees and the public. We are committed to the active management and stewardship of the land, providing solutions that are science-based, legal, and socially acceptable while fostering partnerships and empowering employees.

The philosophy of restoration on MNF focuses on creating ecologically valuable biological communities in the context of a developed or disturbed landscape while fostering public and partnership support. Our focus of restoration is that the restored landscape enhance not only the plant life, but wildlife populations, ecological functioning (e.g., watershed and forest health, carbon sequestration, recreation, road/trail maintenance, etc.), and human enjoyment. MNF promotes the protection of both life and property affected by wildfire and healthy resilient ecosystems through collaborative stewardship.

### Ecological Services Provided

Mendocino National Forest provides very significant water resources to the state of California. Water flows from the mountains of the Forest into two of the state's largest river systems- the Sacramento and the Eel. This water benefits California through:

- Annual diversions averaging 190 million cubic meters from the Main Fork of the Eel are used for agricultural, municipal and industrial activities via the Sonoma County Water Agency as far south as Marin County.
- Eel River water generates up to 9.4 MW of power via the diversion at the Potter Valley powerhouse.

- Main Fork of the Eel waters also supply the Potter Valley Irrigation District for Agricultural Use.
- The Middle Fork of the Eel hosts one of the State's last and best anadromous fisheries, critical to maintain since most are now so imperiled across California.
- Nearly 240 million cubic meters of water per year to Yolo County municipal and agricultural users via Indian Valley Reservoir and Clear Lake. Most tributaries of these lakes are in the Forest.
- Several agricultural water and municipal supplies in the Sacramento Valley such as the Stony Creek Water District, Paskenta Water District and the Corning Water District derive water from Forest streams and small rivers
- Hundreds of thousands of people on Lake Pillsbury, Van Arsdale Reservoir, Lake Mendocino, Clear Lake, Indian Valley Reservoir, East Park Reservoir, Black Butte Reservoir and Stony Gorge Reservoir use Forest water resources to fish, swim, ski, and generally recreate and have a nice time with their families and friends.

## Goals, Challenges & Opportunities

### Goals

Improve overall forest health, diversity, resistance and resilience to serve the needs of the public

- Protect communities, natural and cultural resources, and developed areas from unwanted, high-intensity wildland fires
- Identify and prioritize vegetation treatments in areas where hazardous fuel loading has occurred as a result of fire suppression and past fires
- Protect and restore water resources and watershed health
- Manage wildland fires, consistent with resource objectives, for multiple objectives; consider firefighter and public safety, benefits, and values to be protected

## Challenges

- **Hazardous Fuels:** Aggressive fire suppression and inadequate vegetation treatment has accelerated the accumulation of fuels and created extreme fire hazards in some areas of the forest.
- **Limited Operating Period:** LOP's to protect wildlife, fisheries, and plants can cause delays in project implementation.
- **Surveys:** MNF has not focused enough resources on conducting surveys as needed (e.g., Northern Spotted Owl surveys).
- **Infrastructure:** Lack of biomass processing plants makes the utilization of biomass on the Mendocino unfeasible. There is a lack of sawlog processing facilities on the west side of the Mendocino creating long haul distances to a mill. This makes Mendocino timber sales difficult to sell.
- **Litigation & appeals:** Receiving notice of intent to litigate on a proposed project delays and/or stops restoration progress. Currently the Forest Leadership Team is working on plans to break down the barriers of resistance through collaboration.
- **Declining budgets:** The value of the penny is decreasing as the need for ecological restoration is increasing. Though leveraging external funding through state and private sources is a valid concept, these other parties are also experiencing declining budgets.
- **Approach to restoration:** Lacking a landscape scale approach, this will be achieved through FireScope (see below).
- **Telling our Story:** MNF has not adequately documented, recorded, and shared our successes.

## Opportunities

### Institute the FireScope Model

FireScope is a collaborative “all lands approach” to ecological restoration that crosses jurisdictional boundaries and involves a range of community partners. Using a three-part process: collaboration, science, and environmental analysis; MNF will enlist and engage private landowners, interested parties, and Government agencies to identify treatment types across a landscape with clear management objectives, including monitoring and adaptive management.

MNF will also develop a hierarchical Land Type Association (LTA) as a base layer of ecological units/systems. One of the principal uses of LTA is to provide information on ecological patterns and

potentials useful for identifying alternatives and setting vegetation management objectives at landscape and watershed scales.

### Collaboration

MNF will continue to improve our relationship and partnership through collaborative efforts with local, state, tribal, and federal agencies, and leverage programmatic agreements to proactively complete formal consultation on land and resource management projects: (e.g., streamline Section 7 consultation with regulatory agencies in support of the Endangered Species Act).

Through the use of open standards and practices of conservation, MNF will improve collaboration with external public and private interest groups; this includes inviting interested parties to field trips and other learning venues.

### Stewardships

MNF will continue to promote a closer working relationship with local communities in a broad range of activities that improve land conditions.

### Grants

MNF will continue to seek out and leverage grant opportunities (e.g., OHV, EPA, CVPI-Act, Rocky Mountain Elk Foundation)

## Plans, Tactics & Integration

### FY2013 Ecological Restoration Plans

- Though guided by the WO and the RO on target accomplishments, MNF is focused on outcomes of restoration efforts. Current and future projects on the MNF demonstrate an integration approach to restoration by combining the various Budget Line Items (BLIs) and treatments (e.g., prescribed burning, thinning, vegetation and roads maintenance, etc.). The table below shows our planned restoration activities for fiscal year 2013:

### Tactics

#### Restore ecosystem processes and create resilient ecosystems

- Integrate the existing program management effort FireScope
- Develop a basis for restoring sustainable, more natural fire regimes across large areas such as entire mountain ranges or large landscapes
- Improve management techniques and incorporate lessons learned from past and on-going work

Measure Name	Quantity
Acres of forest vegetation established	318
Acres of forestland vegetation improved	342
Volume of Timber sold (CCF)	15,500
Acres of rangeland vegetation improved	3,102
Miles of system trail maintained	121
Miles of road decommissioned	5
Miles of high clearance system roads receiving maintenance	242
Number of acres treated to reduce the risk of catastrophic wildland fire	4,230
Highest priority acres treated annually for noxious weeds and invasive plants on NFS lands	61
Acres of water or soil resources protected, maintained or improved to achieve desired watershed conditions	1,482
Acres of lake habitat restored or enhanced	7
Miles of stream habitat restored or enhanced	17
Acres of terrestrial habitat restored or enhanced	8,228

The Appendix of this document provides a map of current and future projects, map and pictures of past roads/trail maintenance in support of ecological restoration.

- Invest strategic work towards our goal of self-sustaining landscape system that provides desired ecosystem services and conditions

#### Apply innovative and scientific approaches

- Take advantage of mosaic patterns and reduced fuels left by past fires and treatments
- Use the various tools, techniques and technologies available to reduce undesirable effects of unwanted fire behavior on people and communities
- Incorporate research and monitoring to answer key questions
- Build on past successes; focus on future restoration action

#### Keep people engaged in all activities

- Develop a shared vision by seeking out and working with partners and the public
- Share our experiences with others

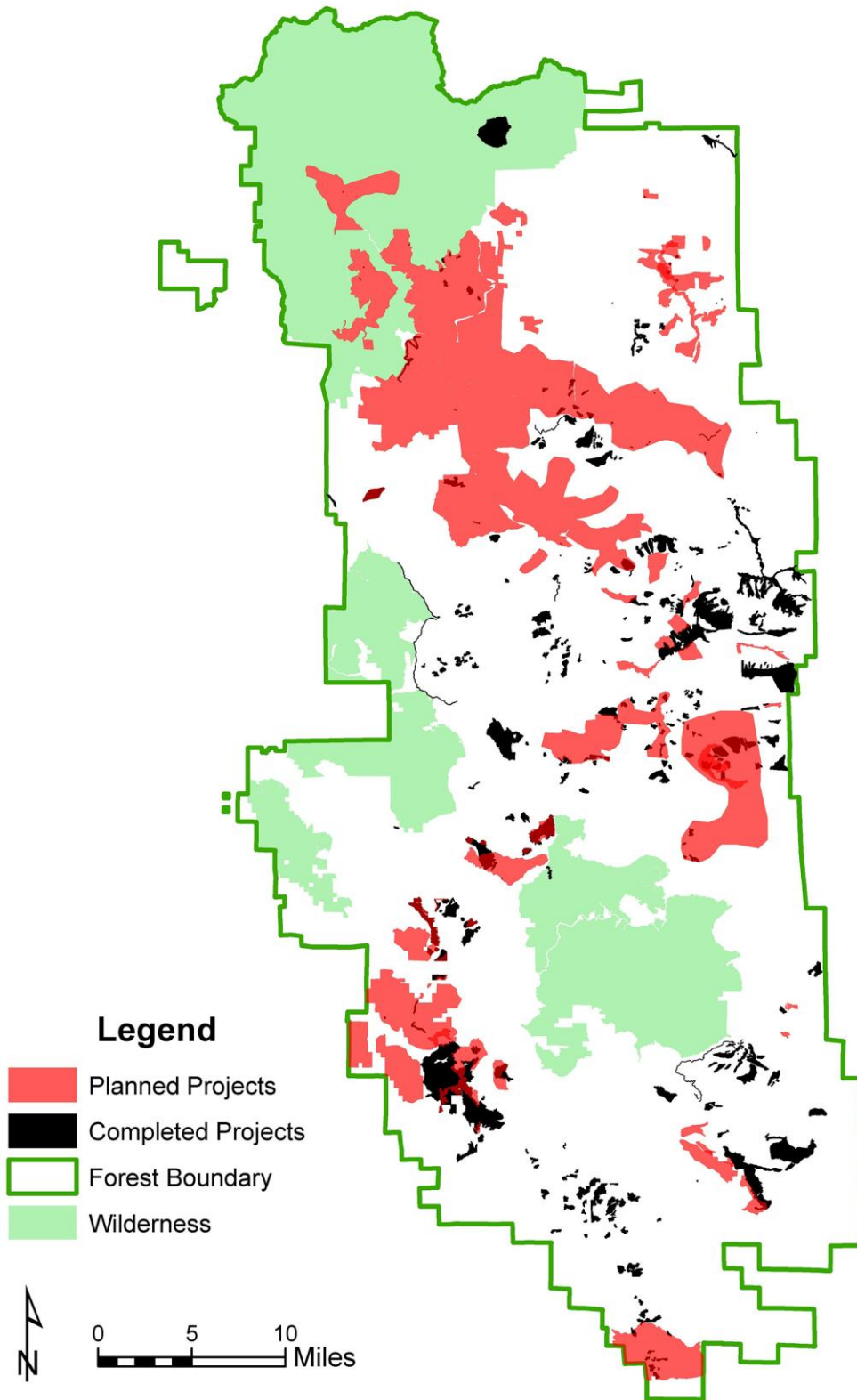
## Integration of Budget and Actions

In order to increase the pace and scale of ecological restoration with constricting budgets, MNF will identify and utilize opportunities to leverage resources and integrate ecological restoration activities and Budget Line Items (BLIs) across multiple functions, and with other agencies and partners, across broad landscapes. MNF will seek opportunities to improve efficiency by:

- Integrating various BLIs and accomplishing multiple restoration activities in a given area to provide a greater restoration effect or larger restoration footprint (e.g., vegetation treatment, prescribe burning, treating invasive species, improving habitat or connectivity, and addressing legacy road issues in a project area; coordinating work across land ownerships using the All Lands Approach).
- Contracting bundles of work to allow coincident use of equipment or crews to accomplish multiple ecological restoration activities in an area at lower cost (e.g., maximizing the use of stewardship contracting authorities, harmonizing different priorities across resource areas to accomplish a lower priority restoration action now rather than come back to the area and do the action independently later).
- Integrated planning of nearby projects to streamline pre-NEPA surveys and fieldwork and simplify NEPA analysis (e.g., coordinating project boundaries and project timelines to streamline field work and maximize information benefit and allow for integrated, multi-resource field work).
- Selecting, where appropriate, initial sites for ecological restoration that have immediate ecosystem benefits or can contribute to establishing ecosystem service infrastructure (e.g., selecting sites for initial restoration that can help maintain or establish infrastructure for beneficial use of restoration biomass).

Future “Firescape” would look at the entire forest and beyond. This will allow for the option to manage fires for multiple objectives forest-wide.

**ECOLOGICAL RESTORATION PROJECTS ON THE MENDOCINO NATIONAL FOREST**



## Restoration Examples

### Atchison Road and Ericson Road stormproofing and fish passage projects (2009)

These projects “stormproofed” roads in the Black Butte (Atchison) and Lake Pillsbury (Ericson) watersheds by constructing rolling dips to reduce concentrations of runoff from the roadway, and critical dips to lessen stream diversion potential. Also included in the projects was road brushing, outsloping selected road segments, and cleaning of culvert inlets. Atchison had a total cost of \$149,910, treated 31 miles of native-surfaced road, and opened/restored 3 miles of salmon

and steelhead habitat. Ericson had a total cost of \$66,384 (\$27,810 of Forest Service funding and \$38,574 from other sources) and treated approximately 8 miles of native-surfaced road.

Insloped roads concentrate surface runoff and rolling dips will benefit the watersheds and threatened/endangered species through sediment reduction. Critical dips at culverts will potentially prevent hundreds of cubic yards of sediment resulting from culvert fill/failure. Stormproofing is especially important as most of the culverts on the Forest are over 30 years old and are approaching the end of their expected service.

Atchison (before)



Ericson (before)



Before: Existing road systems were predominantly insloped with ditch and crossdrains.

Atchison (after)



Ericson (after)



After: Rolling dips are constructed at intervals that greatly reduce potential runoff accumulations.

## Middle Creek Open Riding Area Restoration Project

This project has significantly reduced sediment from the OHV staging area into Middle Creek, which is habitat for the Clear Lake Hitch.



Photo 1 (Before): Picture is taken looking toward the Elk Mountain Rd bridge over the West Fork of Middle Creek. In the foreground is the OHV riding area being subsoiled to alleviate compaction. The highly compacted riding area would contribute significant amounts of runoff and fine sediment into the West Fork during even frequent low-intensity rainfall events.



Photo 3 (After): This picture was taken from about the same spot as the first one (The bridge over the West Fork can be seen in the background), about 2 years after completion. Native vegetation has been established creating a bio-filter for overland flow coming from the remaining riding area.



Photo 2 (During): Picture was taken from the bridge over West Fork Middle Creek the first winter after completion. Straw was used to stabilize the area until vegetation could take hold. Overland flow can be seen ponding in depressions allowing the majority of the runoff to infiltrate back into the soil and deposit fine sediments instead of spilling into West Fork. Also seen in this picture are two of the rocked outlets that were constructed for infrequent high-flow events. Rocked and waddled outlets also helped trap sediment. These outlets serve to also direct return flow back into the West Fork when it floods over its banks into the area.



Photo 4 (After): Close-up of the sign. Also the greyish area to the right is a ponding/infiltrating area. Distinct vegetation around the edges is comprised of riparian species. These ponded areas also provide habitat for macroinvertebrates.

# Ecological Restoration on the Modoc National Forest

## Overview

This chapter describes the landscape-level restoration strategy for the ecosystems on and adjacent to the Modoc National Forest. Nestled in northeastern California, the Modoc National Forest is a land of ecological contrasts, including vast stands of sage steppe intermixed with coniferous forests, ephemeral wetlands, lava flows, and high-desert plateaus. Consequently, it contains a variety of habitats for unique plants, wildlife, and fish. Geologically, the Modoc NF is unique in the world for its obsidian sources, which have added to the rich prehistoric and settlement history. The vastness and remoteness of the Modoc and expansive adjacent private lands create a penetrating solitude that is valued by both locals and visitors, while continuing the cultural heritage of this place.

The objective of the restoration on the forest is to treat landscapes in a holistic fashion regardless of ownership. Accordingly, the forest has engaged many partners in all phases of planning, implementation, and monitoring. Due to its location outside of the political forefront, the forest and its partners recognize the need to work together to stretch the money they receive both from internal budgets and grants.

Modoc County is consistently in the lowest 20 percent of California counties, based on various economic metrics (e.g., per capita income). The grazing industry is a key component of the county economy. Although Modoc County is poorly located to compete for the relocation of existing and expanding businesses, a stable biomass industry would enable the creation of jobs, while providing a key driver in the forest's ability to proceed with large-scale restoration. The estimated economic benefits of restoration efforts on the Modoc could range from \$606 to \$1,402 plus per acre, based on an Oregon study; the same study found two to three indirect jobs created for each direct job created. For this reason the Modoc NF believes the county would receive a great economic boon from implementation of planned restoration activities.

## Past Projects

### Turner Creek

Watershed restoration has been a key focus on the forest, especially given the number special-status fish species. Turner Creek on the Devil's Garden Ranger District was selected as a focus area for long-term restoration, due to condition of the habitat and the restricted range of the endangered Modoc Sucker (*Catostomus microps*). This area is key to maintaining

the population as a whole. Although the project began with in-stream improvements, it expanded into the uplands to achieve habitat improvement goals for the Modoc sucker and other wildlife species.

Work began in the Turner Creek area in 1985 and expanded recently with a series of grants from United States Fish and Wildlife Service (USFWS)—Klamath Falls Office, Modoc County Resource Advisory Committee, and Rocky Mountain Elk Foundation. The current Turner Creek Project sought to enhance vegetation condition using the following: (1) a 200-acre riparian enclosure, which will receive long-term light grazing in a rest-rotation system; (2) a 2,900-acre riparian pasture system with early season, limited grazing; (3) installation of a cattle guard and stock tanks to redistribute livestock across the allotment; (4) maintenance of an existing fish barrier to decrease the presence of competing exotic fish species; (5) construction of a fish barrier to prevent movement of exotic fish species; and (6) thinning of 132 acres of junipers in the floodplain and encroaching conifers in an adjacent aspen stand to enhance riparian plant species abundance. The forest staff members expect an increase in riparian and upland plants, which not only improve riparian function and creek shading for the Modoc sucker, but in turn provide food and cover for elk, deer, antelope, and a variety of land birds. The pictures below show before (L) and after (R) the restoration.

### Sage Steppe Restoration

The 785,000-acre sage steppe landscape has been altered significantly in the past 150 years. Historic landscape vegetation patterns in the sage steppe consisted of a mosaic of big and low sagebrush, grasslands, and western juniper. Fire controlled these landscape patterns. Factors such as past livestock grazing, introduction of nonnative invasive species, and fire suppression have altered plant community composition. The changes in plant composition have had wide-ranging effects: (1) increased juniper density causing a reduction in ground cover with corresponding increases in erosion; (2) a decrease in greater sage-grouse and antelope populations due to the decrease in sagebrush and other native plants; and (3) a decrease in livestock forage. A decrease in the forage base coupled with the potential listing of the greater sage-grouse, makes implementation of sage steppe restoration projects critical from a social, economic, and ecological standpoint.



Turner Creek before restoration.



Turner Creek after restoration.

Sage steppe restoration on the Modoc National Forest is focused on the restoration of ecosystem processes and vegetation conditions that resemble historic mosaics, so that fire can be re-introduced; the forest is trying to use biomass as the vehicle for implementing national renewable-energy direction where appropriate. Although sage steppe restoration began on the Modoc National Forest on a small scale back with projects like the 350 acre chaining to decrease juniper cover in 1969, the multi-agency Sage Steppe Ecosystem Restoration Strategy Final Environmental Impact Statement and companion Record of Decision have allowed for a large-scale approach to managing sage steppe habitats across various ownerships. Many partners have supported the sage steppe restoration, including the Devil’s Garden/Clear Lake Sage-Grouse Working Group; the Natural Resource Conservation Service (NRCS)—Tulelake District and Alturas District Offices; USFWS—Klamath Falls Office and the Klamath Basin National Wildlife Refuge Complex; Modoc County Resource Advisory Committee; Lava Beds—Butte Valley Resource Conservation District (RCD); Bureau of Land Management (BLM)—Alturas Field Office.

The NRCS Sage-Grouse Initiative has been instrumental in jump-starting large-scale treatments. The Sage-Grouse Initiative is the culmination of work by the NRCS to find a way to proactively manage greater sage-grouse so there is no need to federally list the species. If the greater sage-grouse were listed as a threatened or endangered species, this event would likely have a dramatic impact on livestock ranching and other industries in northeastern California and Modoc County.

Monitoring to measure project success consists of measuring the following: noxious weed presence, old-growth juniper retention, point line intercept data (to determine understory grass and forb response to treatments), and dense juniper retention. This data is housed in a database cooperatively developed by the

BLM—Alturas Field Office, the United States Geological Survey (USGS)—Bend Office, the Modoc National Forest, and others.

The forest has been active in getting the restoration message out to the public. A series of ADA-compliant interpretative panels was placed in Howard’s Gulch, highlighting long-term watershed and sage steppe restoration efforts. The Modoc NF submitted a release to the Region 9 Success Story Reporting Web site telling about this project. Also, the Doublehead Ranger District was recently featured on a field trip sponsored by Oregon State University. The following photo shows an interpretive panel placed next to California Highway 139, explaining the restoration work done on Howard’s Gulch.



An interpretive panel placed next to California Highway 139, explaining the restoration work done on Howard’s Gulch.

With respect to 2011 project implementation, the Carr Juniper Project and Mowitz Pasture Juniper Treatment Project are two of the project-level accomplishments for sage steppe management. The Carr project treated 100 of the 1,000 planned acres; the junipers removed from the treatment area will be used as sawlogs and sold to REACH, Inc. in Klamath Falls, Oregon. REACH, Inc., a non-profit organization, promotes equality and acceptance of people with disabilities;



they produce juniper wood products such as decking, landscape bark, flooring, square posts, peeled poles, paneling, and lumber. The partnership that REACH has built with the community is aimed at encouraging the growth and development of these relationships. There were 700 acres of juniper treatment in the Mowitz area, which is key late brood rearing and fall habitat for greater sage-grouse. The following picture shows the Carr Juniper project area with treated and untreated areas in the photo. The area in the background left is private land where most of the juniper trees have been cut down. The remaining junipers are within the Carr Juniper ARRA Project area. Most of these trees will be mechanically removed, which will complement efforts made by the private land owner, the USFWS, and the NRCS.



The Carr Juniper project area showing treated and untreated areas.

