

Landscape Strategy

Southern Sacramento Mountains Restoration Project



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Introduction

The Lincoln National Forest (LNF) developed a Strategic Plan in 2006 (USDA Forest Service 2006) guided by national and regional priorities. That plan then encompassed local landscape and community needs such as the Lincoln County Wildfire Protection Plan, Otero County Community Wildlife Protection Plan, and the New Mexico Forest and Watershed Plan. The Sacramento District, where the SSMRP is located, also prioritized landscape restoration and watershed health as part of this Landscape Strategy that further focused on protecting adjoining communities.

Otero County has experienced a growth pattern on private lands that intermingle within forested areas. This growth is comprised of residences, structures, and businesses. The areas surrounding private lands have been and continue to be at risk of wildfire, mainly due to human influence and human caused fires. As a result of fire prevention and fire suppression tactics in and around these private lands, many WUI areas have developed significant wildland fuels contributing to the increased probability of a wildfire becoming catastrophic.

The purpose of the LNF Landscape Strategy is to guide on-the-ground restoration treatments to improve forest health. Forest health issues include; WUI, insect and disease, erosion, stream sedimentation, wildlife habitat, commercial forest resource uses, and local interests. The Landscape Strategy also guides efforts to increase ground cover, thus reducing soil erosion and wildfire hazards, while improving wildlife habitat and sustaining native plant species. In brief, the resource strategy is to evaluate selected landscapes, identify forest health problems and to treat these as funds allow.

Additional goals that are essential to the Landscape Strategy are contributions to watershed health and water quantity and quality. Water shortages in New Mexico have reached critical levels due to drought conditions, decreased water production, and increased demand. Farmers are unable to obtain adequate water for irrigation and many communities restrict water use. As population growth places greater demands on local water supplies and as drought conditions continue or worsen, water shortage issues will continue to accelerate. Legal actions and settlements involving the state of Texas, Threatened and Endangered species (TES) and irrigation adjudication are increasing. This has placed more emphasis on water planning and water production opportunities.

Furthermore, projects developed under this Landscape Strategy respond to goals and objectives outlined in the Forest plan (USDA Forest Service, 1986) and the Region 3 Central Priority by: 1) reducing horizontal and vertical fuel loading, and continuity of hazardous fuels to reduce the risk of catastrophic wildfire, 2) restoring functionality of fire adapted ecosystems with the goal of improving sustainability and resiliency, and 3) improve forest health, restore proper watershed function, improve water quality and quantity, improve native plant communities and biodiversity, and TES species abundance and diversity.

Collaboration and the SSMRP

The Southern Sacramento Restoration Project (SSMRP) is a collaborative effort, founded in science-based ecosystem restoration. The SSMRP will encourage ecological, economic, and social sustainability in the surrounding communities, draw on as well as support local resources (federal, state and private). The SSMRP will primarily reduce wildfire management costs, reestablish natural fire regimes, and reduce the risk of uncharacteristic wildfire.

The SSMRP covers 290,600 acres on the Sacramento Ranger District of the Lincoln National Forest. The project area has a mix of existing conditions for forest resources and vegetation in the project area and varies greatly by elevation, slope, and aspect. The topography ranges from open meadow areas in the bottom to steep, greater than 40 percent slope, mountain sides, and ridges. The area is dominated by limestone and sandstone geology.

The SSMRP area is predominantly (75%) forested National Forest System (NFS) lands that are managed by the Sacramento Ranger District of the Lincoln National Forest. The remainder is owned by private landowners (21%) and the State of NM (4%). This landscape is vital to the lively hood of the communities of Cloudcroft, Timberon, High Rolls Mountain Park, Weed, Piñon Mayhill, Sacramento and Alamogordo, among others.

