Sierra Nevada Watershed Improvement Program Regional Strategy

September 22, 2016

Table of Contents

Purpose of this Document 3
Overview 3
Focus Areas and Key Activities 8
Assessing Restoration Needs 9
Key Activity 1: Federal Lands Assessments 9
Key Activity 2: Rapid Watershed Restoration Needs Assessments 9
WIP Implementation 11
Key Activity 1: Increased Investment 11
Federal Government 11
State Government 12
Local Government 12
Private Stakeholders 13
Nonprofit Organizations 13
Out-of-Region Beneficiaries 13
Land Trusts and Conservancies 13
Key Activity 2: Addressing Key Policy Issues 14
Air Quality and Prescribed Fire 14
Greenhous Gas Emissions Reduction and Carbon Storage 15
Water Quality and Quantity 16
Wood and Biomass Utilization 16
Landscape-scale Restoration 17
Federal Lands Management Opportunities 18
Key Activity 3: Project Identification and Implementation 18
WIP Pilot Watersheds 19
Socioeconomic Implications 19
Communications and Outreach 20
Timeframe 21
Metrics 22
The Time to Act Is Now 23

Appendix A. State and Federal Plans and Guidance Document Updates 24
Appendix B. Watershed Assessment Areas Map 27
Appendix C. WIP Memorandum of Understanding between CA Natural Resources Secretary and Regional Forester for U.S. Forest Service Region 5 28
Appendix D. Additional Proposed WIP Metrics 39

Sierra Nevada Watershed Improvement Program

Regional Strategy

"Only an environmental restoration program of unprecedented scale can alter the direction of current trends."

U.S. Forest Service Region 5 Ecological Restoration Leadership Intent

Purpose of this Document

This document explains the importance of the Sierra Nevada Watershed Improvement Program (WIP), and how the WIP creates the unifying framework needed to focus, leverage, and increase the resources required to restore the resiliency of California's primary watersheds. This restoration will be accomplished by increasing investment in restoration, addressing key policy issues affecting restoration, and increasing infrastructure needed for restoration. Due to rapidly changing conditions in the Sierra Nevada Region, including swift-moving tree mortality, the Regional Strategy will be a dynamic document. It will be re-assessed and updated as often as required to ensure any course corrections needed to keep us on the path to healthy and resilient watersheds.

Overview

The Sierra Nevada Region (Region) is critically important to the environmental and economic well-being of California. It is the origin for more than 60 percent of the state's developed water supply, headwaters of the State Water Project and federal Central Valley Project, primary source of fresh water for the Sacramento-San Joaquin Delta, and a municipal watershed for the Los Angeles Aqueduct. The Region's forested watersheds store massive amounts of carbon, provide crucial habitat to hundreds of species, provide world-class recreational opportunities enjoyed by millions, are major producers of wood products and hydroelectric power, and serve as the home and workplace for many California residents. All of these benefits are dependent on the resilience of the watersheds that comprise this Region. In the context of the WIP, as well as this Regional Strategy, the Sierra Nevada Region includes the lands within the boundaries of the Sierra Nevada Conservancy (SNC) as well as the California Tahoe Conservancy.

Several high-profile statewide plans and programs identify the importance of the Sierra to the state's well-being and recognize the critical state of its forests (see Appendix A for a more expansive list). Recently, Governor Brown issued a Proclamation of Emergency addressing the substantial tree mortality occurring in California, initially focusing

activities on six southern Sierra counties. The governor identified a number of actions state government will be undertaking to address this issue, all consistent with the objectives of the WIP. As well as addressing tree mortality concerns, the WIP identifies actions to increase the resilience of Sierra watersheds and the living trees that remain, so that the Region can continue to produce the benefits upon which the rest of California relies.

What is the WIP?

The WIP is a coordinated, integrated, collaborative program to restore the health of California's primary watershed through increased investment, needed policy changes, and increased infrastructure. This comprehensive effort is being organized and coordinated by the SNC and U.S. Forest Service (USFS) in close partnership with other federal, state, and local agencies as well as diverse stakeholders, and aims to increase the pace and scale of restoration in the Region.

The USFS Region 5 released its Ecological Restoration Leadership Intent in March 2011, noting a need to "increase forest resilience through treatments (including prescribed fire and thinning) and wildfire, resulting in resource benefits to approximately nine million acres on national forest system lands." This equates to increasing the rate of forest restoration from 200,000 acres annually to 500,000 acres annually. When completed, analyses conducted for the WIP will provide the implementation strategy for the Leadership Intent. Along with forest health treatments, significant effort will be required to restore meadows, since their health is critical to stream condition as well as downstream water quality. The protection and improvement of riparian habitat and stream cover are also essential to ecosystem function and water quality improvement.

The WIP is a large-scale restoration program designed to address ecosystem health in the Sierra Nevada in a holistic manner and encompass concerns including wildfire, water reliability, habitat, infrastructure, recreation, socioeconomic, and public safety issues. By restoring and protecting the health of Sierra forests, streams, meadows, and soils, we can achieve the following objectives:

- Reduce the risk and consequences of large, damaging wildfires
- Reduce greenhouse gas (GHG) emissions and stabilize carbon storage
- Improve and protect air quality
- Improve and protect the quantity and quality of water available year-round
- Improve and protect habitat for wildlife, fish, and plant species
- Improve local socioeconomic conditions and public safety

This Regional Strategy identifies the processes, steps, and activities needed to achieve these objectives. The WIP will include high level, rapid watershed-level assessments that identify a wide range of restoration needs, including forest, stream, and meadow restoration; invasive species removal; sediment reduction treatments; and abandoned mine lands restoration. A range of activities will be identified during the assessment phase, as local conditions will vary from watershed to watershed.

The WIP will build upon existing efforts while providing a basis for exploring new models for getting restoration work done more effectively at the watershed level. At least two pilot watersheds will be selected where agencies and stakeholders will explore and potentially employ new or underutilized governance, finance, and process models for delivery of watershed restoration activities. The WIP pilot watersheds are intended to provide an opportunity to design and field test new and innovative ways of doing business at a scale that allows for experimentation and provides timely feedback to resource managers, policymakers, investors, and the general public. The ultimate goal of the WIP is apply the lessons learned in these pilot watersheds across the broader landscape, in order to increase the pace and scale of watershed restoration. At the same time, efforts will be ongoing Region-wide to increase investment and address policy issues.

The three key elements of the WIP are:

Increased Investment in Restoration
Significant financial investments are needed now to increase the pace and scale of watershed restoration in the entire Sierra Nevada Region. The WIP will serve as a tool to attract and focus investments in watershed restoration from a broad array of stakeholders, including federal, state, and local governments; special districts; private and corporate interests; nonprofit organizations and foundations; and those who benefit from Sierra resources.

Addressing Key Policy Issues Affecting Restoration
A number of policy-related issues need to be addressed in order to restore Sierra forests and watersheds to a healthier state. Even if funding increases to support more restoration activities, if impeding policy challenges are not addressed it will be virtually impossible to make significant progress toward establishing resilient Sierra watersheds that provide for the health and well-being of all California. Policy alignment will allow us to better leverage both funds and engagement.

Increased Infrastructure Needed for Restoration
The lack of wood- and biomass-processing infrastructure remains a significant impediment to forest restoration efforts. The Sierra's existing forest-related infrastructure must be maintained and expanded if it is to handle the pace and scale of needed restoration. In doing so, it will be imperative that policies and procedures are aligned to appropriately provide for the maximization of local contracting opportunities in forest restoration activities.

The WIP is designed to increase coordination and interaction at the Regional and watershed levels. It is not intended to create a singular set of restoration priorities, but rather to assist in harmonizing the multiple organizational restoration activities and objectives that already exist in the Region. It also provides an opportunity to explore new models and approaches in achieving large landscape restoration. In order to gauge success of the WIP, performance measurement metrics will be developed, tracked, and regularly reported as part of WIP communications efforts. As noted above, the WIP

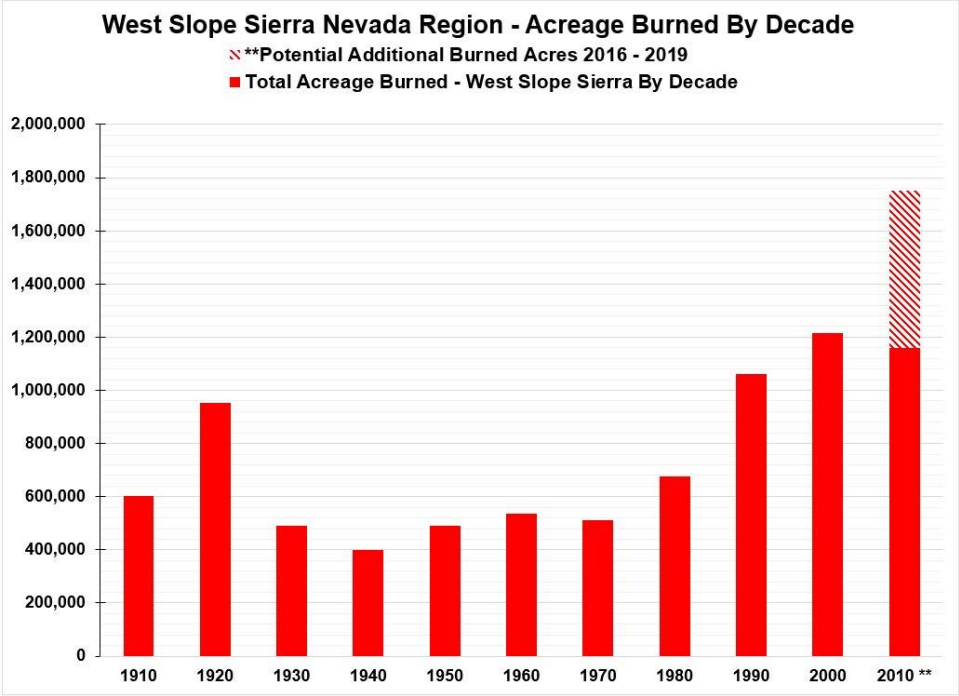
is the implementation strategy for the USFS Ecological Restoration Leadership Intent. A key metric will be the answer to this question: have we increased the pace and scale of ecological restoration?