### Crowder Elk

The Crowder Elk Project is an 11,000-acre series of prescribed burns to revitalize understory grasses, forbs, and shrubs in east-side pine stands on the Devil's Garden Ranger District. Specifically, pine stands that had been thinned receive prescribed fire, which stimulates species such as snowbrush and chokecherry. The combination of the thinning and fire open overstory stands to permit more light and decrease competition for understory grasses and forbs. In 2011 the forest treated 867 acres within the Crowder project area.

This project is part of an overall reintroduction of fire into fire-adapted ecosystems. Data indicates that this area has the largest concentration of elk on the Devil's Garden Plateau. As part of a larger habitat restoration effort for elk on the Devil's Garden Plateau, the Rocky Mountain Elk Foundation has also provided funding for the installation of guzzlers, as well as treatment to remove juniper to enhance sage steppe stands.

Monitoring consists of a series of photo points to determine understory plant response.

## Future Restoration Projects

### Ambrose-Ash Watershed Enhancement Project

The Ambrose-Ash Watershed Enhancement Project covers about 3,150 acres in the southwest corner of the forest. (See map on the next page.) The project aims to remove invasive junipers to increase forage and water yields, reduce stream-zone fire hazards while improving timber growth potential, and restore oak-pine woodland habitat through under-burning.

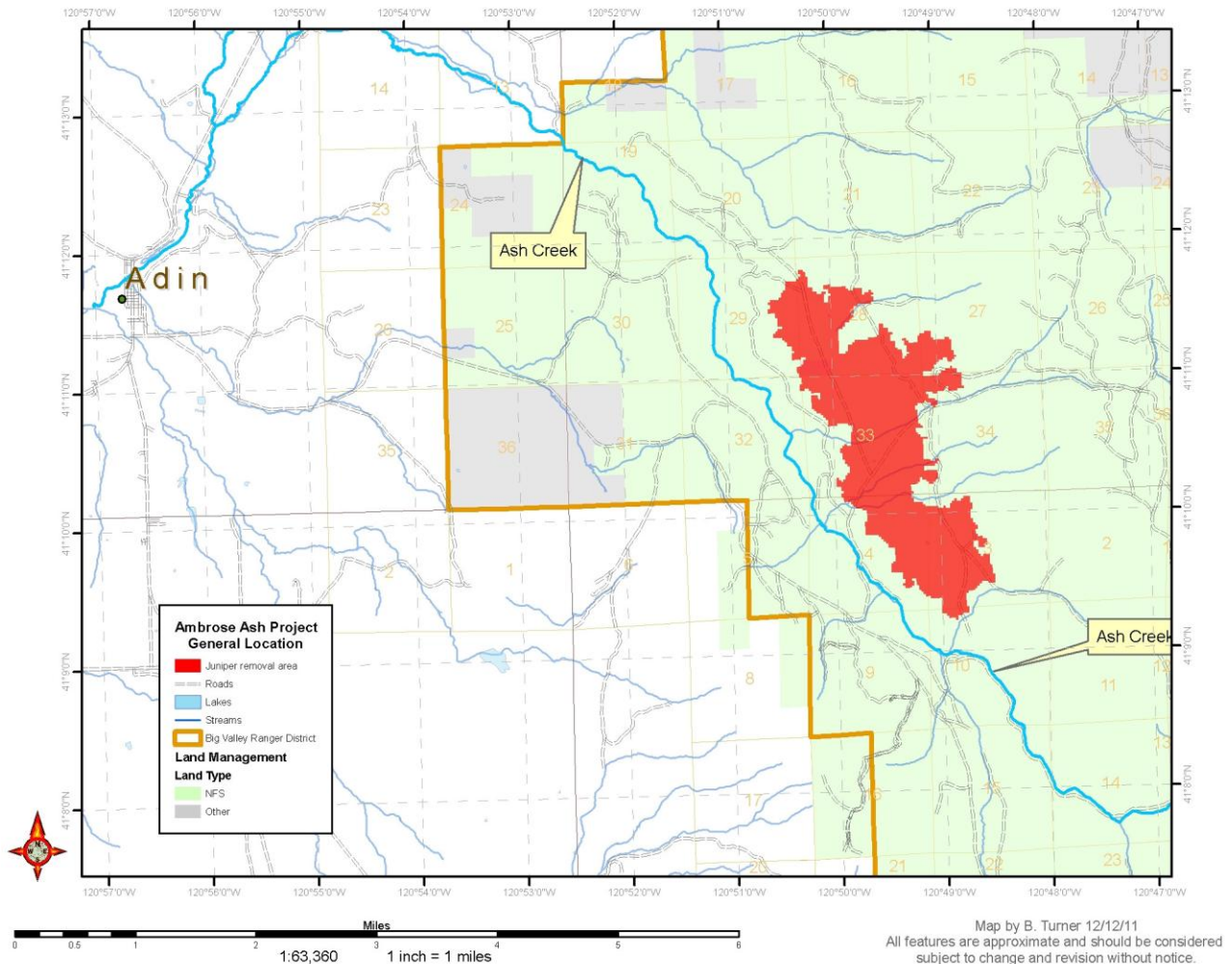
On approximately 1,000 acres in Ambrose Valley, invasive junipers will be removed to improve growing conditions for grasses, forbs, shrubs, and especially sagebrush. Other features in this restoration project are removal of junipers (except old growth) by hand thinning, and piling and burning of slash piles. As a result, moisture within spring-fed soils in Ambrose valley is expected to increase from reduction in transpiration by junipers. Cost is about \$425,000.

On about 130 additional acres, removing the coniferous fuel ladder will improve the streamside management zone. Estimated cost is \$78,000. On another 20 acres, thinning the conifers from below in the outer half of the RCA and removing the fuel ladder within the inner half will improve the riparian conservation area (RCA) at an estimated cost of \$15,000.

We also plan to thin and under-burn on pine and oak stands near Ash Creek at a cost of \$300,000 for 2,000 acres. Benefits will be restored grazing and water yields, fire resiliency in the stream side and thinned pine stands, and oak-pine habitat enhancement through under-burning. The following photo shows the oak-pine forest in the Ash Creek area; a map of the Ambrose-Ash area follows.



The Carr Juniper project area showing treated and untreated areas.



## Sage Steppe Restoration

Given the tremendous financial resources provided by the Sage-Grouse Initiative, sage steppe restoration will continue to be a forefront of Modoc NF restoration efforts in the next 2 to 5 years. Working with the livestock permittees and other partners, there are plans to treat 18,350 acres of juniper as well as install 17 water developments and 25 miles of wildlife-friendly fences. Total amount of grant money under the various initiatives to accomplish the work is \$2.5 million dollars for projects occurring on forest system lands. The Modoc NF projects are part of the larger restoration efforts on USFWS, BLM, and private lands enabling large-scale habitat improvements, which should benefit plant and animal species as well as watershed function at multiple levels.

One of the greatest challenges to the forest sage steppe restoration program is the cost of surveys to prepare environmental documentation. Although many organizations willingly provide implementation funding, they are not willing to provide funding for planning. The Modoc County Resource Advisory

Committee and the USFWS have been very generous in offering funding for archeological and botanical surveys; however, the Modoc NF is currently in need of additional funds to accomplish restoration efforts.

## Lassen Creek

The Lassen 13 Restoration Project, located in the northern Warner Mountain RD, is approximately 25,000 acres in size; plans are to begin restoration in 2014. The project area consists of ponderosa and Jeffrey pine dominated stands, many of which were planted after a stand-replacing fire impacted the area in the early 1940s. White fir and lodgepole pine pockets, small natural meadows, and grasslands are scattered throughout the project area.

The overall objectives of the project are to create stands more resilient to fire, insect, and disease by reducing stocking levels while providing sustainable economic and social benefits to the surrounding communities. Focus areas are riparian area enhancement; timber stand improvement; range and big game habitat regeneration; and recreation

management. Prescribed fire will be used to reduce fuel loading remaining after harvest treatments, to rejuvenate stagnating grasslands and sage steppe habitat, and to regenerate aspen stands. Adaptive grazing management will be used to enhance aspen stands and riparian system function. The key components of adaptive grazing are production monitoring, the development of exclosures, and rotational grazing. Decommissioning of identified campgrounds is also proposed to reduce impacts to associated riparian areas as well as preserving the condition of areas that may have historically been used by Native Americans.

Project collaboration among Forest Service and outside partners will be essential. Potential external partners are the Modoc County Cattleman’s Association, Rocky Mountain Elk Foundation, Pit River Tribe, Modoc/Washoe Experimental Stewardship Program, and grazing permittees. The District Ranger has begun consultation with the Modoc County Cattleman’s Association, Modoc/Washoe Experimental Stewardship Program, and grazing permittees for this effort.

### Homestead

The Homestead Forest Health Project proposes to treat approximately 1,500 acres of mixed conifer forests at the southern end of the Warner Mountains that are being threatened by both mountain pine beetle and fir-engraver beetle. The primary goal of the project is to restore the forests to a mixture of species and stand structures that better resemble the historic norm before wildfire was excluded from the area. To accomplish this goal, stands will be thinned to reduce the percentage of both lodgepole pine and white fir, and promote the successful regeneration of Washoe and ponderosa pine. Thinning treatments will be followed by prescribed fire. The resulting stands should be more resilient to fire, drought, insects, and disease. A secondary goal of the project is to experimentally test treatments to establish whitebark pine.

### Medicine Lake Highlands

The Medicine Lake wildland-urban interface (WUI) is a highly valued recreational area threatened by a mountain pine beetle infestation. Left unchecked, this infestation could substantially reduce tree diversity, reducing future timber yields, degrading wildlife habitat, watershed health, and aesthetic values of the Medicine Lake recreational area. The infestation could also affect tribal spiritual and cultural interests.

The planning area is 13,000 acres within the Medicine Lake watershed, including about 5,400 acres of lodgepole pine. The forest proposes (a) green-tree thinning to reduce tree density and increase the health

and vigor of residual trees; (b) removal of green, dead and dying insect infested trees to reduce the insect population; and (c) use of Verbenone pouches (an anti-aggregation pheromone) and carbaryl insecticide.

The forest also proposes fuel treatments to reduce fire behavior effects within the Medicine Lake WUI: placing fuel breaks along established roads, whole-tree removal, slash piling and burning, mastication, pruning, chipping, and under-burning.

The following picture shows lodgepole pines in the Medicine Lake area with dead and dying limbs from beetle infestation.

### Wild Horses

The Devils Garden Plateau Wild Horse Territory consists of about 268,750 acres on the Devils Garden and Doublehead Ranger Districts, and 8,500 acres on BLM land administered by the Alturas Field Office. The Modoc NF manages the animals under authority of a 1979 memorandum of understanding with the BLM. The Modoc Forest Plan (1991) has set the appropriate management level (AML) at 275 to 335 head.

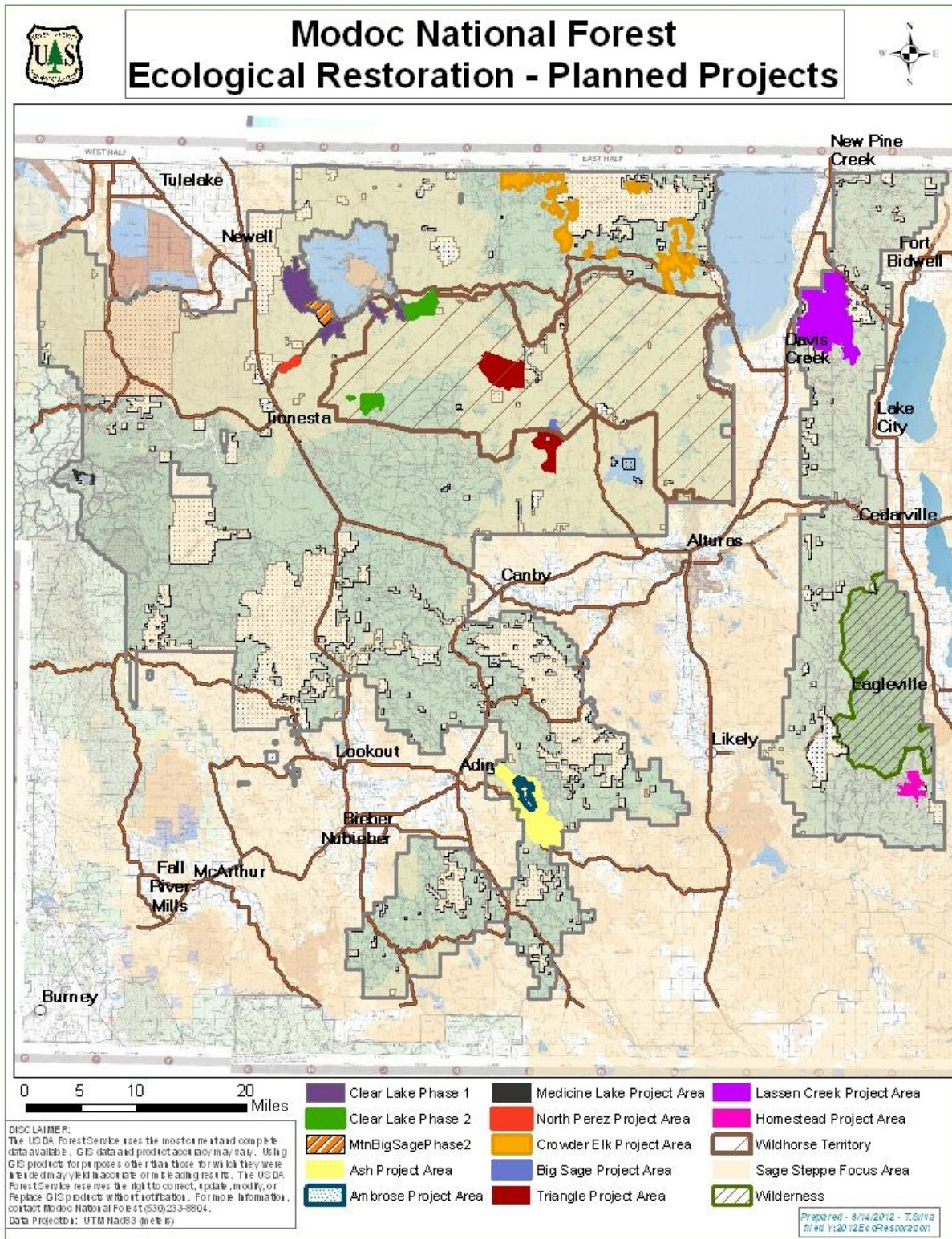
The territory contains western juniper and east-side pine. They provide adequate cover to protect animals from inclement weather, except for very cold winters. Forage consists of sagebrushes, bitterbrush, Idaho fescue, blue grasses, clovers, and mule’s ear. There is sufficient forage to maintain the wild horses when their populations are at or near AML in all but the most severe winters.

Permitted livestock grazing occurs across the territory. There is evidence of overuse by horses in some of the limited riparian areas. Besides deer and antelope, there is also a growing elk herd of over 600 head.

Since the passage of the Wild and Free-Roaming Horse and Burro Act in 1971, wild horses in the territory have been managed as an integral part of their habitat. Excess wild horses have been periodically removed to achieve population levels in balance with the habitat. The BLM’s Eagle Lake Field Office works cooperatively with the forest to capture, care for and hold, and offer for adoption excess animals removed from the forest.



Lodgepole pines in the Medicine Lake area with dead and dying limbs from beetle infestation.



# Plumas National Forest Ecological Restoration Program

## Water, Forests, Communities...and room to breathe...

The 1.2 million acre Plumas National Forest (PNF) is located in the north eastern Sierra Nevada just south of the Cascade Range. The forest extends from the western foothills just above the Sacramento Valley/Lake Oroville to the Great Basin desert near the Nevada border with elevations ranging from 900 to 8,372 feet.

The PNF encompasses the majority of the upper Feather River watershed, the largest watershed in the Sierra Nevada at 3,500 square miles and one of the most significant sources of water for almost half of California's population (15 million) via the State Water Project. A series of dams and powerhouses on the Upper Feather River provide 9–30 percent of the State's electrical supply via hydroelectric generation.

Heavily forested and thinly populated, 70 percent of the forest lies within Plumas County with a population of around 20,000. PNF acreage is also within boundaries of Butte, Lassen, Sierra and Yuba counties. The PNF has historically been a regional leader in timber production.

Local community economies are largely natural resource dependent with a growing component of older retirees and affluent second home owners (e.g., Graeagle, Lake Almanor). Non local recreational traffic comes primarily from nearby cities of Reno, NV and the Sacramento Valley area. Developed recreation is primarily reservoir based.

## Key Ecological Restoration Goals

FY 2012: Continue a Forest-wide defensible fuel profile zone (DFPZ) network per the Herger-Feinstein Quincy Library Group (HFQLG) Forest Recovery Act prior to expiration of the Act. Over 3500 acres of integrated projects (fuels, vegetation, watershed, timber, and wildlife) will occur, largely in priority watersheds.

FY 2013: Substantially expand project integration with an increased level of partner engagement.

## Strategic Goals for 5-year Program of Work [no priority order] include:

Focus on forest health restoration projects, including: (1) fuels reduction work that reduces fire risk to communities, strategic watersheds and recreation sites,

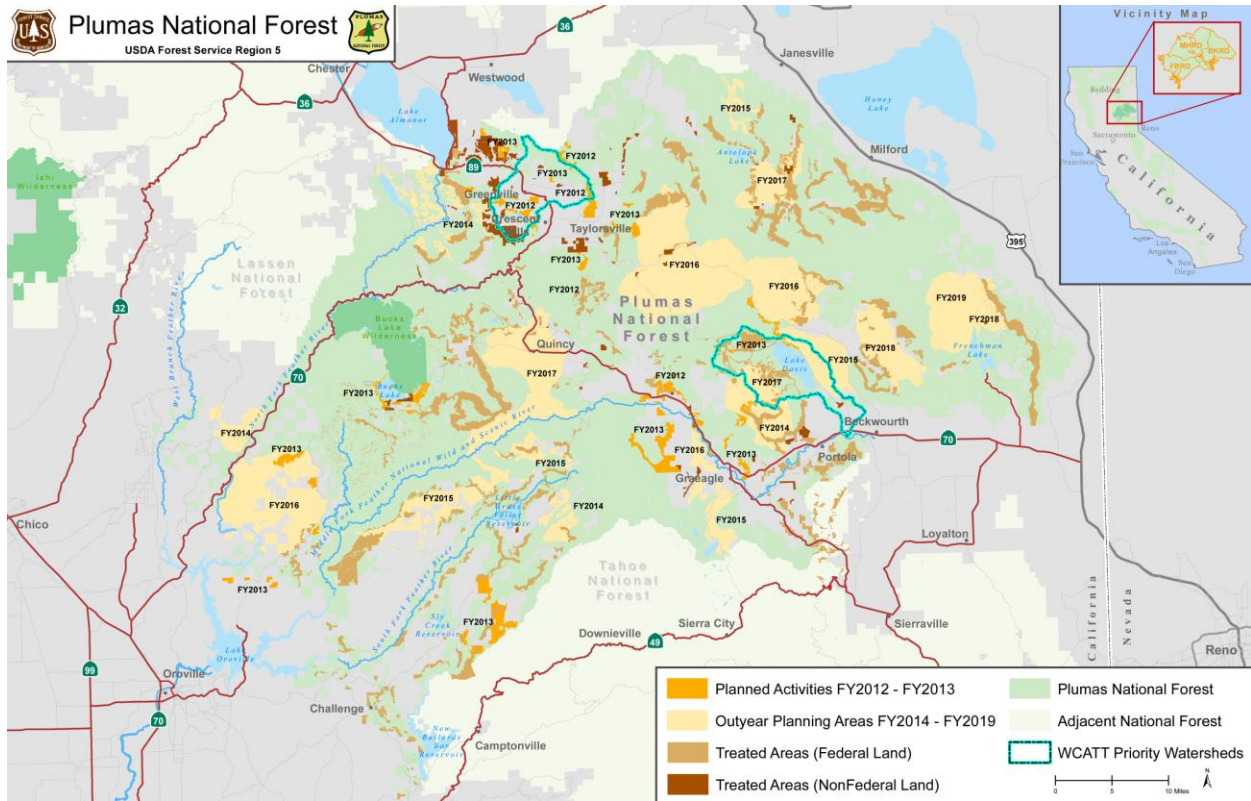
and (2) watershed work that restores meadows and riparian/aquatic ecosystems

- Increase project coordination with tribal, local, county, state and federal partners
- Contribute to job creation in restoration and recreation as key components of local rural community stability and worker/industry sustainability for the PNF
- Complete a PNF Strategy for Sustainable Recreation; integrate recreation project work to the degree possible with forest health restoration projects
- Continue to revise the transportation system to enhance sustainability
- Improve resilience of general forested landscapes to stand-replacing wildfire, particularly in high-value wildlife habitat in keeping with the principles expressed in Pacific Southwest Research Station (PSW) publications GTR-220<sup>6</sup> and GTR-237.<sup>7</sup>
- Restore fire-damaged watersheds including re-establishing habitat connectivity in forested landscapes (Moonlight Fire alone destroyed 20 CA Spotted Owl Protected Activity Centers)
- Identify areas and resources most vulnerable to climate change, and develop management strategies to reduce vulnerability and support additional restoration actions (e.g., watershed restoration and potential salmon reintroduction to headwater tributaries)
- Reduce spread of invasive species and treat existing populations
- Improve economics of forest product removal
- Capitalize on existing and new opportunities for partnerships, particularly to leverage declining appropriated dollars.

