

# State of California

## National Disaster Resilience Competition Phase II

October 27, 2015



## **EXHIBIT A – EXECUTIVE SUMMARY**

The 2013 Rim Fire burned over 250,000 acres, making it the third largest wildfire in State history. The fire burned through the Stanislaus National Forest, threatening surrounding communities and damaging the critical watershed that supplies water to the San Joaquin Valley and the City and County of San Francisco. The Rim Fire had a direct emergency response cost of \$127 million, and estimates of the environmental damage range up to \$736 million.

Unfortunately, the Rim Fire was not an isolated incident. Most recently, in September 2015, the Valley and Butte Fires burned a total of 146,935 acres, destroyed 2,728 homes and resulted in 6 deaths. These severe fire events highlight the immediacy of the actions proposed in the State of California's Phase II application for the National Disaster Resilience Competition (NDRC). As of September 26, 2015, wildfires have burned over 115,000 more acres across California than burned in all of 2014, and almost 200,000 more acres than the five year average ([CAL FIRE](#)). California's prolonged severe drought magnifies risk, as the conditions for rapid fire expansion are all-too-ripe.

These fires have serious consequences for local communities, but also pose risks to the State's upper watersheds, which are a critical backbone of the State's water system. Sixty percent of the State's water supply originates in California's Sierra Nevada region, falling first through the forest canopy and understory, residing temporarily as snow pack, filtering through soil, before flowing into networks of rivers, reservoirs and aquifers, and finally, reaching taps on farms and in homes, schools, and businesses state-wide. The risks to these ecosystems are expected to increase. Climate models project a future with declining snowpack, rising temperatures, and an increase in the frequency and intensity of wildfires and other extreme events – all of which threaten the health of the State's watersheds. Preparing for these changes



as the state's population grows to 50 million requires a proactive, innovative, and collaborative approach to watershed management and resilience.

The Rim Fire recovery effort provides an opportunity to put the dimensions of resilience that are of concern statewide and to the Western United States into action, and to develop a model for resilient watershed management replicable in other communities, regions and states. The NDRC funding opportunity will provide the resources needed for the State of California and its partners to develop and implement the Community and Watershed Resilience Program (CWRP), in Tuolumne County. The CWRP provides an innovative, revenue-generating, scalable, and replicable model that can serve myriad similar regions throughout the western United States.

In partnership with federal and local government agencies, community organizations, and private business, California is working to develop a balanced, integrated, and sustainable approach to watershed restoration and forest management that supports the interdependent relationship of communities and forest ecosystems. The CWRP is built around partnerships and practices designed to overcome the financial and institutional barriers to sustainable, healthy forests and watersheds, linked to resilient communities and economic development opportunities, and to facilitate the transition to a sustainable forest economy in our rural communities. The State of California has developed a strong partnership with Tuolumne County and the U.S. Department of Agriculture Forest Service (USFS) to lead this effort. We have engaged with local businesses, non-profits, community groups, and education leaders to identify unmet recovery needs and to develop a program for community and ecological resilience in the immediate and surrounding areas.



The State of California's Community and Watershed Health Resilience Program is composed of three primary activities:

1. Forest and Watershed Health: biomass removal, restoration, and reforestation activities in the Rim Fire burn area. Activities designed to improve forest and watershed health.
2. Integrated Biomass and Wood Products Facility: This facility will provide clean power, cooling and heating, and a wood products facility to utilize wood removed from the impacted disaster area. The facility will serve the Rim Fire recovery area, but also serve as a regional facility available for thinning and biomass removal across Tuolumne County and the surrounding counties.
3. Community Resilience Centers: Designed to increase community resilience, these facilities will provide a model for increasing community resilience through outreach and education programs and provide services during an emergency. These facilities will be a model for serving rural communities.

The State of California in partnership with Tuolumne County and the U.S. Forest Service, in consultation with impacted communities within Tuolumne County and the greater Sierra Nevada region, are pleased to present the Phase II application for the National Disaster Resilience Competition, outlining its Community and Watershed Resilience Program as a model for forest and watershed recovery and resilience. To magnify the benefits of the Program, California is leveraging funds from the USFS's Rim Fire recovery funds, investments through state's Greenhouse Gas Reduction Fund, State Water Bond Funds designated to protect upper watersheds, and the California Public Utility Commission's Senate Bill 1122 program. The total cost requested is \$117 million, the cost benefit is 1.10.



## **EXHIBIT B – THRESHOLD REQUIREMENTS**

**General Section** The Department of Housing and Community Development (HCD), on behalf of the State of California will follow all applicable laws, regulations, and Executive Orders throughout the application process and, if awarded, throughout the grant administration process. This includes but is not limited to laws, regulations and guidance pursuant to Section 3, Fair Housing, Equal Access and OMB administrative requirements and cost principles. HCD has no outstanding civil rights matters or delinquent federal debts.

### **I. ELIGIBLE APPLICANT**

**Eligible Applicant** State of California, Qualifying Disaster Declaration #4158 (The Rim Fire)

### **II. ELIGIBLE COUNTY**

**Eligible County** Tuolumne County

### **III. MOST IMPACTED AND DISTRESSED TARGET AREA(S)**

The Target Area for California's application is a Tuolumne sub-county area including the Rim Fire burn area and evacuation area. ([Rim Fire Burn Scar, Evacuation Areas and Census Tracts - MID-URN Area Map](#))

**Census Tracts** 06109002200, 06109004100, 06109003100, 06109003200, 06109004200

### **IV. ELIGIBLE ACTIVITY**

California will demonstrate that each CDBG-NDR activity proposed is an eligible activity or will request an eligibility waiver with the Phase 2 application. The State is aware that HUD does not guarantee such waivers will be granted, but any request will be evaluated prior to determination regarding disposition of the application.