Why is the WIP necessary?

Today, all is not well in this critical Region of California. Many Sierra Nevada watersheds are unhealthy. Forests are overgrown, and suffer from uncharacteristically large, intense fires and dramatic amounts of tree mortality. These conditions not only threaten ecological values, but also create a threat to public life and property. Degraded streams and meadows exist throughout the Region, some a result of decades-old practices such as legacy gold mining and grazing, as well as road building. Inadequate on-the-ground management actions, or no active management actions due to institutional, fiscal, or legal barriers, have also contributed to a decline in watershed health. The increase in catastrophic wildfire impacts and the extreme burn intensity resulting from our unhealthy forests have caused the most significant current impacts on these streams and meadows. Many Sierra communities also face extreme adverse economic conditions. Clearly, the severe drought conditions we face have made the situation worse and the projections of a changing climate portend more trouble ahead.

The occurrence of uncharacteristically large, intense wildfire presents the most significant threat to the Region. In fact, the number of acres burned on the western slope of the Sierra has increased steadily, and with a normal fire season in 2016, we will establish a new record for acres burned in a decade – with three years left in the decade. In addition, the historic average of nearly 20 percent of acres burned succumbing to high-intensity fire has steadily increased to nearly 30 percent. Nearly 40 percent of the 2013 Rim Fire area burned at high intensity, and almost 50 percent of the 2014 King Fire area burned at high intensity. On forested lands, the rate of catastrophic fire is outpacing the ability of land managers to restore and reforest. Forest land burned at high intensity, and not reforested, is a candidate for conversion to non-useful vegetation types, such as non-native invasive plants. This type conversion has a variety of negative repercussions, including but not limited to the loss of habitat needed by many of the state's sensitive and endangered species. Additional information detailing the conditions of Sierra forests can be found in the State of the Sierra Nevada's Forests report, published by the SNC in 2014.

To be clear, not all fire is bad. In fact, fire has always been an essential part of the Sierra Nevada ecosystem. A key component of the WIP will be significantly increasing the use of fire as an ecological restoration tool in appropriate locations and under suitable conditions.



**The hatched-bar graph above adds the average yearly west slope Sierra Nevada Region acres burned between 2000 and 2015 to the remainder of the decade of 2010. This is not based on climate or fire season predictions.

The amount of area consumed by fire in the Sierra Nevada continues to increase.

The current decade will likely shatter the record for acres burned.

How can partners get involved?

Given the scope and scale of the challenges ahead, the WIP cannot succeed without partners. There is a wide range of roles partners can play, including:

- Endorsing the WIP (www.restorethesierra.org)
- Utilizing data collected through the watershed-level assessments
- Helping with identification of existing and new funding sources that will restore Sierra Nevada watersheds to a state of resilience
- Helping to identify and address policy barriers to large-scale, ecologically sound watershed restoration
- Sharing consistent messages that will positively impact barriers to large-scale restoration and bring more resources into the Region to implement restoration

As additional opportunities for collaboration arise, new partners will be identified and engaged.

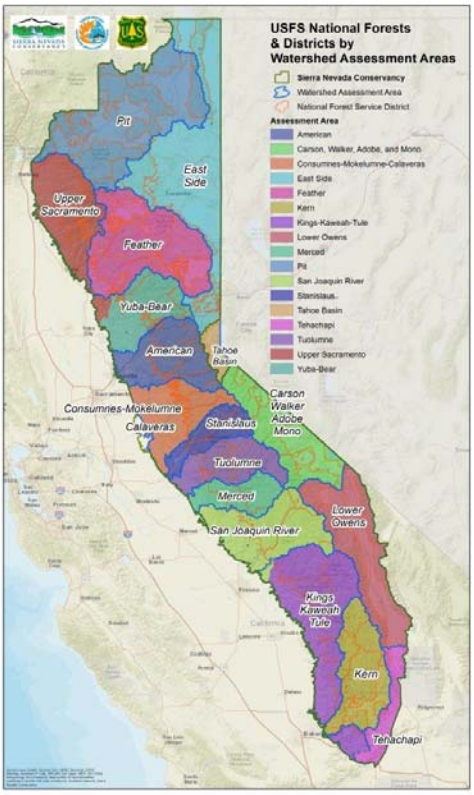
Focus Areas and Key Activities

In March 2015, the USFS and the SNC co-hosted a summit to launch the WIP, with participation from a number of state, federal, and local agencies, and key stakeholders. In September 2015, a Memorandum of Understanding (MOU) between the California

Secretary for Natural Resources, John Laird, and the Regional Forester for USFS Region 5, Randy Moore, committed ongoing support to the effort and helped to guide this program. The MOU identified the SNC as the lead state agency for the WIP (Appendix C).

This Regional Strategy identifies key information, trends, plans, efforts, and data for major categories influencing watershed health, as well as the process and timeline for implementing the WIP. The WIP has two primary focus areas: a rapid assessment of the level and cost of watershed restoration needs in the Sierra Nevada Region; and implementation, which includes project identification and completion, increased investment, and addressing key policy issues. The key activities under the rapid assessment include high-level restoration needs assessments on federal lands and the assessment of general issues and opportunities in the 17 WIP Watershed Assessment Areas. The key activities under WIP implementation are: increasing investment in the Region, addressing policy issues to ensure the implementation of needed restoration projects and the infrastructure needed to support such efforts, and project identification and implementation. The Regional Strategy identifies opportunities to leverage collective resources to effect significant on-the-ground progress toward watershed resilience, and specific metrics will be developed to measure the program's success.

WIP Watershed Assessment Areas Map



The SNC and USFS Region 5 will act as the primary coordinators of the WIP and partner activity. Given the scope and scale of this program, however, the active engagement and participation of governmental and non-governmental partners will be critical. The creation of steering or advisory groups will occur as needed to move the program forward. This may occur at both the Regional and watershed level.

WIP-supported activities will build upon and enhance existing collaborative efforts addressing watershed restoration. The WIP process also provides an opportunity to explore new models for delivering restoration activities.

Assessing Restoration Needs

In addition to addressing key issues at a Regional level, the WIP will identify critical issues and restoration opportunities at the watershed level through high-level assessments. Initially, information will be gathered in 17 identified watersheds (see map, Appendix B) and will include rapid assessments of restoration needs on federal lands, as well as available information on needs, plans, reports, and existing efforts within each watershed. These dynamic assessments will allow information to be added over time, and some watersheds may require unique categories or situations to be addressed. Updates will be particularly important given the rapidly changing conditions in the Region, particularly tree mortality.

These Rapid Watershed-Level Assessments will provide baseline knowledge, and present information to help steer interested partners to specific watersheds, issues, or types of restoration. The assessments will help paint a picture of conditions and restoration needs across the Sierra Nevada identify funding gaps, and provide a basis for exploring new models for accomplishing restoration work more effectively at the watershed level.

Key Activity 1: Federal Lands Assessments

Given the USFS's role as the program's primary federal partner, the WIP effort is beginning with the USFS assessing the holistic restoration needs of the lands it manages in the Region. Certain activities, such as timber harvesting, on USFS lands can generate revenue for the agency, increasing the ability to conduct additional restoration activity. However, many of the needed actions will not generate any revenue and require funding to implement. The National Forest Watershed Assessments will consider a wide range of watershed restoration issues on USFS Region 5 lands in the Sierra Nevada, as well as the Humboldt-Toiyabe National Forest in Region 4 USFS. These issues include forest health and fuel reduction projects, meadow and stream restoration, habitat restoration and enhancement projects, invasive species removal, sediment reduction activities, aquatic organism passage issues, and abandoned mine lands remediation. Forests may add other restoration issues on a forest-by-forest basis, based on local conditions. The assessments will help refine our understanding of restoration needs and costs for the next two to five years, and may also identify key constraints that affect restoration efforts. The Forests will complete these assessments by the end of 2016.

The Bureau of Land Management and the National Park Service are conducting similar assessments, which should be completed by the end of 2016.

