



# **National Fish and Wildlife Foundation**

Business Plan for Los Padres National Forest

**August 9, 2016**

## **Purpose of a Business Plan**

The purpose of a NFWF business plan is to provide a detailed blueprint of the strategies and resources required to achieve the desired conservation outcomes. The strategies discussed in this plan do not represent solely the foundation's view of the actions necessary to achieve the identified conservation goals, but instead reflect the view of the leadership and staff of the US Forest Service that were consulted during plan development. This plan is not meant to duplicate ongoing efforts but rather to invest in areas where gaps might exist so as to support the goals and efforts of the Los Padres National Forest.

## **Acknowledgements**

This business plan is the result of close collaboration and guidance from the Los Padres National Forest management and staff. NFWF would like to thank first and foremost, LPNF Forest Supervisor Robert Baird, for his vision and leadership in establishing this partnership. In addition, the guidance, input, and support of the LPNF Technical Advisory Group has been invaluable in developing this plan and identifying goals, strategies, and potential partners to be successful. In particular, we thank Ken Heffner, Susan Shaw, Kevin Cooper, Sue Exline, Nate Rezeau, Kyle Kinports, Nicole Molinari, Kristie Klose, Patrick Lieske, Lloyd Simpson, Greg Thompson, Nancy Arkin, Jeff Bensen, and the many others at the Los Padres National Forest whose time and expertise helped inform this plan.

## **About NFWF**

The National Fish and Wildlife Foundation protects and restores our nation's wildlife and habitats. Chartered by Congress in 1984, NFWF directs public conservation dollars to the most pressing environmental needs and matches those investments with private contributions. NFWF works with government, nonprofit and corporate partners to find solutions for the most complex conservation challenges. Over the last three decades, NFWF has funded more than 4,000 organizations and committed more than \$2.9 billion to conservation projects. Learn more at [www.nfwf.org](http://www.nfwf.org).

**Plan photos credit:** Jim Bond, National Fish and Wildlife Foundation

# Purpose

## The Los Padres National Forest and National Fish and Wildlife Foundation Partnership

In 2015, the National Fish and Wildlife Foundation (NFWF) undertook a cooperative partnership with the U.S. Forest Service – Region 5 and the Los Padres National Forest (LPNF) to address the impacts of the Zaca and Piru Fires in a holistic way that will lead to compounded benefits for the impacted landscapes and watersheds. For this partnership, the Forest Service dedicated \$8.25 million for planning and restoration projects in the Zaca Fire scar and surrounding areas and \$2.75 million for planning and restoration in the Piru Fire scar and surrounding areas through the year 2020 (Figure 1).

This business plan serves as the guiding document to aid the LPNF and its partners in focusing, and ultimately implementing, projects that advance post-fire restoration in an ecologically meaningful and measurable way. The business plan outlines the goals and objectives of the LPNF for the Zaca and Piru Fires restoration work, and highlights potential actions toward reaching those goals. Focus areas described within this document will be targeted in the initial phases of restoration, however projects outside of these areas may be considered depending on their alignment with the strategic goals of the program. Revisions to this plan may be considered over time, subject to the identification and securing of additional funding. This document is the product of close collaboration between the NFWF staff and their partners at the LPNF.



Figure 1. Los Padres National Forest with Zaca (right) and Piru (left) fire scars

# Conservation Need

## Significance of the Los Padres National Forest

The Los Padres National Forest spans nearly two million acres in the Coast and Transverse Mountain Ranges of central and Southern California. Stretching across almost 220 miles north to south, the LPNF encompasses land from the spectacular Big Sur coast in Monterey County to the western edge of Los Angeles County, and ranges in elevation from sea level along the Pacific Coast to almost 9,000 feet at the peak of Mt. Pinos (USDA Map 2014).

One of the most biologically diverse National Forests in California, the LPNF is uniquely situated among one of the world's biodiversity hotspots and contains a wide variety of distinct habitats and ecosystems. The LPNF supports approximately 500 animal species and nearly 1,200 plant species. While dominated by chaparral (68% of the land area), the ecosystems of the forest also contain oak woodlands and savannas, mature conifer forests, pinyon-juniper communities, semi-desert environments, and riparian corridors (USDA Map 2014). It is the stronghold of species like the California condor and one of the last refuges of the Southern California steelhead, as well as being home to 24 other federally listed threatened and endangered species (Appendix A).

The LPNF also provides a wide array of important services and functions including flood protection and quality drinking water, protection of Wildland/Urban Interface areas from wildland fire, and offers an outdoor classroom and living laboratory to learn about the region's natural and cultural heritage and the importance of conservation. In addition, the LPNF serves as an important gateway for nature lovers and recreationists. The Forest contains over 1,200 miles of trails, 65 camping locations, and 10 federally designated Wilderness Areas that constitute nearly half (48%) of its acreage. Furthermore, its proximity to the greater Los Angeles urban area and communities such as Santa Barbara, Santa Maria, Ojai, Ventura, San Luis Obispo, and Monterey intimately connects the forest to much of the population of the central and south coast region.

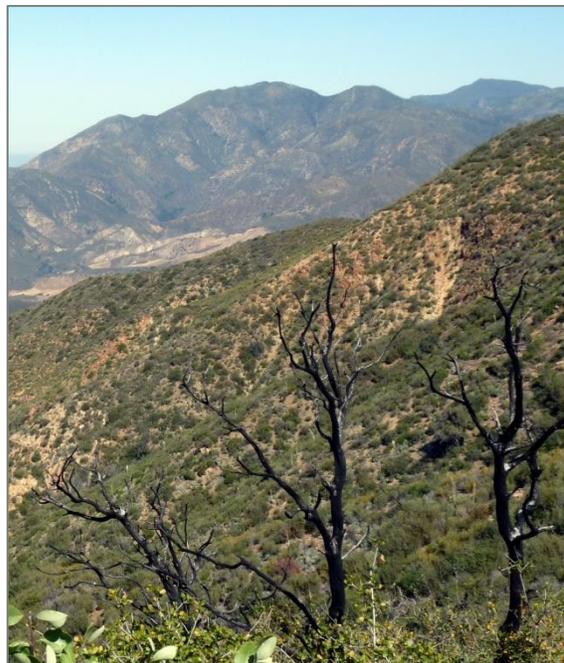
## Wildfire and the National Forests

Wildfire may be the biggest challenge forest managers, and the public, face over the next couple of decades (USDA 2005a). The National Forests of Southern California occur within a Mediterranean climate; one of the driest, most fire-prone areas in the United States. Wildfire is a natural and important part of the ecological processes of the region, however risks related with wildfire have been compounded by changes in regional climate patterns, decades of fire suppression activities, recent droughts, insect infestations, and the challenges from increased human ignitions associated with population growth and growing use of the forest. Although the ecosystems of Southern California are well adapted to fire, the threats listed above have led to recent increases in frequency and intensity of fires, in some cases resulting in long-term losses in habitat, ecosystem transitions, changes in hydrology and nutrient fate and transport, the mobilization of sediment, all of which may facilitate the spread of invasive species. In addition, urban communities adjacent to National Forest boundaries share the risks of wildfire, and forest managers are challenged to address the increased threats for those within and adjacent to Forest lands. In California, 7 of 10 of the state's largest wildfires have occurred within the

last 15 years, with 3 of the top 5 caused by human-related activities. The State's fourth largest fire, the Zaca Fire, occurred largely within the LPNF (CalFire 2015).