Project Activity	Eligible Activity	Regulatory Citation
Forest and Watershed Health	Public Infrastructure	HCDA 105(a)2
Biomass Facility & Wood Products Campus	Planning  Public Facilities; public facility with nonprofit	HCDA 105(a)12 and/or 16  HCDA 105(a)2
Community Resilience Center	Public Facilities	HCDA 105(2)

## V. RESILIENCE INCORPORATED

As further described in Exhibit E: Soundness of Approach, completion of the plans and activities proposed in the State's Application are designed to increase resilience in local communities, the broader region, and statewide. California has a comprehensive program to address climate change and boost resilience. In 2006, the legislature passed Assembly Bill (AB) 32, the [California Global Warming Solutions Act](#), which requires the state to reduce greenhouse gas emissions to 1990 levels by 2020. In 2009, California was the first state to develop a comprehensive climate adaptation strategy ([2009 Climate Adaptation Strategy](#)). The 2014 update to this strategy, [Safeguarding California](#), lays out risks and resilience needs across sectors. California has also incorporated climate change considerations into the [State Hazard Mitigation Plan](#). California voters showed further support for our critical resources by approving [Proposition 1](#), bond for investments to address current drought conditions and develop resilience in the State's water system. In recognition of the role forests play in



delivering clean water to the state's growing population, a portion of the funds in the bond supports upper watershed health which takes California another step in its effort to fully protect vulnerable and critical watersheds and downstream resources.

The State of California will incorporate resilience and create a replicable model for forest and watershed health throughout California and the Western United States. The forest health activities include fuel breaks, reforestation, biomass removal, rangeland improvements and noxious weed treatments. The combination of these factors will increase safety in the impacted area, remove hazardous and flammable materials, secure livestock protecting against erosion and damage to forest infrastructure, and treating the forest will reduce the amount of invasive species from invading the burn area., These targeted activities will strengthen the Rim Fire burn area, which is at risk for future burns due to its soil health, amount of biomass and dead trees.

The proposed biomass facility will serve the impacted area, as well as the region, providing a space for biomass removal within the county, reducing the need for controlled burns of biomass. This facility will increase resilience by lessening Tuolumne County's reliance on outside energy sources, reduce greenhouse gases, and produce jobs in the region.

The two proposed Community Resilience Centers will provide social resilience to Tuolumne and surrounding counties. Tuolumne is considered a regional leader in responding to disaster, with the region's only food bank, and major evacuation center. The proposed resilience centers will be located in two communities: Groveland and Tuolumne City. Given the terrain, access to community services is difficult year round, but this is exacerbated during a disaster. The Tuolumne City location was selected because of its proximity to LMI communities, and as a central space within the county. Groveland is the gateway to Yosemite which receives



millions of visitors every year. Groveland is isolated geographically but is a strategic location for providing services to the majority rural county.

Through the three activity areas, Tuolumne County will address social, economic, and environmental resilience. This combination will serve as a model for rural counties located in the Sierra Nevada's, and throughout the Western United States.

## **VI. NATIONAL OBJECTIVE**

California will demonstrate that each proposed activity other than general administration and planning, which are not subject to such demonstration, can and will meet a CDBG-NDR national objective or request and receive a waiver from HUD.

## **VII. OVERALL BENEFIT**

At least 50 percent of the funds requested in the State's application will assist activities that will provide sufficient benefit to low- and moderate-income persons in the form of services, area benefit, housing, or jobs, to meet the national objective of benefit to low-and moderate-income persons or request and receive a waiver from HUD.

## **VIII. ESTABLISH TIE-BACK**

The qualifying disaster in 2013, the Rim Fire in Tuolumne County, California demonstrates the vulnerability of the state's watersheds, resource-based rural economies, and the fragile and vulnerable relationship between the state's people, economy, and its natural resources. Sixty percent of the San Francisco Bay Area's water comes from Tuolumne County, so any threat to this water source threatens the economic and natural resources of one of the Country's economic drivers. This region is also representative of large portions of the western States, so this program will have wide applicability throughout the West. Investments made





through this program will tie-back to the qualifying disaster. The activities proposed in the State of California's Phase II application directly tie-back to the declared Rim Fire Disaster, with Forest and Watershed health activities taking place within the burn scar and MID-URN area, the Community Resilience Centers within the MID-URN area, and the biomass facility potentially expected to target biomass removal from the Rim Fire burn area.

In the Western United States, the fire season has lengthened and become more frequent and intense due to climate change. (Peter Howard, September, 2015) Existing research predicts a 50 percent increase in the area burned in the US by 2050, with particular risk to the western United States. If we do nothing, California could experience a 36 to 74 percent increase in area burned (Yongqiang Lin, Goodrick, and Heilman, April 2014). A wildfire the size of the Rim Fire—one of the top 3 biggest fires in California's history that burned almost a quarter of a million acres—releases stored carbon and contributes to the state's greenhouse gas emissions creating a positive feedback loop that increases the rate of climate change. (Patrick Gonzalez, Battles, Collins, Robards, and Saah. July, 2015)

## **IX. BENEFIT-COST ANALYSIS**

The State of California, in partnership with GCR, Earth Economics, and the NDRC steering committee including: the Governor's Office of Planning and Research, the Department of Housing and Community Development, CalEPA, CAL FIRE, U.S. Forest Service, Tuolumne County undertook the Benefit Cost Analysis process to ensure that each activity (Forest and Watershed Health, Biomass Facility, and Community Resilience Centers) will demonstrate cost effectiveness, while also achieving substantial benefits to the impacted area, Tuolumne County, the Sierra Nevada Mountains, and California as a whole. The team utilized the structure



provided in Appendix H, incorporating best practices in engineering, forest science, and social science to produce a robust BCA for the application.