Key Activity 2: Rapid Watershed Restoration Needs Assessments

The condition and needs of each watershed will vary, and the WIP relies on multiple partners to gather relevant existing data and help develop localized

strategies for moving assessments forward in the 17 watersheds. These high-level assessments have been initiated by the Sierra Coordinated Resources Management Council (SCRMC), a Joint Powers Authority comprised of several Sierra Nevada Resource Conservation Districts (RCDs), through an interagency agreement funded by the SNC and USFS Region 5. This arrangement relies on the RCDs' local relationships and on-the-ground knowledge of these watersheds to gather, verify, and summarize available information regarding private lands as well as broader restoration needs, plans, reports, and efforts across the watershed assessment areas. The watershed assessments are to be completed by the end of 2016.

The SCRMC staff have been asked to work with partners to gather the following data (if other relevant categories are identified, they will be added):

- Reports, studies, plans
- Collaborative groups and efforts (including Collaborative Forest Restoration Act groups and other types of collaborative groups involved in watershed restoration)
- Issues and opportunities specific to tribes and contacts who can help build our understanding of Traditional Ecological Knowledge
- Key stakeholders
- In-watershed and outside-the-Region beneficiaries
- Model projects

Together, the public lands and broader watershed assessments will be used to help identify needs and increase the pace and scale of restoration activities in the Sierra Nevada. The WIP will bring agencies, stakeholders, and valuable information together, and be the hub of a network connecting partners to data, funding, projects, and each other in order to more efficiently restore Sierra watersheds. The assessments are expected to inform and support decisions on increased investment and key policies. They will likewise help connect funders and decision makers to specific projects, issues, and partners in areas of interest to implement needed restoration.

Forest restoration work removes excess brush and trees, returning the forests to a more healthy and resilient state.

WIP Implementation

Key Activity 1: Increased Investment

Significant and sustainable financial investments are needed now to increase the pace and scale of forest and watershed restoration in the entire Sierra Nevada Region, and to ensure the ongoing planning, permitting, implementation, maintenance, monitoring, and adaptive management of restoration efforts. The WIP will serve as a tool to attract and focus watershed restoration investments from a broad array of stakeholders, and help ensure investments will maintain and increase the benefits that come from these watersheds.

Successful implementation of the WIP will require commitments to invest from all stakeholders, including federal, state, and local governments; special districts; private and corporate interests; nonprofit organizations and foundations; and out-of-Region beneficiaries. Failure to invest at the needed levels will result in the continued deterioration of the Region's natural, social, and economic benefits, to the detriment of all.

Federal Government
The largest landholder in the Sierra Nevada Region is the USFS, although significant acreage is under the management of the Bureau of Land Management, National Park Service, U.S. Fish and Wildlife Service, Bureau of Reclamation, Department of Defense, and the Bureau of Indian Affairs. The

public at large places many demands on these federal lands and derives multiple benefits from resources found there. Sustainable management of these public resources requires investments to secure long-term benefits of clean water, clean air, forest products, fish and wildlife resources, tourism attractions, and healthy communities. In addition, the Natural Resources Conservation Service provides significant support for private landowners in the Region and U.S. Department of Agriculture (USDA) Rural Development has been an active partner on restoration-related activities in the Region.

There are a number of existing federal programs and funding streams that align with WIP objectives, and efforts will be undertaken to increase the Sierra Nevada's share of these opportunities.

One key issue that is currently garnering considerable attention is federal legislation intended to correct "wildfire borrowing" by putting wildfire disasters on par with natural disasters such as floods, tornadoes, and hurricanes for response funding. The current system forces the USFS to pay for fire suppression costs above the appropriated amount out of other budget categories, including restoration. For the fiscal year that ended in fall 2015, the USFS redirected $700 million from important programs including recreation, research, watershed protection, rangeland management, and forest restoration to cover fire suppression costs. The State and Private Forestry program, the leading federal effort to provide technical and financial assistance to protect communities from wildfire, lost $37 million that instead went to cover fire suppression costs.

State Government

California government agencies are major stakeholders as well as landowners in the Region, and the state's citizens are the primary beneficiaries of resources originating in the Region. Increased levels of investment are needed from state sources to restore and maintain lands that provide environmental and economic benefits for all of California. A number of state funding sources could be accessed and/or enhanced to contribute to the WIP, including, but not limited to:

- Proposition 1 (and other bonds) grant funds
- Greenhouse Gas Reduction Fund
- California Electric Program Investment Charge
- State Responsibility Area funds

Local Government

Counties, cities, special districts, and other local governments operating in the Region continually invest in their respective jurisdictions at levels they can afford. Investments made at this level contribute to the benefits received by all beneficiaries, in and out of the Region, and should be accurately tracked. Examples include, but are not limited to, Community Wildfire Protection Plans and Integrated Regional Water Management (IRWM) planning. The WIP will provide opportunities for local governments to receive credit or recognition for their stewardship and investment in the Region, and provide a platform to

leverage additional investments in their respective watersheds. Investments by local agencies and governments in discretionary programs are significantly limited due to fiscal constraints as well as a population that is economically constrained in many areas of Sierra Nevada watersheds. It is a challenge for these communities to provide fiscal support for landscapes that dwarf their populations, and their tax base.

Private Stakeholders

The economic survival of many private businesses is directly attributable to the continued health of Sierra Nevada watersheds. Since much of the responsibility for managing and maintaining the resources used by the private sector falls to public agencies, a strong partnership will be required to leverage additional investment from the private sector, which is showing an increasing interest in the health of its headwaters. Clear and compelling examples of the need for additional private investment must be developed and demonstrated.

Nonprofit Organizations

Numerous nonprofit organizations operate within the Sierra Nevada. These organizations range in size and capacity, and will play a critical role in implementing projects and securing funds to support the WIP. They can play important roles in monitoring and data collection to ensure the effectiveness of restoration efforts, and must also be collaboratively engaged and involved in representing the public in political processes. The collective influence of this sector, along with private stakeholders, will be extremely important, and unified messaging is essential. It should also be acknowledged that many community-based collaboratives are already over-extended, and supporting their efforts to find additional resources to allow them to continue to participate in collective discussion and actions around critical issues will be important to the success of the WIP.

Out-of-Region Beneficiaries

Water agencies, municipalities, utilities, agricultural interests, irrigation districts, private business and industry, and others beyond the Sierra Nevada derive benefits from ecosystem services that originate in the Region, and there is an increasing recognition of the value of healthy headwaters. These benefits include not only clean water, but also clean air, recreation opportunities, and more. It is essential that we engage partners and beneficiaries beyond the Region to invest appropriately in the protection and enhancement of Sierra resources.

Land Trusts and Conservancies

It is important to note the important role that land conservation easements and acquisitions can play in enhancing the health of Sierra watersheds. Consolidated ownerships can allow for comprehensive, coordinated, and sustainable landscape-scale forest and watershed management for multiple benefits. In many cases, easements and acquisitions can help address some of the challenges posed by the fragmented pattern of private and protected land in the

Region, including private inholdings preventing comprehensive fire management and response, and conversion of working landscapes into developed areas due to financial pressures. Transferring lands of high resource value into public ownership can result in land management with a focus on societal goods. These goods include healthy forests and watersheds, clean water, and enhanced wildlife habitat.

Key Activity 2: Addressing Key Policy Issues

There is growing understanding that a number of key policy issues at the federal and state level affect the pace and scale of forest restoration in the Sierra Nevada. These include policies established by public land management agencies, as well as by statute and regulation. The WIP provides a forum for identifying, reviewing, and discussing ecological needs and potential necessary and appropriate policy changes.

Clearly, opportunities to establish more reliable, policy-based funding sources for restoration in the Sierra exist, but coordination among federal, state, and local agencies and private partners is necessary, including the need for federal agencies to improve coordination and cooperation between various regulatory agencies.

A number of policy areas affect restoration efforts and provide examples of issues to be addressed as a part of the WIP:

Air Quality and Prescribed Fire
Prescribed fire, under appropriate conditions (which can include initial mechanical treatment of the area), is an important restoration tool that improves forest resiliency and reduces the risk of large, high-intensity fires. However, a number of factors, including air quality regulations, staffing, funding, and liability issues can restrict the use of prescribed and managed fire.

Existing policies may have the unintended consequence of enabling larger, more damaging fires to occur and result in far more emissions than would have been released by prescribed fire. Working with the U.S. Environmental Protection Agency (EPA), California Environmental Protection Agency (CalEPA), California Air Resources Board, and local air districts to determine strategies to achieve air quality objectives while allowing for an increased use of fire will be an important focus of the WIP. WIP partners will also work with local communities, health care professionals, and recreation/tourism leaders to educate parties about the value of prescribed fire. An MOU entered into in Fall 2015 between a number of parties including the USFS, CAL FIRE, SNC, and key stakeholders provides an excellent framework for addressing these issues.

Smoke plume from the 2014 King Fire in El Dorado County
Photo courtesy of Tim Webster

Increased use of prescribed fire as a restoration tool will reduce emissions from larger, more severe wildfire events.

GHG Emissions Reduction and Carbon Storage

Since 2000, the climate and fire behavior patterns in California have differed significantly from the previous century. Sierra Nevada forests are huge carbon reservoirs, but high-intensity wildfires and massive tree mortality are turning storage pools into emissions sources. For example, the Rim Fire of 2013 produced GHG emissions equivalent to the emissions of 2.3 million vehicles in one year, counting only the fraction of total emissions that occurred during the fire. The Air Resources Board has acknowledged the contribution of wildfires to California's GHG emissions, and has charged the Governor's Forest Climate Action Team with the development of a proposed reduction strategy. However, there still is no clear methodology for including wildfire emissions in current accounting of GHG emissions in California, although multiple efforts are underway to move forward in this area. Additionally, more and more conversion of forests to shrub and/or grassland has been documented, dramatically reducing the capacity for storing carbon. Finally, millions of trees in the southern Sierra are dead and dying as a result of the drought and over-dense forest conditions. The number of dead trees and extent of tree mortality is expected to increase in the immediate future.