The Zaca (2007) and the Piru Fire (2003) were significant wildfire events impacting the LPNF. The Zaca Fire raged for over 3 ½ months and burned 240,207 acres, 95% of which were on the National Forest. The smaller Piru Fire lasted for 14 days and burned 63,991 acres, comprising 51% of Forest Service lands.

On the Zaca Fire, loss of vegetation resulted in significant negative impacts to creeks and rivers and the species they support, as erosion and sediment loading in the watersheds reduced available habitat and impaired stream connectivity in some locations. The fire burned approximately 176 miles of trails, and instigated the creation or improvement of over 400 miles of fuel break lines across the forest. These conditions provided further sources of erosion and sediment, and entry and spread of invasive species.



The area affected by the Piru Fire experienced similar impacts in nine different watersheds, including Sespe Creek, a designated Wild and Scenic River, and within California condor critical habitat and the Sespe California condor sanctuary. Numerous threatened and endangered species were affected, and two California condors died in the fire.

### **Imperiled or Unique Species of the Los Padres National Forest**

As will be described later, the primary focus of the business plan is to advance ecological restoration of the areas impacted by the Zaca and Piru fires. In doing so, the actions developed through this program are intended to benefit a wide variety of species and ecosystems, from threatened and endangered species like the southwestern willow flycatcher and arroyo toad, to distinct habitat types that support them like montane mixed conifer forests, valley oak savannas, and riparian corridors. The LPNF is home to three species in particular that are of significant interest to the USFS, and other federal, state, and local natural resource managers throughout Southern California: Southern California steelhead, big cone Douglas-fir, and the California condor. These three species represent native populations that at one time thrived within the LPNF landscape, but whose present day populations have been significantly diminished. The conservation needs of these species are much broader than the fire scars, however, improving the health and function of watersheds within the fire scars provides an important contribution toward their recovery. Brief descriptions of these highlighted species and the concerns affecting them are provided below, and a complete list of threatened and endangered species on the LPNF can be found in Appendix A. As appropriate, projects may be included through this program that are either explicitly or implicitly designed to benefit any of these species as part of the broader watershed recovery goals.

### **Southern California steelhead**

Steelhead of the south coast region of California are designated as a distinct population segment (DPS) and federally listed as endangered under the Endangered Species Act (ESA). Steelhead (*Oncorhynchus mykiss*) are one of six Pacific salmon species that are native to the west coast of North America, and are currently the only species of this group that naturally reproduces within the coastal watersheds of Southern California. (NMFS 2012)

In Southern California, primary threats to steelhead include habitat blockages, habitat degradation, dewatering from irrigation, drought, urbanization, channelization, high water temperatures, and invasive vegetation (Tamarisk and *Arundo donax*) and fauna (bullfrogs, non-native crayfish, centrachids) and most all of these threats are present and significant within the LPNF watersheds. (NMFS 2012) Improving connectivity to restore habitat and hydrology, and reducing the threats from invasive species are two of the most immediate concerns identified on the LPNF and will be addressed by implementing the ecosystem restoration activities described in this plan.

### **Big cone Douglas-fir**

Big cone Douglas-fir (*Pseudotsuga macrocarpa*) is one of only two species of *Pseudotsuga* in North America, and the only one native to Southern California. Stands of big cone Douglas-fir can be found within forested patches throughout the mountains of the LPNF, and may be intermixed with oaks and chaparral to create a complex and biologically diverse ecosystem. These mixed montane conifer environments provide habitat for a wide variety of flora and fauna, including the California spotted owl (*Strix occidentalis occidentalis*), which are dependent on, and unique to, the conifer communities that include big cone Douglas-fir.

Big cone Douglas-fir is a fire tolerant species adapted to survive in the fire prone environment of Southern California mountain forests. However, in recent decades, the increase in intensity and frequency of wildfire has reduced the resilience of these systems (Howard 1992) and left them more susceptible to competition from non-native species and subsequent conversions from forest stands to non-native grass and shrub dominated landscapes. A GIS analysis and field inventory will be conducted to examine the pre- and post-fire conditions of big cone Douglas-fir. The results from that effort will then be used to identify needs for seed collection, propagation, and replanting or other restoration activities where needed.



### **California condor**

Thousands of years ago the California condor (*Gymnogyps californicus*), the largest flying bird in North America, was common in many parts of the continent. However, as people settled the West, they increasingly disrupted the bird's habitat, reduced their food supply, and intentionally

and unintentionally killed birds. In 1967, the cumulative impact of these actions led to the listing of the California condor as endangered under the Endangered Species Act, and by the late 1900s the population was diminished to only a few individuals; their habitat limited to only the mountainous parts of Southern California, including the rugged and remote terrain found within the Los Padres National Forest (Battistone 2014).

While many areas within the LPNF maintain appropriate habitat for condor, the US Fish and Wildlife Service (USFWS) identified lead and microtrash as ever present threats to their well-being on the forest. After wildfires, loss of vegetation may reveal previously concealed microtrash, and new areas are made accessible to the public, which may lead to new sources of spent lead shot or trash. This plan includes activities to address some of these concerns, for example through active clean-up efforts and strategic education and outreach.

## Current Conservation Context

In Southern California, the US Forest Service is challenged in part with ensuring long-term ecosystem health, biological diversity, and species recovery across roughly 3.5 million acres of public land. These lands are a critical component to the ecological integrity of the region, and are integral to maintaining safe and healthy socio-economic environments adjacent to one of the nation's largest urban concentrations. Subsequently, a vibrant community of conservation focused individuals, organizations and agencies are active in the local region, both within and outside of the LPNF. However, budget, time, and resource constraints have often limited the capacity for Forests, like the LPNF, to participate with these groups, let alone adequately implement their own conservation strategies and recovery actions in the wake of wildfire events. The LPNF's partnership with NFWF provides an opportunity to establish, renew, and expand relationships with the regional conservation community, and bolster communication and collaboration with many complementary regional programs like NOAA's South-Central California Coast Steelhead Recovery Plan, USFWS California Condor Recovery Program, and California's Proposition 40 Fuels Management Program and Proposition 1 Water Quality, Supply, and Infrastructure Improvement Act initiatives to restore healthy forests, manage fuels for fire protection, and safeguard watersheds and public water supplies.

# Conservation Outcomes

## Los Padres National Forest Zaca & Piru Fire Restoration Goals and Priorities

The conservation outcomes of this program are informed by the Strategic Plan for the Nation's Forests, which identifies two main goals: (1) restore, sustain, and enhance the nation's forests and grasslands by fostering resilient, adaptive ecosystems through strategic land management, mitigating wildfire risk, and conserving open space, and (2) deliver and sustain the benefits of the National Forests to the American public by providing abundant clean water, strengthening communities, and connecting people to the outdoors (USDA 2015). Those goals are further described and expanded upon for the LPNF within the Forest Service's Southern California Land Management Plan (USDA 2005a). To achieve those goals, the program intends to direct and focus restoration efforts at the subwatershed scale.