Specifically, the SSMRP implements this Landscape Strategy by implementing treatments through guidance and collaboration with the Otero Working Group (OWG) and various other collaborators. The OWG was formed in 2004 and has been instrumental in developing landscape restoration and fuels reduction goals for the project area. The SSMRP will undertake a wide variety of coordinated and integrated treatments including forest thinning, prescribed fire, watershed restoration, wildlife habitat improvement, and develop economic opportunities for local communities. Past treatments in the project area were more narrowly focused on hazardous fuel reduction or single resource needs, and conducted on small, disconnected parcels of land by each land jurisdiction. This SSMRP treatment strategy identifies, prioritizes, and integrates multiple ecosystem restoration needs across a large, complex landscape and different administrative boundaries.

An initial multi-party monitoring and adaptive management plan was collaboratively developed and will be collaboratively implemented by numerous partners. Using well-established and state-of-the-art approaches for restoration monitoring, restoration partners will measure and evaluate the extent and rate to which restoration treatments are reducing the risk of uncharacteristic wildfire and restoring natural fire regimes, reducing invasive exotic species,

improving wildlife and fish habitat, restoring water quality and watershed functions, maintaining or promoting old growth conditions, mitigating climate change impacts, and utilizing woody by-products.

Results from monitoring will be used to modify treatment prescriptions as needed, and analyze cumulative effects at the landscape level. Success will be measured by determining the change in conditions and trends for each monitoring element, tied to each restoration objective. Changes can be gauged in consideration of the extensive data available on historic fire regimes, distributions of plants and wildlife species, long term water quality and availability, and other ecosystem conditions. Success will be measured through a carefully-designed network of replicated monitoring plots, untreated control areas, and other experimental design methods to evaluate the restoration strategy as a whole across the landscape.

The proposed area is significant socially, ecologically, and economically. Socially, it represents one of the largest contiguous blocks of Wildland Urban Interface found in southern New Mexico. Ecologically, the area contains the highest concentration of Threatened and Endangered species (namely, Mexican Spotted Owl or *Strix occidentalis lucida*) per acre within the Southwestern Region. Economically, the area provides a wide range of jobs, natural resources, and revenue for the surrounding community. Biomass utilization products from the area include firewood, wood pallets, mulch, wood pellets, shavings, poles, and sawlogs. The area also provides unique recreational opportunities for all four seasons which brings in visitors from all over the United States and northern Mexico.

The SSMRP will create a landscape more resilient to climate change, and will provide local opportunities for non-traditional markets for climate mitigation and biomass energy while continuing to recognize traditional uses of forest resources. Collaborative work through the OWG will restore the project area forest ecosystems, particularly by reintroducing fire and manipulating vegetation through mastication and/or removal. The OWG will work across all property boundaries fulfilling the ‘all-lands approach’. Information about the project area dates back to the 1880’s when European settlement began. This historic information comes from a variety of sources and will provide a foundation for treating the landscape.

Historical Context and Existing Conditions

In general, the western portion of the project area contains the highest elevations (+8,500’), and is dominated by mixed conifer forest. Progressing from west to east and dropping in elevation into the canyons, the vegetation transitions to relatively pure stands of ponderosa pine, meadows and Pinyon Juniper. General Land Office surveys of the vicinity in 1889 and 1891 found the higher elevations dominated by “heavy pine and fir timber” with a dense oak, aspen, and locust understory (Kaufmann et. al., 1998). Aspen exists in the project area as the primary forest type in some stands and in other stands as only a component of mixed conifer stands.

Timber harvest has occurred since the late 1800s and early 1900s and has continued to the present day. Heavily logged by commercial loggers and by homesteaders clearing land for livestock pastures and crop land, most trees in the western portion of the area are less than 100 years old (Kaufmann et. al. 1998). The end result of the early day logging was most likely a

decrease in number of large, older ponderosa pine that once inhabited the area. Removing the ponderosa pine allowed for many of the stands to become dominated by white fir and Douglas-fir.