Working together, the members of the California team, Earth Economics and GCR evaluated each of the pillars of the program separately for cost effectiveness, further aggregating and analyzing the Program on a comprehensive basis. Admittedly, performing a BCA for a robust pilot program in a rural region brings with it no shortage of challenges. To achieve success in this undertaking, the Team drew largely upon the expertise of Earth Economics and the BCA work completed for the 2013 Rim Fire Report, in which environmental benefit losses from the Rim Fire were valued as high as \$736 million. The BCA working group conducted meetings relative to each of the three pillars to identify a comprehensive lists of the history of hazards associated with each, in addition to evaluating avoided future costs, damages, and community and social benefits. See Appendix H for additional detail.

## **X. MOST IMPACTED CHARACTERISTICS**

### **i. Narrative Description**

#### **Description of the Qualifying Disaster**

The 2013 Rim Fire burned over 250,000 acres in Tuolumne County. The fire destroyed forest, rangelands, tribal lands, public and private cabins and camps, and other forest and rangeland infrastructure – all of which are part of the critical upper watershed for the state’s water supply. The majority of the burn area is in Stanislaus National Forest, but the fire also burned portions of Yosemite National Park, other publicly held lands, and private timber and ranching land. The fire burned for over two months, causing to serious economic disruption in nearby communities.



## ii. Supporting Data

**Public Infrastructure** The Rim Fire destroyed permanent public infrastructure, including roadway systems that provide access in to and out of Stanislaus National Forest. The damage resulted from direct fire impacts and resulting changes in the landscape that led to erosion and landslides that have undermined the integrity of the system. The Rim Fire also destroyed rangelands, fencing, and water troughs that had been in use by cattle ranchers under long-term agreements with the US Forest Service. While not an exhaustive list of the impacts, the projects included in the documents referenced below represent **\$2,797,750** in Most Impacted damage to permanent public infrastructure, as well as Unmet Recovery Need.

Impact	Cost Estimate	Source
Roadway and culvert damage	\$1,130,000	<a href="#">USFS-Rim-Roadway/Culvert/Retaining Wall Repair Report</a>
Rangeland infrastructure damage #1	<a href="#">\$1,06,350</a>	<a href="#">USFS - Rim -Range Infrastructure Repair Report</a>
Rangeland infrastructure damage #2	<a href="#">\$661,400</a>	

**Environmental Degradation** Earth Economics estimated the environmental benefit losses from the Rim Fire to be in excess of \$100 million in the first year following the event, based on estimates of ecosystem services within the burn area before and after the fire. ([Earth Economics Rim Fire Report\\_11.27.2013](#) – page 25, 6. Conclusions). This estimate was calculated using a FEMA accepted and scientifically validated Benefit Transfer Methodology. ([Earth Economics](#)



[Rim Fire Report 11.27.2013](#) – page 4 Preliminary Assessment). This methodology enables quantification of a range of benefits, including open space, public’s willingness to pay for outdoor recreation, water quality, and to determine the costs incurred when healthy ecosystems are degraded. Looking only at the federal land burned, the USFS [estimates the following environmental damage in the Forest](#) ([USFS Environmental Degradation Summary Report, amounts shown below do not include the](#) infrastructure projects discussed under “Public Infrastructure”):

- Soil and Water: \$3,639,375
- Heritage/Archeological: \$3,054,752;
- Timber: \$117,191,490
- Botanicals: \$9,085,000
- Other Infrastructure: \$1,493,520
- Recreation Revenue losses: \$43,766,779
- **Total Environmental Damage on US Forest Land: \$178,230,916.**

The damage from the Rim Fire has had long-lasting effects on the forests, local communities, and beyond. Local communities, whose economy is closely linked to the health of the forest through tourism, recreation, timber, and wood products suffered from business loss and closure, direct public health impacts, and depressed property values. And, as discussed in more detail in Exhibit D, the effects on downstream water storage and supply and the long-term implications for carbon storage affect the entire state.

## **XI. MOST DISTRESSED CHARACTERISTICS**

### **i. Narrative Description**



**Economically Fragile Area** Per current American Communities Survey (ACS) data, the census tract area has an unemployment rate of 15.4 percent, which is 158.4 percent of the national average of 9.7 percent [CA NDRC Target Area Unemployment-Census Tracts](#).

Census Tract	Population in Workforce	Employed Population	Unemployed Percentage	Unemployed Percentage vs National Average
06109002200	3342.485	2821.18	15.6%	160.8%
06109004100	2470.608	2121.084	14.1%	145.8%
06109003100	2140.137	1777.221	17.0%	174.8%
06109003200	2874.609	2434.854	15.3%	157.7%
06109004200	1486.73	1264.83	14.9%	153.9%
Burn Area + Evacuation Area	6501.476	5476.905	15.8%	162.5%
Burn Area + Evacuation Area + Evacuation Warning Area	12314.569	10419.169	15.4%	158.7%

