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 anadramous 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).

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 impleenting 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[10] and GTR-2372[11] for managing mixed-conifer forests and GTR-1783[12] and 1194[13] 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.

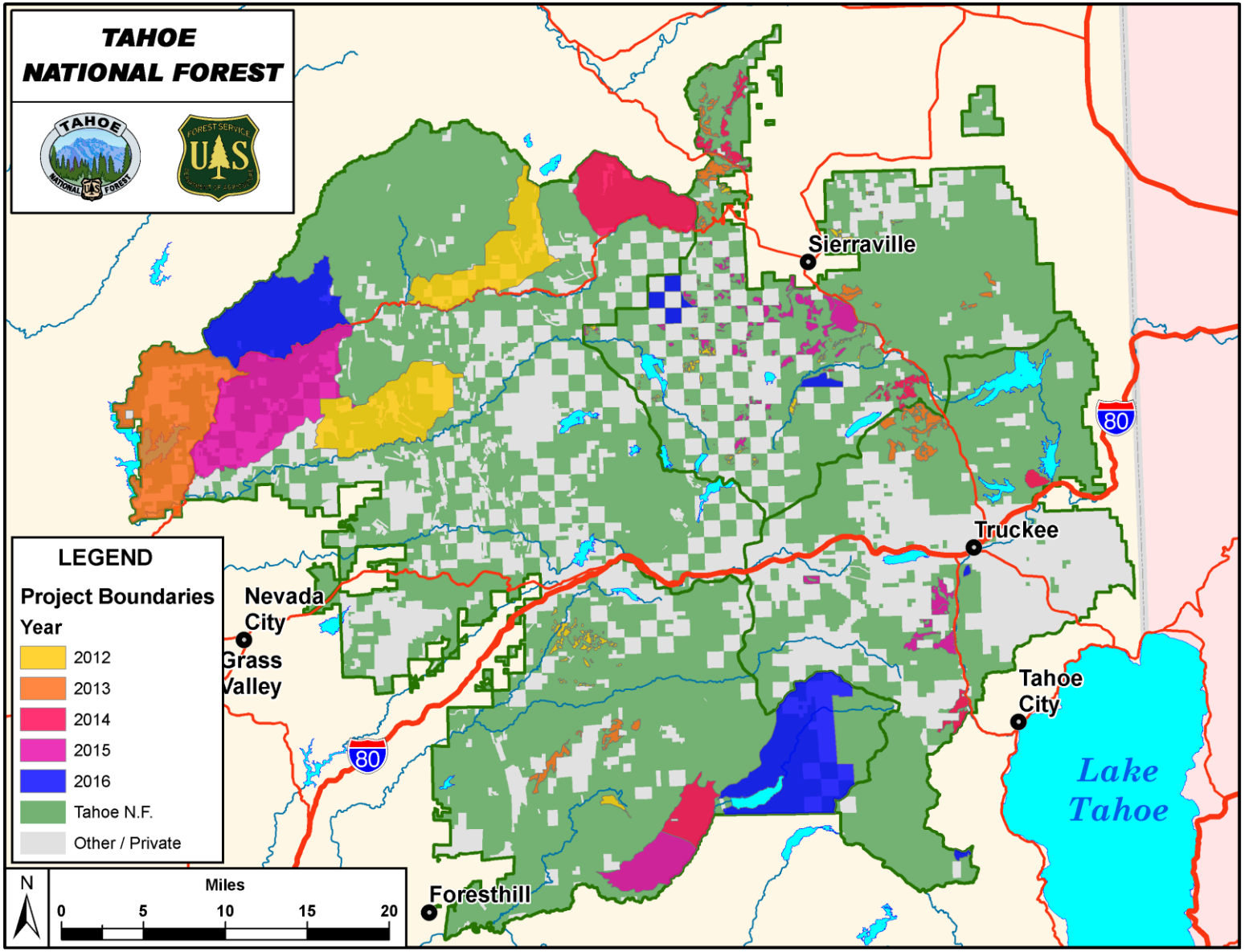
Partnerships and collaboration opportunities are expected to increase throughout the forest including Treasured Landscapes – Unforgettable Experiences along the Truckee River watershed, in the Sagehen project, for a variety of recreation and trails projects, and through the Resource Advisory Committees. 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/

11. Available for download at 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

13. Available for download at http://www.fs.fed.us/rm/pubs_rm/rm_gtr119.html


TAHOE
NATIONAL FOREST
LEGEND
Project Boundaries
Year
2012
2013
2014
2015
2016
Tahoe N.F.
Other / Private
N
Miles
0
5
10
15
20
Sierraville
Truckee
Nevada City
Grass Valley
Tahoe City
Foresthill
Lake Tahoe
80
80