Pre-settlement fire regimes in or near the SSMRP area were generally found to be frequent, low intensity surface fire and the majority of the SSMRP project area had a historic fire regime in category I. This historic frequent fire regime also indicates that fire was a dominant natural disturbance and played a major role in shaping forest structure, as (Kaufmann, 1998) explains: “The relative openness of the forest and density of shrubs, the presence of considerable aspen, and the grassy understories were indicative of fairly frequent surface fires.”

Science Application and Ecological Restoration

The LNF’s Strategic Plan efforts benefit from a long and rich history of forest science in southern New Mexico, beginning with the establishment of the Cloudcroft Experimental Forest, a satellite of the Fort Valley Experimental Forest. Researchers established permanent plots near Cloudcroft in the 1920’s to track forest structure, primarily focused on Douglas-fir dynamics. Recently, scientists have relocated similar plots throughout the Southwest and have determined the magnitude and direction of changes that have occurred over the last century (Moore et al. 2004).

Dendrochronology research from the Tree-Ring Laboratory at the University of Arizona (UA) and the Rocky Mountain Tree-Ring Research Lab in Fort Collins, Colorado describe this area as dominated by a frequent surface-fire regime (Kaye and Swetnam 1999, Brown et al. 2001). Fires recurred every 3-11 years in ponderosa pine and every 4-14 years in the mixed conifer forest prior to Euro-American settlement, when an abrupt reduction or cessation of fires occurred.

In the spring of 2008, the Ecological Restoration Institute (ERI) at Northern Arizona University (NAU) performed a rapid assessment surveys within the SSMRP project area with the purpose of determining the site-specific historical stand structure and subsequent departure from reference condition (Brewer and Denton, 2008). All sites were found to be outside of their natural range of variability and the ERI suggested treating with prescribed fire to reduce stand densities and surface fuel loading. They also indicated that mechanical thinning is needed to drastically reduce stand densities to those closer to reference conditions.

Recent research has included numerous studies on old-growth dynamics (Regan 1997), effects of treatments on wildland fire behavior (Cram et al. 2006), and research on the Sacramento Salamander (Ramotnik 1997) and the Mexican Spotted Owl (Ward and Ganey 2003 and Ganey et al. 2005), specifically in the project area. This vast amount of forest ecosystem research conducted by Rocky Mountain Research Station, NAU, the UA, New Mexico State University, and other agency and non-governmental organization researchers makes the forests of the SSMRP area one of the best-studied ecosystems in the Southwest. Given the depth of understanding of how forest ecosystems function and the inherent capacity to model and evaluate treatment effects at a landscape scale, the OWG collaborative and the LNF are well-positioned to use and develop the best available science for restoration within the SSMRP

Another tool, the Crown Fire Initiation Potential which is generated by the Integrated Forest Resource Management System (INFORMS) analysis tool is a combination of both torching and crowning indices. Crown Fire Initiation Potential is a convenient way of showing fire hazard because it combines the quantifiable descriptions of the fuel profile. Using this measure, the OWG plans to identify the most influential locations to treat in the SSMRP.

Past and on-going restoration treatments conducted on the LNF complement the SSMRP strategy and demonstrate a high potential for continued success. These include thinning and burning over 10,000 acres, fuel reduction projects on private properties (extensively throughout the village of Timberon) through New Mexico State Forestry/Firewise programs, wildlife habitat improvement- Habitat Stamp projects, and management of recreation and livestock grazing activities to reduce impacts to water, riparian, wildlife, and fish.

Prioritization Criteria and Process

The criteria used to identify landscapes was initially developed through discussions driven by the OWG at monthly stakeholder meetings and careful consideration was given to all values and issues. Eventually, analysis and selection criteria settled on identifying areas in need of rehabilitation and restoration to insure watershed resiliency; reduced catastrophic wildfire risk through hazardous fuel treatments (therefore, directly addressing CWPPs) and potential capacity for biomass and forest product markets; the protection of tribal lands; forest health projects; community assistance and job creation; limitation of new and existing invasive weeds populations; and potable and irrigation water rights issues.