**Prior Environmental Distress** The Target Area has suffered prior environmental distress due to drought, previous wildfires, and forest overgrowth. The US Department of Agriculture and National Oceanic and Atmospheric Association’s Drought Monitor Mitigation Map shows that Tuolumne County was under Moderate Drought conditions in August 2012 ([August 14 2012 Drought Monitor Map](#)). Four days before the start of the Rim Fire, a similar map shows that Tuolumne County was under Severe Drought ([August 13, 2013 Drought Monitor Map](#)). Currently, nearly 40% of California, including Tuolumne County, is under Exceptional Drought, the most severe drought ranking used ([Current Drought Monitoring Map](#)), and other than the highest peaks in Tuolumne County, the Target Area in Tuolumne County is and has consistently been under very high fire threat as shown by the [California Fire Threat Map](#). This map is based on 2005 data, which does not include the current drought. Pre-Rim Fire mortality was high due to the drought and associated disease, and possibly a changing climate. The dead



and dying trees translated into a lot of fuel, and set the stage for the Rim Fire. After the fire, in addition to the fire mortality, the trees that survived the fire were often damaged by the fire, even though they may still have been green, they died over a period of time. Insect populations also increased due to the large numbers of fire-killed trees, migrating onto the surviving stressed trees.

From a regional perspective, the Target Area has experienced regular wildfire events, as shown in the [Tuolumne Burn History Map](#). The 1987 Complex Fire burned 157,000 acres in Tuolumne County, much of which was burned again in the Rim Fire. Following wildfires that burn as hot as the Complex and the Rim fires, tree regrowth is minimal. As a result, land converts from forest to grass- and shrub lands, which are [more susceptible to high severity fire](#) and [store less carbon](#) than healthy forests.

Overgrown, dense forests, like the location of the Rim Fire, are common across California and much of the Western United States. Across much of the West, the board feet of timber grown far surpasses the amount of timber harvested annually, which leads to an overgrown forest that is ripe for catastrophic wildfire ([Quantitative Evidence for the Increasing Forest Fire Severity](#) – Pages 28-30). This overgrowth has occurred as a result of declines in the timber industry and shifting and constrained budgets for the US Forest Service. From 1995 to 2014, the Wildland Fire Management appropriation has tripled as its share of the US Forest Service budget from 17 percent to 51 percent ([US Forest Service-Rising Cost of Fire Operations](#) – Page 3). This shift in funding has come at the cost of forest maintenance and research programs. Forest overgrowth also decreases the amount of water absorbed into the forest ground. The greater the forest canopy, the greater chance that rain and snow is captured in the canopy rather than making it to the ground and flowing into streams, rivers, and reservoirs ([2011 Community](#)



[Forest Stewardship Program](#), Pages 8-11). Current forest health and climate change is leading to more frequent and more severe wildfires ([Quantitative Evidence for the Increasing Forest Fire Severity](#), Page 28).

## **XII. UNMET NEEDS**

### **i. Narrative Description**

**Infrastructure** As noted in the “Most Impacted” section above, The Rim Fire damaged permanent public infrastructure systems in the forest. Unmet recovery needs provided for threshold include those listed above in “Most Impacted.” The source documentation for these projects are also linked above. The [USFS - Unmet Need-Infrastructure-Sources and Uses](#) for these projects lists the projects, cost estimates and the reason for the gap in financing, which is further discussed and documented above in the “Prior Environmental Distress” section.

**Environmental Degradation** As noted in Most Impacted Characteristics above, environmental degradation due to the Rim Fire continues to threaten the Target Area. As summarized in the [USFS-Environmental Degradation Summary Report](#), the Rim Fire burn area included 154,430 acres of national forest lands. The environmental degradation on these lands totaled nearly \$200 million, as discussed in the “Most Impacted – Environmental Degradation Section.” Recovering these damages will require investments in reforestation, biomass removal, forest treatments, and sustainable forest practices. The US Forest Service has already invested \$134 million in Rim Fire Recovery and has committed \$9,814,655 additional [USFS-Rim Fire Investments To Date and 2015](#). Additional resources are needed to continue and expand these efforts to recover the environmental damages reported in the “Most Impacted – Environmental Degradation” section.



## **EXHIBIT C: FACTOR 1 – CAPACITY**

### **I. PAST EXPERIENCE**

This application builds on the State’s extensive capacity to work across sectors; engage at the federal, State, and local level; develop and use technical and data resources; and leverage funding opportunities to achieve multiple outcomes. Together, this capacity enables the State to accomplish systemic changes through innovative and collaborative thinking, fostering and integrating sound project design and selection, developing large scale high-impact programs, active monitoring of investments, and use of adaptive management tools.

The Governor’s Office of Planning and Research is coordinating resilience activities under Executive Order B-30-15, and will oversee the implementation of the Community and Watershed Resilience Program in partnership with HCD. The Community and Watershed Resilience Program includes activities proposed in this Phase II application to the NDRC, and includes Forest and Watershed Health, the creation of a Biomass and Wood Products Campus, and Community Resilience Centers within the disaster impacted area in Tuolumne County.

The Sierra Nevada Conservancy will administer and coordinate the Forest and Watershed Health Activities within the State of California's Community and Watershed Resilience Program. SNC currently coordinates the Watershed Improvement Program, which is designed to proactively take steps to restore forest and watershed health throughout the Sierra Nevada. SNC funds projects that reduce the risk of large damaging wildfires that threaten communities and water supply, while also providing job opportunities. SNC manages the \$50 million fund created by Proposition 84.





The California Environmental Protection Agency will administer the Biomass and Wood Products Facility activity within the Community and Watershed Resilience Program, in coordination with CAL FIRE. CalEPA will manage the partnership to conduct a feasibility analysis for a biomass and wood products facility within Tuolumne County. CalEPA will manage contracting for the development the feasibility study and lead a State-level Bioenergy Working Group to identify opportunities for replicating the process across the State of California.