The restoration activities conducted through the use of fire cost recovery settlement funds are limited in scope to activities that address the impacts and concerns related to their respective fires.<sup>1</sup> In addition, these funds are time limited, and required to be expended by 2020. Given these constraints, while the results from actions taken within the fire scars may support improvements to the landscape within the burned area, it may only be but a fraction of what is necessary to achieve measurable improvements for broader watershed and species recovery goals. Therefore, this business plan has been developed to address the timeframe and applicability of currently available funds, but acknowledges that a longer timeframe will likely be necessary in order to more effectively achieve holistic watershed recovery. As such, this business plan represents the first phase of an expected 10-year effort. At the end of this initial stage, watershed recovery goals and needs will be reassessed and strategies pursued, subject to the identification and availability of additional funds. Regardless, it is anticipated that the actions described in this document will provide a valuable contribution to the improvement of watersheds and ecosystems within the LPNF.

With those ideals and limitations as guiding principles, the LPNF/NFWF collaboratively identified the following conservation outcomes for this business plan:

- 1) **Watershed Restoration** - Restore and improve the watersheds impacted by the Zaca and Piru fires to increase ecosystem integrity and resilience to the effects of intensifying and increasing droughts, flooding and erosion events, altered fire regimes, and climate change. As will be discussed in more detail later, the USFS Watershed Condition Classification (WCC) provides a useful framework for considering restoration needs and prioritizing action. The WCC evaluates a suite of physical and biologic indicators in terrestrial and aquatic environments and provides ratings that classify a watershed as properly functioning, functioning at risk, or impaired function. **NFWF's overarching goal is to strategically improve the conditions for those indicators classified as less than properly functioning, and raise the condition classifications within the watersheds of the Zaca and Piru fires scars.** The specific goals for these watersheds will be determined based on review and analysis of the classification indicators, and

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<sup>1</sup> Fire cost recovery settlements are governed by three criteria from 16 USC 579c that define the use of these funds: to conduct improvement, protection, or rehabilitation work; on lands administered by the Forest Service; and for purposes rendered necessary by the fire.

identification of actions necessary to shift classifications to properly functioning. Some key indicators of functioning watersheds include:

- Aquatic Habitat Connectivity
- Riparian Vegetation Health
- Road and Trail Condition/BMP Implementation
- Presence/Absence of Invasive Vegetation

Intermediate outcomes that support this goal include promoting native plant communities and self-sustaining populations of fish and wildlife. Specifically,

- a. Restoring 3,000 acres of vegetation communities such as chaparral, oak savanna, and mixed montane conifer environments that include big cone Douglas-fir through replanting, forest thinning, prescribed burn, or other forest health improvement techniques;
- b. Restoring 500 acres of riparian habitat;
- c. Removing invasive vegetation from 1,000 acres of LPNF land, and;
- d. Increasing aquatic habitat connectivity through removal of 3 aquatic passage barriers.

2) **Land Use Management and Non-natural Features Improvement** – In conjunction with the goals of Watershed Restoration, where appropriate, rehabilitate fire damaged Forest Service infrastructure, particularly where degradation of infrastructure directly contributes to further ecosystem damage, or limits the ability of partners and Forest Service employees to conduct restoration efforts, including:

- a. Improvement of 100 miles of trails and roads, particularly those which inhibit fish passage or whose sediment significantly degrades water quality and habitat, and up to 1,000 acres of fuel breaks to reduce and prevent future environmental degradation.
- b. In addition, restore access where it has been degraded by fire to improve capacity of Forest Service staff and partners to advance ecosystem restoration, maintain the health and function of the LPNF, and connect its users and stewards to the outdoors.

# Selection of Focal Areas

Current funding for this program is provided predominantly through USFS fire settlement funds which are dedicated to restoration and recovery activities directly associated with the fire from which they were derived. However, within those bounds, focal areas will be selected through review and consideration of available information in context with the expressed goals for conservation. Focal areas serve to concentrate effort to priority locations where work is likely to have a significant effect toward achieving one or more of the desired target outcomes. In the LPNF, the criteria for selection of areas in which to focus fire recovery and ecological restoration include:

- Ecosystem restoration within, or displaying a discernable cause-and-effect nexus to, the lands affected by the Zaca and Piru Fires;
- AND
- Areas identified as presently or historically supporting high value resources and key threatened and endangered species such as steelhead, California condor, and bigcone Douglas-fir;
  - Areas where natural recovery is unlikely to occur without the assistance of active conservation or restoration effort;
  - Areas that are necessary to protect or restore in order to maintain existing natural populations and ecosystems in a stable or improving state;
  - Watersheds designated by the LPNF as priority watersheds or those watersheds which are categorized as Functioning at Risk or Impaired Function through the Watershed Condition Classification methodology.

## **Focal Area: Manzana Creek watershed**

Using these criteria, Manzana Creek has been identified by the LPNF and NFWF as the initial high priority watershed within the Zaca fire scar. Much of the Sisquoc River watershed, including Manzana Creek, has been recognized for its high quality steelhead habitat. In 1999 through 2000, the LPNF conducted snorkel surveys on selected streams. Within the Southern California ESU, the highest densities of steelhead (>50 fish/100-m) were observed in Manzana Creek (USDA 2005b).

Manzana Creek is one of the lower-most tributaries to the Sisquoc River within the LPNF boundary, before the Sisquoc joins the Cuyama River to form the Santa Maria River. Much of the 36,000 acre Manzana Creek watershed escaped immediate impacts from the fire as it burned; however, as one of the furthest downstream areas below the Zaca Fire scar, it has been affected from subsequent sediment loading, resulting in significant habitat changes. At the same time, the Manzana watershed has served as a critical oasis for several federally threatened and endangered species, including steelhead, that live within the Sisquoc and upper Santa Maria environments. In addition to its importance to steelhead, this area of the Forest sees heavy use from campers and hikers, and the Nira Campground near Davy Brown Creek is known to be one of the most popular campsites on the Santa Lucia Ranger District.

Additional focal areas will be developed based on the outcome of pending ecosystem assessments occurring in the first years of this program and continued collection and evaluation of available data from the Forest Service and other regional land and resource specialists.

# Implementation Plan

The LPNF seeks to implement a holistic, watershed-scale approach to fire restoration. As shown in the results chain (Figure 2), the following separate but complementary strategies and associated activities broadly represent recommended approaches to be implemented over the course of this program. As more information is gathered, additional methods may be incorporated to increase the success and effectiveness of the program.