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6. [Available for download at  
www.fs.fed.us/psw/publications/documents/psw\\_qtr220](http://www.fs.fed.us/psw/publications/documents/psw_qtr220)

7. [Available for download at  
www.fs.fed.us/psw/publications/documents/psw\\_qtr237](http://www.fs.fed.us/psw/publications/documents/psw_qtr237)



Fiscal Year	NEPA Document	NEPA Status	Project Name	Fuels Acres	Volume (CCF)	Priority Watershed?	Other Integrated Targets
FY 2013	Big Hill	In progress	Eureka MP Thin (TS or IRTC)	1,415	11,600	yes	
			Gallagher (TS or IRTC)	900	4,400	yes	
	Bucks Lake Fuels/Hazard Tree	Complete	Bucks Lake Fuels/Haz Tree Stewardship	1,319	10,600		
	Empire	Complete	Refuge MP Thin Re-offer IRTC or IRSC	1,038	11,285		
	Small Sales	Complete or Almost	Small Sales	100	1,350		
	Grass Flat (part)	In progress	Grass Flat DFPZ and GS	956	7,100		
	Grizz EA	Complete	Pano (TS or IRTC)	150	1,125	yes	Watershed (WS)
	Ingalls	Complete	Ingalls SC	770	-	yes	WS
	Keddie Ridge Fuels Reduction	Complete	Keddie Stewardship (IRTC)	1,385	9,840	yes	WS; Terrestrial Wildlife (WL-Terr)
	On Top	In progress	Palmetto MP Thin	695	16,450		
	Sugarloaf	In progress	Paulson MP Thin SBA	962	12,600		
	Jackson	Complete	Sugarloaf DFPZ and GS	611	22,200		WS; WL-terr
Integrated Fuels Program	Complete or Almost	Jackson SC	200	-			
			Integrated Fuels Program	1,600	-		WL-terr
<b>Total FY 2013</b>				<b>2,101</b>	<b>108,550</b>		

Fiscal Year	NEPA Document	NEPA Status	Project Name	Fuels Acres	Volume (CCF)	Priority Watershed?	Other Integrated Targets
FY 2014	Belden	In progress	Belden	7,563	39,000		
	Big Hill	In progress	Big Hill SC	800	-	yes	WS
	Cradle Valley	In Development	TBD (TS or IRTC)	70	350		
	Eastside Underburning	In Development	Eastside Underburning FY 14	1,000	-		WL-terr
	Hayden	In Development	Hayden (TS or IRTC)	1,000	8,000		
	Union Hill	In Development	Union Hill	1,500	26,000		
	Integrated Fuels Program	Complete or Almost	Integrated Fuels Program	1,800	-		
	<b>Total</b>				<b>13,733</b>	<b>73,350</b>	

Fiscal Year	NEPA Document	NEPA Status	Fuels Acres	Volume (CCF)
FY 2015	Camp Creek	In Development	10,000 – 14,000	70,000 – 85,000
	Crocker			
	Lakes Basin			
	Wildcat			
	Integrated Fuels Program			
FY 2016	Dogwood	In Development	10,000 – 14,000	70,000 – 85,000
	Genesee			
	Middle Fork			
	Pinchard			
	Plumas-Eureka			
	Poco			
FY 2017	French Creek	In Development	10,000 – 14,000	70,000 – 85,000
	Frenchman			
	Mohawk Vista			
	Monitor Flat			
	Murdock Crossing			

## Challenges

- Overstocked stands with disproportionately large component of shade tolerant species with low resiliency to wildfire and climate change (forest health)
- Uncharacteristically severe and more frequent large fires compared to historical averages
- Challenging market conditions for forest products removed for ecological restoration purposes, particularly biomass
- Idled biomass facilities
- Watershed impacts from extensive road system and historic mining
- Air quality concerns as prescribed fire is reintroduced into fire-adapted ecosystems (small burn windows)
- Extremely steep canyons (topography)
- Landowner concerns about water rights downstream from some types of meadow restoration projects
- County & Community infrastructure is strained (losing schools, hospitals & funding for chambers of commerce)



- Recreation remains relatively undeveloped and organized recreation coalitions are few

## Opportunities

- Landscape-scale treatments are possible as a result of consolidated Federal land ownership patterns; series of fuel breaks (HFQLG) already in place at the landscape scale (all lands) to protect investments
- Organizational experience remains; employees have successful track record with integrated resource management projects at the landscape-scale
- High local community drive and capacity as unemployment rate is twice national average (urgency)
- Community leaders are supportive of active forest management, particularly fuels reduction
- Existing wood products infrastructure
- Important partnerships in place (Feather River Coordinated Resource Management Group (FRCRM), HFQLG & Firesafe Councils)
- Little pressure from rapid human population growth in wildland urban interface
- Continue building resilience and re-alignment (integration) into our forest management strategies, as appropriated funding projections show declines
- Local interest and local capacity to enhance recreation-based economy
- Noxious weed populations are small
- Continue highly effective habitat enhancement projects, particularly for aspen, black oak, and aquatic species, with local, state and national partners
- Increase conservation education, interpretation and volunteer programs to increase understanding of the USFS mission

## Compelling Need for Action

On a regional scale, the California Water Plan and the Integrated Regional Water Management Plan recognize the importance of forest management on water quantity and quality, and potentially timing of water delivery as well. Nearly all forest management, whether for

recreation, roads, fuels management, forest health, wildlife habitat management or timber production, at some level comes down to water.

The Feather River region has been identified as “climate vulnerable” due to warming temperatures. (Example: winter average minimum nighttime temperatures have risen by as much as 9 degrees Fahrenheit in parts of the Feather River region over the past 50 years, compared to a more common range of 2–3 degrees Fahrenheit increases across the Sierra Nevada). As a result, the Feather River watershed has exhibited some of the largest changes in timing of runoff and loss of low-elevation snowpack observed in California (with potential long-term consequences to water supply, hydroelectric supply, flood control, etc.). Restoration takes on additional urgency as the National Marine Fisheries Service looks to the upper watersheds in the Sierra Nevada, including those on the PNF, for reintroduction and recovery of highly endangered salmon populations.

Recent fire history (160,000 acres burned/2000 – 2012; much at high severity) indicates a trend toward increases in disturbance events such as uncharacteristic large-scale wildfires, floods, and landslides, highlighting the urgency to improve forest health and resiliency especially in landscapes that haven’t been impacted by large scale events.

The rural communities that lie within and adjacent to the PNF are heavily dependent upon the National Forest for forest products jobs, services and recreation-based tourism. Unemployment rates are twice the national average in some counties. From a community standpoint, economic recovery and ecological restoration are inseparable.

## Readiness to Succeed

The PNF is uniquely positioned with opportunities to succeed in ecological restoration. A highly skilled and dedicated workforce and a multitude of existing partners and stakeholders, form a strong collaborative foundation for planning and leveraging federal dollars with non-appropriated sources of funding.

The FRCRM is made up of 24 federal, state, and local partner agencies, organizations and stakeholders, including the PNF. Since 1985, this highly successful partnership has implemented approximately 4100 acres of meadow/floodplain and 47 miles of stream/riparian restoration projects.

**Other examples include:**

1. PNF fisheries and watershed engineering staffs recognized in Region 5 in 2011 for their work restoring aquatic organism passage relative to streams and roads
2. PNF working closely with Plumas County on their County General Plan Update and the Plumas County Coordinating Council on various projects
3. Long term commitment to the Quincy Library Group, local Firesafe Councils, Plumas County Coordinating Council, Biomass Working Groups and Rock Creek Cresta Ecological Resources Committee (ERC), chartered in the 30-year hydropower license with PG&E (FERC 1962)
4. Partnerships with tribes (e.g., Maidu Stewardship Project)
5. Other timber industry, grazing permittee, recreation, school, and other non-governmental organizations, are also essential to the Plumas NF's integrated ecological restoration strategy.

An important partnership and advantage unique to the PNF is based on several years of the Plumas-Lassen Administrative Study, implemented under the HFQLG Pilot project in partnership with the Pacific Southwest Research Station, including multi-party monitoring. The Forest has trained personnel and a solid record of evaluating responses to different forest management practices and using predictive models to forecast responses to that management. There is an opportunity for follow-up surveys and evaluations (at 1, 5 and 10-year intervals). The objective is ecologically and socially responsible forest management within economic realities; reducing the risk of catastrophic wildfire while retaining biological diversity across the landscape and contributing to community economic stability.

Finally, the PNF has begun (2009) integrating PSW GTR-220 concepts into fuels reduction projects, thus improving collaboration, improving wildlife values of the treatments, and avoiding costly litigation.

## Examples of Ecological Restoration Projects

**Watershed Restoration:** Watershed restoration on the Plumas National Forest can take many forms, including

meadow restoration, riparian revegetation, road decommissioning, fish passage, grazing management, fuels reduction, and aspen restoration.

- The example provided in the photographs below is representative of meadow restoration projects implemented over the past several years on the Plumas NF. In addition to restoring degraded ecosystems, data indicates that these projects may also positively affect late-season water yields during a critical period when flows downstream are particularly beneficial to local watersheds and California's water users. The 1994 photo is pre-project; the 2005 and 2006 photos follow implementation of meadow restoration planned and implemented by the Feather River Coordinated Resource Management Group (FRCRM). [Information for FRCRM available at http://www.feather-river-crm.org.](http://www.feather-river-crm.org)
- The Cottonwood Creek/Big Flat project on the Beckwourth Ranger District moved Cottonwood Creek from its old down cut channel into 4,050 feet of new channel constructed on top of Big Flat Meadow. The abandoned gully was filled or converted into a series of ponds that created wildlife habitat. The project was sponsored by the USFS and carried out by Plumas Corporation with funding of \$30,000 from the USFS, \$10,000 from PG&E, \$70,000 from the SWRCB, and other funds from Ducks Unlimited, CA Department of Water Resources, CA Department of Fish and Game, and the Milford Grazing Association for a total of \$189,000. In 2004, modification to the channel to fill the riffles to the correct elevation was completed, allowing high surface flows to more readily access the floodplain. This element was funded by the Resource Advisory Committee (RAC) PL106-393, Secure Rural Schools, and Title II funds with contributions from the Plumas NF.
- Since this project was implemented, the FRCRM has been highly successful at obtaining grant funding (Prop 50) to increase the pace and scale of meadow restoration and other projects benefitting watershed health, riparian habitat, and water quality. This has been an important element of the HFQLG Pilot Project. This program also includes a substantial monitoring component.



Top Left (1994): The down-cut channel of Cottonwood Creek prior to restoration.

Bottom Left (2005): An aerial view of the restored Cottonwood Creek and Big Flat Meadow.

Top Right (2006): Cottonwood Creek flowing in its new channel.

**Aquatic Organism Passage (AOP):** Integrated planning between the Plumas NF Fisheries, Watershed and Engineering programs, accompanied by successful proposals for internal and external grant programs, has resulted in forest-wide accomplishments recognized at the regional level for successful restoration of fish and other aquatic organism habitat connectivity, plus watershed improvement. Example from Mount Hough Ranger District 2010–2011: Contracted to replace two AOP barriers and rehabilitate two additional barriers on Squirrel Creek and Pine Creek. Funded by the American Recovery and Reinvestment Act of 2009 (ARRA); planning accomplished with integration into HFQLG projects.

**Fuels Reduction and Community Protection:** The Slapjack DFPZ on the Feather River Ranger District is an example of a project supporting fuels reduction,

community stability, and forest health objectives of the HFQLG Forest Recovery Act. Two stewardship projects were awarded in 2007; a service contract was awarded in 2008. The Slapjack project stewardship and service contracts collectively accomplish nearly 20,000 cubic feet (ccf) of sawlog removal, 13,000 ccf of biomass removal, and over 3,100 acres of fuels reduction.

This project was challenged under the 2004 Sierra Nevada 2004 Framework litigation, but the courts allowed it to proceed over 98 percent of the project area because of its focus around 7 communities in the wildland-urban interface (WUI). The stewardship projects are still in operation with a local contractor. Several of the workers on these projects are local residents who are literally building a DFPZ in their own back yards.



Culvert at the Pine Creek crossing of Road 25N29 on the Mount Hough Ranger District. Left photo shows the crossing prior to restoration, with a significant drop to the creek impairing passage for fish and other aquatic organisms. Right photo shows the crossing after restoration with streambed substrate and retention weirs.



Slapjack DFPZ Before (Left photo) and Unit Nearing Completion (Right photo). In the Before photo, a Timco is barely visible beginning operation in this overstocked stand.

# San Bernardino National Forest Ecological Restoration Implementation Plan

## Forest Ecological Restoration Overview

The San Bernardino National Forest, one of the most urbanized forests in the nation, strives to provide a balanced and sustainable flow of goods and services for a growing diverse population while ensuring long-term ecosystem health. Maintaining healthy, sustainable national forests in southern California is affected by a complex set of factors including population growth, rapid urbanization, increased demand for access and recreation use, impacts from climate change, disease and tree mortality, high wildfire frequency and intensity, and non-native invasive species.

The Forest provides the headwaters for the Santa Ana, Mojave, San Jacinto, and Whitewater Rivers and serves as the primary clean water source for many of the cities in southern California. The Forest is characterized by the Mediterranean ecosystem, a system of unique ecological communities found nowhere else with many endemic plant and animal species. There are 21 federally threatened and endangered plant and animal species on the Forest. Urban influences create the ever increasing demand for convenient national forest access, improvements to facilities, environmental protection measures, and public education programs.

The Forest is the backdrop to, and respite from, the urbanized web of communities that surround it which requires a high level of management to ensure that the forest ecosystem remains resilient and healthy. The Forest is located in one of the driest, most fire-prone areas in the United States. The high level of public use of the Forest makes fire management difficult due to the predominate human ignition of wildfire. Repeated large wildfires can have secondary resource impacts through the introduction and spread of non-native invasive species and the increased erosion of soils, vegetation type conversion, and reducing endemic plant and animal species populations.

The challenge for Forest managers is to effectively engage and collaborate with the public to sustainably manage the Forest. This means working together in a nontraditional, coordinated, collaborative network of tribes, communities, government agencies, groups, organizations, and individuals to sustain the Forest for the future.

## Ecological Restoration Goals

The Forest's goal is to continue to engage partners in an "All Lands Approach" to ecological restoration across the Forest in order to re-establish and retain ecological resilience of the land and provide a broad range of ecosystem services.

Although not exclusively, the focus of the Forest's efforts over the next 2-4 years will be the Upper Santa Ana watershed. This watershed is one of the largest watersheds on the forest that has not had a history of repeated, intense large wildfires. Ninety percent (90%) of the water provided by this watershed comes from National Forest System lands. Improving the health and resiliency of the watershed is critical to its ability to provide continued water to over 5 million downstream residents.

Partners are interested in investing in the upper Santa Ana watershed to increase water quality, quantity, and availability. This requires that new ways to accomplish restoration work including large scale conservation actions across jurisdictional boundaries are explored. In order to reverse current trends of degrading watershed conditions and resiliency, the pace and scale of ecological restoration work will need to increase. To accomplish this the Forest has and will continue to integrate budgets for hazardous fuels reduction, vegetation management, wildlife management, recreation management, road and trail maintenance, and special use and mining administration to accomplish work, but this alone will not meet the level of work needed. This will require that the Forest continues to work with cooperators, such as the Santa Ana Watershed Planning Authority (SAWPA), in a collaborative fashion to implement ecological restoration activities, and increase funding opportunities. The Forest will work with SAWPA to define economic value to the planned ecological restoration activities on National Forest System lands over the next 2-4 years.

Integrated Activities include: (See the attached Project List for specific project names):

- Restoration of meadows for water retention will be accomplished as a part of fuels reduction activities through the removal of encroaching trees.
- Restoration of lands damaged by unauthorized trails and abandoned mines, and repair of Forest Service roads and trails to reduce sediment into the lakes and streams.

- Restoration of native chaparral ecosystems that have been type converted to grass covered slopes.
- Restoration of forest lands to increase resiliency and reduce the risk of catastrophic wildland fires through hazardous fuel treatments, including and coordinating fuels reduction activities on adjoining private lands with public and private organizations.
- Reintroduce endangered species in partnership with the U.S. Fish and Wildlife Service, eradicate non-native invasive species, and restore habitat in the priority watershed.

## Ecological Restoration Accomplishments

Within the Grout Creek subwatershed, less than 1 mile from the Forest Service boundary, the Forest improved the road surface on a Forest Service road in a chronically bad stretch. A spring above the road seeped down onto the road and created a pond that contributed sediment through erosion to downstream waterbodies. The Forest rerouted the drainage from the spring under the road to a wildlife drinker downstream, and then resurfaced the road. These actions are estimated to reduce sediment loading by 80% from the before condition.



Before: Spring drains down road.



After: Spring channeled under road to wildlife water source.

Another example of ecological restoration on the Forest is the stabilization of large gullies within three montane meadows. Montane meadows are one of 12 rare ecological communities in the southern California national forests; they are important for water absorption, retention and filtration. The Forest worked with volunteers and interns to stabilize the gullies, estimated at 900 hours of labor valued at \$18,225. The areas were recontoured through the construction of approximately 21 grade stabilizers and 17 geofence stabilizers. Soil was brought in to fill in the eroded area and the area was re-sodded. The sites were restored with willow planting, native seeding and planting, and weeding. Erosion prevention was accomplished through Best Management Practices through the installation of erosion control mat and straw wattles, vertical mulching, and chipping. The area was then slashed and signed to prevent illegal access to vehicles. Habitat for 8 sensitive plants, 6 sensitive wildlife species, an endangered bird, and 3 Management Indicator Species benefited from this project.



Paramount High School Environmental Club assists with meadow repairs.



Recontoured channel Cienega Redonda meadow retains perennial flow.

### NEPA Ready Projects:

The Forest’s focus for the next 2–4 years will be projects in the priority watershed that are ready to implement. The South Big Bear and Bluff Mesa Hazardous Fuels Reduction projects are typical on the Forest in that they are designed to integrate ecological restoration by reducing erosion and improving water quality by restoring historic and unauthorized routes, improving road drainage and hardening water crossings, treating of non-native invasive species, and creating and protecting wildlife habitat. With the focus

in the priority watershed many of the other actions that are going to occur over the next 2–4 years will compliment these fuels reduction activities by improving road drainage and hardening water crossings in the Santa Ana River, Minnelusa Canyon, Deer Creek, and the road into the South Fork campground, the Fish Creek Recreational Residence access will be improved while enhancing meadows, and the Skyline and South Big Bear non-motorized trails will establish a system of mountain bike trails in the priority watershed while restoring the unauthorized trails that cause erosion.

Projects in Santa Ana River Priority Watershed	Benefits (X=yes)								
	Water Quality		Hydrologic Function		Habitat Restoration			Recreation	Forest Resiliency
	Sediment Reduction	Other Constituents	Flood Attenuation	Water Quantity	Wildlife Benefit	Weed Control	Species Re-introduction		
South Big Bear Fuels – MTRD1	X			X	X	X			X
Bluff fuels – MTRD1	X			X	X	X			X
Butler Slide Hazardous Fuels/Grout Creek 2N13 hazardous tree removal. (30% of NEPA is in upper Santa Ana)	X			X	X	X		X	X
Skyline non-motorized trails	X							X	
South Big Bear non-motorized trails	X							X	
Baldwin Lake Fuels – MTRD1	X				X	X	X		X
1N45 – Santa Ana River crossings/RCA protection	X	X				X		X	
2N03Y – Minnelusa Canyon reconstruct road/drainage	X	X				X		X	
1N17 – South Fork campground recontour/sediment basin	X		X			X		X	
1N64 – Deer Creek crossing	X				X	X		X	
Fish Creek Recreational Residence entry road crossing/meadow enhancement	X		X		X	X		X	
1N09 – Deer Creek crossing	X		X		X	X		X	
2N99 – reconstruct road/drainage	X	X						X	

<sup>1</sup> MTRD – Mountain Top Ranger District

Projects in Other Watershed	Watershed Basin	Benefits (X=yes)								
		Water Quality		Hydrologic Function		Habitat Restoration			Recreation	Forest Resiliency
		Sediment Reduction	Other Constituents	Flood Attenuation	Water Quantity	Wildlife Benefit	Weed Control	Species re-introduction		
Thomas Mountain Fuels – SJRD1	Santa Ana River	X								X
South Ridge Fuels – SJRD1	Santa Ana River	X								X
Oak Glen Fuels – FCRD2	Santa Ana River	X								X
Angeles Oaks prescribed burn – FCRD2	Santa Ana River				X					X
Circle Mountain restoration	Santa Ana River	X						X		

Projects in Other Watershed	Watershed Basin	Benefits (X=yes)							Recreation	Forest Resiliency
		Water Quality		Hydrologic Function		Habitat Restoration				
		Sediment Reduction	Other Constituents	Flood Attenuation	Water Quantity	Wildlife Benefit	Weed Control	Species re-introduction		
Palm Canyon Tamarisk Removal	Whitewater River				X			X		
Spanish Broom Removal	Santa Ana River							X		
May Valley Fuels – SJRD1	Santa Ana River	X								X
Restoration of Shay Creek through expansion and cleanout for restoration of Three-spined Stickleback habitat	Santa Ana River					X				
Relocate Speckled Dace in Cajon Wash and Indian Creek	Santa Ana River								X	
Re-introduce Mojave tui chub in Coxey Pong	Mohave River								X	
Re-introduce Mountain yellow-legged frog in City Creek, Plunge Creek, and NF San Jacinto river, through removal of trout and support of the captive breeding program	Santa Ana River								X	
Support the re-introduction of Santa Ana sucker on FCRD2	Santa Ana River								X	
3N34 – Willow Creek crossing	Mohave River	X				X	X			X
5S05 – Herkey Creek crossing	Santa Ana River	X				X	X			X
2E43 – Hixon-Bautista crossings	Santa Ana River	X				X				X
4S02 reconstruct road/drainage	Santa Ana River	X					X			X
1N34 reconstruct road/drainage	Santa Ana River	X					X			X
5S06 – Alvin meadows unauthority route decommissioning	Santa Ana River	X		X		X	X			
3N14 – Coxey meadow	Mohave River	X		X		X	X	X		X
3N53, 2N89 – OHV interactions	Santa Ana River	X								



Projects in Other Watershed	Watershed Basin	Benefits (X=yes)							Recreation	Forest Resiliency
		Water Quality		Hydrologic Function		Habitat Restoration				
		Sediment Reduction	Other Constituents	Flood Attenuation	Water Quantity	Wildlife Benefit	Weed Control	Species re-introduction		
<b>drainage</b>										
3N49 reconstruct road/drainage	Santa Ana River	X								X
3N99 reconstruct road/drainage	Mohave River	X								X
3N31 crossing above Clyde Ranch	Santa Ana River	X								
3N11 reconstruct road/drainage	Mohave River	X								X
3N10 reconstruct road/drainage	Mohave River	X								X
Summit Staging OHV	Mohave River	X				X	X			X
Baldy Mesa Staging OHV	Santa Ana River	X				X	X			X
Miller Canyon Staging OHV	Mohave River	X		X		X	X			X
2N02 – Arrastre Creek crossing	Whitewater River	X				X				X
North Fork prescribed burn – SJRD1	Santa Ana River				X	X				X

1. SJRD – San Jacinto Ranger District
2. FCRD – Front Country Ranger District

# Sequoia National Forest and Giant Sequoia National Monument Implementation Strategy for Ecological Restoration

## Ecological Restoration

### Overview:

The Sequoia National Forest/Giant Sequoia National Monument (SQF) is the most southern National Forest in the Sierra Nevada. It is dominated by mixed conifer forest types which includes over 20,000 acres of giant sequoia groves. The SQF is a highly fire prone forest environment with a recent history of large fires, including the Manter (75,000 acres in 2000), Mc-Nally (150,000 acres in 2002), and Piute (38,000 acres in 2008) wild fires as well as several large managed wildfires, including the Sheep (6,000 acres in 2010) and Lion (21,000 acres in 2011). In FY 2011, the SQF applied ecological restoration actions on approximately 2% of the landbase and has applied restoration actions on approximately 10% of the landbase over the last decade.