Tuolumne County will administer the Community Resilience Centers within the Community and Watershed Resilience Program, which will provide emergency services as well as ongoing educational, economic development, and public services to the community. The Sierra Business Council is a non-profit organization that will help support the development of a Resource Economy Business Incubator within the Community Resilience Centers. Tuolumne County has demonstrated experience leading the design and construction of public facilities, developing long term plans for operation and maintenance, and the ability to provide economic development and business support to the Community Resilience Centers. In 2015, Tuolumne County is currently managing the construction of a 3,000 foot transit facility with a budget of \$3.2 million. The County procured services for an architect, developed a facility and road program plan with the Transit Authority and architect, and conducted plan and construction specification review and approval. Tuolumne County is also managing the construction of a 56,000 square foot, 224 bed jail facility in Tuolumne County. County staff has layered state, AB 900 and SB 1022 funds, and county general funds for the \$42 million county jail facility. The County's role has included the development of a facility program document, schematic design, and construction monitoring.



## **i. General Administrative Capacity**

California's NDRC application is not only driven by the State's recovery and resilience needs, but is also a natural extension of the State's robust integrated climate change program that drives cross-sector and -jurisdiction collaboration. The State has developed a robust Climate Adaptation Strategy, Safeguarding California, and adopted a suite of new laws that codify the State's robust climate adaptation and resilience efforts. These include the formation of the Integrated Climate Adaptation and Resilience Program within the Governor's Office of Planning and Research (OPR).

The Community and Watershed Resilience Program (CWRP) is designed as a partnership between the State of California, Tuolumne County, as well as Federal, regional and local partners actively engaged in forest and watershed health and recovery from the 2013 Rim Fire. The Department of Housing and Community Development is the applicant on behalf of the State of California. The California Department of Housing and Community Development and the OPR will serve as project managers for the Community and Watershed Resilience Program, which will be coordinated through the newly-created Integrated Climate Adaptation and Resilience Program within OPR.. For the three proposed Phase II activities, the Sierra Nevada Conservancy will manage the Forest and Watershed Health activity, CalEPA will manage the Biomass and Wood Products Campus development, and Tuolumne County and Sierra Business Council will co-manage the Community Resilience Centers.

- **HCD** is the applicant of record on behalf of the State of California. HCD will ensure that the grant efforts are carried out in compliance with all HUD requirements and serve as fiscal agent to oversee financial, procurement, quality assurance, and internal controls. HCD has extensive experience in managing the State's federal consolidated plan funds and has



allocated over \$4 billion in state and federal capital resources to municipalities, community-based organizations and private sector business and developers over the last 15 years.

HCD's CDBG Program, Policy Development Division and its newly-created Internal Audit Division, will oversee and be responsible for grant compliance and ensure the appropriate internal controls and training are in place for grant and sub-recipient activities. HCD can also quickly develop programs as needed, as it currently leads the development and implementation of cross-agency loan and grant programs that invest in transportation, community and business development, and affordable housing projects.

- **OPR** has primary leadership role for project management and implementation, including coordinating and aligning the CWRP within the Integrated Climate Adaptation and Resilience Program, which will coordinate with the State's Climate Action Team. OPR currently facilitates several statewide and regional efforts bringing multi-sector resources and funding together, including support for the Drought Mitigation Task Force, California Environmental Quality Act (CEQA) guidance, and local General Plan Guidance.
- **Sierra Nevada Conservancy** will administer and coordinate the forest and watershed restoration work. The CWRP is a natural extension of SNC's Watershed Improvement Program.
- **CalEPA** will administer the Biomass and Wood Products activity for the NDRC in partnership with CAL FIRE. CalEPA staff and its boards, departments and offices have project management experience with state and federal procurement, contracting, community engagement, and financial management. CalEPA has demonstrated experience developing programs, tracking and evaluating projects at the State level, enforcing program and



regulatory integrity, and ensuring parity in program deployment for disadvantaged communities.

- **Tuolumne County** will manage the planning and construction of the Community Resilience Centers. The County has demonstrated experience managing projects, logistics for community engagement efforts, managing and tracking State and local funds within Tuolumne County.
- and Stewardship

## **ii. Technical Capacity**

The State is working with partners across the Sierra Nevada region to leverage existing efforts and relevant investments in other sectors and regions and to replicate this approach to resilience in other watersheds and communities. Each partner brings capacity to work across disciplines and organizations and provides expertise in the following areas:

### **Overall Management of Community and Watershed Resilience Program**

- **Governor's Office of Planning and Research** will provide overall project management for the Community and Watershed Resilience Program. OPR brings a history of experience in regional and long-range planning, research, public engagement, and risk mitigation and serves as the State of California's Comprehensive State Planning Agency. OPR facilitates statewide and regional efforts that leverage multi-sector resources and funding. OPR is a national leader in climate adaptation and resilience.
- **Civic Spark** is an AmeriCorps program launched by Governor Brown in 2014 to build capacity for local governments to address climate change. OPR and the Local Government Commission administer the Program. A Civic Spark fellow will provide programmatic and administrative support to the NDRC's California Resilience Collaborative, starting in



October 2015. Housed in the Sacramento Metropolitan Air Quality office, the resilience fellow will focus on urban-rural connectivity and will be immediately available to assist in early implementation efforts.

- **Department of Housing and Community Development (HCD).** HCD will facilitate Program implementation, provide contracting and financing support, and bring site, city and regional planning expertise to the Program. HCD's expertise also includes mixed income financing and technical feasibility analyses.
- **GCR, Inc.** has provided project management and technical assistance to the State of California for Phase II of the NDRC process. GCR brings extensive expertise in community and resilience planning and community engagement. GCR has managed State and local CDBG-DR programs including housing, economic development, community planning and infrastructure programs.