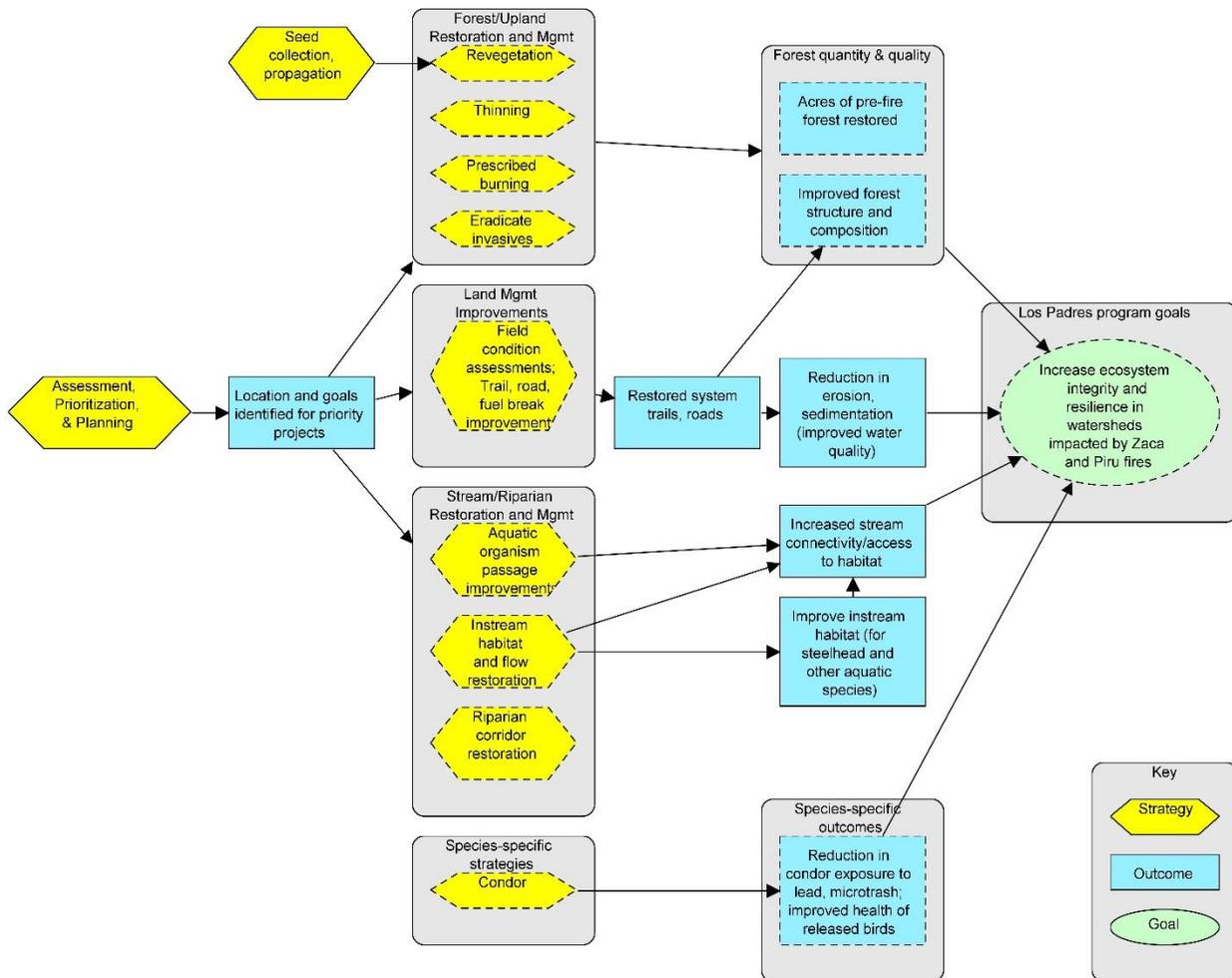


Figure 2. Los Padres National Forest – Zaca and Piru Fires Restoration Strategy Results Chain

## Watershed Restoration Strategies

The primary focus of the partnership between the LPNF and NFWF is to advance ecological restoration of the watersheds impacted by the Zaca and Piru fires. The restoration strategies focus on three broad categories of action that, in combination, address watershed-wide recovery.

## **Strategy 1. Assessment, Prioritization, and Planning**

Information regarding pre and post-fire forest conditions is often incomplete or outdated across many areas of the fire scars. In order to develop strategic and effective restoration and conservation projects, relevant information must be gathered to focus opportunities to areas of greatest need, to determine the best techniques to employ given site conditions and restoration goals, to comply with regulatory requirements, and to evaluate project effectiveness over time.

The Watershed Condition Classification (WCC) is a standardized method used by the United States National Forests to evaluate and rate the health and function of watersheds on a number of different attributes. Initial prioritization of watersheds and their related needs will be based on review of the available WCC information for the LPNF.

Following the WCC review, assessment, prioritization, and planning needs for the LPNF will be developed to fill gaps and aid in establishing baseline conditions and long term goals. The results from this process will in turn be used to define and refine the activities needed within each watershed to, where possible, improve its condition classification. The types of assessment, prioritization, and planning activities that will be conducted are broadly identified in the following strategies (adapted from Roni and Beechie 2013):

- 1.1 *Watershed-scale Process Assessment* – Assess effects of changing land cover and vegetation types on runoff and stream flows, erosion processes, nutrient supply to streams, and the implications on ecosystems and natural communities.
- 1.2 *Reach-scale Process Assessment* – Assess riparian conditions, alterations of stream flow by dams or diversions, sediment transport and storage, and floodplain habitats.
- 1.3 *Habitat Alterations Assessment* – Evaluate condition of habitat features relative to expected natural conditions or reference conditions, identify fish passage barriers, and assess water quality.
- 1.4 *Changes to Biota* – Evaluate status of priority populations or species, ecosystem assemblages, and presence, abundance, and impacts of non-native species.
- 1.5 *Regulatory Compliance and Approval* – Develop analysis and reports for compliance with regulatory policies such as the Endangered Species Act, Wilderness Act, and Wild and Scenic Rivers Act.

## **Strategy 2. Forest/Upland Restoration and Management**

Activities identified under this strategy refer largely to work designed to improve or sustain terrestrial environments. Projects may be developed at a broad scale to restore ecosystems like grasslands, chaparral, or forest stands, but depending on the locations most impacted by the fires and identified by USFS staff or through Strategy 1 assessments, projects may be more directly focused on the recovery of individual species such as big cone Douglas-fir.

- 2.1 *Seed Collection/Propagation* – Changes in fire regime, like increases in high intensity wildfire or changes in fire frequency may decimate standing vegetation and the seed bank within the soil. As

high intensity fires become more frequent, burned landscapes become more susceptible to converting from diverse native vegetation communities to monocultures dominated by invasive plants. Seed collection and propagation is therefore important to ensuring a source for conducting restoration.

2.2 *Revegetation* – In order to restore forest and upland environments, replanting native species where native vegetation communities once existed may be necessary where natural recovery processes have been delayed or altered as a result of wildfire or other stressors.

2.3 *Forest Thinning* – Thinning is a management tool used to reduce the accumulation of fuels that increase the risk of larger and more intense wildfires. Thinning is also an important technique to slow or reduce the impacts of disease and insect infestation, improve stand species diversity and age classes, and increase biodiversity across the forest.

2.4 *Prescribed Burn* – Prescribed burns may help some areas replicate the natural process of wildfire, which, similar to forest thinning, reduces fuels, removes competitive invasive species, promotes germination of fire adapted species like big cone Douglas-fir, and increases diversity and age structure in vegetative environments.

2.5 *Invasive Eradication* - A number of invasive species have established a presence on the Forest, and in some cases, were introduced and are threatening native plants and the species they support. Where possible, implementation of control measures to remove invasive species should be conducted. Invasives of particular concern include:

- Tamarisk (*Tamarix* spp.)
- Yellow Starthistle (*Centaurea solstitialis*)
- Tocalote (*Centaurea melitensis*)
- Castor Bean (*Ricinus communis*)
- Tree Tobacco (*Nicotiana glauca*)
- Spanish Broom (*Spartinum junceum*)
- Fennel (*Foeniculum vulgare*)
- Tree-of-Heaven (*Ailanthus altissima*)
- Giant Reed (*Arundo donax*)

### **Strategy 3. Stream/Riparian Restoration and Management**

Activities identified under this strategy refer to restoration of aquatic environments and the species they support, including steelhead and California red-legged frog.