Our primary restoration goals are to treat the land to improve overall forest health and resiliency, and to re-introduce fire into the landscape. These actions must be carefully planned and implemented to protect key resources, including the giant sequoia groves, wildlife habitat, meadow and riparian habitat, and many communities located within the forest boundary.

There are unlimited opportunities to treat the landscape to meet our restoration goals and almost as many challenges. The most significant challenges are completing the Giant Sequoia National Monument Management Plan; protecting the highest concentration of Pacific fisher in the Sierra Nevada; maintaining quality wildlife and aquatic habitat while protecting a large number of threatened communities in a highly fire prone landscape; maintaining the current, local infrastructure; and finding a balance of management actions to satisfy competing values among our stakeholders.

### Ecological Restoration Accomplishments, Tactics, and Integration:

The SQF accomplishments for 2012 include reforestation on approximately 5000 acres, primarily within two of the large fires mentioned above (McNally and Piute); vegetation improvement (primarily small tree thinning) on approximately 3,500 acres; watershed improvement on approximately

1,200 acres; habitat improvement on 17 miles of streams and 5,700 acres of terrestrial habitat; and noxious weed treatment on 280 acres. For FY 2013 our five year schedule indicates a similar amount of vegetation and habitat improvement projects. One project of note is the proposed Boulder Burn, a prescribed fire that is planned for approximately 8,000 acres in 2013. This project is being designed in collaboration with several partners, including R5 Air Resource staff, Sierra Forest Legacy, local air pollution control board, EPA, local land owners and permittees, and Sequoia and Kings Canyon National Parks. Another noteworthy project planned for 2013 is the Tule River Reservation Planning Project. This project is being developed in cooperation with the Tule River Indian Reservation, consistent with the Tribal Restoration Act. This project would treat lands adjacent to the reservation to reduce the potential for fires crossing into the reservation watershed. The project includes treatments with the giant sequoia groves that are located on SQF and reservation lands.

The SQF is implementing a significant watershed restoration strategy that includes meadow restoration on three degraded meadows in the Kern River basin. These are part of an effort to improve the overall watershed health upstream of Lake Isabella, a federally-listed impaired reservoir under the Clean Water Act. The SQF has successfully implemented “plug and pond” techniques on Big Meadow and is currently designing a similar application for Long Meadow and Osa Meadow. This work is proceeding with a combination of allocated funds and a grant from the Sierra Nevada Conservancy. Additional meadow restoration work is planned for French Meadow, located within the Piute Fire perimeter.

Integration of funds has been successfully applied to most restoration projects on the SQF for the past several years. Virtually all of our projects meet multiple objectives, especially vegetation improvement and fuels projects that include fuel reduction, forest health, wildlife habitat, and watershed condition improvement. The objectives shown on our five year schedule indicates this type of integration for the vast majority of projects. A more intensive application of unified budget in FY 2012 has enhanced this effect and expanded the number of staff integrated into the budgeting and prioritization of projects on the SQF.

The fire/fuels staff, ecosystem management staff, and line officers have worked closely to integrate funding to meet targets and prioritize accomplishments on the forest.

The SQF worked closely with the Strategic Decision Support group at McClellan to develop an integrated timber strategy to meet restoration goals and to maintain the local manufacturing infrastructure in Terra Bella, CA. The fire/fuels, ecosystem, GIS, and planning staffs worked with line officers to define a set of assumptions and guidelines that were combined with known information and modeling to determine the best combination of restoration treatments for lands on SQF that are outside the Giant Sequoia National Monument. Maintaining the local mill provides opportunities to treat lands to meet these objectives in a cost effective way by keeping the local infrastructure in place.

Part of the SQF strategy to re-introduce fire to the landscape is managing naturally ignited fires for ecological restoration. In the past decade the SQF has successfully managed wildland fire on approximately 50,000 acres. This includes the Deep and Lion Fires, managed in cooperation with Sequoia and Kings Canyon National Parks, San Joaquin Air Quality Control Board, Fish and Wildlife Service, and local agencies to meet resource objectives on approximately 27,000 acres.

Another example of partnering and integration is monitoring the effects of the Lion Fire with a combination of Forest Service funds and funds provided through an agreement with the U.S. Fish and Wildlife Service. The final monitoring outcomes will be synthesized into a white paper in cooperation with staff from fire and fuels, range, air quality, hydrology, fisheries, wildlife, and our zone ecology program.

The SQF has received State OHV grants for trail development, maintenance and restoration. Based on the Forest's Travel Management Plan we are proposing restoration of several user created routes within the watershed of Lake Isabella. The SQF has also received State OHV grant funds for watershed condition road inventory, a program developed in cooperation with the Watershed staff of R5, TEAMS enterprise team, and SQF. The SQF hydrology program is also responsible for inventory and management of the R5 Water Rights program.

### Summary of Three Ecological Restoration Accomplishments:

The Lion Fire burned 21,000 acres in the Golden Trout Wilderness, all within critical habitat for the Little Kern Golden Trout. While this was an unplanned ignition the fire/fuels staff and ecosystem staff worked

closely with the Sequoia Kings Canyon National Park, San Joaquin Air Quality Control Board, Fish and Wildlife Service, CA Department of Fish and Game, and Adaptive Management Services Enterprise Team (AMSET) to evaluate and monitor the potential effects of the Lion Fire on resource conditions. The pre and post fire monitoring program was initiated and is continuing in an effort to quantify the impacts and effects of the fire on critical fish habitat, stream condition, vegetation and fuels condition, and range condition. This monitoring effort should provide valuable information on the effect of re-introducing fire to this ecosystem and the effect of decisions made during the management of the fire.

The SQF has applied Stream Condition Inventory (SCI) into all ground disturbing projects including timber harvest, fuel reduction, prescribed burning, and range management. Integration of SCI into all projects requires significant planning and integration in order to cover all projects with the fewest plot locations necessary. The workload is funded by a wide array of funds as appropriate for the type of objectives met by each project. The information gathered is critical to meeting regional water quality control reporting requirements for forest management actions. The hydrology program provides a well trained staff to complete this work on the SQF and has provided their services to the Angeles, Cleveland, Sierra, Mendocino, and Los Padres forests. In addition, the hydrology staff coordinated regional SCI training and protocol enhancement for R5.

The Ice Timber sale was enjoined by a federal court in 2006 until additional analysis was completed to determine the effects of timber harvesting on Pacific fisher. Many new studies were incorporated into the analysis to determine if the Ice project could be implemented without negative effects on fisher. An extensive analysis was completed using information gathered from several sources including the Conservation Biology Institute (CBI) report, ongoing carnivore monitoring in the southern Sierra Nevada, cooperative studies with the Pacific Southwest Research Station, use of the Fisher Assessment and Sustainability Tool, and extensive work with the U.S. Fish and Wildlife staff. An interdisciplinary team was formed from all resource areas and work was funded from several allocations. Based on this analysis the court released the Ice sale and the contract was re-started within 5 days.

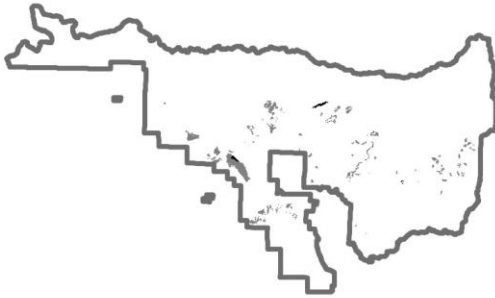
### NEPA Ready Projects:

We currently have approximately 787 acres of fuels treatments that are NEPA ready and could be accomplished with an additional \$322,600. In addition, we could accomplish an additional 200 acres of small

tree thinning with an additional \$50,000. These projects were included in our FY 2012 mid-year request.

Meadow restoration at French and Mack Meadow within the Piute Fire (2008) could be accomplished with an additional \$60,000. This restoration would

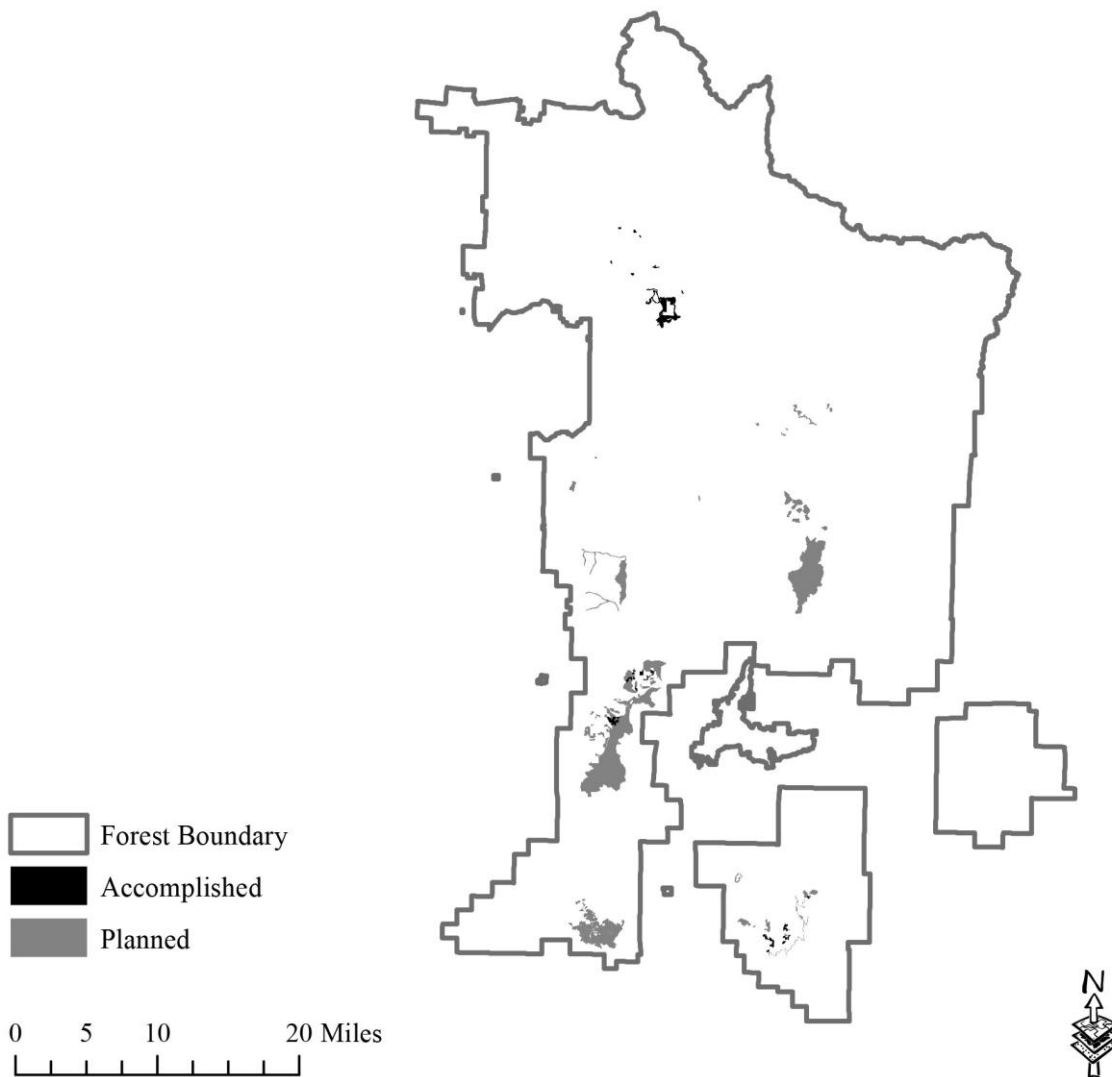
improve 1/4 mile of stream, install a culvert and drain in an existing road to protect the meadows, and install fencing to protect the restoration work from impacts from cattle grazing. This proposal was included in our response to the Regional Office request on May 3, Approval of Additional Watershed Restoration Capability Project Proposals.



**SEQUOIA NATIONAL FOREST  
GIANT SEQUOIA NATIONAL MONUMENT**



**Ecological Restoration Projects  
FY2012 and FY2013**



# Shasta-Trinity National Forest Ecological Restoration Program

## Overview

Located at the headwaters of the Sacramento and Trinity River basins, the Shasta-Trinity National Forest (Forest) manages 2.1 million acres of land and over 11,000 miles of streams and rivers. The Forest produces more water than any other Forest in the Pacific Southwest Region providing roughly 5.3 million acre feet of water per year to California's residents. The Forest is also home to two of the largest reservoir lakes in California, Shasta and Trinity. These reservoirs catch runoff and route water through the Central Valley Project network of waterways channeling water southward. The combined storage capacity of both lakes is 7,000,000 acre feet (2.2 trillion gallons) which is equivalent to the amount of water used by over 13 million households for an entire year. Water from Shasta and Trinity reservoirs is used for recreation, irrigation, agriculture, power generation, navigation flows, environmental and wildlife conservation, as well as municipal and industrial needs.

Functioning watersheds are critical to the sustainability of a clean water supply necessary to sustain a healthy environment, economic vitality, and strong communities. Fire is a critical disturbance process throughout the Klamath Mountains. The presence or absence of fire in these ecosystems affects the structure and function of forest habitats influencing the health and resiliency of these watersheds.

**Challenges:** Active management to reduce dangerous accumulations of hazardous fuels and address travel management remains contentious at national and local levels. Limited resource availability, ceaseless appeals and litigation and coordination with regulatory agencies are the primary factors restraining planning and implementation of ecological restoration projects. Diverse perspectives regarding the desired future conditions of a restoration project, as well as the methods to needed to obtain those conditions, present both a daunting challenge for accomplishing ecological restoration on the Forest and opportunities for collaboration.

**Opportunities:** The Forest is uniquely located geographically to influence a range of ecological resources that have wide-spread implications (water, species conservation, air quality, fire adapted forests, land conservation). The Forest is also nationally recognized for the wide variety of outstanding recreational opportunities available, many of which

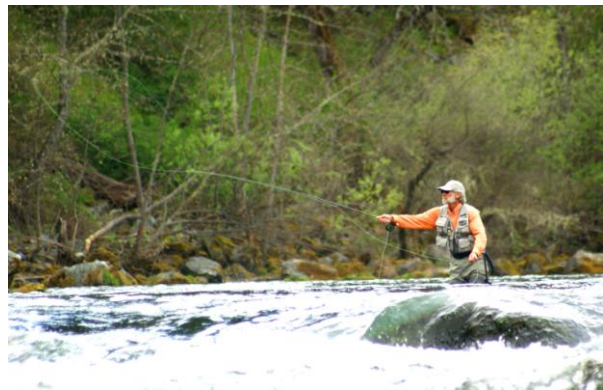
offer high visibility to the health of natural resources. The presence of a well-staffed and knowledgeable workforce and enthusiastic local partners present numerous opportunities for sustaining a long-term ecological restoration focus.

## Strategies for Ecological Restoration

Out-year strategic planning is used to gain efficiencies with environmental compliance and fosters collaborative partnerships. Outlining a multi-year program of work allows planners, resource specialists and the public to know where the Forest's priority investments are located for management activities. There are currently two complementary strategic planning efforts addressing ecological restoration goals on the Forest.

### Watershed Restoration Strategy

The Watershed Restoration Strategy was updated in 2009 outlining projects such as road storm proofing, decommissioning and closure, trail rehabilitation, fish passage, aquatic habitat improvement, meadow restoration and sediment inventory/restoration opportunity assessments. This strategy is in the process of being revised to incorporate the Watershed Condition Framework (Framework) completed in 2011.



Fly Fishing on the Trinity River

**Measuring Outcomes:** This program will use the Framework to monitor program accomplishments and effectiveness. There are twenty-four attributes used in Framework to assess condition class. A subset of these attributes, primarily focused on road and trail indicators, will be targeted for management actions to improve the overall watershed condition class rating

for a sub-watershed. The Forest will test the feasibility of using these attributes to provide context for scale and type of applicable restoration activities needed to meet the desired watershed condition class during out-year planning.

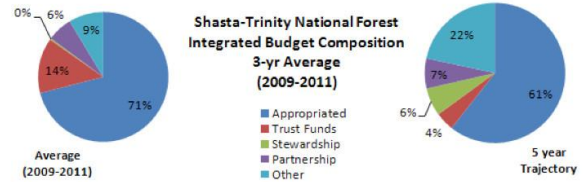
### Integrated Vegetation Management Strategy

The Integrated Vegetation Management Strategy (IVMS) was also developed in 2009 to create a 5-year plan for vegetation management. This strategy was framed on the concept of restoring wildfire resilience.<sup>8</sup> The dominant Forest values emphasized for restoration and protection through enhancing wildfire resiliency were water, wildlife, and wildland-urban-interface. There are four primary goals of the IVMS strategy: 1) maintain or improve forest resilience to wildfires; 2) community wildfire protection; 3) maintain and improve beneficial uses of water; and 4) maintain and improve habitat for threatened and endangered species.

Key components of implementing the IVMS include designing and developing treatments that meet multiple resource objectives and taking advantage of large contiguous areas for landscape scale treatments. This strategy has opened up dialog among silviculturists, fuels specialists, wildlife biologists and other resource specialists to learn more about opportunities and constraints unique to each specialty as well as opportunities to share data and use modeling in new ways. To the maximum extent permissible, appropriated funds are combined where objectives overlap.

**Measuring Outcomes:** The IVMS strategy utilizes an effectiveness metric designed by the Region 5 Strategic Decision Support Group to measure the cumulative effect of activity accomplishments. The effectiveness metric is based on research that indicates landscape fire resilience is improved when approximately 20% of the area has been treated in a manner that results in reduced potential fire behavior and increased fire resilience at the stand level.

8. Forested systems characterized by fire regimes of frequent, mostly low-moderate intensity fires, dominated by large, long-lived trees, are considered resilient if the forested landscape exhibits a generally forested condition, including larger trees, shortly following a disturbing event such as fire.



Composition of the integrated budget available for Ecological Restoration. The Average graph (Left) is based on actual budgets 2009-2011. The 5 year Trajectory graph (right) is based on diversifying funding sources such as transitioning to more stewardship contracting from traditional timber sale contracts and acquiring more non-appropriated funding sources.

### Tactics for Increasing Restoration

There are currently several tactics being implemented on the Forest to increase restoration capacity. When appropriate, the Forest uses stewardship contracting and other fee retention programs to increase monetary investment potential for restoration. In recent years the Forest has increased planning and implementation efficiencies by integrating program budgets, creating planning standards and designing projects to use economies of scale. Implementation of both strategic plans requires strong internal and external partnerships. Engaging in a variety of partnerships has resulted in new ideas and an increased capacity to accomplish restoration projects. The Forest averages 24 ecologically-related partnership agreements each year. The Forest has also begun to use opportunities created as a result of wildland fire activity focusing on maintenance of and adjacency to burned areas. Increased use of stewardship contracting over the next five years will aid in increasing the pace and scale of restoration treatments across the Forest by retaining more timber receipts locally for implementation of restoration activities.

### Recent Accomplishments

The Forest has recently planned or implemented numerous projects relating to ecological restoration. Examples of some of these projects include improving aquatic organism passage, reforestation, improving aspen health, decreasing road densities, increasing fire resilience, and decreasing erosion and sedimentation in streams. Two of these projects are highlighted below.

#### Trout Creek Restoration

The Trout Creek Restoration Project is a partnership between Federal and State agencies, private landowners and non-governmental organizations. This project restores 1.5 miles of Trout Creek and the surrounding wet meadow ecosystem approximately 15 miles east of Mount Shasta in the Upper McCloud River Basin. The area suffered from impaired riparian vegetation, poor quality habitat and erosion due to the

incision of a deep gully into the surrounding meadow. The project was collaboratively designed to restore the wet meadow ecosystem, reduce and prevent erosion, improve habitat for redband trout and other wildlife and foster community-supported stewardship of the watershed.

Restoration activities are occurring on 145 acres of public and private land. Activities include stream reconstruction, riparian re-vegetation, and the removal of encroaching conifers. Aquatic habitat complexity and structural diversity are being added to the restored channel by transplanting mature willow and introducing large woody debris. Implementation began in 2006 and monitoring will continue through 2017. An additional 270 acres of vegetation thinning treatments on public lands adjacent to the meadow systems is planned during 2012.

The Project is occurring on lands managed by the U.S. Forest Service, Hancock Forest Management and Sierra Pacific Industries. Funding has been provided by the California Department of Transportation, U.S. Fish and Wildlife Service, U.S. Forest Service, California Trout and the River Exchange. Other partners include California Department of Fish and Game, Youth Conservation Corps, and the California Conservation Corps.

The full 5-year plan for both strategies as well as geospatial layers are available from the Forest upon request.



Trout Creek Restoration pre-treatment



Trout Creek Restoration post-treatment

### Burnt Ranch Fire Resilient Community

The Burnt Ranch Fire Resilient Community Project is a partnership between Federal, State, and local agencies, private landowners and community organizations. Burnt Ranch is a small community along State Highway 299 in northwest Trinity County. The overarching goal is to use an all-lands approach to build a strategy for making Burnt Ranch a “fire resilient” community. The spatial focus of the project is the Defense Zone, which includes all land within one quarter mile of structures. The historic fire regime for the area is characterized by frequent low to mixed severity fires. Currently, over half of the area has a high fire hazard (flame lengths greater than 8 ft) and/or a high potential for active crown fire. Treatments will focus on reducing fire hazard and crown fire potential as well as maintaining areas with low fire behavior potential. There will also be efforts to build upon and reinforce work identified in the Community Wildfire Protection Plan and accomplished with American Recovery and Reinvestment Act funds.