Identifying immediate and long-term mechanisms to increase investment in the Sierra Nevada through the Greenhouse Gas Reduction Fund will be critical as California works to meet emission reduction goals. As state officials adopt policies guiding the use of these funds, it is important to understand the opportunities that exist to provide for stable long-term carbon storage while reducing GHG emissions from uncharacteristic high-severity fire. Additional investment in meadow restoration offers a positive opportunity for stable carbon storage. Soils are also an important carbon sink. Functional watershed

processes, including prescribed and managed fire, create the conditions where precipitation can percolate into the soil, and create conditions for carbon sequestration.

Water Quality and Quantity

If California is to restore its primary watershed and increase reliability of the water supply for a growing population, protecting and improving water quality is critical. For example, the impacts on surface water from abandoned mines present unique challenges in many Sierra watersheds. Mercury, sediment, and other substances from abandoned mines in the Sierra travel downstream, impairing California's reservoirs and accumulating in the Sacramento-San Joaquin Delta and the San Francisco Bay. Adopting policies and providing investments that remediate these substances is an important component to a holistic approach to water quality.

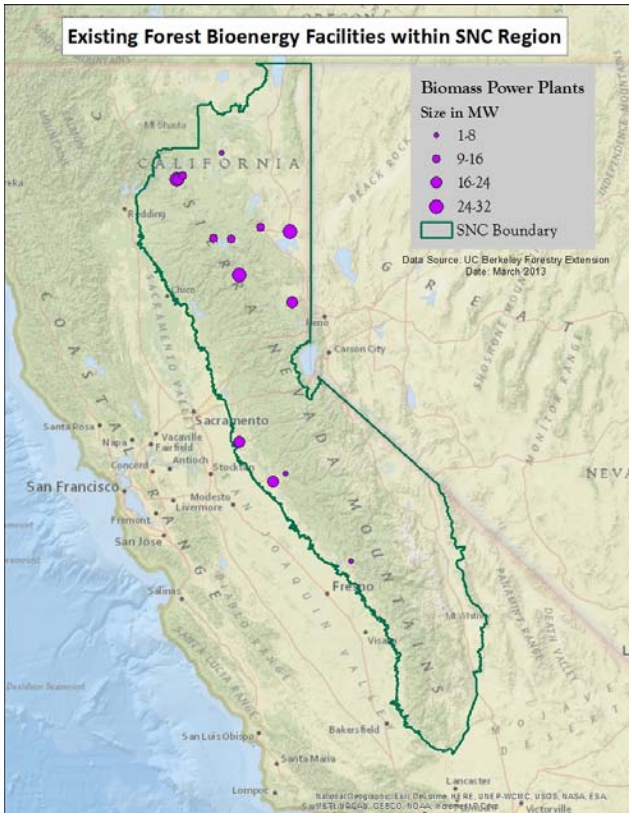
Healthy watersheds likewise contribute to stable water yield and reduced sedimentation. Sedimentation rates from high-intensity burn areas are at least five to ten times greater than experienced in low- or moderate-intensity burn areas. Post-fire sedimentation not only degrades water quality and damages infrastructure, but also fills reservoirs and reduces storage capacity. Additionally, the restoration of healthy forest conditions and possible improvement in snowpack retention can produce increased water flows in upper watersheds, colder water temperatures, and improved riparian conditions. The potential also exists for increased water yield due to fewer trees per acre, but past research in this area has not focused on ecological restoration. Efforts to quantify this potential effect are ongoing, but the drought has hindered efforts to date.

Wood and Biomass Utilization

The lack of wood- and biomass-processing infrastructure in the Sierra Nevada is a significant impediment to forest restoration efforts. While recent state policy efforts such as the Bioenergy Action Plan, SB 1122 (2012), and Governor Jerry Brown's Proclamation of Emergency addressing tree mortality (2015) provide direction on increasing the use of forest biomass for energy production, a number of challenges remain. Utilizing biomass removed as part of restoration efforts can improve community safety, offset forest restoration costs, and reduce GHG emissions. Biomass power generation is heavily constrained by the cost of transporting the feedstock material (wood chips) from the field to the plant – transportation costs often exceed the value of the fuel. Many obstacles must be addressed, including the development of more sustainable product-related income to support these operations, and long-term stewardship contracts that can provide the necessary supply guarantee to attract investors. The unprecedented amount of tree mortality now appearing in the Sierra Nevada Region is causing further shortfalls for an already overwhelmed infrastructure. With the help of partners, short-term solutions to this new threat must be identified to bridge the gap before new infrastructure is established. WIP partners will also work with local communities, governmental decision makers, and the

public to educate parties about the value of appropriately scaled wood processing infrastructure.

The USDA Biomass Crop Assistance Program (BCAP), which subsidizes transportation costs using Farm Bill funding, has been a critical resource for biomass energy facility operators, and provides greater potential for the future. Additionally, the USFS Woody Biomass Utilization Grant program provides another source of funding to promote and support the utilization of woody biomass, products, and residues from forest restoration.



The Sierra Nevada Region currently lacks the wood and biomass processing infrastructure necessary to support the level of restoration needed.

Milling capacity, in particular for smaller diameter trees, is also limited in the Sierra Nevada, despite the retrofitting of many mills in the last two decades for smaller trees. In recent years, a significant portion of mill capacity was met with logs burned in wildfire, reducing opportunities for managing "green forests." In the next several years, insect-killed trees will flood the mills and the market as well. However, wildfire and insect-killed trees have only one- to two-year windows of economic opportunity. Considering new business models that can utilize materials removed as a part of forest restoration activities, including a wider range of small diameter wood products, is essential.

Landscape-scale Restoration

The variety of policies, regulations, issues, responsible agencies, and range of stakeholders active in the Sierra Nevada makes landscape-level restoration complicated and challenging. Addressing these issues requires continuing efforts to engage a wide range of stakeholders in fully understanding the potential impacts and benefits associated with changing various processes versus maintaining the status quo. Identifying opportunities to improve the efficiency of planning processes and enhancing the coordination and integration of various processes will result in increased ecologically sound restoration activities in the Sierra Nevada.

Identifying specific opportunities to demonstrate more efficient approaches to landscape restoration planning as it relates to National Environmental Policy Act (NEPA), California Environmental Quality Act (CEQA), state and federal Endangered Species Acts (ESA), and other permitting processes is critical to increasing the pace and scale of ecological restoration. For instance, land managers struggle with the responsibility to treat unhealthy forests in a mandated manner to prevent large wildfires, while also working to improve forest conditions to meet the habitat requirements for native species and to create a forest more resilient to droughts. The need for mature, multi-age class forests in various seral stages for sensitive wildlife species may be in direct conflict with the requirements of forest management for wildfire. The potential for litigation provides yet another filter through which land managers must view proposed projects.

Federal Lands Management Opportunities

Because the federal government is the largest land manager in the Sierra Nevada, its land management practices have significant impacts on the benefits Californians receive from the Region. Therefore, it is critical to identify and evaluate policies that affect the pace and scale of restoration. For example, the combination of the 2012 National Forest Planning Rule, which emphasizes ecological integrity and sustainability, and the upcoming forest plan revisions offer a great opportunity for re-evaluating policies, processes, and guidance at the forest level. In addition, utilizing authority granted under the most recent Farm Bill, including the expansion of Sierra Nevada areas designated as “insect and disease threat areas” and the Good Neighbor Authority provides opportunities to achieve significant restoration efforts.

Key Activity 3: Project Identification and Implementation

By better identifying restoration needs and costs, increasing restoration investment, and addressing key policy issues, implementation of the WIP will result in an increase in the pace and scale of on-the-ground restoration activities, meeting the USFS Region 5Leadership Intent for Ecological Restoration. Identifying and addressing the needs for project planning activities is a key component of implementing projects.

The WIP serves as a hub connecting partners to data, funding, projects, and each other in order to more efficiently and effectively implement the restoration projects needed to restore the health of Sierra watersheds. As the WIP is fully implemented, specific restoration projects will be identified and considered in the context of each watershed. The WIP will provide the following:

- Data regarding the need for restoration, including restoration projects that have been identified
- Information about issues critical to watershed health, and strategies for addressing them

- Information on potential funding sources for various project types
- Facts regarding partners and project plans at the Regional and watershed levels
- Information about successful collaborations and funding invested in the Sierra Nevada

WIP Pilot Watersheds

The WIP will identify specific impediments to large-landscape restoration, and create opportunities to discuss them, with the end goal of working with a wide range of partners to develop more informed solutions. The WIP creates the opportunity to explore new models for delivering restoration activities to Sierra watersheds through watershed pilots. Given the mix of landowners and managers, various regulatory regimes, and competing priorities, more efficient and effective ways to achieve the needed restoration need to be identified and explored. At least two pilot watersheds will be selected for on-the-ground testing at the watershed level of innovative, new, and underutilized finance, governance, and process models to increase the pace and scale of watershed restoration through WIP watershed pilots.