3.1 *Aquatic Organism Passage Improvements* – Aquatic organism passage barriers affect some aquatic species by obstructing their distribution and range, reducing available habitat, threatening genetic diversity by isolating populations, and increasing the risks from predation, competition, and water quality and quantity impacts. These impacts can be exacerbated even further with increases in pollutant loads and altered habitat after wildfire events. Activities may include modifying road/stream crossings to allow unimpeded natural flow such as replacing culverts with a free span bridge, or installing fish ladders or other engineered solutions for fish or other aquatic species to traverse barriers.

3.2 *Invasive Eradication* – As with the forest/upland environments, aquatic and riparian invasive plant and animal species that have established a presence in LPNF waterways threaten the success of native populations. Invasive species may displace, outcompete, or prey on native species and disrupt the ecology of the aquatic and riparian environments. Additionally, aquatic and riparian invasive plants may affect water availability, nutrient cycling, sediment storage, and flow and flood dynamics. Activities may include removing aquatic vegetation through hand-pulling and mechanical treatment, or localized herbicide application. Aquatic invasive animal species removal may be completed through systematic surveys of the aquatic systems, followed by selective capture and eradication.

3.3 *Instream Habitat Restoration* – The alteration of habitat after fire events is not confined to upland environments. Sediment and debris that enters stream channels and floodplains may dramatically modify the type and distribution of in-stream habitats throughout the stream network. These impacts may be magnified when anthropogenic influences such as dams, diversions, or road crossings modify the flow regime and prohibit the natural movement of sediment and other inputs through the system. Instream habitat restoration may include removing or modifying culverts or other flow obstructing features to enhance downstream sediment transport; restore floodplain connectivity to streams to disperse sediment from channel; re-establish habitat types necessary for various life-cycle stages of aquatic organisms that have been eliminated or diminished as a result of the effects of the fire.

3.4 *Instream Flow Restoration* – Wildfire may have ramifications to local hydrology, particularly in the arid Mediterranean climate of Southern California. Changes in soil infiltration rates, evapotranspiration, and overland flows and pathways may all be impacted by post-wildfire events, which can lead to changes in the quantity and timing of in-stream flows. These changes may in turn directly affect aquatic species that are flow and habitat dependent to reach all life history stages. In addition, changes in hydrology have implications for the supply and management of water for human populations that rely on local sources of surface and groundwater. Where these hydrologic alterations are identified and understood, efforts should be made to recover in-stream flows to conditions supportive of aquatic and riparian species that exist in affected streams.

3.5 *Riparian Corridor Restoration* – Riparian corridors provide a number of ecosystem functions that support both upland and aquatic environments. Stream side vegetation buffers pollutants from waterways, contributes shade and habitat structure for both aquatic and terrestrial species, ameliorates fluctuations in water temperature, and reduces instream water temperature, stabilizes stream channel form and function, and can help slow or halt advancing wildfire. However, the loss of riparian vegetation, and the conversion of riparian systems from native species to invasive dominated vegetation such as *Arundo donax* or tamarisk can alter and degrade these functions in ways that have lasting impact across the landscape. Riparian corridors will be assessed and restored, where appropriate, to help maintain healthy watersheds and support species like steelhead, arroyo toad, southwestern willow fly-catcher.

#### **Strategy 4. Species Specific Strategies**

The LPNF supports 27 federally threatened and endangered species (Attachment A). Many of the activities identified in Strategies 1 (particularly 1.4), 2, and 3 directly influence the restoration and conservation of these species, however the California condor in particular has been identified for conservation action within the forest.

#### 4.1 California condor

Impacts from wildfire both directly and indirectly continue to pose threats to condor. Because the lands in and around the LPNF are an integral component to the greater recovery efforts of this species, where appropriate this program seeks to incorporate projects that reduce those threats and maintain the sustainability of California condor primarily on and beyond the Los Padres landscape. Opportunities for improving condor recovery within the LPNF include:

- Reducing impacts from micro-trash and lead poisoning
- Educating the public about anthropogenic threats to condors
- Contributing to the success of captive breeding programs and subsequent release of birds into the wild

### **Strategy 5. Land Management & Non-Natural Features Improvement**

In addition to ecosystem restoration, the post-fire recovery of non-natural features such as trails, roads, and fuel breaks plays an important role in maintaining healthy landscapes. These features provide critical pathways that allow Forest Service personnel and other resource managers access to the forest to work and fight fires. They also provide an opportunity to connect people with the outdoors and foster appreciation of the natural environment. However, unmaintained and damaged trails, roads, and fuel breaks may exacerbate natural resource problems by acting as conduits of sediment and other pollutants. Degraded infrastructure may also lead to users creating their own off-trail routes, which further impact the landscape, increase pollutant sources, and provide new conduits for the introduction of invasive species. Restoring these features to Forest Service standards therefore provides multiple benefits to ecosystem restoration and facilitating use and appreciation of public land.

*5.1 Field Condition Assessments* – Gather information to strategically identify critical trails, road segments, or fuel breaks in need of recovery projects related to the goals of this plan.

*5.2 Trail System Improvements* - Maintenance, decommissioning, or improvement of Forest Service system trails impacted by the Zaca and Piru Fire. Preference for restoration locations will be toward those locations that have resulted in the post-fire diminishment of forest or watershed health, forest management capabilities, or forest use.

*5.3 Fuel Break System Improvements* - Recovery of fuel breaks to pre-fire conditions including invasive species removal and revegetation projects, and maintenance of critical fuel breaks deemed necessary for future forest health and fire management so long as they include mitigation to meet other ecological goals.

*5.4 Forest Road System Improvements* - Maintenance of forest roads at critical locations where repercussions from fire have led to chronic erosion and sediment loading to watersheds, habitat, or other natural features of the forest.

### **Implementation Risk Assessment**

Risk is an uncertain event or condition which, if it occurs, could have a negative effect on an initiative's desired outcome. We assessed several risk event categories to determine the extent to which they would impede progress towards our stated business plan strategies and goals during the next 10 years.

## **Regulatory Risks**

Actions conducted on federal lands must comply with a variety of federal regulations to ensure proper consideration and evaluation for a number of different factors. In many instances on the LPNF, these processes require significant time and coordination to complete successfully. Depending on the level of complexity, these regulatory risks can significantly impact project timelines and program momentum.

*Mitigating strategies:* Increasing regulatory compliance capacity through the contracting of non-FS professional's expert in completing regulatory compliance may be pursued to efficiently and expediently address these concerns. In addition, where appropriate, developing regulatory compliance documents at a programmatic level that address forest wide issues may be an option to allow for single efforts to encompass multiple projects.

## **Financial Risks**

Funding for this program comes largely through finite USFS Federal Fire Settlement Funds. Therefore, funding for maintenance and evaluation activities that may be long-term in nature, such as multiple year treatments to ensure invasive species removal, are potentially problematic.