Community engagement and collaboration began in May, 2011. A series of seven meetings were held with community organizations and government agencies to begin fostering partnerships and developing the project framework. This collaboration effort culminated in a joint public meeting of all partners with private land owners. Mapping exercises allowed local knowledge of high hazard areas to be passed on to government land managers. Land owners were given parcel maps and satellite imagery of their property as well as provided information regarding multiple funding opportunities to implement fire hazard reduction work on their land.



The NEPA process to design and implement treatments on Federal land will officially begin in the summer of 2012. Public collaboration will continue to play a critical role throughout this process. The Natural Resource Conservation Service is assisting private landowners with creating and implementing conservation plans that expand on community fuels reduction plans. Other partners include Willow Creek and Trinity County Fire Safe Councils, Trinity County, CalFire, Trinity County Resource Conservation District, Hawkins Bar Volunteer Fire Department and local landowners. The collaboration model developed

for this project is now being used to address hazards in and around the community of Hyampom.

### **Current Opportunities for Partner Support**

The Forest has identified several projects and activities that either have NEPA completed or are anticipated to have relatively simple NEPA requirements that contribute to ecological restoration (see Table 1). Project specific details for restoration projects and other restoration partnership opportunities are available upon request (contact the Ecosystems Staff Officer).



Burnt Ranch Community Collaboration Meeting September 2011

**TABLE 1. DETAILS FOR PROJECTS THAT ARE READY OR NEAR READY FOR IMPLEMENTATION AND PROVIDE OPPORTUNITIES FOR PARTNER SUPPORT.**

Project	Description/Activities	Contribution to Ecological Restoration	Environmental Compliance	Partnerships
Trail Rehabilitation and Restoration	Multiple projects reconstructing and rehabilitating hiking trails. Activities include stream crossing repair, tread repair, erosion control and shrub removal.	Long term stabilization of the trail system and protection of water quality would enhance fisheries productivity and provide access opportunities for the recreating public. Some of the watersheds are home to federally listed Coho salmon. Without action to rehabilitate trail tread and erosion control features, sediment delivery will continue into the water-ways. Service providers in small local communities suffering depressed economic conditions due to reduced logging and mining activity would benefit from increased tourism. Restored access would also expedite fire management and resource monitoring activities.	Resource review and analysis for work within the existing tread was covered under the 2009 NEPA for American Recovery and Reinvestment Act trails work. Culver removal and restoration of the stream crossings may require an additional CE.	The California Conservation Corps and Backcountry Horsemen of California volunteers will contribute matching funds, time, and support for camp moves and resupply during implementation.
Wilson Creek Aquatic Organism Passage	Restore 1.1 miles of anadromous fisheries habitat, including replacement of culverts, removal of concrete head and wing walls, and stream channel restoration.	Wilson Creek is in the South Fork Trinity River Watershed. Once completed the project will prevent 5,000 cubic yards of road fill from entering the creek in the event of crossing failure.	A Decision Memo for Shasta-Trinity Fish Passage Sites was signed in June 2005. All engineering design work has been completed.	
Lower McCloud	Creation of fuelbreaks along major ridge tops and roads in conjunction with landscape scale prescribed burning.	Returning fire back into a fire adapted ecosystem. Landscape scale prescribed fire treatment. Roadless and late stage reserve land designation being treated with fire.	Proposed action is being drafted. Scoping to occur this summer. Decision planned for 2013.	McCloud River Coordinated Resource Management Group has been involved in the planning. The McCloud River Club is interested in cooperative treatments across ownership boundaries. Tribal members are involved in archaeological surveys.
Fuels Management	Multiple projects developing fuel breaks or mechanically reducing fuels. Some projects also include prescribed fire treatments.	Reintroduction of fire to its natural role in the ecosystem. This will result in reduced future risk of highly destructive wildland fire.	NEPA analysis is on-going.	The Watershed Research and Training Center, Trinity County Resource Conservation District and Weaverville Community Forest have been involved with at least one of these projects.
Prescribed Fire Projects	Multiple projects using prescribed fire as a tool for restoration and fuel management.	Fire is a key process in the Klamath and Cascade Mountains. These projects will reintroduce fire to its natural role in these ecosystems; reduce surface fuel loadings and future risk of highly destructive wildland fire; improve existing wildlife habitat; increase future suppression efficiency, increase options for future fire management, and complete restoration treatments following mechanical entry.	Several projects have NEPA completed and are ready for implementation. A few projects are in development or currently working through NEPA analysis and documentation.	Current partners include: Local Tribes, Six Rivers National Forest, Trinity County Resource Conservation District; Weaverville Community Forest; California Deer Association, adjacent private property owners, and the Rocky Mountain Elk Foundation.

Project	Description/Activities	Contribution to Ecological Restoration	Environmental Compliance	Partnerships
Land Acquisition	Multiple projects acquiring land adjacent to Trinity Lake and inholdings near Mt. Eddy.	Parcels located near Trinity Lake are primed for development and the parcels near Mt. Eddy are in a high priority watershed for restoration. Acquisition will help protect wetlands and riparian areas as well as maintain connectivity between the lake and nearby late-successional reserves. Consolidation of the ecosystem allows for cohesive landscape management, thus increasing resiliency to climate change in this critical watershed by preventing habitat fragmentation and protecting downstream water supplies and systems.	NEPA has not been initiated.	The Trust for Public Land has had or is in the process of obtaining an option to secure these properties until funding is available.
Nelson Creek Phase II – Riparian Restoration	Planting of riparian vegetation along approximately 0.1 miles of Nelson Creek using local willow cuttings that will be potted, rooted out and then planted along the banks of the project area.	The project area is the site of a recent dam removal project and is in need of riparian vegetation to provide stream shade and cover. The riparian vegetation will also provide bank stability as well as shade out non-native black berries. The riparian restoration phase will provide leaf litter and nutrients to the streams benthic macro-invertebrates.	The NEPA for this project has already been completed as this is a continuation of the original dam removal project. The project is covered by the existing categorical exclusion.	Shasta College will provide the student labor to collect, grow and plant the willows. The Forest Service will provide the pots and the expertise. Shasta College will also provide any heavy equipment and operator if needed, while the Forest Service will cover the costs of the fuel and oil.

# Ecological Restoration on the Sierra National Forest

## Forest Vision

The Sierra National Forest's vision is an integrated program that reinforces the use of all available tools to achieve vegetation resource objectives. The vegetation treatments would focus on key points of the Healthy Land Initiative and Healthy Forests Restoration Act and the guiding principle to use fire to achieve resource management objectives is well documented in the Forest's Land and Resource Management Plan.



Whisky Ridge Ecological Project Field Trip, June 27, 2012

The state of vegetation and the defensible boundaries on the Forest limit fire use opportunities on both the Forest and adjacent federal lands. Continuous over-mature vegetation provides an avenue for fire to burn from neighboring lands managed for wilderness values through like lands on the Sierra, into high resource value areas, structures and improvements, then onto private lands. Implementing the Forest vision tempers this situation by greatly increasing the Forest's ability to use fire as a primary vegetation management tool.

## The Need to Take Action

The Sierra National Forest (SNF) is committed to promoting ecosystem resilience, sustainability, and health under current forest conditions and also changing uncertain future environmental conditions such as those driven by climate change and increasing human use.

The SNF has taken measures to increase integration across programs, increase collaboration with our stakeholders and we are focusing on larger landscape level projects. Integrated projects include watershed restoration, biomass, wildlife and fuel-vegetation management targets. To increase our capacity we have

increased use of volunteer support, additional grants and matching fund opportunities.

Despite these sizable cost saving reductions, the Sierra National Forest is maintaining a Five-Year Plan that delivers an integrated ecosystem restoration program. Funding levels continue to challenge the Forest's ability to hire staff needed to fill skill gaps and manage current program reductions.

The Sierra National Forest Five-Year Plan (Plan) is an integrated program approach to treat vegetation on National Forest System lands to promote the ecological restoration of the Forest. The Plan prioritizes areas of concern to efficiently deliver change in condition and address watershed health.

## Overview

High elevation lakes defined by towering conifers, deeply carved river valleys and huge granite monoliths describe the Sierra National Forest and epitomize mountain California landscapes. The SNF is the gateway to the Sierras including the intensely visited Yosemite, Sequoia, and Kings Canyon National Parks. Sierra National Forest ownership totals over 1.3 million acres. The Forest is divided into two ranger districts located in three counties in California.

The Forest provides a diversity of recreation opportunities to local rural residents, nearby communities, towns, and to the highly urban areas along the California coastline. Facilities offer opportunities that range from highly developed campgrounds, and picnic areas to minimally developed overnight and day use areas that serve primarily as access points to trails, creeks, rivers and general forest areas. There are five wilderness areas on the Sierra National Forest. Comprising nearly 50 percent of the Forest, these areas offer solitude and vast open space as part of one of the largest contiguous blocks of wilderness in the continental United States. The forest provides tremendous opportunities for hiking, horseback riding, mountain biking as well as off-road vehicle use on trails jointly maintained by the Forest Service and many partners. The Forest is home to two groves of giant Sequoias, Nelder and McKinley groves. Nelder Grove includes 1,006 mature giant sequoias and features the Shadow of the Giants trail that provides information to hikers on the ecology of the sequoias.



Local residents listen to a presentation during the Whiskey Collaborative field trip.

The forest offers scenic backdrops to the San Joaquin Valley as well as residents living in mountain communities. Extreme elevation changes provide diverse vegetation from grasslands to sub-alpine meadows. The elevation ranges between 900 to 13,986 feet. The Ponderosa pine is the predominant tree species in this forest and can be found between 4,000 and 8,000 foot elevations. This area provides an important component for biological diversity in the landscape of the Western U.S. Sierra National Forest is one of three native sites for the Pacific Fisher, a threatened species whose original range included much of the Western United States and Canada.

## Challenges

Our current challenges call for extraordinary levels of teamwork, collaboration, and science integration within our agency. The Sierra National Forest can meet these challenges by taking a proactive approach to changing environmental conditions. The following list provides a set of both near (less than 2 years) and long-term (more than 5 years) approaches.



Down woody material on the Forest floor.

**Ecological Restoration:** The process of assisting in the recovery of the resilience and adaptive capacity of ecosystems will be a critical first step in preparing our ecosystems to changing climate. Fundamental to this step is the recognition that while our immediate objective may be to restore pre-settlement patterns in ecosystem attributes (such as tree densities and canopy cover), our ultimate goal will need to focus on restoring ecosystem processes (carbon sequestration, nutrient cycling) and services (fresh water, biodiversity, renewable wood products).

**Monitoring:** Monitoring is a hugely important part of managing ecosystems conditions. However, monitoring will require a tiered or prioritized approach in order to make it useful and relevant. For example, Tier 1 (high priority) could consist of the few monitoring indicators that would be prioritized and used to guide management decisions; Tier 2 (medium priority) could be important indicators to be undertaken when funding or expertise is available; Tier 3 (low priority) would not be monitored but considered if future conditions warrant their inclusion to a higher tier.

**Science Integration:** Science-management integration will need to become stronger in order to meet rapidly changing conditions. This will likely require completely new approaches to closing the science-management information gap.

**Uncertainty:** We will be dealing with an unprecedented level of uncertainty in our decision making. The Sierra National Forest will need to clearly acknowledge our levels of uncertainty revolving around management decisions, since most decisions will be based on substantial knowledge gaps. Monitoring and science integration will be key components of addressing uncertainty in future conditions.

**Funding:** The Sierra National Forest has been facing declining funding allocations, yet the scope and scale of volume sales on the forest has increased.

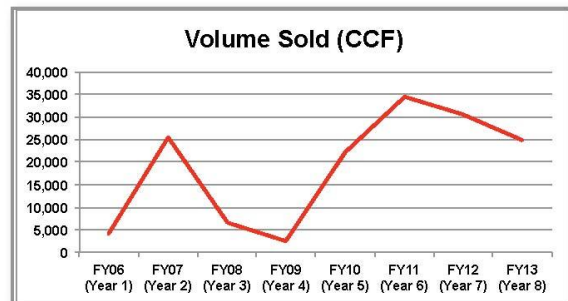
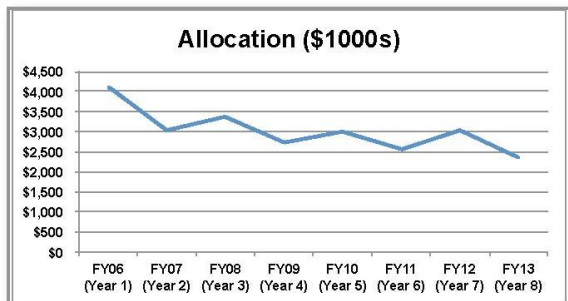
Fiscal Year Allocation (\$K)	FY06 (Year 1)	FY07 (Year 2)	FY08 (Year 3)	FY09 (Year 4)	FY10 (Year 5)	FY11 (Year 6)	FY12 (Year 7)	FY13 (Year 8)
	\$4,124	\$3,032	\$3,386	\$2,748	\$3,007	\$2,566	\$3,044	\$2,346
Final Allocation compared to FY06	100%	74%	82%	67%	73%	62%	74%	57%
Volume Sold (CCF*)	4,140	25,616	6,552	2,527	22,100	34,564	30,656***	25,000***
Volume Sold (WMF**)	2,084	14,903	4,181	2,054	12,950	19,936	15,328***	12,500***
Final Ccf Sale compared to FY06	100%	619%	158%	61%	534%	835%	740%	604%

\*CCF – Hundred Cubic Feet

\*\* MBF – Million Board Feet

\*\*\* Volume sold for FY 12 and FY 13 are projections

Projections for FY 12 and FY 13 are estimates.



**Partnerships & Collaborations:** Form lasting regional partnerships that span agencies and stakeholders to bring together scientific researchers and resource managers. A current example of this partnership is the Southern Sierra Conservation Cooperative (under The Strategic Framework for Science in Support of Management in the Southern Sierra Nevada Ecoregion MOU) a collaborative group developed by federal agencies to face climate change challenges.

**Climate Vulnerability and Risk Assessments:** These new science-based tools will guide management prioritization and help identify locations where key resources are most vulnerable or adaptable to future environmental conditions.

**Adaptive Strategies:** Climate change will necessitate a broader range of approaches, both current and novel, to management of ecosystems in the future. Currently, ecological restoration represents one such approach, but additional adaptive approaches (e.g., facilitating ecosystem changes to novel conditions) will become increasing important over time.

## Strategy

The ecological restoration strategy for the Sierra National Forest is a composite of wildlife, hazardous

fuels and timber vegetation treatment projects. Vegetation treatments are integrated, and focus on a common goal that addresses areas of high risk. The integrated approach stems from respective disciplines identifying low, moderate, and high areas of concern; overlapping areas of high concern are the treatment focus for the next five years.

Treatment preference is based on the proximity to wildland urban interface, at-risk high resource value areas, areas that will increase the opportunity for wildland fire use, and areas of deteriorating critical wildlife habitat.

The integrated treatments will focus on about 75,000 acres of the most critical areas in the next five years. Treatment preferences by priority are wildland urban interface, municipal watersheds, agency improvements, at-risk high resource value areas, areas that will increase the opportunity for wildland fire use, and areas of deteriorating critical wildlife habitat.



Forest staff giving a presentation during the Whiskey Collaborative field trip.

Targeting the most critical areas will fashion the way to employ wildland fire use to achieve LRMP objectives on lands that have limited timber harvest opportunities; seventy-five percent of the Forest is not suitable for timber harvest. The treatments focus on modifying potential extreme fire behavior adjacent to at-risk communities, municipal watersheds and agency improvements, and increase the ability to use wildland fire to achieve resource benefits. The treatments also address insect issues on lands that harbor timber commodities; insect spread is managed by generating a mosaic of stand density and age classes.

### Tactics

The trend for treating vegetation is an aggressive continuation of outputs over the next five years from with a current annual output of about 4,500 acres to

17,000 acres annually. Fire use acres are not reflected in the outputs due to the uncertainty of projecting annual acres treated in the acres available to use wildland fire to achieve resource benefits.

A number of tools are being employed to address planning and project implementation. The five new categorical exclusions are being applied where appropriate. Stewardship, Service, ID/IQ, and conventional contracts, in concert with the agency’s workforce, will provide the means to accomplish the Plan’s objectives.

The Sierra National Forest Five-Year Plan (Plan) is an integrated program approach to treat vegetation on National Forest System lands to promote the ecological restoration of the Sierra National Forest. The Plan prioritizes areas of concern to efficiently deliver change in condition and address watershed health. It is a composite of wildlife, hazardous fuels, and timber vegetation treatment projects. Vegetation treatments are integrated, and focus on a common goal that addresses areas of high risk. The integrated approach stems from respective disciplines identifying low, moderate, and high areas of concern; overlapping areas of high concern are the treatment focus for the next five years.

## Restoration Accomplishments for FY 2012-2013

Increasing the pace and scale of ecological restoration sufficient to reverse current trends is a driving force behind the need for projects on the Sierra National Forest Five Year Plan.

FY 2013 NEPA Project Name	Within Priority Watershed	Volume Sold (CCF)	FP-Fuels-Non-WUI (acres)	FP-Fuels-WUI (acres)
Whiskey Meadow Restoration	N	8,000		
Bass Lake RD Planting and Release for Survival	N		30	
Release for growth and pre-commercial thin	N		100	
Mastication Thin and Release (Madera County Grant)	N		600	
Bass Lake RD road hazard sale	N	2,000	450	
Sugar Pine Prescribed burn	N			215
Soaproot (CFLR)	Y	750		900
Coyote	N	8,000	1,000	3,000
High Sierra Hazard Program	N	750		
Carls & B7 Turtle Under Burn	Y		2,300	
KREW Under Burn	Y		100	100
Dinkey N&S Pile Burns (CFLFR)	Y			800
<b>Total FY 2013</b>		<b>19,500</b>	<b>4,580</b>	<b>5,015</b>

**Kings River Experimental Watershed Forest Health and Research Project Environmental Impact Statement (EIS):**

The SNF in cooperation with the Pacific Southwest Research Station prepared a Kings River Experimental Watershed Forest Health and Research Project (KREW Project) Environmental Impact Statement (EIS). The KREW Project is now implementing the treatment of the Kings River watershed to improve forest health and to study the short- and long-term effects of these treatments.

**Whisky Ridge Ecological Restoration Project:** The project would implement a strategy for ecological restoration that emphasizes the ecological role of fire, changing climate conditions, sensitive wildlife habitat and the importance of forest structure heterogeneity and hydrologic function.

**Dinkey Landscape Restoration Project:** Sierra National Forest's Collaborative Forest Landscape Restoration projects (Dinkey North and Dinkey South) will accomplish vegetative restoration treatments - thinning timber stands, underburning, and reforestation - consistent with the Pacific Southwest Research Station publication "An Ecosystem Management Strategy for Sierran Mixed-Conifer Forests."<sup>9</sup>

**Rancheria Campground Rehabilitation:** The SNF proposes to improve campground facilities and to protect and/or restore culturally and biologically sensitive resources at the Rancheria Campground. This project is in cooperation with Southern California Edison under FERC license.

**Greys Mountain Ecosystem Restoration Project (EIS):** The purpose of the project will be to: reduce fuel ladders and ground fuels in a wildland urban interface area, increase vigor and health of mixed conifer stands, restore key ecological watershed components, and restore wildlife structures/habitat.

**High Sierra Fuel break Project (EA):** This planning effort will create and maintain 3 new fuel breaks and maintain 6 existing fuel breaks in the front country of the High Sierra Ranger District using various mechanical, hand and herbicide methods. Maintain Access roads to fuel breaks.

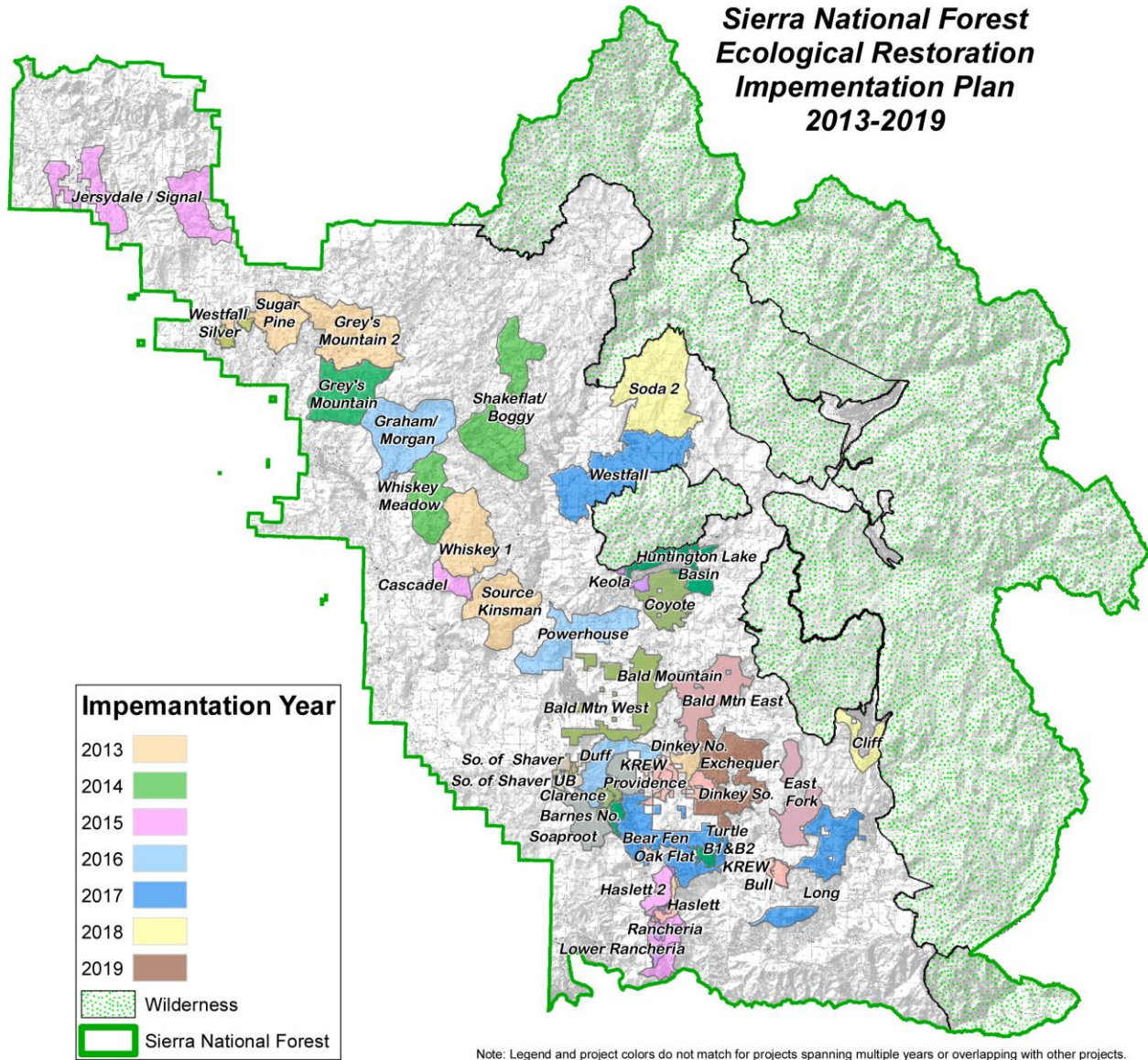
**Willow Creek General Recreation Access Trail Project (EA):** Proposed construction of the Willow Creek access trail and an associated access road and parking area.