#### **Activity 1: Forest and Watershed Health**

- **Sierra Nevada Conservancy** will serve as the project manager for the Forest and Watershed Health activity under Phase II of the NDRC. SNC is experienced in managing complex projects with multiple funding sources and developing innovative green infrastructure designs. SNC currently administers the State of California's Watershed Improvement Program and is an active partner in restoration and forest management projects in the Sierra Nevada region.
- **CAL FIRE** is providing technical and leadership capacity for green infrastructure and reforestation design and wood products and biomass energy development. CAL FIRE also has extensive experience managing multiple funding sources and employs scientists with cross-sector climate change expertise.



- **The United States Department of Agriculture Forest Service (USFS)** regularly engages with citizens, business, and State and county agencies on forest management issues, including remediation, restoration and redesign. The USFS holds multiple stakeholder workshops and public meetings, hosts dozens of field visits, and works consistently with the local collaborative group, Yosemite Stanislaus Solutions. USFS efforts are focused on meeting the interests of local government, local and regional industry and utilities, environmental groups, permittees, and landowners.
- **California Conservation Corps** will serve as an implementing partner for reforestation and watershed restoration. The CCC hires workers between the ages of 18 and 25 to implement conservation projects. The CCC will support CAL FIRE, the USFS, and the SNC to reduce biomass, and perform treatments in the Target Areas within the Rim Fire burn scar.
- **Blue Forest Conservation** serves to access and leverage operating and investment capital; create a quality investment vehicle to allow private capital to fund proactive forest restoration; and develop a forest health management model to generate returns through pay-for-success contracts that monetize ecosystem services such as watershed protection, increased water yield and reduction in fire suppression costs.

## **Activity 2: Biomass and Wood Products Facility**

- **CalEPA** will serve as the project manager for the plan to develop a Biomass and Wood Products Facility. It will coordinate USDA, USFS, CAL FIRE, and Native American tribes and private landowners through site selection. Boards and departments within CalEPA will contribute expertise in risk and vulnerability assessments, climate change monitoring and forecasting, implementation pathways for climate change mitigation, and resource quality



protection. The Agency will also provide guidance on leverage and mixed financing at the state and federal level, and provide technical assistance for all activities.

- **USFS** will provide technical assistance for site selection, and assess the feasibility and supply of adequate feedstocks of biomass for production at the facility. USFS will also explore opportunities of siting a biomass and wood products facility on federal land and leverage existing programs and capital for site development.
- **TSS Consultants** is the primary consultancy in California providing project development, engineering, and design services, environmental and cultural review, and financial consulting for biomass and biofuel facilities. TSS will provide project development assistance for the wood products and bioenergy campus, assist with site analysis and selection within Tuolumne County, perform technical feasibility assessments, provide design and engineering support, and support environmental and cultural permitting.

### **Activity 3: Community Resilience Centers**

- **Tuolumne County** will serve as the program manager for the development of both Community Resilience Centers within Tuolumne County. The County has demonstrated project management experience, expertise in site and city planning, pre-development site preparation and permitting, and project management from procurement to completion. The County will also serve as the owner/operator of both CRCs.
- **Sierra Business Council** will serve as the Tuolumne Restoration Economy Business Incubator within the Tuolumne City Community Resilience Center. SBC brings expertise in project assessment and operating and investment capital in the Sierra Nevada region.
- **Columbia College** will serve as an implementation partner for the Community Resilience Centers, utilizing the community kitchens for continuing education for Hospitality



Management, and providing job training and community education in Fire Technology and Forestry and Natural Resources.

- **The California Conservation Corps** will co-locate in the Groveland Community Resilience Center to continue its support of the Rim Fire recovery efforts, including reforestation, biomass removal and watershed restoration.
- **Sierra Watershed Progressive** will serve as an implementation partner in the Groveland Community Resilience Center including community outreach services, permit management, ecological landscape planning, habitat regeneration, and engineered technologies including use of greywater, rainwater and stormwater infiltration.

### **iii. Community Engagement and Inclusiveness**

In California, stakeholder engagement is critical to decision-making at the local, regional and State level. A Core Team of key state and regional partners has led the development of the application, and are actively engaging stakeholder and community organizations needed to successfully implement the proposed NDRC framework. These organizational partners comprise a cross-disciplinary cadre of professionals in the fields of forestry and fire management, watershed health, climate resilience, energy generation, local government, regional planning, and service provision for seniors and children. The Core Team members are listed in Attachment D.1.1. All members of the Core Team have staffed, led, attended, and/or managed formal and informal public engagement meetings and workshops.

***Regional Collaboration:*** Wildfires are ubiquitous in California, not just in Tuolumne County. The Sierra Nevada and other mountain regions in the west have a long history of wildfire, though in recent years the fires have become more severe. Because the Program is durable, we





are working to engage the broader Sierra Nevada region with an eye to replicating the Program in more communities. This extension will be facilitated through collaboration with the Sierra Nevada Conservancy's [Watershed Improvement Program](#).

Another partner, the [Sierra Business Council](#), a regional organization whose mission is to support the economy and sustainability of the region, has long served as a convener in the region and houses the Sierra Nevada region's new collaborative for climate adaptation and mitigation, Sierra Climate and Mitigation Partnership (Sierra CAMP). As we look to develop broader engagement throughout California, we will work with the [Alliance of Regional Collaboratives for Climate Adaptation](#) (ARCCA) to broaden our outreach. We will also work with the [Pacific Coast Collaborative](#) (PCC) to extend our reach to other western states and to western Canada. The PCC is a partnership between California, Oregon, Washington, and British Columbia, with a focus on climate change mitigation and resilience.