Given these criteria, the Working Groups settled on hydrological Unit Code (HUC) 5 watersheds as analysis units. In addition, careful consideration was given to ownerships, current and proposed, divergence from the historical range of variability, fuel loading and wildfire risk, commercial and non-commercial forest products, and historical and current wildfire activity. In brief, the process used to identify and select priorities within the landscape was as follows:

1. Conduct Monthly stakeholder meetings to discuss temporal and spatial scales and feasibility of project implementation
2. Coordinate and accumulate historical, current, and planned projects/activities across ownerships in proposed project areas
3. Supplement discussions with maps illustrating the location of the aforementioned prioritization criteria;
4. Selection of single/multiple HUC 6 watersheds nested in selected HUC 5 watersheds
5. Ranking of projects within these watersheds to ensure collaboration and maximize efforts and benefits
6. Begin NEPA process if needed on FS lands and initiate necessary funding proposal processes with non-FS collaborators
7. Coordinate field trips to various FS and non-FS project areas targeting information transfer as needed

Desired Future Conditions

The overall desired condition for the SSMRP area is to move the ecological structure, composition and function toward conditions that are more reflective of those present before Euro-American settlement. In the long-term, the desired condition is to:

- Manage the landscape through rehabilitation and restoration to insure watershed resiliency
- Reduced catastrophic wildfire risk through hazardous fuel treatments (therefore, directly addressing CWPPs)
- Explore potential capacity for biomass and forest product markets development
- Protect adjacent land ownership, including Mescalero Tribal Lands to the north
- Improve forest health and watershed function
- Encourage rural economic development and job creation
- Limit the development of new and existing invasive weeds populations
- Improve potable and irrigation water rights issues through road decommissioning and vegetation treatments.

Potential Restoration Activities

Activities will take place in vegetation types ranging from grasslands and low elevation piñon-juniper woodlands to upper montane coniferous, sub-alpine and alpine forests, as well as high-elevation meadows. The SSMRP treatment strategy will integrate multiple ecosystem restoration needs across a large, multijurisdictional and complex landscape. Specific prescriptions and direction for overstory and understory treatments, restoration of openings, transition zones, and restoration of watershed functions and riparian areas will be taken from the LNF Forest Plan (USDA Forest Service 1986), existing NEPA decisions, and any new NEPA completed for the project area. Potential restoration activities are outlined in Table 1.

Table 1. Proposed restoration activities and brief descriptions.

Potential Activity	Description
Prescribed Burning/Unplanned Ignition for Multiple Objectives	Pile, broadcast and wildland fire use. Pile and broadcast burning would occur in phases to address activity generated slash as well as re-introduce fire to the fire adapted ecosystem. Wildland fire use would be implemented on a case by case basis.
Meadow Restoration	Removal of woody vegetation such as Piñon Juniper, Ponderosa Pine, etc., which is encroaching into the meadows through various methods such as thinning, harvest and burning.
Wildlife Habitat Improvement	Creation of five acre openings through various activities such as thinning, burning, roller chopping, or other mastication type activities.
Road/Trail/Watershed Restoration	Re-establish riparian habitat, restoring and creating wetlands, improving aquatic habitat, decommissioning roads and trails and improving drainage on the road and trail network, fuel treatments, treating noxious weeds, awareness programs on invasive spread, creating incentives for hunting of wild pigs and working with New Mexico Game and Fish for the removal of aquatic invasives. Furthermore, the trail system will be managed to standards that are user friendly