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9. Available for download at [www.fs.fed.us/psw/publications/documents/psw\\_gtr220/](http://www.fs.fed.us/psw/publications/documents/psw_gtr220/)



### Sierra National Forest Ecological Restoration Implementation Plan 2013-2019



# Rivers to Ridges Ecological Restoration

## Six Rivers National Forest

### Ecological Restoration: Purpose and Need

The Six Rivers National Forest (SRNF), established in 1947, and named for the Smith, Klamath, Trinity, Mad, Eel, and Van Duzen rivers, manages over 1,500 miles of these rivers and their tributaries, which constitutes nine percent of California's total freshwater runoff. These rivers provide salmon and steelhead access to over 400 miles of their traditional spawning grounds and provide enormous commercial benefit to local communities in the North Coast and Klamath Provinces both in terms of sustainable recreation and commercial fisheries.

**Resilient Processes:** Ecological restoration on the SRNF incorporates the principles of making the landscape resilient to natural disturbances such as wildfires, floods and droughts, particularly given the uncertainties associated with climate change. Ecological restoration, first and foremost, means managing forest lands to protect our water resources. High-quality water from forests is fundamental to these fisheries, our prosperity and our stewardship responsibility.

The need for ecological restoration has become increasingly important because of the myriad threats to the Forest's unique "Rivers to Ridges" landscapes. They include catastrophic wildfire, climate change, drought, insects and disease, and increasing pressures of human population. That's why the time is right to pick up the pace and scale of our ecological restoration work to continue providing ecosystem services and benefits which are being jeopardized by these large scale threats.

The historic annual occurrence of fire in California, both natural and through Native American traditional cultural use, had prevailing effects on ecological processes for thousands of years. Those effects over time lead to the current management question of how forest fire use for resource benefits can be most effectively managed to maintain and improve critical salmonid fisheries habitat.

The intensity with which forest fires burn has a direct connection to the quality and quantity of water available. The fire return frequency controlled the vegetation composition and fuel loading effecting retention and storage; generally fires burned with low intensity.

Also, Native Americans use of fire for resource benefit is well known. Native American traditional cultural and agricultural burning occurred in the fall/spring. They managed their fires through appropriate seasonal use and use of local land features. The wildfires maintained the landscape and provided a consistent quality and quantity of water, within the range of natural variability, for healthy salmonid fisheries habitat.

"Rivers to Ridges Ecological Restoration" on the Six Rivers National Forest must include fire for fish as a prevailing component of our management strategy. Landscape scale fire management will maintain and improve the upland and aquatic habitats within the range of natural variability, result in healthy salmonid habitat in our key watersheds, and aid in the recovery of upland T&E species.

## Anadromous Fish on the Six Rivers National Forest



Adult Fall-run Chinook Salmon at Slant Bridge on the Smith River



Steelhead



Coho Salmon



Fish Spawning on Siskiyou Creek – Tributary to Smith River

**Restoring Uplands and Meadow Systems:** As a result of decades of fire suppression, vegetation composition shifts have impacted unique meadow and oak-woodland ecosystems due to conifer encroachment. Oak-woodland ecosystems have some of the highest species diversity on the Forest. However, fire suppression policies have reduced these communities dramatically. For example, the North Fork Eel watershed has lost over 82% of its oak-woodlands. Species that have been impacted as a result of these vegetation shifts include the acorn woodpecker, western gray squirrel, black bear, black-tailed deer, and wild turkey. Over the past decade, the SRNF experienced long duration wild fire events due to excessive fuels, climate change, and increased lightning activity. Although all fires are managed under a suppression strategy, one can see resource benefit across the vast majority of the quarter million acres burned during this time.

In an effort to reduce wildfires risks and make the landscape more resilient to wildfires, the SRNF has developed a fuels program that gives priority attention to strategically reduce hazardous fuels near communities. Working closely with local and County Fire Safe Councils and Resource Advisory Committees, multiple examples of community protection projects and strategically placed fuels breaks have been accomplished in recent years. The use of fire through prescribed burning will be an important tool of this Forest strategy. The following photos display the results of some of these projects.

### Coon Mountain Meadow Restoration Project



Coon Mountain Restoration Project- Untreated condition



Coon Mountain Restoration Project- Underburning



Coon Mountain Restoration Project- Post treatment (desired condition)

### Big Flat Vegetation Management Project, Late Successional Reserve Restoration



Big Flat Project before treatment



Big Flat Project after treatment

### Pappas Flat White Oak and Meadow Restoration: Smith River National Recreation Area



Pappas Flat before treatment



Pappas Flat post-burn

The Forest has thousands of acres of conifer plantations, a result of past management practices that emphasized maximizing volume. In some areas these managed stands are a major component of the ecosystem. While much of the initial treatments will emphasize hardwood restoration, treating plantations will accelerate their development to more resemble natural stands. These combined treatments would occur over 150,000 acres in the next decade. This will help restore and sustain the health, diversity, and productivity of these upstream forest and meadow environments, while creating needed jobs. This effort must not abandon, however, our current support of Tribes, local communities and Fire Safe Councils working across boundaries to protect and develop their capacity.

#### **Restoring Resilient Watersheds and Fisheries Habitats:**

In addition to upland fuels reduction work, the SRNF has for many decades, emphasized watershed and fisheries restoration. Visionary in-stream restoration work in the 80's yielded an aggressive in-stream and riparian restoration program designed to help the rivers recover after the 1955 and 1964 floods. Since 1990 to the present, the SRNF focused on fixing high risk road problems through a combination of road decommissioning and road storm proofing. More than 430 miles of forest roads were decommissioned, 450 culverts with potential problems corrected, and more than 50 replaced with larger pipes. Ongoing efforts continue to make our watersheds and fisheries more resilient to floods and wildfires by reducing road risks and their potential impacts on aquatic resources.

**Framework for Sustainable Recreation:** Ecological restoration is critical to providing quality recreation services. Some examples of recreation opportunities on the Forest include:

- Local guide services are dependent on a robust fisheries and are critical to local community employment.



- The Six Rivers National Forest provides unique and nationally recognized whitewater recreational opportunities vital to local communities.



- Watersheds like the Klamath, Salmon, and Smith Rivers are key attractions for urban recreationists seeking remoteness and solitude.



- Fish Lake provides recreational fishing, camping, and educational opportunities and is a vital recreational draw for the local coastal communities.



As the photos show, our recreation niche is, “Rivers to Ridges for Fun and Renewal” for good reason. Travelers and recreationists are beginning to discover one of California’s best kept secrets which include the Smith River National Recreation Area, one of only two congressionally designated areas in California.

The Forest contains over 35% of California’s Wild and Scenic Rivers (WSR) on federal lands. The 1500 miles of waterways offers fantastic whitewater and river recreation opportunities.

The Rivers to Ridges For Fun and Renewal Framework for Sustainable Recreation can be read at: [www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprd\\_b5325131.pdf](http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprd_b5325131.pdf).

To be successful, emphasis will be placed on expanding and developing partnerships to increase our organizational capacity to achieve our restoration goals. The Forest Partnership Coordinator will engage partners and volunteers and closely coordinate with other agencies, County Boards, local communities, stakeholders, and Tribes.

Only an environmental restoration program of unprecedented scale can change the current trend. It will only happen if collaboration is a meaningful process where people with diverse interests share their knowledge to improve outcomes to enhance future decisions for the good of the Forest.

## Partnerships

Ecological restoration by definition necessitates a landscape approach that transcends land ownership, geographic, and social/tribal boundaries. The SRNF has an extensive history of successful partnerships associated with watershed and fisheries restoration. The SRNF, in partnership with California Department

of Fish and Game, National Marine Fisheries Service, USFWS, North Coast Water Quality Control Board, Caltrans, Karuk and Yurok Tribes, and California Parks and Recreation, has leveraged its watershed and fisheries funding to garner over \$8.8 million in outside grants in the past 15 years in order to implement watershed and fisheries restoration activities. Similar partnership efforts are underway with Humboldt Bay Municipal Water Board, Rocky Mountain Elk foundation, Mid Klamath Watershed Center, Hayfork Watershed Center, and Del Norte, Humboldt and Trinity County Resource Advisory Committees (RACs) to leverage funding for upland ecological restoration activities such as fuels reduction, oak woodland restoration and recovery for Northern Spotted Owl.

The specific project details and partnerships associated with the SRNF Rivers to Ridges Ecological Restoration are described in the Project description listed below.

## Projects

The SRNF has been planning and implementing the SRNF Rivers to Ridges Ecological Restoration for many years. Examples of SRNF Rivers to Ridges include upland vegetation restoration as well as watershed/fisheries restoration actions such as the Orleans Transportation and Road Restoration EA (2007) (shown below) and the \$3 million in outside partnership to implement the NEPA restoration projects.



Photo of perennial stream crossing being decommissioned. Karuk Tribal members are operating the equipment and placing the final erosion control on the side slopes.



This photo shows the Forest Service and the Tribe's project inspectors discussing the finished product with the equipment operators. All equipment operators and laborers that worked on this grant are members of the Karuk or Yurok Tribes.



Fill removed from the stream crossings as well as recontouring the swales results in a gently outsloped road as part of the final road decommissioning work.



View of culvert and fill prior to being decommissioned.



View looking upstream of newly constructed perennial stream crossing.



This photo shows how the dozer uses the rippers to decompact the road surface. This technique promotes infiltration and new vegetation growth. Native grass seed is spread to provide cover until other shrubs and trees become established.

Other recent examples of successful ecological restoration projects include the Coon Mountain Meadow Restoration, Big Flat Plantation and Fuel Reduction Project, Pappas Flat (all shown above) and the Orleans Community and Fuel Reduction Project which have fuel reduction treatments within WUIs being implemented this fiscal year. Examples of specific projects that incorporate the SRNF Rivers to Ridges Ecological Restoration are described extensively in the Bluff Creek and Upper Mad River Watershed Restoration Action Plans (WRAPS). The WRAPS integrate watershed and upland restoration activities and include a range of accomplishments such as:

- terrestrial habitat improvement
- stream enhancement habitat improvement
- soil and water improvements
- road decommissioning
- fuels reductions WUI and non WUI
- timber volume sold
- forest vegetation improved

Documents describing these activities and projected accomplishments in detail are available from the Forest upon request.

Upper Mad River WRAP	Bluff Creek WRAP
Road upgrade/decommissioning	Port-Oxford cedar root disease sanitation evaluation
Unauthorized route decommissioning	Road decommissioning
Clover Gulch Hazardous Fuel reduction	Road storm proofing
Mad Ridge Fuelbreak maintenance	Priority fuels (includes plantation eval/treatment and Bluff Creek WA)
Upland fuel treatment	Riparian enhancement
Beaverslide Timber Sale and Fuel Reduction and road decommissioning	Fisheries habitat improvements
Kelsey Peak Timber Sale and Fuel Reduction and road decommissioning	Fish Screen
Little Doe/Low Gulch Timber Sale	Invasive plant removal



# Ecological Restoration Implementation Strategy

## Stanislaus National Forest

*“We are not responsible for this or that resource;  
we are responsible for the forest as a whole.”*

Aldo Leopold

### Where We've Been

Aldo Leopold's words above beautifully describe the path the Stanislaus National Forest (NF) has been on for many years. Thousands of acres have received ecological restoration treatments (mechanical thinning, shredding, etc.) and several more thousand have had prescribed burns or wildfires used to restore the natural fire regime to the forest. For years, we have approached our projects on a landscape level, allowing us to complete much meadow, aspen, road, noxious weed, recreation, and trail enhancement work while creating thousands of acres of resilient forest.

The Stanislaus NF always strives to restore a process, not a condition at a single point in time, which is why small non-commercial log removal is a part of all our timber sales, and prescribed burning always follows these mechanical treatments within a few years. The Forest has been very efficient at restoring acres, but one major need is funding to complete follow-up prescribed burning every seven years or so in these areas recovering from years of fire exclusion.

Ecological Restoration projects using collaborative groups have been going on since the 1990's here and the recent emphasis placed on this process by the Washington and Regional Offices has only further encouraged us to accelerate this approach to land and resource management. In 1997, two very different groups formed on the Stanislaus National Forest: Our Back Yard or OBY was created by a group of concerned citizens to help determine the desired condition after the 1973 Granite Fire, which was replanted into a successful plantation, but was in need of the next step.

Out of this collaboration and vision, Granite became one of the first Stewardship projects in the nation and thousands of acres were thinned for fuels reduction and fire protection, 7 million board feet were taken to nearby mills, roads were decommissioned, and meadows restored. At about the same time, the Pinecrest Pathways Future Search Conference brought together 47 community members to create vision statements for the Pinecrest Recreation Area. This

information would be used a few years later as the basis for the relicensing of the dam and for recreation improvements in the area.

In addition to a history of strong collaborative groups, the Stanislaus NF is fortunate to have several wood processing facilities including a large timber mill, a fencing plant, two biomass (small log) power plants, a shavings processor, and a landscaping bark plant. These facilities and our ability to continually provide material to them is a critical means for us to meet the triple bottom-line of sustaining a resilient forest, supporting local communities, and enhancing local economies, while providing a unique and special place in the world.

### Three Rivers, Three Stories: Tales of Collaboration

The Stanislaus National Forest is uniquely positioned to provide clean water and air, spectacular vistas, diverse recreation experiences, remote wilderness opportunities, interpretive programs and historic sites, timber and other products to local mills, and jobs for our community. The Mokelumne and Tuolumne Rivers provide the drinking water to over 4 million people in the San Francisco and East Bay areas, and other smaller water districts use water from the Stanislaus River and its tributaries. As the collection and storage area for the water used by millions of downstream users, the Forest relies on meadows to store and slowly release that water. These “sponges” are water retention areas and filters as well as critical habitat for many special plant and animal species. The oxygen produced from the millions of trees on the Forest and the carbon each tree has sequestered and continues to uptake each year helps to mediate climate change (see attached tree diagram). Recreation on the Forest exceeds 1.8 million visitors a year, running the gamut from thousands of people on a lake boating, fishing or sunbathing, to fishing a creek in the remote backcountry. The three Wilderness areas on the Forest offer pristine experiences and opportunities for solitude. Outdoor recreation experiences are endless on the Stanislaus NF.



A man fly fishes the pristine waters of the Middle Fork Stanislaus River hoping to catch a trout.

Today, the Stanislaus National Forest works with three different collaborative groups to help guide the management of the Forest and ensure healthy resilient lands regardless of ownership. Following is a brief description of each, showing the varied partners with whom we work, and each effort's unique objectives (see the attached map for locations).

### The Stanislaus River

In 1999, Pacific Gas & Electric (PG&E) and Tri-Dam Project formed the Stanislaus Planning Action Team (SPLAT) to recommend resource measures in their licensing process for three dams and their adjacent large reservoirs which are within or originate on the Forest. The Forest Service was also a member of this group which held over 100 meetings, all open to the public, over a 5 year period. This group and its various subcommittees lead the way in establishing various plans and changes to the management of these reservoirs, including restoring year round natural flows to improve fisheries and riparian habitats downstream of the dams while meeting the business needs of the utility companies. The collaborative process is ongoing and recreation improvements in the area are just beginning. Several million dollars of facility upgrades (all paid for by PG&E and Tri-Dam) will be invested over the next several years. Projects include the construction of a new campground in the Beardsley Canyon area, upgrading all existing campgrounds and day use areas, and restoration of trails. The Federal Energy Regulatory Commission license that was issued in conjunction with this effort will last for 38 years, making this a critical and long-term process for the Forest, recreational users, the utility companies, and their customers whose homes may run on electricity produced in the Stanislaus National Forest.

### The Mokelumne River

The Amador Calaveras Consensus Group (ACCG) is a collaborative effort of diverse community members working to create healthy forests and watersheds, fire-safe communities, and sustainable local economies.

The Mokelumne River is the source of drinking water to the East Bay. The ACCG was convened in December, 2008 and operates within California's Amador and Calaveras counties in and adjacent to the Mokelumne River watershed. The Forest Service is one member of this amazing group of community leaders, and was asked to join by a local county supervisor.

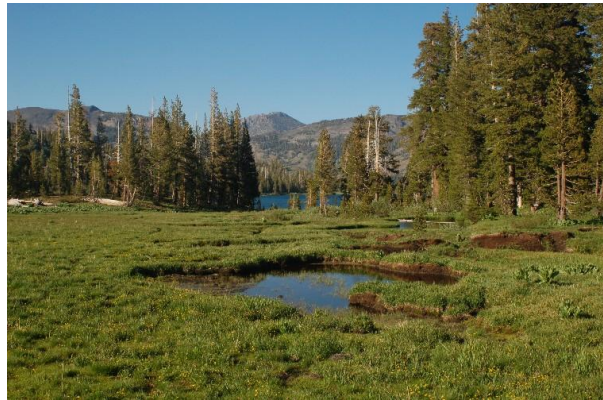


Middle Fork Stanislaus River

Because of this effort, the ACCG received one of ten nationwide Collaborative Forest Landscape Restoration Program (CFLRP) grants that the Forest Service awarded in January, 2012. This program provides matching funding for a wide variety of ecological projects including reduced risk of uncharacteristically destructive fire and threats to lives and property, restored cultural sites, streams, meadows, and enhanced forest vegetation (see attached table for a list of these projects by year).



A man, his daughter and their dog visit the Highland Lakes campground on the Stanislaus NF.



Mokelumne River Headwaters: Upper Highland Lake.

## The Tuolumne River

The Yosemite Stanislaus Solutions (YSS) collaborative group was formed in December, 2010 to assist the Stanislaus National Forest in developing restoration plans across the landscape regardless of ownership patterns, in the southern part of the Forest (see attached map). The diverse group of stakeholders includes federal, state, county, tribal, municipal water and power entities, environmental organizations and private landowners. The mission of YSS is to restore and maintain healthy forests and watersheds, establish fire-safe communities, and support a sustainable local economy. An example of one critical area within the YSS collaborative is Hetch Hetchy Reservoir which provides the drinking water to San Francisco residents.

Approximately one third of the land within the YSS boundary burned in 1987 and succeeding years. Since then, the majority of this land has been successfully reforested, but 25 years later has a high potential to burn again due to the thick and contiguous density of the plantation trees.

The Stanislaus National Forest partnered with the Sierra Nevada Conservancy (a State Agency) to initiate this opportunity where participants can identify, craft, and prioritize the elements of restoration. Recognition of the importance of maintaining high water quality to all downstream users is a key component. This collaborative process will enable the Stanislaus NF to develop a science-based restoration approach that goes far beyond what any one group could accomplish on its own.

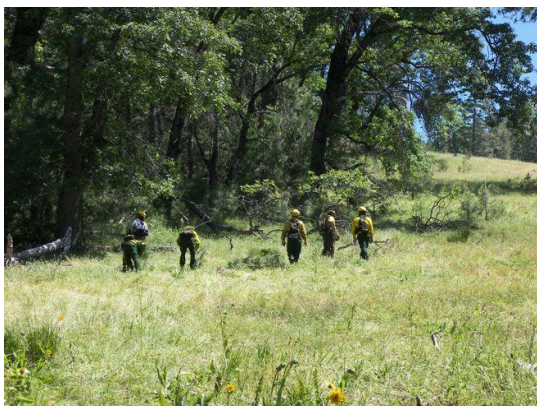
## Ecological Restoration on the Stanislaus Today

### Indigenous Stewardship, Meadow Restoration:

Prior to the 2001 Darby Fire, archaeological field investigations noted that this Meadow contained flora and fauna at a magnitude that once sustained one of the largest village complexes of Native Americans on the Stanislaus National Forest. In the years since the fire, the meadow's functionality and ethno- botanical diversity noticeably declined due to post-fire conditions, lack of canopy, invasive species and meadow down-cutting.



Tuolumne River Canyon



Tuolumne Band of Me-Wuk fire crew accomplishing meadow restoration.

This project is working to improve the ethno-botanical component through a close partnership with the Me-Wuk tribe by restoring native plant communities, improving meadow function, and enhancing indigenous stewardship opportunities. Most of the work has been done by the local Me-Wuk fire crews and the Calaveras Healthy Impact Products Solutions crew (CHIPS). It is an ongoing partnership with the local tribe and a wonderful example of successful collaboration and restoration.



Tuolumne Band of Me-Wuk fire crew remove encroaching pine trees from a meadow.

### Niagara Aspen Restoration:

This project restored approximately 50 acres of aspen community that had been declining due to conifer encroachment and fire suppression over the past 100 years. Aspen rely on fire to keep them healthy and resilient by killing off the conifers and allowing young vigorous coppices (sprouting seedlings) to become established and to continually come into the stands over time. This restoration work is being accomplished through the use of volunteer groups and a small timber sale.



Miller Unit pre-treatment condition; note no young aspen.



Miller Unit Aspen growth ten years later.