*Mitigating strategies:* Given that the resources available for this program will likely be insufficient to address all recovery needs throughout all the affected watersheds, it will be necessary for this program to identify those projects that are expected to accomplish the greatest ecosystem benefit given the time and resources available. Analysis of each watershed's condition ratings (as described in the WCC), and comparison of the restoration needs, the associated costs, and expected outcomes among the watersheds will be evaluated by LPNF, NFWF, and potentially other partners or consultants to target those projects that provide the greatest ecological return on investment. Where long-term activities are required or geographic focus must be broadened outside of the fire scar or off federal lands, the need to build additional partnerships and expand sources of funding will be integrated into future phases of this plan.

## **Environmental Risks**

Environmental risks pose a significant threat to ecosystem restoration on the LPNF. The threat of fire is ever-present and can potentially negate the gains made through years of recovery implementation. The threat of fire can also impact accessibility to the forest and reduce opportunities to conduct work. El Niño events can strongly influence regional weather patterns and affect precipitation, impact hydrology and stream morphology, and result in huge sediment loads after storm events even in areas that haven't been disturbed by fire. Recently, long term severe drought in the region has increased stress on vegetation and aquatic communities and heightened risk of fire. Simultaneously, impacts from insect infestation and disease have increased tree mortality for pine species, and poses threats for large landscape level ecosystem change. Additionally, the effects of climate change may be influencing a departure from historical conditions toward 'new normals' that are still in transition. As a result, referencing past conditions or statistical trends may not always be appropriate.

*Mitigating strategies:* Projects will be developed and selected in part based on their ability to reflect the conditions where they are located, and to the extent practicable, designed to account for the potential influence those environmental risks may have on the success of the project. For example, given the high likelihood of fire on the Los Padres National Forest, road-stream crossings are recommended to be designed to pass water and sediment flows equivalent to that expected post-fire events, which may be significantly greater than under 'typical' forest conditions. All projects proposed to this program will be required to document the potential environmental risks that may influence their activities and expected

outcomes and include options to minimize the impact of those risks to the project. Review of this information will be conducted by a technical advisory group or other qualified reviewers, and projects will be approved, modified, or denied based on these considerations.

### **Scientific Risks**

The ability to effectively plan and prioritize activities to direct conservation efforts is limited on the LPNF due to sometimes sparse and/or disperse available data, and the lack of resources within the Forest to adequately investigate the full extent of impacts from the fire.

*Mitigating strategies:* Addressing critical gaps in information and our understanding of the resource issues will be accomplished through the inclusion of preliminary assessment and planning projects to help answer key questions and further develop priority actions. Additionally, working with other natural resource managers throughout the region and sharing information on cause and effect relationships and best practices applicable to the LPNF environments will expand the Forest's capacity to plan and implement sound projects.

### **Social Risks**

Given that the LPNF are public lands, and used by groups with varied interests, the strategies selected by the Forest Service to conduct restoration may not be the preferred approach by all parties. For instance, the use of prescribed fire as a management tool may lead to public opposition which could then impact the options and associated costs of management. In addition, the vast size of the forest, and limited personnel capacity, means that enforcement of rules and protection of sensitive areas or restoration projects are at times at risk. For example, the eradication of invasive weeds could be negated through subsequent intentional or incidental re-introductions.

*Mitigating strategies:* Disseminating information to the public about the issues related to fire restoration and the protection of natural resources on the LPNF, and the actions identified to address those issues, will be important for creating an information exchange and building local community support. As priority actions and projects continue to be identified and refined throughout this program, information and education strategies will be budgeted for and incorporated into the project goals to ensure appropriate awareness and discourse among stakeholders. Engaging with the stakeholders early, is expected to help resolve issues, clarify rationale, and provide opportunities for discussion and involvement while allowing for flexibility and adaptability of project actions. These activities will also contribute to the long term support and maintenance of projects on the forest.

### **Institutional Risks**

Insufficient agency capacity may lead to bottlenecks and potentially more limited engagement from FS employees who already have huge workloads and limited resources to accomplish their assigned tasks.

*Mitigating strategies:* One of the major benefits of this program comes from the added capacity gained through establishing partners via grant opportunities. These opportunities can help fill a number of needs including on the ground implementation of projects, assistance with the development of regulatory compliance documents, engineered designs, and sampling and analysis plan development and execution. The grant process instituted through this program helps attract partners, build networks and relationships, and strengthens the collaboration among all parties interested in the restoration and proper management of the LPNF.

# Monitoring & Evaluating Performance

Data from individual projects will be aggregated annually into a scorecard providing a snapshot of progress on the program’s primary strategies and outcomes (Table 1). At a key stage in the program’s lifecycle, NFWF might conduct an in-house assessment or commission a third-party evaluation to evaluate progress towards the conservation outcomes and examine the factors that have facilitated and hindered successful program implementation. These tools inform future decision-making and allow NFWF to adaptively manage the program.

Table 1. Los Padres Wildfire Restoration Conservation Outcomes

Goal	Metric	Zaca Fire	Piru Fire	Total
Watershed Restoration	acres of riparian habitat restored	375	125	500
	acres of invasive vegetation management	750	250	1000
	acres of upland restoration/forest health improvements	2250	750	3000
	aquatic organism passage barriers rectified	3		3
Land Use Management & Non-natural Features Improvement	100 miles of authorized Forest Service system trails restored	90	10	100
	1000 acres of fuel break/fire management locations restored	750	250	1000

NFWF plans to build off of an existing evaluation approach, the U.S. Forest Service’s Watershed Condition Classification (WCC) system, to monitor progress on ecosystem restoration. The Forest Service currently uses the WCC to classify watershed conditions on NFS lands, including all watersheds within the LPNF. It is a coarse but comprehensive approach that quantitatively and qualitatively rates a variety of watershed condition attributes in one of three categories (Figure 3):

- 1) functioning properly,
- 2) functioning at risk, and
- 3) impaired function

NFWF will use the WCC to establish baselines for watershed conditions and work with a contractor and local Forest Service officials to refine the WCC so that it works as a tool for tracking NFWF’s progress toward restoring and improving specific watershed indicators impacted by the fire. See Appendix B for more information about the WCC and how we will adapt it to monitor the performance of this program.