The State of California seeks to develop a model for strengthening forest and watershed health across rural California and the Western United States. Intentional efforts to engage organizations in regional collaboration have consulted regional business and planning groups, neighboring counties, and downstream water districts who benefit from a healthy watershed. The organizations engaged in the consultation process to determine the resiliency framework and California's application are listed in Attachment D.1.2

The Community and Watershed Resilience Program application development brings together State, federal, regional and local stakeholders to address unmet recovery needs from the qualifying disaster and achieve greenhouse gas reduction goals. This unprecedented collaboration between California State agencies, the U.S. Forest Service, Tuolumne County and Sierra Nevada-based groups including the Sierra Business Council and Sierra Nevada



Conservancy convenes stakeholders who have previously worked independently to address Forest and Watershed health. The NDRC has enabled greater collaboration between regional stakeholders that will be institutionalized through the coordinating work of the Governor's Office of Planning and Research and the Climate Action Team..

***Cross-Disciplinary Collaboration:*** The Governor's Office of Planning and Research oversees the Community and Watershed Resilience Program, managed by the Office of Planning and Research and the California Department of Housing and Community Development. This collaboration at the state level provides the framework for partnership and commitment letters found in Attachment A.

***Outreach to Vulnerable Populations and Advocates:*** Throughout Phase I and Phase II, organizations who serve or advocate for vulnerable populations, including low-income families and seniors have been in the NDRC development. First, the County successfully engaged multiple agencies in the design of the Resilience Centers including Amador Tuolumne Community Action Agency. Many of these organizations will be actively using the completed Centers to expand their services. Second, to ensure the Core Team receives comments from organizations and their clients, we phoned over 15 statewide, regional and local organizations to ask them to help us reach vulnerable populations through social media and email. The response was overwhelmingly positive--from the California Rural Legal Assistance Foundation sharing it with their many attorneys who serve low-income families to the Tuolumne County Continuum of Care sending it out to their entire mailing list. This effort will continue throughout the public comment period.



***Project Coordination with Implementing Stakeholders:*** Throughout Phase I and Phase II there have been a total of 266 individuals and organizations engaged in the planning process for the Forest and Watershed Health Program. Attachment D provides a complete list of organizations engaged in the process. The Governor’s Office of Planning and Research and Department of Housing and Urban Development led the stakeholder engagement, while Tuolumne County and the USFS led engagement within the impacted area including receiving project and activity ideas directly from Tuolumne County residents. All implementing stakeholders have been engaged throughout the NDRC process, including OPR, HCD, CalEPA, SNC, Tuolumne County and SBC.

***Consultation and Stakeholder Involvement in All Phases:*** Stakeholders have been engaged throughout the NDRC process. From Community meetings held in Tuolumne County, to weekly stakeholder coordination meetings throughout the process, the research and development of the NDRC application has included unprecedented levels of state, federal and local coordination.

***Community Engagement in Rim Fire Recovery and NDRC Application Development:***

California and our partners have great capacity to work with stakeholders to identify specific recovery and resilience needs to incorporate in this application. Tuolumne County leaders regularly engage with their constituents and were a reliable resource, along with State and federal personnel, to community members, businesses, and community organizations during the fire. Since the fire, the County has responded to unmet needs identified by community members, including holding a focused study session on the impact of the fire on access to



insurance in the County. The Program leadership team has and will continue to engage regional groups in the development of this program (See Attachment D for a full list of groups engaged.)