### Returning Fire to the Landscape:

The Stanislaus National Forest has used prescribed burns on thousands of acres over the past 20 years as part of our effort to reduce fuels and restore natural fire regimes to the forest. These photos show one example of an area that has been burned twice over the past 15 years following a mechanical treatment which



South Beardsley Canyon prior to reintroduction of fire.



Post fire, first entry in 1998.



Post fire, second entry in 2011.

delivered logs and biomass to our local mills. Fire is an integral part of a resilient forest and plays a critical role in our ecological restoration program. It reduces fuels and destructive fire potential which protects local communities and landscapes, and recycles nutrients into the soil which creates fertile seed beds for plants and tree seedlings.

### Into the Future:

The Stanislaus National Forest has a multitude of opportunities for partners to do work on the Forest that:

- keeps or increases the Forest’s capacity to recycle the precious element of water: capturing and purifying it, then releasing it slowly over time to eventually provide drinking water, electricity, and irrigation of crops for thousands of downstream souls.
- actively manages the forest, its trees, grasses, and plants. These elements purify the air and moderate the climate of earth, in addition to providing a myriad of other things such as homes for animals, wood products for human use, and a diversity of environs for centuries to come.
- provides the opportunity – through stunning vistas, forests of solitude, streams running with fish, campgrounds to touch the earth - for humans to revitalize spirit and soul.

Please see the table and accompanying map at the end of this chapter for an extensive list of planned ecological restoration activities on the Forest for the next five fiscal years.

We invite you to bring your vision and mission, and explore how it can be realized in partnership with the Stanislaus National Forest.

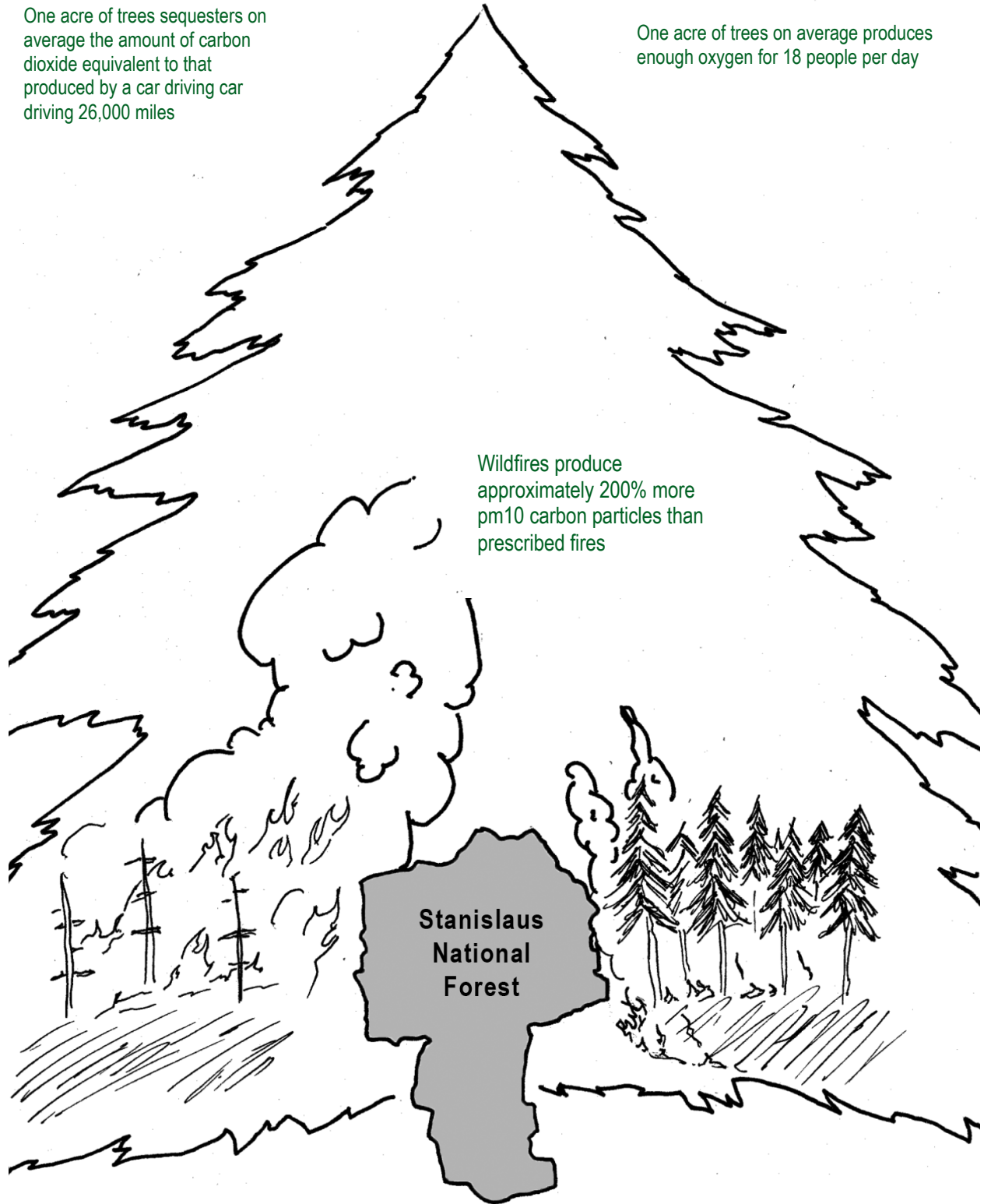


Middle Fork Stanislaus River

One acre of trees sequesters on average the amount of carbon dioxide equivalent to that produced by a car driving car driving 26,000 miles

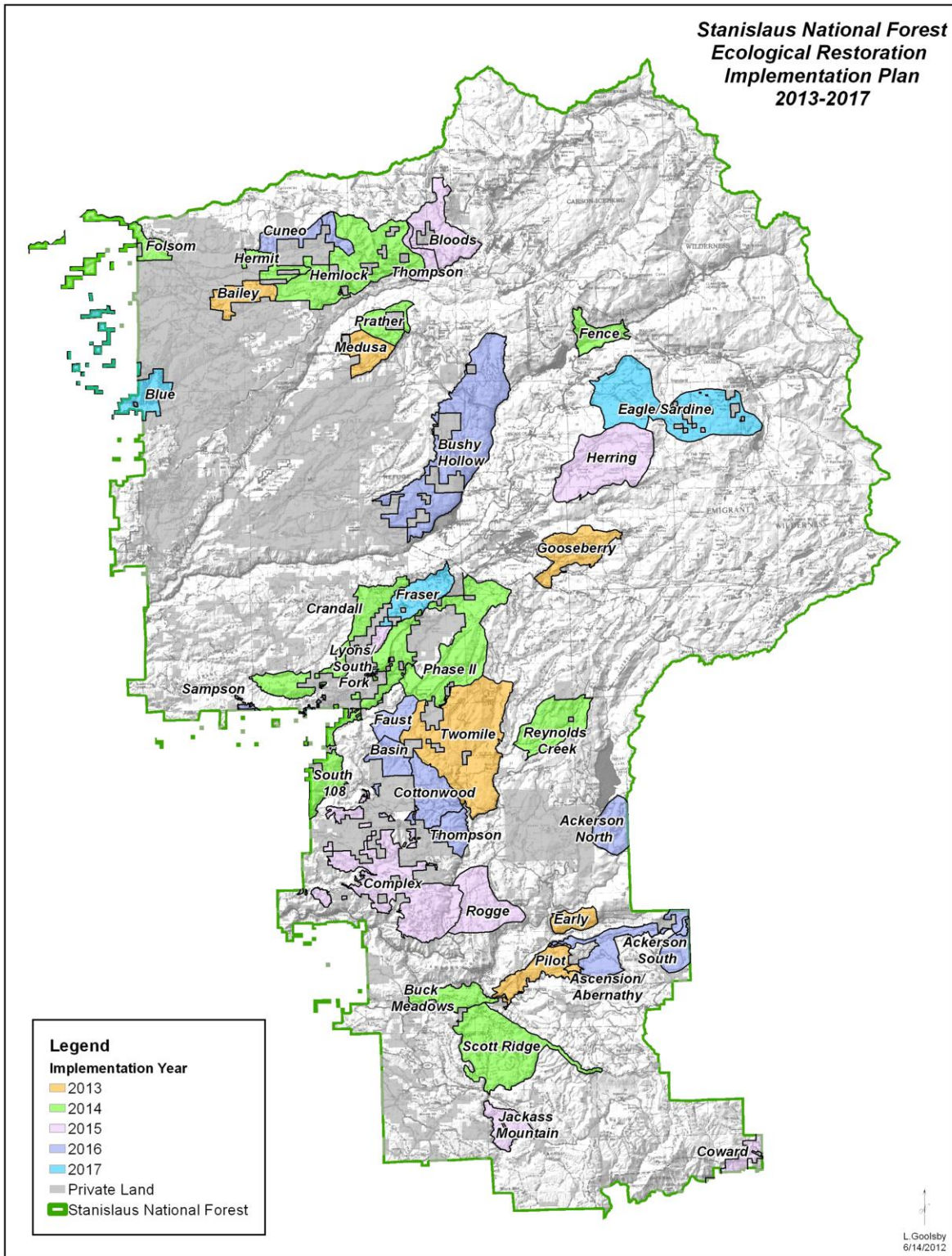
One acre of trees on average produces enough oxygen for 18 people per day

Wildfires produce approximately 200% more pm10 carbon particles than prescribed fires









Project	Emphasis Area	Acres/Miles	NEPA Status	Collaboration	comments
<b>2013 Projects</b>					
Twomile Ecological Restoration Project	Fuels Reduction	1,835 acres	Appeal Period ends 6/15/12	Environmental and Industry Groups and Tribal/State/County Governments and Other interested parties	Biomass removal; Machine and hand pile & burn; underburn
		185 acres			Prescribed burn only
	Forest Restoration	5,570 acres			Mechanically thin, biomass removal, masticate, herbicide application & burn
	Weed treatments	5 acres			
	Road Improvements	85 miles			
	Fuels Reduction	4,050 acres			Thinning in natural stands
		1,634 acres			Thinning in plantations
Meadow Restoration	72 acres				
Twomile Ecological Restoration – Motorized Trails	Road and trail improvements	22 miles	Appeal Period ends 8/6/12	Environmental and Industry Groups and Tribal/State/County Governments and Other interested parties	
Twomile Ecological Restoration – Transportation	Road improvements	82 miles	Developing Proposed Actions	Environmental and Industry Groups and Tribal/State/County Governments and Other interested parties	
Gooseberry Ecological Restoration	Forest Health	2,000 acres	Scoping Completed	Dodge Ridge Winter Sports Area, local and statewide environmental groups	Disease and mistletoe reduction
	Fuels Reduction	2,500 acres			Some stands are burn only, no mechanical treatment prior to burning
	Meadow Restoration	14.5 acres		As above plus the Range Permittee	3 separate meadows have gully restoration proposed
	Aspen Restoration	190 acres		As above plus Back-country Horsemment	7 separate stands. These will be "fenced" to protect from cattle grazing for the first few years
	Campground Improvements	12 acres			Kerrick Corral Horse Camp, coordinating with Horse Users
	Road Improvements	37 miles			Includes 1.74 miles of decommissioning for resource protection
Bailey Forest Health/Cornerstone Project	Forest Health	330 acres	5/27/2011	ACCG	Amador-Calaveras Consensus Group (ACCG) Project. Falls within the Collaborative Forest Landscape Restoration Program (CFLRP) Cornerstone Project Area
	Road/Watershed Improvements	40 miles			Reduce sedimentation and improve soil stability through road reconstruction, realignment, and decommissioning
	Cultural/Sensitive Site Enhancement and Protection	20 acres			Hand cut, pile, and burn fuels within archeological sites to reduce susceptibility to wildfire damage and enhance existing conditions
	Fuelbreak Maintenance/Construction	20 miles			Shredding/mastication and control burning
	Prescribed Burning	250 acres			Moore Creek and Shovel Grave areas

Project	Emphasis Area	Acres/Miles	NEPA Status	Collaboration	comments
	Noxious Weed Control	91 acres			Hand cutting and herbicide treatments
	Fuels Reduction	400 acres			Treating biomass and brush within stands
Reynolds Creek	Aspen Restoration	Unknown	Developing Proposed Action	YSS	Removal of encroaching conifers
	Forest Health				White Pine Blister Rust, mistletoe, and root disease
	Meadow Restoration				
	Forest Health				Planting of incense cedar and fir
	Oak Enhancement				
	Road Improvements				
	Noxious Weed Control				
Pilot & Early Fire Areas Restoration	Oak Enhancement	Unknown	Developing Proposed Action	YSS	
	Noxious Weed Control				
	Forest Health				Planting conifers in suitable sites
	Cultural/Sensitive Site Enhancement and Protection				
	Fuels Reduction				Includes broadcast burning
	Forest Health				Thinning in natural stands
	Road Improvements				
	Meadow Restoration				
China Flat Healthy Forest Restoration	Fuels Reduction/Forest Health	389 acres	7/11/2008	Interested Publics	Shredding of 20 year old plantations. Within the Forest's number one priority watershed, Bean Creek (North Fork of the Merced River) and Yosemite Stanislaus Solutions (YSS) Collaborative area
		430 acres			Shredding and/or biomassing of 20 year old plantations. Within the Yosemite Stanislaus Solutions (YSS) Collaborative area
		1,632 acres			Hand thinning, piling, and burning within 20 year old plantations. Within YSS
		4,606 acres			Broadcast burning, reintroducing fire. Within YSS
	Road Improvements	31 miles			Within YSS
Peach Growers Fuel Reduction	Fuels Reduction	98 acres	2007	Interested Publics	Hand thin, pile, and burn. Within YSS
		704 acres			Broadcast burning, reintroducing fire. Within YSS
	Wildlife Enhancement	8 acres			
Long Shanahan Fuel Reduction and Forest Health Project	Fuels Reduction	470 acres	2007	Interested Publics	Dense natural stands, plantations, and decadent brushfields near homes. Shred. Within YSS
		178 acres			Hand thin stands similar to above. Within YSS
		799 acres			Underburn. Within YSS
	Road Improvements	11.8 miles			Decommission 0.4 miles, reconstruct/block 11.4 miles

Project	Emphasis Area	Acres/Miles	NEPA Status	Collaboration	comments	
Middle Fork Fuel Reduction and Forest Health Project	Fuels Reduction	809 acres	2007	Interested Publics	Shredding of natural stands. Within YSS	
		1,001 acres			Broadcast burning, reintroducing fire. Within YSS	
		179 acres			Machine pile and burn. Within YSS	
	Road Improvements	19.4 miles			Reconstruct 19.4 miles. Within YSS	
Big Creek Plantation Commercial Thin	Fuels Reduction		2007	Interested Publics	Plantation thinning. Within YSS	
Bear Mountain Fuel Reduction and Forest Health Project	Fuels Reduction	176 acres	2006	Interested Publics	Machine pile and burn in natural previous thinned stands. Within YSS	
		18 acres			Hand thin, within YSS	
		1,683 acres			Prescribed burn within YSS	
Monotti Urban Fuel Reduction and Plantation Thinning	Fuels Reduction and Forest Health	2,481 acres	2011	Interested Publics	Shredding and/or biomassing of 20 year old plantations. Within the Yosemite Stanislaus Solutions (YSS) Collaborative area and Bean Creek, Forest's #1 priority watershed	
		277 acres			Tractor/grapple pile and burn in plantations. Within YSS and priority watershed	
		272 acres			Hand thinning, piling, and burning within 20 year old plantations. Within YSS and #1 priority watershed	
		140 acres			Broadcast burning, reintroducing fire. Within YSS and #1 priority watershed	
	Noxious Weed Control	100 acres				
	Road Improvements	23.2 miles				Decommission 0.6 miles of road, and reconstruct 22.6 miles. Within YSS and #1 priority watershed
Soldier Creek Healthy Forest Restoration Project	Fuels Reduction	1,103 acres	2009	Interested Publics	Shredding of natural stands treated 10 years ago. Within YSS	
		110 acres			Machine pile and burn. Within YSS	
		2,124 acres			Broadcast burning, reintroducing fire. Within YSS	
	Road Improvements	2.5 miles			Reconstruction work. Within YSS	
Experimental Forest Underburn	Fuels Reduction/Science	68 acres	Jul-10	Local Environmental Groups & Industry Groups	Part of the ongoing study in this area	
Gap Burn	Fuels Reduction	800 acres	Developing Proposed Action	Interested Publics	Prescribed burn within untreated stands	
Wilderness Habitat Restoration	Yellow Legged Frog Restoration	10 acres	Done	Interested Publics	Lakes within the Emigrant Wilderness	
FERC Day Use Improvements	Campground and Day Use Restoration	40 acres	Done	SPLAT and interest publics	Includes Pinecrest Day Use Area, construction of new campground in Beardsley Canyon, Beardsley Day Use Improvements	
White Fire Precommercial Thinning	Fuels Reduction and Forest Health	113 acres	1/15/2009	Local Environmental Groups	Shredding of trees and brush	
Strawberry Fuels Reduction	Fuels Reduction	675 acres	10/18/2007	Local Environmental and Industry Groups	Shredding of trees and brush	
Crandall Fuel Reduction and Forest Health Improvement	Fuels Reduction	164 acres	7/24/2007	Local Environmental and Industry Groups	Shred units: 3205, 3301, 3304. This will complete shredding in Crandall	

Project	Emphasis Area	Acres/Miles	NEPA Status	Collaboration	comments
Crandall Fuel Reduction and Forest Health Improvement	Fuels Reduction	300 acres	7/24/2007	Local Environmental and Industry Groups	Underburn units: 1301, 2801, 2802, 2901, 2305, 2306, 2401, 2402
Phase II Fuel Reduction, Forest Health and Road Management	Fuels Reduction	137 acres	5/29/2009	Local Environmental and Industry Groups	Shred units: 3280, 3281
South 108 Fuel Reduction, Forest Health and Road Management	Fuels Reduction	274 acres	6/10/2005	Local Environmental and Industry Groups	Units: 16, 20; 215 ac. Shred, 59 ac. Handcut
<b>2014 Projects</b>					
Fence Ecological Restoration Partnership	Fuels Reduction/Forest Health	1,500 acres	Developing Proposal	Local Environmental and Industry Groups	Thinning and biomass removal
	Meadow Restoration	9 acres			3 Meadows to repair; including a fen being impacted by road run off
	Road Improvements	8 miles			Road run off is impacting resources and causing yearly road damage
	Aspen Stand Enhancement	4 acres			Removal of conifers (competition) from within aspen stands
	Dispersed Camping Improvements	3 acres			Identifying and creating sites for camping while protecting resources
Hermit/Folsom Compartments Forest Health Treatments/Cornerstone Projects	Forest Health/Fuels Reduction	380 acres	Developing Proposal	ACCG	Thinning and biomass removal and mastication (shredding)
	Road/Watershed Improvements	2.5 miles			Mokelumne River Road Crossing Removal and road reconstruction
	Cultural/Sensitive Site Enhancement and Protection	10 acres			Hand cut, pile, and burn fuels within archeological sites to reduce susceptibility to wildfire damage and enhance existing conditions
	Fuelbreak Maintenance/Construction	120 acres			Shredding/mastication and control burning. One mile of new fuel break on Bailey Ridge
	Prescribed Burning	250 acres			Grave, Moore Creek, Airola, and Garnet areas
	Noxious Weed Control	84 acres			Hand cutting and herbicide treatments
	Trail Construction	5 miles			New construction on 5 miles of Mokelumne Coast to Crest Trail
Wilderness Habitat Restoration	Yellow Legged Frog Restoration	10 acres	Done	Interested Publics	Lakes within the Emigrant Wilderness
Wilderness Noxious Weed Eradication	Noxious Weed Control	10 acres	Developing Proposal	Interested Publics	Wilderness enhancement
Wilderness Meadow Restoration	Meadow Restoration	100 acres	Developing Proposal	Interested Publics	Wilderness enhancement
Shell Meadow Restoration	Meadow Restoration	3 acres	Developing Proposed Action	Interested Publics	Gully Restoration, repair down cutting
Crab & Pine Underburn	Fuels Reduction/Forest Health	1,000 acres	C	Interested Publics	Follow up to mechanical thinning treatment
Lyons/South Fork Fuels Reduction Project	Fuels Reduction	270 acres	9/14/2006	Environmental and Industry Groups and Tribal/State/County Governments and Other	Shred units: 9, 10, 13, 15, 16 (KV funding available)

Project	Emphasis Area	Acres/Miles	NEPA Status	Collaboration	comments
				interested parties	
South 108 Fuel Reduction, Forest Health and Road management	Fuels Reduction	1,286 acres	6/10/2005	Environmental and Industry Groups and Tribal/State/County Governments and Other interested parties	Shred units: 101, 1501, 1502, 1602, 1604, 2001, 2002, 2003, 2101, 2102, 2104, 2303, 2801, 2901, 2904, 2905, 3001, 3104, (Appropriated \$); 109, 113, 202, 204, 207, 2105, 2106, 2902, 3102, 3106 (KV \$)
<b>2015 Projects</b>					
Complex Ecological Restoration and WL Habitat Improvement	Forest Health/WL Habitat improvement	12,000 acres	Developing Proposed Actions	Environmental and Industry Groups and Tribal/State/County Governments and Other interested parties	Thinning of plantations and some natural stands
	Fuels Reduction	6,000 acres			Shred and underburn
	Weed treatments	unknown			Invasive weed control
	Meadow Restoration	unknown			Possible areas: Wet Meadow, Indian Spring, Walton Cabin Spring
Twomile Ecological Restoration – Meadow Restoration	Meadow Restoration	8 acres	Appeal Period ends 8/6/12	Environmental and Industry Groups and Tribal/State/County Governments and Other interested parties	Wolfen Meadow – Main and North; Upper Fahey Meadow South and Lower; 2N55 Meadow
Shovel Grave Compartment Forest Health Project/Cornerstone Project	Forest Health/Fuels Reduction	325 acres	Developing Proposal	ACCG	Thinning and biomass removal and mastication (shredding) brush in plantations
	Forest Health/Fuels Reduction	1,150 acres			Thinning and biomass removal, approximately 8.5 MMBF produced
	Road/Watershed Improvements	25.5 miles			Decommission two washed out road stream crossings moving sediment into the Mokelumne River. Reduce sedimentation and improve soil stability through road reconstruction, realignment, and decommissioning.
	Meadow Restoration	3 acres			Reduce sedimentation/head cutting within Mattley Meadow
	Cultural/Sensitive Site Enhancement and Protection	5 acres			Hand cut, pile, and burn fuels within archeological sites to reduce susceptibility to wildfire damage and enhance existing conditions
	Fuelbreak Maintenance/Construction	40 acres			Shredding/mastication and control burning. Two miles of new fuel break on Bailey Ridge.
	Prescribed Burning	250 acres			Grave, Moore Creek, Airola, and Garnet areas
	Noxious Weed Control	90 acres			Hand cutting and herbicide treatments
	Trail Construction	5 miles			New construction on 5 miles of Mokelumne Coast to Crest Trail
Rogge	All Resources	1,500 acres	Developing Proposed Actions	YSS	Ecological Restoration project within old fire area
Jackass	All Resources	500 acres	Developing Proposed Actions	YSS	Ecological Restoration project within old fire area
Coward	All Resources	500 acres	Developing Proposed Actions	YSS	Ecological Restoration project within old fire area
Trail of the Ancient Dwarves	Restoration and	1 mile	Developing Proposed	YSS	