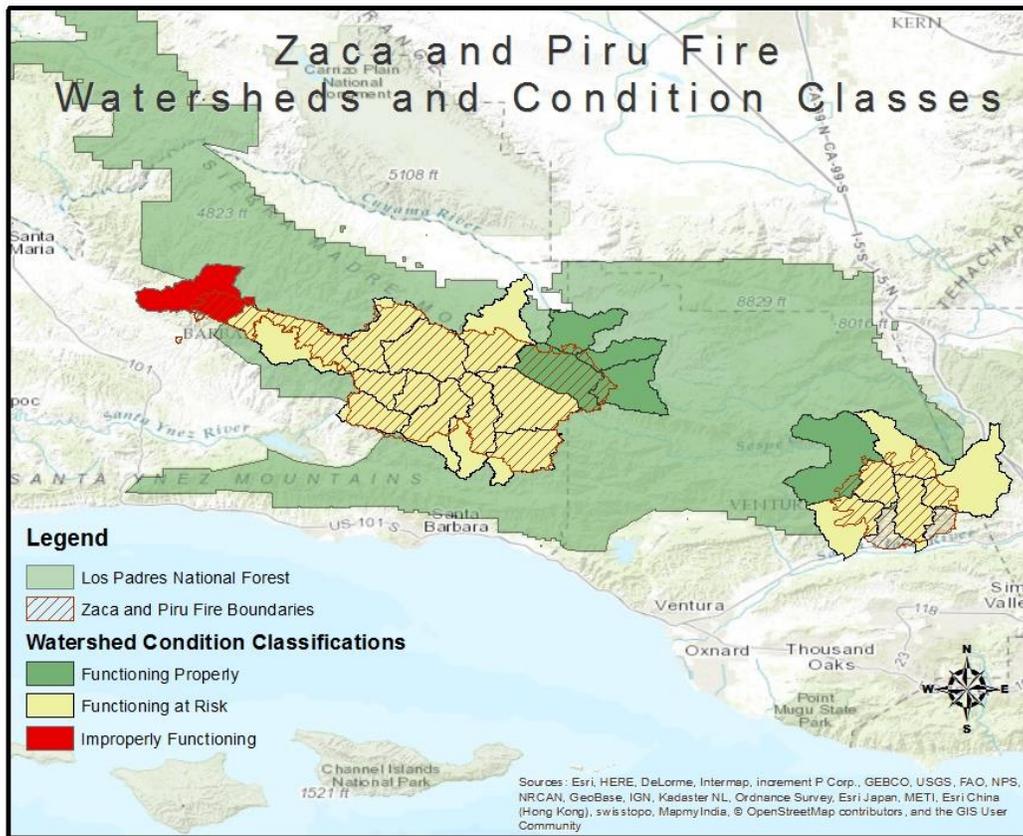


Figure 3. Zaca and Piru Fire Watersheds and Condition Classes

In addition, NFWF is funding work in the initial years of this program to identify similar evaluation tools and information, and collect baseline data for other conservation outcomes. Information being collected includes, but is not limited to:

- 1) baseline information related to reach-scale habitat and water quality within the Zaca fire;
- 2) steelhead lifecycle monitoring using redd counts and snorkel surveys; and
- 3) condition assessment of pre/post Zaca fire for big cone Douglas-fir communities.

We will fund similar monitoring efforts during later years of the program to assess the progress made towards these conservation outcomes.

## Funding Needs

Table 2 shows the estimated budget for the first 5 years of restoration actions using the available fire settlement dollars associated with the Zaca and Piru fire scars. The aim over the 10-year period of this business plan is to expand our watershed-based restoration by engaging in critical activities beyond the fire scars, where appropriate. NFWF would have to raise funds to meet these additional costs; therefore, this is *not* a commitment by NFWF to invest. At the end of the first 5 years of this program, restoration needs will be re-evaluated, and strategies and budgets developed to address funding for future phases of this program, as needed.

<b>Table 2. Zaca and Piru Fire Restoration Budget, Years 1-5</b>			
<b>BUDGET CATEGORY</b>	<b>Zaca</b>	<b>Piru</b>	<b>TOTAL</b>
<b>Forest/Upland Restoration and Management</b>			
Assessment, Prioritization, and Planning	\$750K	\$250K	\$1M
Seed Collection/Propagation	\$100K	\$100K	\$200K
Revegetation	\$400K	\$250K	\$650K
Fuels Reduction (manual)	\$200K		\$200K
Fuels Reduction (Rx burn)	\$200K		\$200K
Invasive Eradication	\$600K	\$200K	\$800K
<b>Stream/Riparian Restoration and Management</b>			
Assessment, Prioritization, and Planning	\$750K	\$150K	\$900K
Aquatic Organism Passage Improvements	\$1.5M		\$1.5M
Invasive Eradication	\$500K	\$200K	\$700K
Instream Habitat Restoration	\$500K	\$200K	\$700K
Instream Flow Restoration	*	*	*
Riparian Corridor Restoration	\$500K	\$200K	\$700K
<b>Species Specific Strategies (where different from strategies above)</b>			
<b>California condor</b>			
Reduction of micro-trash/lead on landscape		\$150K	\$150K
Public Education and Awareness		\$100K	\$100K
Captive Breeding Assistance		\$200K	\$200K
<b>Land Management &amp; Non-natural Features Improvement</b>			
Assessment, Prioritization, and Planning	\$250K	\$200K	\$450K
Trail maintenance, decommissioning, and improvement	\$400K	\$100K	\$500K
Fuel break maintenance, decommissioning, and improvement	\$400K	\$100K	\$500K
Road maintenance, decommissioning and improvement	\$250K		\$250K
<b>Program Monitoring and Assessment</b>	\$200K	\$100K	\$300K
<b>TOTAL BUDGET</b>	<b>\$7.5M</b>	<b>\$2.5M</b>	<b>\$10M</b>

- No budget allocated at this time.

# Appendix

## Appendix A – Threatened and Endangered Species on the Los Padres National Forest

SPECIES	SCIENTIFIC NAME	STATUS	
		State	Federal
<b>BIRDS</b>			
California condor	<i>Gymnogyps californianus</i>	Endangered	
California least tern	<i>Sterna antillarum browni</i>	Endangered	
Least Bell's vireo	<i>Vireo bellii pusillus</i>	Endangered	
Marbled murrelet	<i>Brachyramphus marmoratus</i>	Endangered	Threatened
Western snowy plover	<i>Charadrius alexandrinus nivosus</i>		Threatened
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	Endangered	Endangered
Yellow-billed cuckoo	<i>Coccyzus americanus</i>		Threatened
<b>MAMMALS</b>			
San Joaquin kit fox	<i>Vulpes macrotis mutica</i>	Threatened	Endangered
Southern sea otter	<i>Enhydra lutris nereis</i>		Threatened
Giant kangaroo rat	<i>Dipodomys ingens</i>	Endangered	Endangered
Stellar sea lion	<i>Eumetopias jubatus</i>		Threatened
<b>REPTILES</b>			
Blunt-nosed leopard lizard	<i>Gambelia silus</i>	Endangered	Endangered
<b>AMPHIBIANS</b>			
Arroyo toad	<i>Anaxyrus californicus</i>		Endangered
California red-legged frog	<i>Rana aurora draytonii</i>		Threatened
California tiger salamander	<i>Ambystoma californiense</i>		Endangered
<b>FISH</b>			
Tidewater goby	<i>Eucyclogobius newberryi</i>		Endangered
Steelhead trout:	<i>Oncorhynchus mykiss</i>		
Southern California DPS			Endangered
South/Central California Coast DPS			Threatened
Santa Ana sucker	<i>Catostomus santaanae</i>		Threatened
<b>INVERTEBRATES</b>			
Smith's blue butterfly	<i>Euphilotes enoptes smithi</i>		Endangered
Conservancy fairy shrimp	<i>Branchinecta conservatio</i>		Endangered
Longhorn fairy shrimp	<i>Branchinecta longiantenna</i>		Endangered
Vernal pool fairy shrimp	<i>Branchinecta lynchi</i>		Threatened
Kern primrose sphinx moth	<i>Euproserpinus euterpe</i>		Threatened
<b>PLANTS</b>			
Camatta Cyn. amole	<i>Chlorogalum purpureum var. reductum</i>		Threatened
Chorro Creek bog thistle	<i>Cirsium fontinale var. obispoense</i>	Endangered	Endangered
Kern Mallow	<i>Eremalche kernensis</i>		Endangered
Southern mountain buckwheat	<i>Erigeron kennedyi var. austromontanum</i>		Threatened

## **Appendix B - Monitoring and Evaluating Performance of Conservation Outcomes Using the USFS Watershed Condition Classification Framework: Review and Summary**

### ***Introduction***

The Watershed Condition Classification (WCC) is an approach employed nationally by the United States Forest Service to evaluate watershed conditions across a variety of attributes, and subsequently aid in the strategic focus of investments in watershed improvement and conservation practices at landscape and watershed scales. This process is intended to help with the systematic and consistent evaluation of watershed conditions and strengthen the effectiveness of the Forest Service to maintain and restore the productivity and resilience of watersheds and their associated aquatic systems on NFS lands.