Socioeconomic Implications

The Sierra Nevada would greatly benefit from a robust, skilled workforce to conduct proposed restoration work. Groups such as the Amador Calaveras Consensus Group and Calaveras Healthy Impact Product Solutions are two examples of many restoration-focused collaboratives with workforce development as a key component. These workgroups emphasize diversity in the workforce and keep work local to provide maximum benefit to the communities where the work originates. Workforce development opportunities like these programs should be considered for replication throughout the Sierra Nevada,

Engaging local crews and restoration-focused collaboratives that emphasize workforce development, such as the Calaveras Healthy Impact Product Solutions, whose crew is shown thinning the forest above, brings jobs to communities in the Sierra, many of which are economically disadvantaged.

and are of particular interest to tribal governments and organizations.

Another key component of improving the social well-being of Sierra Nevada communities is the utilization of contracting options that maximize local benefit. Significant work on this issue has been done by the USFS, SNC, and partners to clarify options that exist at the project level and provide an opportunity for further progress.

Keeping or replacing forest products infrastructure provides additional socioeconomic benefits to local communities and counties. Statistics from the USDA show that for every $1 million invested in forestry projects, 37.2 jobs were created. These jobs bring families and business back to these communities, to assure schools and hospitals are maintained and vibrant.

Communications and Outreach

The WIP is complex, with many moving pieces and partners. It cannot succeed without consistent messaging delivered to prioritized audiences through effective channels. The goals of the WIP include increasing investment to restore watershed health in the Sierra Nevada, addressing policy barriers limiting the pace and scale of restoration, and increasing the infrastructure necessary to increase the pace and scale of ecological restoration. Those who have the ability to direct funding and alter policy within the Sierra Nevada Region are the primary audiences. We will work with our partners to help key audiences understand the urgency and benefits of watershed restoration and ultimately support this effort.

A successful communications strategy for the WIP will:

- Establish the Sierra Nevada Region as a critical component of California's water and climate future
- Encourage partners, policy-makers, and decision-makers to view the WIP as California's solution to addressing declining forest and watershed health in the Sierra
- Establish the WIP as the program for distributing state forest and watershed health-related funding in the Sierra
- Encourage policy-makers and decision-makers to implement new policies and recommend legislation that helps improve forest and watershed health in the Sierra Nevada, and begin addressing past policies and legislation that hinder ecological restoration in the Region
- Provide partners across the Region with the messages and tools they need to communicate the value of the WIP to primary audiences
- Enable all partners to speak clearly and coherently about the WIP, and incorporate these messages into their Regional work activities

Timeframe

The WIP is a long-term, ongoing effort that evolves and serves as a hub for the restoration of Sierra Nevada watersheds. The critical first phase includes engaging appropriate partners to continue to refine the WIP strategy and identify details required to ensure implementation success.

The initial rapid assessments are expected to be substantially completed by the end of 2016. The complete assessments will be made available to our partners in early 2017, and may be refined over time as conditions change and additional partners engage with the WIP. The assessments, along with ongoing efforts to increase investment and address policy issues, will serve to increase the pace and scale of watershed restoration activities. Project implementation will occur an ongoing basis.

Potential locations for the initial two WIP pilot watersheds, and the new and underutilized tools and processes that may be tested there, will be researched and evaluated from mid- to late 2016, with a the goal of identifying and initiating the pilot watersheds in late 2016 or early 2017.

Without bold action, the iconic landscapes of the Sierra and the many benefits they provide all Californians are at great risk. The Sierra Nevada Watershed Improvement Program is the solution to addressing declining forest and watershed health in the Sierra Nevada.

Metrics

Metrics will be identified and utilized to measure progress of on-the-ground restoration activities. Identifying meaningful performance metrics that will collectively capture an increase in the pace and scale of restoration will be critical to WIP implementation success. The ongoing process of establishing restoration metrics will rely heavily on partner expertise and engagement. Initially, appropriate metrics already established by WIP partners will be used. Once WIP watershed assessments are completed, annual Sierra-wide targets may be established if appropriate, depending on what these assessments yield. Active partner engagement will refine the development of appropriate performance metrics, which will include a set of easily tracked metrics at the Regional level. More specific metrics at the watershed level may be added as well, if partners are willing to take responsibility for tracking and consolidating them.

Some of the Regional level metrics under consideration at this point in the WIP include the following, though these will be refined through work with WIP partners before final metrics are selected. Once identified, final metrics will be incorporated into the Regional Strategy.

- Amount of increased funding invested in the Sierra Nevada Region
- Reduction of fire threat (wildland-urban intermix [WUI] and non-WUI)
- Percentage of fire acres burning at high, medium, and low severity
- Percentage of fire acres burning at high, medium, and low intensity
- Tons of carbon sequestered and GHG emissions avoided
- Number of acres of forests and meadows improved or restored
- Number of acres of habitat improved or restored
- Number of sites of abandoned mine lands restored
- Acreage treated through prescribed or managed fire
- Development of new infrastructure for forest products (hard infrastructure)
- Amount of funding spent in fire suppression versus investments in ecological restoration
- Kilowatts of renewable energy production capacity maintained or created
- Miles of riparian habitat restored or created
- Acres of forest thinned by method (mechanical, prescribed fire, etc.)
- Amount of funding spent on watershed restoration education and job training programs
- Total loss of human life, injuries (this would include fire suppression personnel as well as other first responders, residents, and others), and property damage losses each year attributable to Sierra wildfires
- Total federal, state, and local fire suppression costs each year for Sierra wildfires
- Number of Sierra Nevada watershed restoration projects proposed, but unfunded each year (this represents the backlog we are attempting to erase)
- Species abundance and diversity analysis – pre and post restoration

We will continue to work with our partners to refine and finalize these Regional level metrics. More specific metrics may be identified and tracked at the watershed level, depending on data available and level of partner engagement and commitment to the WIP. Some of the metrics suggested by partners are included in Appendix E of this document.

The Time to Act is Now

Sierra Nevada watersheds are in need of increased restoration, without which there will be significant adverse impacts to the many benefits the watersheds provide to all of California. Wildfires are getting bigger and more intense, a changing climate with record-low snowpack is compromising the Region's ability to filter and store water, and greenhouse gases are being released at a higher rate than previously expected due to drought, insect-related tree mortality, and high-intensity fire events. There is likewise broad consensus that science-based ecological restoration of Sierra Nevada watersheds must be dramatically increased in order to protect the range of benefits they provide.

The WIP is an unprecedented large-scale restoration program designed to address a variety of ecosystem health issues in the Sierra Nevada in a holistic manner. The WIP will be the hub of a network connecting partners to data, funding, projects, and each other in order to more efficiently and effectively implement the projects needed to restore the health of Sierra watersheds. It likewise will provide the opportunity to explore and implement new models for delivering restoration at a landscape scale.

The Sierra Nevada Watershed Improvement Program is the solution to addressing declining forest and watershed health in the Sierra Nevada. Failure to implement this program successfully will have significant long-term impacts on virtually all Californians.

APPENDIX A.

State and Federal Plans and Guidance Document Updates*

The Sierra Nevada provides environmental services that benefit all of California. The issues identified in the WIP process should inform the development and implementation of state and federal planning processes, including, but not limited to:

State

California Water Action Plan and its Implementation Plan

Any comprehensive plan to conserve water resources and improve water quality must acknowledge the impact the health and functionality of Sierra watersheds have on downstream ecosystems and water users. Sierra watersheds and meadows are specifically identified in the California Water Action Plan as needing restoration; including the WIP in ongoing plan developments can help ensure that need is reflected in the Implementation Plan and facilitate watershed and meadow restoration.

Integrated Regional Water Management (IRWM)

IRWM is a collaborative effort to manage all aspects of water resources in a region. IRWM crosses jurisdictional, watershed, and political boundaries; involves multiple agencies, stakeholders, individuals, and groups; and attempts to address the issues and differing perspectives of all the entities involved through mutually beneficial solutions. This network has a wealth of relationships, data, and resources; the WIP will be collecting new data, addressing policy issues, and cultivating restoration funding that can help inform and support the IRWM efforts in the Sierra Nevada, creating the potential for a powerful, mutually beneficial relationship.

Safeguarding California Climate Adaptation Plan and AB 32 Scoping Plan Updates

Since Sierra watersheds may be carbon sinks or emission sources, quantifying the GHG benefits of restoration and connecting watershed health to AB 32 directives would help the state achieve its emission-reduction goals. The WIP will collect and analyze data regarding restoration and preparing the Sierra's watersheds for a warmer climate, and can help shape planning and scoping activities.

Greenhouse Gas Reduction Fund Investment Plan Updates and Guidelines Development

Restoring stressed watersheds will provide myriad benefits, including reducing the threat of severe wildfires that release huge quantities of greenhouse gases to the atmosphere. Connecting WIP partners developing plans that will provide an emission-reduction benefit with funding sources designated for emission reduction could streamline processes and increase the pace of on-the-ground restoration.

California Department of Fish and Wildlife's Wildlife Action Plan

Watershed-level restoration directed through the WIP will yield dividends including improved water quality, aquatic species habitat conservation, and enhanced biodiversity. Dialog between WIP partners and regulators must be encouraged to ensure consistency and compatibility with state agency efforts.