Project	Emphasis Area	Acres/Miles	NEPA Status	Collaboration	comments
	Improvement		Actions		
Strawberry Underburn	Fuels Reduction	1,800 acres	10/18/2007	Local Environmental & Industry Groups	Follow up treatment to mechanical thinning and shredding projects
BeeHart Underburn	Fuels Reduction	2,000 acres	Developing Proposed Actions	Interested Publics	Second follow up burn. Ecological Restoration of site too.
Sampson Fuel reduction project	Fuels Reduction	558 acres	6/16/2003	None	Shred units: 104B, 104J, 104N, 104Q, 104W, 104X, 109
<b>2016 Projects</b>					
Basin/Cottonwood/Faust/Thompson	All Resources	11,000 acres	Start NEPA FY 2014	Interested Publics	Forest Health, Fuel Reduction, Wildlife Habitat improvement, invasive plant control, roads
Brushy Hollow Ecological Restoration Partnership	All Resources	10,000 acres	Start NEPA FY 2015	Interested Publics	Forest Health, Fuel Reduction, Meadow Restoration, Road Improvements, Wildlife Habitat improvement, invasive plant control. This will be an all lands approach with SPI who owns many acres of inholdings in this area.
Cuneo Compartment Forest Health Treatments/Cornerstone Project	Forest Health/Fuels Reduction	220 acres	Developing Proposal	ACCG	Thinning and biomass removal and mastication (shredding) brush in plantations
	Forest Health/Fuels Reduction	2,100 acres			Thinning and biomass removal, approximately 7 MMBF produced
	Road/Watershed Improvements	20 miles			Reduce sedimentation and improve soil stability through road reconstruction, realignment, and decommissioning
	Cultural/Sensitive Site Enhancement and Protection	20 acres			Hand cut, pile, and burn fuels within archeological sites to reduce susceptibility to wildfire damage and enhance existing conditions
	Fuelbreak Maintenance/Construction	55 acres			Shredding/mastication and control burning. Establish 2 miles of new fuel break on Bailey Ridge.
	Prescribed Burning	300 acres			Grave, Moore Creek, Airola, and Garnet areas
	Noxious Weed Control	400 acres			Hand cutting and herbicide treatments
	Trail Construction	5 miles			New construction on 5 miles of Mokelumne Coast to Crest Trail
Ackerson	All Resources	500 acres	Developing Proposal	YSS	Plantations, forest health and fuels reduction
Abernathy & Ascension	All Resources	2,000 acres	Developing Proposal	YSS	Forest Health and Ecological Restoration project
<b>2017 Projects</b>					
Garnet Hill/Blue Creek Compartment Forest Health Treatments/Cornerstone Project	Forest Health/Fuels Reduction	200 acres	Developing Proposal	ACCG	Thinning and biomass removal and mastication (shredding) brush in plantations
	Forest Health/Fuels Reduction	2,200 acres			Thinning and biomass removal, approximately 8.5 MMBF produced
	Road/Watershed Improvements	20 miles			Reduce sedimentation and improve soil stability through road reconstruction, realignment, and decommissioning
	Cultural/Sensitive Site Enhancement and Protection	25 acres			Shredding/mastication and control burning. Establish 2 miles of new fuel break on Bailey Ridge.
	Fuelbreak Maintenance/Construction	300 acres			Grave, Moore Creek, Airola, and Garnet areas

Project	Emphasis Area	Acres/Miles	NEPA Status	Collaboration	comments
	Prescribed Burning	300 acres			Hand cutting and herbicide treatments
	Noxious Weed Control	5 miles			New construction on 5 miles of Mokelumne Coast to Crest Trail
Eagle/Sardine Ecological Restoration Partnership	Trail Construction	10,000 acres	Developing Proposal	Interested Publics	Forest Health, Fuel Reduction, Meadow Restoration, Road Improvements, Wildlife Habitat improvement, invasive plant control. This will be an all lands approach with private landowners covering several hundred acres of inholdings in this area.



# Ecological Restoration in the Tahoe National Forest

*“When we try to pick out anything by itself,  
we find it hitched to everything else in the universe.”*

**John Muir**

In the Tahoe National Forest (TNF), we are moving toward a forest-wide program of ecological restoration as we better understand current research; identify ways to incorporate and implement ecological restoration processes and programs; and increase collaborative approaches.

## Past Impacts and Current Restoration Programs

The character of the Forest today and the compelling need for ecological restoration have mostly been the result of ancient geological events and past human history. Legacy disturbances and land uses – including mining, road building, and wildfire – have created many opportunities and challenges for restoring ecosystems within the Forest. The Tahoe National Forest’s ecological restoration goals are, in part, in response to the conditions that developed over time due to its complex history.

### Gold!

Early geological events resulted in accessible gold deposits both in the form of tertiary gravels from ancient river systems and the quartz load beneath the surface of the western part of the Forest. As a result, the TNF has some of the most extensive gold deposits and mining history of any national forest in the nation. From 1848 through 1859, most every aspect of life in the gold bearing area was “closely tied with the fortunes and misfortunes of the miners.”

## Settlement Patterns and Needs for Services and Amenities from the National Forest

During the gold rush, the Northern Mines gold mining area had the largest population of any mining area in California. The early transitory mining camps that sprang up were replaced by more permanent towns based on deep gold deposits and resulting hard rock mining. This settlement pattern has contributed to today’s sustained, rural population surrounding and within the Forest with ongoing needs for amenities and services including water, fire safety and recreation.



Hydraulic diggings near Camptonville, one of the local communities near the forest boundary and site of the Yuba River Ranger Station. From the collection of Leland Pauly.

## Water and Power Demand

Today, the TNF remains an important source of water for domestic use, agriculture, and hydroelectric power generation. The four major river systems within the Forest include the Yuba, American, Truckee and Feather River drainages. The competition for this increasingly limited resource, as well as the need to balance the human demand with ecological restoration efforts, will continue to be a challenge. One of the emerging issues in the area of limited water supply is water rights.

The growing demand for water has resulted in the damming of many rivers and lakes within or adjacent to the Forest. Four major Federal Energy Regulatory Commission (FERC) relicensing projects are currently underway. These 50-year agreements have the ability to remediate many ecologically impacted resources from activities associated with the previous licenses. The Forest Service, working collaboratively with power and water agencies, other government agencies, non-profit organizations and others continue to negotiate stream flows, public service developments, recreation opportunities, and wildlife habitat protection measures. These efforts have a tremendous potential to enhance forest ecosystems for a substantial period of time by mitigating adverse effects associated with the operation of dams, while also providing a host of ecological, recreational and socioeconomic benefits.

In addition, heightened interest in the reintroduction of anadromous fish throughout their historic range has recently surfaced. The Forest Service is participating with other agencies and the public to help define and assess a process for potential reintroduction.

## Recreation

With population growth increasing within and near the Forest, recreation use is also increasing. The TNF has one of the highest recreation visitation rates in the nation due to its close proximity to major population centers of San Francisco, Sacramento, and Reno. Sustaining quality recreation experiences for the public is an ever increasing challenge. Significant increases in the number of recreationists and changing types of recreation demands combined with limited budgets has decreased our ability to meet the demand and provide the desired levels of quality recreation experiences. Many recreation groups, however, have stepped forward to assist with the restoration of various recreation sites and trail systems.

## Timber Harvest Demands and Forest Health

Throughout the Forest, extensive timber was harvested during the gold rush and subsequent Comstock silver mining periods. Timber was provided for the mines as well as building materials for the numerous towns and mining camps. Thirty four sawmills were operating in Nevada County in 1855 and 36 mills in Sierra County by the late 1850's, with millions and millions of board feet harvested each year. The demand for timber continued throughout most of the 20th century after the area became a National Forest with different approaches used in the timber and vegetation management programs.

**Today**, many forest stands are overly dense and even-aged, making them highly susceptible to catastrophic wildfire, disease, and pest infestations. This, coupled with climate change, is creating great risk to the forest, and communities, as we know it. The Tahoe National Forest vegetation management program is focused on improving forest health through thinning trees, removing fuels (including for biomass energy production), and returning fire to the ecosystem through prescribed fire. These treatments are yielding healthier, more resilient forest stands and safer communities.

## Mining

Hard rock and placer mining left their mark on riparian and aquatic ecosystems. Abandoned mines laden with toxics, including arsenic and mercury, have been an ongoing source of pollution in streams and reservoirs on the west side of the Forest for over 150 years. Fish

from some of these water sources are now considered unhealthy for regular human consumption. Historic hydraulic mining and the resulting sediment scoured the riverbeds, leaving them less habitable for fish and other aquatic species.



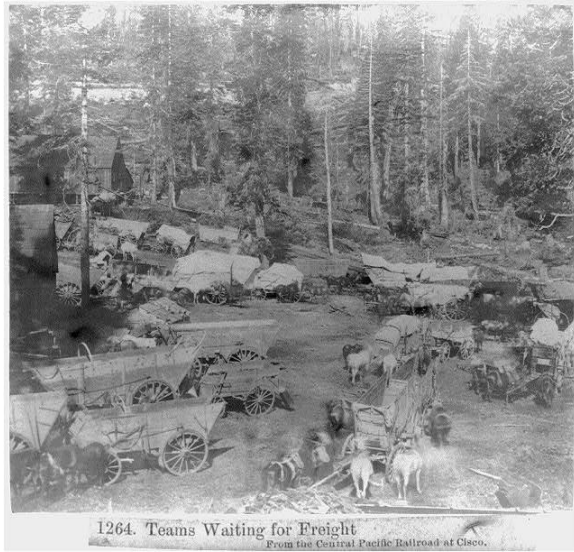
Hydraulic mining using a monitor or water cannon at Brandy City, a small town within the Tahoe National Forest.

**Today**, the Abandoned Mine Lands program provides reclamation work on abandoned mines in the Tahoe National Forest as well as throughout the western U.S., restoring both legacy and current impacts from mining and illegal occupancy of public land. The TNF Abandoned Mine Lands team works in conjunction with the California Department of Conservation, the Bureau of Land Management and other national forests to restore ecosystems adversely affected by mining. This work includes removing or sequestering hazardous materials including mercury from water sources, enhancing wildlife habitat through placement of bat friendly closures in mine entrances, addressing public safety concerns, and removing garbage or abandoned equipment.

## Transportation Systems over the Sierra Nevada

During the historic Euro-American settlement period, trails and roads over Sierran passes through the TNF provided important access to Sacramento and the rest of California. The route over Donner Summit brought settlers, interstate travelers, and recreationists, starting in 1844 with the Stephens-Townsend-Murphy Party, the first group of emigrants who crossed the Sierra Nevada by wagon.

The trans-Sierra history through the TNF includes many firsts: the first transcontinental railroad, the first transcontinental highway (Highway 40), and the first transcontinental interstate (Interstate Highway 80).



1264. Teams Waiting for Freight  
From the Central Pacific Railroad at Cisco.

Wagon freighters at Cisco Grove traveling across the Sierra and throughout the Forest, created an extensive array of wagon roads

Although these major travel ways have provided extensive access to the Forest for community expansion and recreation, they also disrupted the connectivity of wildlife habitat and travel routes of various species.

**Today**, the Forest has an extensive road system. Although roads provide important access, there can be some undesirable consequences. The TNF is identifying its system of necessary roads and will continue, in FY 2012 and 2013, to implement the Motorized Travel Management decision. These efforts are designed to stop the proliferation of unplanned motorized routes and reduce potential erosion, meadow damage, and adverse impacts to wildlife habitat while still providing important motorized recreation opportunities.

## Construction of the Railroad and Land Ownership Patterns

In 1864, as an incentive for the construction of the railroad, the federal government granted every other section of land for 20 miles on both sides of the railway to the Central Pacific Railroad. The resulting checkerboard ownership pattern of public and private land has created many of today’s resource management challenges.

**Today**, we continue to consolidate National Forest System land and work with our philanthropic partners including the Northern Sierra Partnership and others to reduce this checkerboard ownership pattern. As the management goals between private land owners and the Forest Service often differ, this helps protect many ecologically sensitive areas and provide more

consistent restoration approaches. Several critical land acquisitions are possible in the next several years.

## Ecological Restoration Successes

### Sagehen

The Sagehen Project, north of Truckee, has been designed through broad-based stakeholder collaboration and aims to:

- Reduce hazardous fuel loadings and modifying landscape-scale wildland fire behavior;
- Maintain and enhancing habitat for American marten and other wildlife species associated with late seral forest habitat;
- Create heterogeneous forest stand conditions that would be expected to develop under an active fire regime;
- Enhance the ecological role of fire; and
- Restore declining aspen.

Extensive field surveys, remote sensing and GIS analyses combined with peer reviewed science helped formulate strategies to meet project goals. The Sagehen Project continues to be examined through the Forest Service NEPA process with a decision expected in the winter of 2012/2013 and possible implementation beginning in 2013. This collaborative process has included: Sagehen Field Station, University of California Berkeley, Sierra Forest Legacy, Truckee River Watershed Council, California Fish and Game, Pacific Southwest Research Station, Sierra Nevada Conservancy, Lahontan Regional Water Quality Control Board, The Nature Conservancy, Sierra Pacific Industries, and others.



Collaborative meeting at Sagehen (photo courtesy Sagehen Creek Field Station)

### Perazzo Meadows Watershed Restoration Project

Several meadow restoration projects have been completed throughout the Tahoe National Forest in recent years with Perazzo Meadows restoration being the most extensive to date. The Perazzo Meadow

watershed was subject to decades of intensive human disturbance, including a historic dairy operation, road and bridge construction, historic logging, and de-watering of the meadow caused by the construction of canals built by dairy operators at the turn of the century.

The Sierraville Ranger District is currently implementing this project, which focuses on re-establishing proper floodplain function within Perazzo Meadows. The entire watershed restoration project encompasses approximately 4 to 5 miles of the Little Truckee River and Perazzo Creek and is also designed to eliminate and/or reduce existing sources of soil erosion. Many of the tributaries are down cutting due to excessive erosion in the main and adjacent channels, with associated impaired floodplain function and a lowered seasonal water table. Restoration activities include relocating stream flow to historic remnant channels while closing off existing degraded channels, installing rock grade structures to maintain meadow elevation where stream flow exits meadows, installing rock riffles in incised channels on the alluvial fan, reconnecting a historic overflow channel, removing an abandoned road from the floodplain, installing culverts and low water crossings to improve stream flow for stream crossings at road intersections and re-vegetating disturbed areas.

Due to its size, the project is comprised of multiple phases. Phase I was completed in early October 2009. Phase II was completed in September, 2010. The project is consistent with the Truckee River Basin Plan, and permits were authorized by Lahontan Regional Water Quality Control Board under the National Pollutant Discharge Elimination System (NPDES) Construction Storm Water Program as well Clean Water Act Section 401 Certification. To date, informal assessments indicate that the project was successful in raising the water table, stopping bank erosion, flooding the meadow on a more regular basis, and improving the habitat for a variety of wildlife and aquatic species.



Perazzo Meadow – Before, During and After Meadow Restoration

## Pendola Fire Restoration and Landscape Level Analysis

The Pendola Fire started in 1999 and burned more than 3,000 acres, creating numerous ecological challenges. For over 10 years, the Yuba River Ranger District has been restoring the area using a variety of methods including: noxious weed treatments; fuel reduction; release and culturing of hardwoods; conifer reforestation and release; and erosion control projects. A new approach was initiated this past year which involves a 448,000 acre landscape level analysis of the North Yuba River watershed in both the Tahoe and Plumas National Forests. This analysis will assess the differences in current forest conditions vs. expected conditions had fires burned naturally through the area. This analysis will also allow managers to run various scenarios to look at management options to provide the benefits of fire without the risks. Gathering GIS data will continue in 2013 and the simulation runs are expected in 2014.

## Duncan Canyon - Restoration of Previously Owned Private Land

In 2003, the TNF acquired 640 acres of land within the Duncan Canyon Inventoried Roadless Area (IRA) that was previously owned/managed by a private timber company. The area was harvested through even-age management and was heavily roaded. In 2010, a strong interdisciplinary effort identified opportunities to restore this section to conditions similar to the surrounding characteristics of the IRA, including

stream habitat enhancement, erosion control, and hydrologic function restoration across the 640 acres. To date, 3 miles of roads, 2 miles of skid trails and 6 landings have been decommissioned along with the removal of 26 culverts and the restoration of 4 miles of stream habitat.

Roads being decommissioned were deeply tilled to reduce compaction and to enable regrowth of the vegetation. Woody debris and rocks were placed on the surface to reduce erosion and water bars built to direct flow off the road, reducing erosion. The photos below show a road before and after decommissioning.

## Ongoing restoration challenges and opportunities

**Challenges:** Changing climate conditions, as described in the Tahoe Climate Change Trend Summary authored by the Pacific Southwest Regional Ecologist, pose challenges for ecological restoration. Setting clear, achievable goals for ecological restoration in the TNF requires that we first understand the current condition of ecosystems and those that are most vulnerable to climatic changes. We will focus our efforts on those systems that are most in need of restoration based on a vulnerability assessment to be completed in the next 1–2 years. Working with the province ecologist, regional ecology program, the Pacific Southwest Research Station, interested stakeholders and TNF staff, we will identify those highest priority systems in need of restoration.



Before Road intact



After: Road decommissioned

## Additional Opportunities:

### Treasured Landscapes – Unforgettable

**Experiences:** The Truckee River watershed (234,000 acres), in both the Tahoe National Forest and the Lake Tahoe Basin Management Unit, has been selected by the National Forest Foundation (NFF) as one of its 14 Treasured Landscapes – Unforgettable Experiences sites. The goal of NFF for the Truckee River watershed is to assist with the restoration of these lands by strengthening the conservation partnerships between the local communities, other agencies and the Forest Service. The primary objective will be to complete key restoration work by 2017 with ecological, economic and social benefits continuing in perpetuity. As a part of this effort, the control of noxious weeds including musk thistle and yellow star thistle is continuing through various grants, appropriated funding, and volunteers.

Secure Rural Schools Legislation and Resource Advisory Committees - If the Secure Rural Schools legislation is reauthorized, the program will continue to provide funding through the collaborative Resource Advisory Committees (RACs) for a variety of restoration projects across the Forest. Projects have included: meadow restoration, stream assessment and restoration, road repair (including erosion control), noxious weed control, aquatic invasive species prevention, trail maintenance and reduced erosion potential, fuel reduction and demonstration areas, and wildlife habitat improvement. These restorative projects have been recommended by the RAC's when normal appropriated funding has not been available.

## Plans for This Year and Future Years

**Continued Restoration Programs:** Many programs mentioned throughout this chapter will meet our ecological restoration goals this year and into the future including: FERC hydroelectric re-licensing projects, vegetation management program, abandoned mine lands program, travel management project, potential land acquisitions, meadow restoration, volunteer recreation site and trail maintenance, noxious weed removal, aquatic invasive species program, and wildlife improvement projects.

**Integrated Vegetation and Fuels Program:** The Tahoe National Forest's Integrated Vegetation and Fuels Program map for 2012–2016 is attached which identifies the schedule for planning and implementing forest health thinnings and fuel reduction projects along with associated forest, watershed, and habitat improvement activities. These projects are the keystone to restoring the Tahoe National Forest to a more fire resilient condition as they enable fire to be

reintroduced into the ecosystem while maintaining important habitat elements for wildlife, protecting water quality, and providing quality recreational experiences. With more than a century of fire exclusion, most forest stands are so dense that prescribed fire can't be used without resulting in substantial adverse impacts. Reducing ladder and ground fuels along with forest thinning allows the reintroduction of fire. Thinning of forest stands makes them more resilient to severe impacts from drought, insects, and disease, which will be critical if current climate change trends continue.

## Tactics and Integration for Increasing Ecological Restoration

One of the important tactics being used to increase ecological restoration is through better understanding of restoration research. Several General Technical Reports including GTR-2201<sup>10</sup> and GTR-2372<sup>11</sup> for managing mixed-conifer forests and GTR-1783<sup>12</sup> and 1194<sup>13</sup> for aspen regeneration have been important in designing restoration programs.

The integration of Forest's fuels and vegetation programs has been emphasized in the last decade enabling more effective coordination and implementation of projects and decreased costs.

Partnerships and collaboration opportunities are expected to increase throughout the forest including Treasured Landscapes – Unforgettable Experiences along the Truckee River watershed, in the Sagehen project, for a variety of recreation and trails projects, and through the Resource Advisory Committees. We welcome all who would like to join us in this ecological restoration journey to share their interest, knowledge, and commitment to a healthier and more sustainable National Forest.

10. Available for download at [http://www.fs.fed.us/psw/publications/documents/psw\\_gtr220/](http://www.fs.fed.us/psw/publications/documents/psw_gtr220/)

11. Available for download at [http://www.fs.fed.us/psw/publications/documents/psw\\_gtr237/](http://www.fs.fed.us/psw/publications/documents/psw_gtr237/)

12. Available for download at [http://www.fs.fed.us/rm/pubs/rmrs\\_gtr178.html](http://www.fs.fed.us/rm/pubs/rmrs_gtr178.html)

13. Available for download at [http://www.fs.fed.us/rm/pubs\\_rm/rm\\_gtr119.html](http://www.fs.fed.us/rm/pubs_rm/rm_gtr119.html)