	and do not contribute to erosion and avoids seeps and riparian area, as well as facilitate maintenance and improvements any time of year.
Forest Structure Restoration	Hand and mechanical treatments along with areas of personal and/or commercial fuel wood.
Insect and Disease Control	Increase vigor and resiliency through vegetation treatments such as sanitation thinning and/or prescribed fire. For invasive pests, such as white pine blister rust, the strategy will be to identify and prefer white pine trees that are resistant to blister rust, through selection and genetic testing
Old-Growth Retention and Recruitment	LNF Forest Plan requires that 20% of the project area be targeted to develop old growth conditions as defined by the 1996 Forest Plan amendment. Within mixed conifer stands, all trees greater than 24" dbh will be retained and currently designated Additional acres will be targeted to develop old growth characteristics, either through identifying stands for each forest type which are in the development stage of old growth characteristics, or by additional treatments which will promote the development of larger, older trees.
Invasive Species Mitigation	Employ a combination of methods including: herbicide application, biological (insect or ungulate grazing) control agent introduction, manual and/or mechanical treatment, controlled grazing, and prescribed burning.
Oak Regeneration/Conifer Reforestation	Involves roller chopping, mowing, burning, or removal of the small diameter oak brush to encourage new regeneration. This may also involve the planting of conifer seedlings in selected areas.
Historical Site Restoration	Restoration of the lookout tower, cabin, flagpole and shed to its historic character.
Aspen Restoration	Opening up the dense canopy through thinning, harvest and burning, and protection of the seedlings from wildlife with fencing or other barriers.

Rural Communities and Economy

The SSMRP area includes the city of Alamogordo, and the villages of Cloudcroft, Timberon, High Rolls Mountain Park, Weed, Piñon, Mayhill, and Sacramento. Approximately 4,000 people live within or adjacent to this landscape, which amounts to nine people per square mile. The population is spread throughout the landscape in small mountain towns, with population density highest in Cloudcroft and Timberon. The middle- and high-elevation portions of the SSMRP remain largely unpopulated, except for the scientists and their families residing at the Sunspot National Solar Observatory.

Like many Sky Island landscape of the Southwest, the southern Sacramento Mountains have experienced significant population growth over the past 20 years. Much of the population increase in the landscape is attributable to immigration from other states. New residents are attracted to the area because of its outstanding scenic beauty, intact landscapes, abundant wildlife, recreational opportunities, rural character, and proximity to Holloman Air Force Base. Land use and land use change within the SSMRP area is the result of complex interactions between geographic, socioeconomic, and legal (ownership) characteristics of the landscape. Consistent with its largely rural nature, dominant land uses in the region include ranching, timber harvest, and recreation. Public access to streams, lakes, and private and public lands is highly valued.

Many businesses in this region are reliant on proximity to well-managed public and private forest land. Ranching, forest product processing, and tourism dominate the local economy, including many family ranches and private wood processing facilities, all of which are tied to a larger regional economy that is facing an uncertain future and would be bolstered by CFLRP funds.

Like many rural communities, the traditional resource extraction economy in the SSMRP area is augmented by a service-based economy and an emphasis on biomass utilization and fuels reduction. One such biomass opportunity is Premiere Pellets, LLC whose business plan is based on the procurement of wood products and biomass material from the Lincoln National Forest, among other sources (namely the pecan industry of Las Cruces). While they currently only produce wood shavings, they plan produce wood pellets for energy and heat, have a woody biomass burner, and have begun the process for becoming Biomass Crop Assistance Program (BCAP) certified. Premiere Pellets is interested in smaller, lower-value roundwood, slash, and other wood waste from current and future forest restoration operations in all forest types and has started to explore stewardship possibilities, with the a goal of producing both commercial and residential pellets in less than two years.

Another potential utilization market is the nearby Mescalero Apache Forest Products sawmill. The mill closed in January 2009 but was the recipient of American Recovery and Reinvestment Act (ARRA) funds to re-open, and is the last remaining large scale infrastructure to process woody biomass in southern New Mexico. Upon re-opening, it is likely that the Mescalero sawmill will be a major competitor for timber sales within the SSMRP area, ensuring stability to local economies and returning laid-off workers to employment. ARRA funds are being used to re-engineer the mill to process small diameter material, develop and improve business management systems and capabilities, improving workforce skills, and improve worker safety through facility modernization. Furthermore, the Mescalero Tribe is developing a wood pellet production plant and a six mega-watt power generation facility in conjunction with the Mescalero's sawmill to enhance the tribe's ability to fully utilize biomass material.

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