California Department of Water Resources' California Water Plan
Watershed restoration efforts will aim to improve California's water quality and quantity. WIP partners should be encouraged to work with regulators to find more efficient ways to effect landscape-level restoration, conserve water resources at the watershed and Regional levels, and help DWR achieve its goals while leveraging available funds.

California Department of Forestry and Fire Protection's Fire Plan
Watershed restoration in the Sierra must address the uncharacteristic fuel loads that have been driving an increase in severe wildfire in the Region. WIP collaboration during statewide planning efforts can help ensure consistent approaches to restoration treatments, identify opportunities to increase regulatory efficiency, and help achieve fuel-reduction goals.

Forest and Rangelands Assessment
The WIP will amass significant volumes of data regarding the condition of Sierra forests and rangelands, and the effectiveness of various restoration treatments. Upfront planning and strategic coordination between WIP partners and CAL FIRE staff could avoid duplication of efforts and result in more efficient information collection and analysis.

Forest Carbon Plan (under development)
The WIP will encourage investment in watershed restoration treatments that reduce accumulated fuel loads, increase biomass utilization, and improve terrestrial carbon sequestration capacity while establishing resilient forests on the landscape. WIP activities could well inform efforts to develop the state's forest carbon plan.

California Bioenergy Action Plan
The WIP will support wood- and biomass-processing infrastructure, as this must be enhanced if it is to handle the pace and scale of needed restoration in the Sierra. This will include the alignment of policies and procedures to provide for the maximization of local contracting opportunities in forest restoration activities. The development of new, and sustaining of existing, biomass-processing infrastructure through the WIP will contribute to the implementation and success of the state's Bioenergy Action Plan.

Federal

USFS Watershed Condition Framework
This national framework provides additional criteria and information for the USFS to adjust priorities and identify priority watersheds. The WIP will be utilizing this information, as well as collecting new data on an all-lands basis, addressing policy issues, and cultivating restoration funding that can support the restoration of these priority watersheds in the Sierra Nevada.

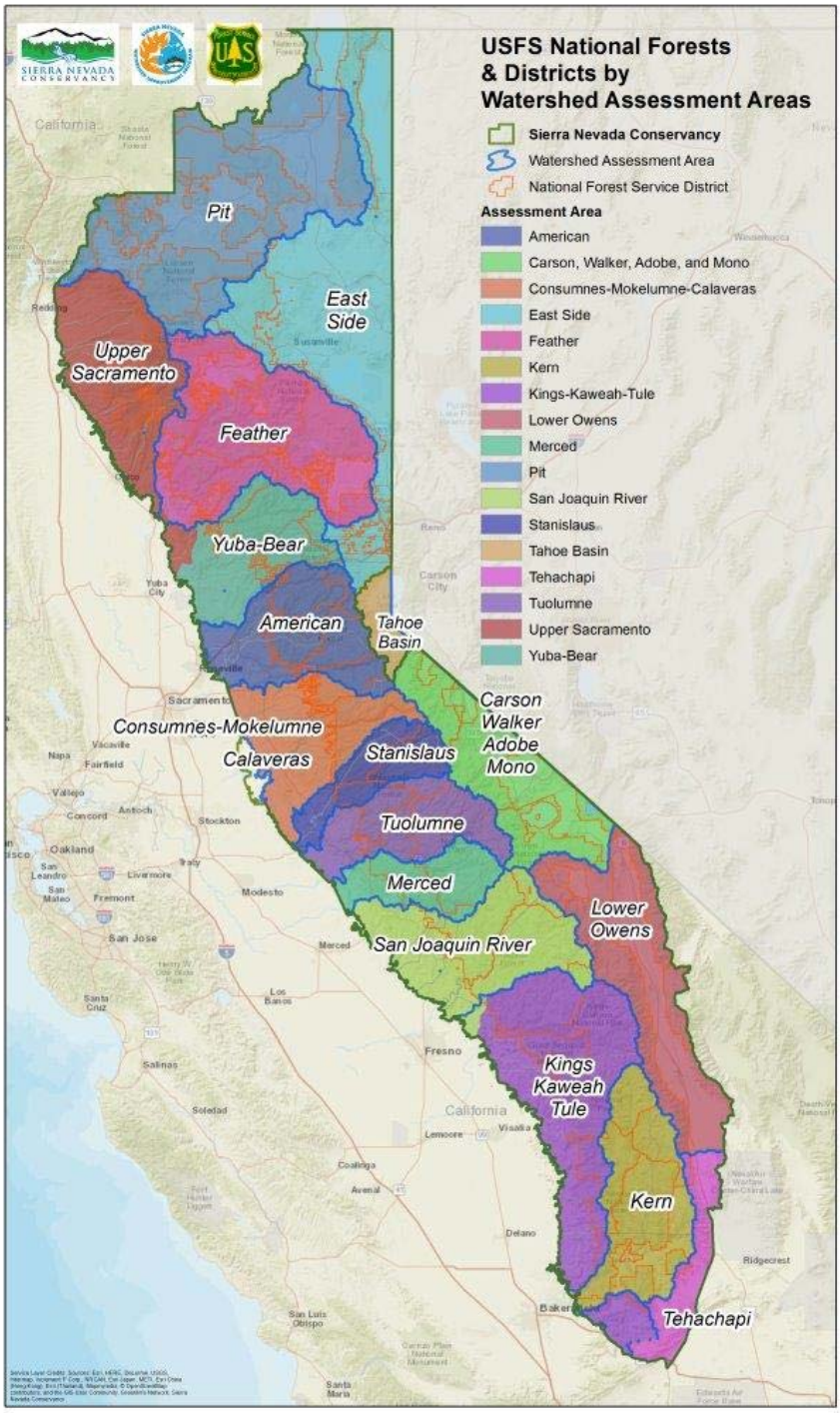
USFS Watershed Restoration Action Plans (WRAPs)

For each Priority Watershed identified under the Watershed Condition Framework, USFS develops a WRAP identifying specific restoration actions, with the goal of implementing needed restoration within five years by providing focused funding for prioritized work. Similar to the USFS Watershed Condition Framework, the WIP can help inform and support the restoration of these areas.

USFS National Forest Land Management Plans

Projects and activities that occur on each National Forest are guided by an overall Land Management Plan. These Plans provide desired conditions, objectives, guidelines, standards, goals, and potential management approaches to improve landscape resilience and sustainability, and prioritize watershed restoration. Most of these Plans will be revised in the next decade and are periodically updated. They provide an opportunity to align the focus of restoration to consider the needs and opportunities identified through the WIP.

APPENDIX B.
Watershed Assessment Areas Map



Note: This delineation of watersheds has been developed to assist in organizing and tracking WIP activities. It is understood that restoration efforts will likely occur in a more localized fashion, based on local conditions, relationships, and existing efforts.

APPENDIX C.

WIP MOU between California Natural Resources Secretary and Regional Forester for USFS Region 5

FS Agreement No. 15-MU-11052000-080
Cooperator Agreement No. _____

REGIONAL MEMORANDUM OF UNDERSTANDING
Between The
CALIFORNIA NATURAL RESOURCES AGENCY
And The
USDA, FOREST SERVICE
REGION 5
Sierra Nevada Watershed Improvement Program

This Memorandum of Understanding (MOU or Agreement) is entered into by and between the California Natural Resources Agency (CNRA) and the United States Department of Agriculture, Forest Service (USFS) (collectively referred to as "Parties" or "Participants"). This Agreement will become effective as of the latest date shown on the signatures page(s), which are attached to this Agreement and incorporated herein.

This MOU is intended to recognize the importance of the Sierra Nevada Region (Region), the challenges and opportunities faced in the Region and the need to work collaboratively to address the issues of the Region under the Sierra Nevada Watershed Improvement Program (WIP) and the California Headwaters Partnership (CHP).

Background: The Sierra Nevada Mountain Range is the source of more than 60 percent of the state's developed water supply. It provides all or part of the drinking water for 23 million people and is the primary source of fresh water flowing into the Sacramento-San Joaquin Delta. Snowpack in the Sierra's provide a natural form of water storage and Sierra forests play a role in ensuring water quality, yield, and reliability.

The area plays a crucial role in California's efforts to implement Assembly Bill (AB) 32, the California Global Warming Solutions Act of 2006. It is also a critical part of the Governor's goal for all natural and working lands to be net sinks of greenhouse gasses. The forests of the Sierra Nevada sequester and store massive amounts of carbon when healthy and resilient. Conversely, large intense wildfires can release significant amounts of greenhouse gases into the atmosphere.

The Sierra Nevada's provide a variety of other critical benefits. They provide crucial habitat to hundreds of species, including many that are listed as threatened and endangered. The Sierra's are home to world-class recreational opportunities enjoyed by millions of people from around the world and is a major producer of wood products and hydroelectric power.

There is scientific consensus the forests, streams, and meadows of many Sierra Nevada watersheds are in decline and the benefits they provide are at serious risk – a condition we must work to change. Decades of fire suppression, a changing climate, and a shortage of forest restoration efforts have led to unhealthy conditions in many Sierra forests. The result is an increase in larger, more damaging wildfires. Although wildfires can have

ecological benefits, current conditions in the Sierra are resulting in wildfires far too often do more damage than good.