### ***WCC Process***

Watersheds are evaluated at the 12-digit, 6-level HUC (subwatershed) scale and are described in one of three classes:

1. Class 1 = Functioning Properly
2. Class 2 = Functioning at Risk
3. Class 3 = Impaired Function

The WCC consists of 12 watershed condition indicators. These 12 indicators are grouped and weighted to represent four general processes that drive watershed function: Aquatic Physical Processes (Weight = 30%), Aquatic Biological Processes (Weight = 30%), Terrestrial Physical Processes (Weight = 30%), and Terrestrial Biological Processes (Weight = 10%).

Each indicator contains one or more attributes which are assigned a numeric score to reflect the relative condition of that attribute for the subwatershed being evaluated. Attributes are scored as 1 (Good), 2 (Fair), 3 (Poor). Attribute scores are then summed and averaged to produce the score representative of that indicator.

The indicator scores are assigned based on criteria provided in the WCC Technical Guide<sup>2</sup>. Depending on the attribute, scoring criteria may be numeric, descriptive, or GIS-based in nature. In particular, the descriptive attributes are qualitative or semiquantitative variables subject to some degree of interpretation by users. The WCC process, regardless of the scoring criteria, is intended to serve as a diagnostic tool to promote discussion and understanding about relative watershed conditions. It relies on local professional expertise and judgment from an interdisciplinary team, GIS data, national databases to the extent they are available, and written criteria, referred to as a “rule set” for proper evaluation and interpretation. Indicators and attributes used in the WCC process are described at the end of this memo.

The goal of the process is to use the best available information and data to assess the ecological conditions of the watersheds of interest. As such, the WCC allows flexibility for the adjustment of attributes depending on local knowledge and/or applicability of the criteria to local physiographic settings. Attributes may be adjusted through modification of the default ranges, substitution of higher quality data, or assigned a value of Not Applicable (if appropriate). Only two indicators (Forest Cover and Rangeland Vegetation) and two attributes (large woody debris and mass wasting) may be rated N/A subject to FS Regional Oversight Team approval.

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<sup>2</sup>U.S. Department of Agriculture, Forest Service, 2011. Watershed Condition Classification Technical Guide.

### ***Use of the WCC for Monitoring and Evaluation in the Business Plan for Los Padres National Forest***

The WCC approach appears to align well with the goals of the Fire Restoration grant program. The primary goal of the Los Padres National Forest – Zaca and Piru Fires Restoration Grant program is to restore and improve the watersheds impacted by wildfire to increase ecosystem integrity and resilience. The WCC identifies and addresses the major factors that influence watershed health and reviews those factors independently and collectively. Although it was designed to support initial assessments of watershed health to inform priority setting and restoration planning, it can be modified to evaluate and monitor how those factors change in response to restoration actions over time. The WCC provides flexibility to adapt and refine the metrics by which those factors are evaluated to best represent the geographies and local conditions of the watersheds being reviewed. As such, NFWF plans to use the WCC as the foundation for a monitoring and evaluation plan to track and monitor program activities and outcomes over time. NFWF will contract with experts to refine the WCC, as needed, so that it satisfies the management goals of both the USFS and NFWF and can be applied in other Forests where similar work is occurring.

### ***WCC Rating Metrics (Indicators to be used for monitoring the LPNF program denoted with \*):***

1. Aquatic Physical Process
  - a. **Water Quality Indicator**
    - i. *Impaired Waters (303d listed)* – Criteria: % of stream miles/lake area listed on 303d or 305b lists
    - ii. *Water Quality Problems* – Criteria: Qualitative judgment of non-listed wq issues
  - b. **Water Quantity Indicator**
    - i. *Flow Characteristics* – Criteria: Qualitative judgement on departure from natural hydrograph regime
  - c. **Aquatic Habitat Indicator**
    - i. *\* Habitat Fragmentation* – Criteria: % of connectivity among historic aquatic habitats
    - ii. *Large Woody Debris* – Criteria: Qualitative judgment on presence/absence of LWD recruitment based on expectations for that system
    - iii. *\* Channel Shape and Function* – Criteria: % of width/depth ratios and channel entrenchment displaying increase from expected conditions
2. Aquatic Biological Process
  - a. **Aquatic Biota Indicator**
    - i. *\* Life Form Presence* – Criteria: % of expected aquatic life form and communities present
    - ii. *\* Native Species* – Criteria: Qualitative judgement of presence and self-sustaining populations of native species
    - iii. *\* Exotic and/or Invasive Aquatic Species* – Criteria: % of historic native aquatic life-bearing habitats with exotic/invasive species present, and trends in expansion
  - b. **Riparian/Wetland Vegetation Indicator**
    - i. *\* Vegetation Condition* – Criteria: % of native vegetation presence and success
3. Terrestrial Physical Process
  - a. **Roads and Trails Indicator**
    - i. *Open Road Density* – Criteria: road/trail density (mi/mi<sup>2</sup>)

- ii. \* *Road and Trail Maintenance* – Criteria: % of roads/trail displaying appropriate BMPs
  - iii. \* *Proximity to Water* – Criteria: % of road/trail length within 300 feet of streams/waterbodies, or hydrologically connected to them
  - iv. \* *Mass Wasting* – Criteria: Qualitative judgment of road/trail stability and potential for delivery to stream channel
- b. Soils Indicator**
- i. *Soil Productivity* – Criteria: % soil and hydrologic cycling process functioning normally throughout the watershed
  - ii. \* *Soil Erosion* – Criteria: % of watershed displaying evidence of accelerated surface erosion
  - iii. *Soil Contamination* – Criteria: Qualitative judgment of areas of soil contamination, and atmospheric deposition related to terrestrial critical load
4. Terrestrial Biological
- a. Fire Regime OR Wildfire Indicator**
- i. \* *Fire Regime Condition Class* – Criteria: Fire Regime Condition Class rating (USFS)
  - ii. *Wildfire Effects* – Criteria: Qualitative judgment on expected recovery of soil and ground cover conditions
- b. Forest Cover Indicator**
- i. \* *Loss of Forest Cover* – Criteria: % of NFS land with cut-over, denuded, or deforested forest cover in relation to desired/expected conditions
- c. Rangeland Vegetation Indicator**
- i. \* *Rangeland Vegetation Condition* – Criteria: Qualitative judgment of annual plant production in comparison to production potential and condition
- d. Terrestrial Invasive Species Indicator**
- i. \* *Extent and Rate of Spread* – Criteria: % of watershed with established terrestrial invasive species and qualitative judgment of potential impact and rate of spread
- e. Forest Health**
- i. \* *Insects and Disease* – Criteria: % of forested land in watershed at risk of abnormally high levels of tree mortality
  - ii. *Ozone* – Criteria: % of years evaluated where ozone causes decrease in biomass

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