Many Sierra meadows are significantly degraded, no longer performing their "sponge-like" function of storing water into the summer months. Crucial habitat and a number of listed or soon-to-be-listed species face a variety of challenges from extreme fire, poor aquatic habitat conditions, climate change, and land use conversion. Mercury, sediment, and other substances from abandoned mines travel downstream, impairing many of California's reservoirs and accumulating in the Sacramento-San Joaquin Delta and the San Francisco Bay.

Because the Sierra Nevada's provide environmental services of such value and benefit to the state of California, CNRA and USFS support of and engagement in the Watershed Improvement Program (WIP) and the Sierra portion of the California Headwaters Program (CHP) ensure that the Sierra Nevada Region is given consideration and included as an active participant in the development and implementation of state planning processes including, but not limited to:

- California Water Action Plan and its Implementation Plan
- Safeguarding California Climate Adaptation Plan and AB 32 Scoping Plan Updates
- Greenhouse Gas Reduction Fund Investment Plan Updates and Guidelines Development
- California Department of Fish and Wildlife's Wildlife Action Plan
- California Department of Water Resources' Water Plan
- California Department of Forestry and Fire Protection's Fire Plan
- Forest and Rangelands Assessment
- Forest Carbon Plan (under development)

Title: **The Sierra Nevada Watershed Improvement Program**

PURPOSE: The purpose of this MOU is to document the cooperation between the parties in working on the Sierra Nevada Watershed Improvement Program (WIP) and the California Headwaters Partnership (CHP). Implementing this program in a strategic, integrated and collaborative manner will maximize the scale of and returns on investment made. It also will ensure that policy changes are made with a comprehensive understanding of needs and capacities.

I. To achieve WIP and CHP objectives, an assessment of needed restoration, costs and impediments is needed at a watershed level throughout the Region This kind of

assessment will inform an action plan for the watershed. Together these efforts will further identify and refine the scope, scale and cost of ecological restoration of the entire Sierra Nevada Mountain Range in accordance with the following provisions.

II. STATEMENT OF MUTUAL BENEFIT AND INTERESTS:

The purpose of CNRA is to restore, protect and manage the state's natural, historical and cultural resources for current and future generations using creative approaches and solutions based on science, collaboration and respect for all the communities and interests involved. The purpose of the USFS is to sustain the health, diversity, and productivity of the Nation's forests and grasslands to meet the needs of present and future generations

The Sierra Nevada Watershed Improvement Program (WIP)

The Watershed Improvement Program (WIP) is a coordinated, integrated, collaborative program to restore the health of California's Sierra Nevada watershed through increased investment and needed policy changes. The WIP is closely aligned with the objectives of the multi-agency California Water Action Plan.

The WIP builds upon the broad consensus that more must be done to restore Sierra Nevada forests and watersheds. The pace and scale of science-based ecological restoration needs to dramatically increase in order to stem the tide of large, uncharacteristic wildfires and further degradation of these ecosystems. This restoration includes the thinning and management of forests through manual, mechanical, and prescribed fire treatments. This comprehensive effort is being organized and coordinated by the state's Sierra Nevada Conservancy (SNC) and the U.S. Forest Service, in close partnership with additional federal, state, and local agencies, and diverse stakeholders.

The key objectives of the Sierra Nevada Watershed Improvement Program and mutual benefits for both parties are:

- Identify and quantify the level of restoration activity needed to restore Sierra Nevada watersheds to a state of proper function and resilience, as well as the cost of implementing these activities.

- Increase state and federal investment in restoration activities, as well as securing investment from those who benefit from the Region, such as the urban, business and agricultural communities who receive water from the Region.

- Identify and address state, federal, and local policy issues that serve as impediments to increasing the pace and scale of restoration and improving the socio-economic well-being of Sierra communities.

California Headwaters Partnership (CHP) Resilient Lands and Waters Designation

The California Headwaters Partnership (CHP) is one of seven regions in the United States named as Resilient Lands and Waters as called for in the President's *Priority Agenda for Enhancing the Climate Resilience of America's Natural Resources.* Of the seven regions named, the CHP is the only region that has joint federal and state leads, namely the U.S. Forest Service and CNRA, respectively. Although the CHP designation encompasses all headwaters to the Sacramento and San Joaquin valleys, the majority of these lands are within the SNC territory. The process used to identify and quantify restoration needs for the WIP will be extended by the U.S. Forest Service to other parts of Region 5, outside SNC territory and the results of these combined efforts will inform the CHP.

The key mutual objectives and benefits of the Resilient Lands and Waters program and the parties are to:

- Identify and map, by October 2016, initial priority areas for conservation, restoration, or other investments
- Build resilience in vulnerable regions, enhance carbon storage capacity, and support management needs.
- Follow upon those efforts by developing landscape-scale resilience strategies to assist in advance planning and management activities.

Identifying such priority areas such as wildfire management, mitigation investments, restoration efforts, water and air quality, carbon storage, and community resilience will mutually benefit CNRA and the U.S. Forest Service .

In consideration of the above premises, the parties agree as follows:

III. CNRA SHALL:

A. Designate and support the Sierra Nevada Conservancy (SNC) as the State lead on the WP.
B. Coordinate the active participation by other departments within the CNRA, and the State Agencies in support of the WIP and the CHP.
C. Communicate the need for, and importance of, the WIP and the CHP and the issues associated with to partners, the legislature and members of the Administration.
D. Particpate as an active member of a sterring/decision-making committee.
E. Provide assistance and support, as appropriate and in coordination with the SNC , on the following matters affecting the success of the WIP and the CHP:
    a. State and Federal policy issues.
    b. State and Federal funding an investment.
    c. Communications and outreach.
    d. Scientific research and analysis.

IV. THE U.S. FOREST SERVICE SHALL:

A. Provide the leadership, resources and direction necessary for successful implementation of the WIP and the CHP.

B. Communicate the need for and importance of the WIP and the CHP to the public and partners.

C. Actively solicit and coordinate the support of other Federal agencies to support the WIP and CHP objectives.

D. Provide staff to co-lead working groups related to Policy, Funding, Implementation/Watershed Analysis, Communications, and Science.

E. Support and assist individual National Forest in the Sierra Nevada with active participation in the WIP and CHP

V. IT IS MUTUALLY UNDERSTOOD AND AGREED BY AND BETWEEN THE PARTIES THAT:

A. Implementing this program in a strategic, integrated and collaborative manner will maximize the scale of and returns on investment made. It also will ensure that policy changes are made with a comprehensive understanding of needs and capacities.

B. To achieve WIP and CHP objectives, an assessment of needed restoration, costs and impediments is needed at a watershed level throughout the Region This kind of assessment will inform an action plan for the watershed. Together these efforts will further identify and refine the scope, scale and cost of ecological restoration of the entire Region.

C. CNRA and the USFS agree that it is in the primary interest and benefit of the state of California and the federal government to develop this arrangement to ensure that the Region will be managed in the long term to maintain beneficial public values. Therefore, we are organizing a multi-state/federal/local agency effort to work with Regional stakeholders, as well as those outside the Region who are impacted by the watershed's resilience, to develop and implement the WIP.

D. CNRA and the USFS agree to formally partner to better understand and address the issues in the Region under the WIP and CHP.

E. PRINCIPAL CONTACTS. Individuals listed below are authorized to act in their respective areas for matters related to this agreement.

Principal Cooperator Contacts:

Cooperator Program Contact	Cooperator Administrative Contact
Name: Jim Branham, SNC Address: 11521 Blocker Drive Ste. 205 City, State, Zip: Auburn, CA 95603 Telephone: 530-823-4670 FAX: 530-823-4665 Email: Jim.Branham@sierranevada.ca.gov	Name: Amy Lussier, SNC Address: 11521 Blocker Drive Ste. 205 City, State, Zip: Auburn, CA 95603 Telephone: 530-823-4670 FAX: 530-823-4665 Email: Amy.Lussier@sierranevada.ca.gov

Principal U.S. Forest Service Contacts:

U.S. Forest Service Program Manager Contact	U.S. Forest Service Administrative Contact
Name: Genny Wilson Address: 650 Capitol Mall Suite 8-200 City, State, Zip: Sacramento, CA 95814 Telephone: 916-491-2834 FAX: 916-498-6675 Email: gewilson@fs.fed.us	Name: Constance Zipperer Address: 1323 Club Drive City, State, Zip: Vallejo, CA 94592 Telephone: 707-562-9120 FAX: Email: czipperer@fs.fed.us

F. ASSURANCE REGARDING FELONY CONVICTION OR TAX DELINQUENT STATUS FOR CORPORATE ENTITIES. This agreement is subject to the provisions contained in the Department of Interior, Environment, and Related Agencies Appropriations Act, 2012, P.L. No. 112-74, Division E, Section 433 and 434 regarding corporate felony convictions and corporate federal tax delinquencies. Accordingly, by entering into this agreement CNRA acknowledges that it: 1) does not have a tax delinquency, meaning that it is not subject to any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability, and (2) has not been convicted (or had an officer or agent acting on its behalf convicted) of a felony criminal violation under any Federal law within 24 months preceding the agreement, unless a suspending and debarring official of the United States Department of Agriculture has considered suspension or debarment is not necessary to protect the interests of the Government. If CNRA fails to comply with these provisions, the U.S. Forest Service will annul this agreement and may recover any funds CNRA has expended in violation of sections 433 and 434.

G. NOTICES. Any communications affecting the operations covered by this agreement given by the U.S. Forest Service or CNRA is sufficient only if in writing and delivered in person, mailed, or transmitted electronically by e-mail or fax, as follows:

To the U.S. Forest Service Program Manager, at the address specified in the MOU.

To CNRA Program Manager, at CNRA's address shown in the MOU or such other address designated within the MOU.

Notices are effective when delivered in accordance with this provision, or on the effective date of the notice, whichever is later.

H. PARTICIPATION IN SIMILAR ACTIVITIES. This MOU in no way restricts the U.S. Forest Service or CNRA from participating in similar activities with other public or private agencies, organizations, and individuals.

I. ENDORSEMENT. Any of CNRA's contributions made under this MOU do not by direct reference or implication convey U.S. Forest Service endorsement of CNRA's products and does not by direct reference or implication convey the cooperator's endorsement of the FS products or activities".

J. NONBINDING AGREEMENT. This MOU creates no right, benefit, or trust responsibility, substantive or procedural, enforceable by law or equity. The parties shall manage their respective resources and activities in a separate, coordinated and mutually beneficial manner to meet the purpose(s) of this MOU. Nothing in this MOU authorizes any of the parties to obligate or transfer anything of value.

Specific, prospective projects or activities that involve the transfer of funds, services, property, and/or anything of value to a party requires the execution of separate agreements and are contingent upon numerous factors, including, as applicable, but not limited to: agency availability of appropriated funds and other resources; cooperator availability of funds and other resources; agency and cooperator administrative and legal requirements (including agency authorization by statute); etc. This MOU neither provides, nor meets these criteria. If the parties elect to enter into an obligation agreement that involves the transfer of funds, services, property, and/or anything of value to a party, then the applicable criteria must be met. Additionally, under a prospective agreement, each party operates under its own laws, regulations, and/or policies, and any Forest Service obligation is subject to the availability of appropriated funds and other resources. The negotiation, execution, and administration of these prospective agreements must comply with all applicable law

Nothing in this MOU is intended to alter, limit, or expand the agencies' statutory and regulatory authority.

The Participants acknowledge that this Memorandum of Understanding is only intended to provide for cooperation between the Parties in support of the Sierra Nevada Watershed Improvement Program and the California Headwaters Partnership. The Memorandum of Understanding does not create any legally

binding rights or obligations. To the extent that any other provision of this Memorandum of Understanding is inconsistent with this paragraph, this paragraph shall prevail.

The Participants commit themselves in good faith to implement this Memorandum of Understanding to the fullest extent possible, subject to any changes in policy that they may adopt. This agreement is to remain into effect until modification by the parties in writing; it is negotiable at the option of any one of the parties.

K. USE OF U.S. FOREST SERVICE INSIGNIA. In order for CNRA to use the U.S. Forest Service insignia on any published media, such as a Web page, printed publication, or audiovisual production, permission must be granted from the U.S. Forest Service's Office of Communications. A written request must be submitted and approval granted in writing by the Office of Communications (Washington Office) prior to use of the insignia.

L. MEMBERS OF U.S. CONGRESS. Pursuant to 41 U.S.C. 22, no U.S. member of, or U.S. delegate to, Congress shall be admitted to any share or part of this agreement, or benefits that may arise therefrom, either directly or indirectly.

M. FREEDOM OF INFORMATION ACT (FOIA). Public access to MOU or agreement records must not be limited, except when such records must be kept confidential and would have been exempted from disclosure pursuant to Freedom of Information regulations (5 U.S.C. 552).

N. TEXT MESSAGING WHILE DRIVING. In accordance with Executive Order (EO) 13513, "Federal Leadership on Reducing Text Messaging While Driving," any and all text messaging by Federal employees is banned: a) while driving a Government owned vehicle (GOV) or driving a privately owned vehicle (POV) while on official Government business; or b) using any electronic equipment supplied by the Government when driving any vehicle at any time. All cooperators, their employees, volunteers, and contractors are encouraged to adopt and enforce policies that ban text messaging when driving company owned, leased or rented vehicles, POVs or GOVs when driving while on official Government business or when performing any work for or on behalf of the Government.

O. U.S. FOREST SERVICE ACKNOWLEDGED IN PUBLICATIONS, AUDIOVISUALS AND ELECTRONIC MEDIA. CNRA shall acknowledge U.S. Forest Service support in any publications, audiovisuals, and electronic media developed as a result of this MOU.

P. NONDISCRIMINATION STATEMENT – PRINTED, ELECTRONIC, OR AUDIOVISUAL MATERIAL. CNRA shall include the following statement, in

full, in any printed, audiovisual material, or electronic media for public distribution developed or printed with any Federal funding.

> ***In accordance with Federal law and U.S. Department of Agriculture policy, this institution is prohibited from discriminating on the basis of race, color, national origin, sex, age, or disability. (Not all prohibited bases apply to all programs.)***
>
> **To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 1400 Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.**

If the material is too small to permit the full statement to be included, the material must, at minimum, include the following statement, in print size no smaller than the text:

> ***"This institution is an equal opportunity provider."***

Q. TERMINATION. Any of the parties, in writing, may terminate this MOU in whole, or in part, at any time before the date of expiration.

R. DEBARMENT AND SUSPENSION. CNRA shall immediately inform the U.S. Forest Service if they or any of their principals are presently excluded, debarred, or suspended from entering into covered transactions with the federal government according to the terms of 2 CFR Part 180. Additionally, should CNRA or any of their principals receive a transmittal letter or other official Federal notice of debarment or suspension, then they shall notify the U.S. Forest Service without undue delay. This applies whether the exclusion, debarment, or suspension is voluntary or involuntary.

S. MODIFICATIONS. Modifications within the scope of this MOU must be made by mutual consent of the parties, by the issuance of a written modification signed and dated by all properly authorized, signatory officials, prior to any changes being performed. Requests for modification should be made, in writing, at least 30 days prior to implementation of the requested change.

T. COMMENCEMENT/EXPIRATION DATE. This MOU is executed as of the date of the last signature and is effective through **August 31, 2020** at which time it will expire, unless extended by an executed modification, signed and dated by all properly authorized, signatory officials.

U. AUTHORIZED REPRESENTATIVES. By signature below, each party certifies that the individuals listed in this document as representatives of the individual parties are authorized to act in their respective areas for matters related to this

MOU. In witness whereof, the parties hereto have executed this MOU as of the last date written below.

John Laird

JOHN LAIRD, Secretary
California Natural Resources Agency

08/28/15
Date

Randy Moore

RANDY MOORE, Regional Forester
U.S. Forest Service, Region 5

8/31/15
Date

The authority and format of this agreement have been reviewed and approved for signature.

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Date

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APPENDIX D.
Additional Proposed WIP Metrics

The WIP will include a set of metrics already tracked at the Regional level, which will be determined in collaboration with WIP partners. More specific metrics may be identified and tracked at the watershed level, depending on data available and level of partner engagement and commitment to the WIP. Some of the metrics suggested by partners are included below, as well as some more general feedback provided on WIP Metrics. Due to limited capacity, not all of these will be added to the list of metrics the SNC tracks for the WIP. However, partners who are willing to track and consolidate any of them to contribute as additional data to support the WIP are encouraged to contact the SNC.

- Increase in school enrollment
- Decrease in free school lunch program
- Stabilization or increase in health and hospital services
- Reduction in mental health needs and drug use
- Miles of roadbed no longer contributing sediment to streams
- Acres of reconnected meadow floodplain
- Miles of reconnected stream habitat
- Miles of riparian habitat restored or created
- Acres of wetlands restored or created
- Acres of meadows restored both singly and in composite assemblages
- Acres of sensitive species habitat restored or protected
- Acres of forest thinned to an acceptable level per desired future condition
- Miles of improved aquatic habitat
- Number of educational or job training opportunities (by region?) accessible within the Sierra Nevada communities
- Total biomass annual energy production (perhaps by region) from fuels sourced in the Sierra Nevada
- River or stream miles of increased water quality (indicators could be less sedimentation, lower water temperatures in certain months, higher, colder late season natural flows, etc.)
- Amount of increased water yield (locally and x miles downstream) from baseline
- Number of terrestrial and aquatic species with neutral or positive response in population to prescribed management actions
- Number of new jobs created or preserved

General feedback by partners on the development of WIP metrics included the following:

- Listing targets in acreage only doesn’t account for the differing levels of GHG sequestration potential (and other benefits) in different ecosystems and locations.

- More water quality and quantity metrics, such as increases in flow, decreases in late season water temperature, and decreases in sediment loading are needed.
- Metrics such as "acres restored" or "acres treated" are only measures of work completed and during some defined time period, but do not indicate if there is any substantial improvement in forest health or reduction in high-intensity fire risk compared to a baseline. Metrics that would better serve to measure forest or watershed health would be those that provide a measurement of forest and watershed function. From the perspective of a water utility, any potential future investment will be directly influence by the effectiveness of metrics in quantifying water quality or supply benefits. These metrics could be a foundation for making a business case for investment.