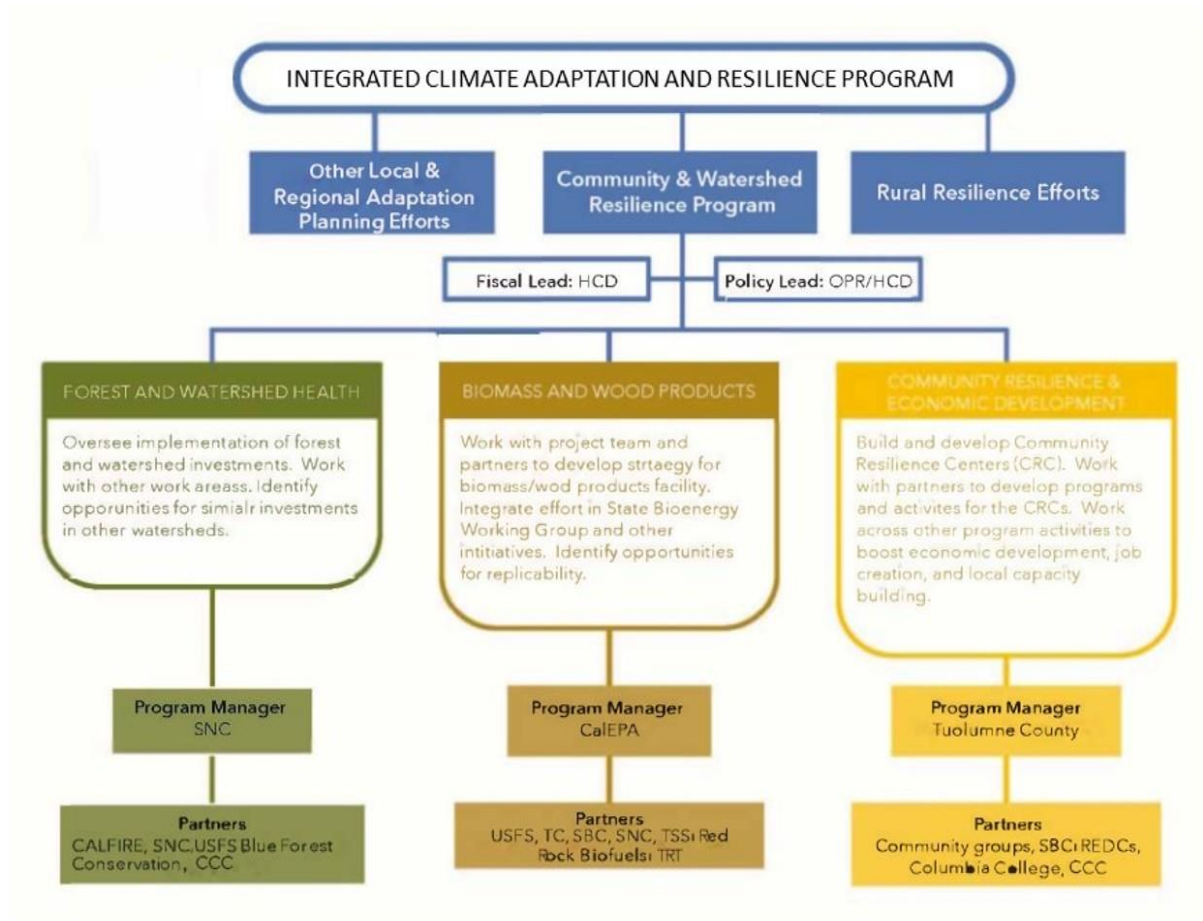
***Community Empowerment for Recovery:*** Because of the extensive post-Rim Fire engagement work, community engagement in the NDRC has been robust. The state's [NDRC website](#) was developed early in the process and has been accessible to the public. Two NDRC-focused meetings were held in Tuolumne County in January and March (see Appendix I Consultation Summary) and a public webinar was held in March. Discussion of the State's NDRC application was included on the agenda of dozens of local, state, and regional meetings and workshops over the past several months, including those held by the Tuolumne County Board of Supervisors, State Climate Action Team subgroups, ARCCA, USFS, and others .

***Harmonizing Diverse Views*** All of the Program's Partners and the leadership team have experience both working with and harmonizing the contributions of diverse stakeholders in the consultation process. Rarely does a policy decision meet all the needs of every stakeholder, yet the partners reach so many communities and interested constituents that we believe our approach holds benefits for all.



## II. MANAGEMENT STRUCTURE

### i. Description



In addition to the identified implementation partners, the Team has enlisted a strong roster of supporting partners, who in the event that a vacancy or gap occurs are ready to fill the vacant position. Each of the partners has deep staff expertise. In the event that an individual identified is unable to participate in the project, alternative staff will be engaged. If an institutional partner is unable to continue to participate, the team is prepared to identify an alternative agency, non-profit, or business to work with. California has deep knowledge across state on natural resources and planning, which the team will be able to tap into. Further, the Team has



extensive experience procuring necessary expertise in myriad diverse projects, and is prepared to solicit appropriate support as needed.

### **Key Project Personnel**

**HCD:** Susan Naramore, CDBG Specialist

**OPR:** Louise Bedsworth, Deputy Director

**CalEPA:** Ashley Conrad-Saydah, Deputy Secretary for Climate Policy

**CAL FIRE:** Helge Eng, Assistant Deputy Director, Resource Protection and Improvement

**Tuolumne County:** Maureen Frank, Deputy County Administrator

**Sierra Nevada Conservancy:** Angela Avery, Chief, Policy and Outreach Division

**Sierra Business Council:** Kerri Timmer, Government Affairs Director

**U.S. Forest Service, Stanislaus National Forest:** Clare Long, Rim Fire Recovery Team, Partnerships Coordinator

### **ii. References**

#### **Capital Projects Reference List**

##### **Striker Court Ambulance/Fire Facility**

- Mike Noonan- CAL FIRE Range Unit Chief (Retired)  
[mtn.chief@yahoo.com](mailto:mtn.chief@yahoo.com); (Cell) 209-694-5044
- Bill Caldera- Executive Director, Manteca Ambulance Authority  
[bill.caldera@gmail.com](mailto:bill.caldera@gmail.com); (Cell) 209-352-3376

##### **Hope House**



- Ann Connolly- Health and Human Service Agency Director  
[aconnolly@co.tuolumne.ca.us](mailto:aconnolly@co.tuolumne.ca.us); (Work) 209-533-5718
- Terry Cox, Executive Director, Cox Consulting  
[Cox\\_Consulting@svcgloba.net](mailto:Cox_Consulting@svcgloba.net); (Work) 209-533-8810

#### **Master Planning – Law and Justice Center Campus**

- Beverley Prior- Principal Justice Facilities Studio, AECOM  
[Beverly.Prior@aecom.com](mailto:Beverly.Prior@aecom.com); (Work) 213-593-8000

#### **Road Infrastructure and Water Line Improvements**

- Beverley Prior- Principal Justice Facilities Studio, AECOM  
[Beverly.Prior@aecom.com](mailto:Beverly.Prior@aecom.com); (Work) 213-593-8000

#### **Mother Lode Regional Juvenile Detention Facility**

- Beverley Prior- Principal Justice Facilities Studio, AECOM  
[Beverly.Prior@aecom.com](mailto:Beverly.Prior@aecom.com); (Work) 213-593-8000
- Jim Aboytes, Project Manager, Vanir Construction Management  
[Jim.Aboytes@vanir.com](mailto:Jim.Aboytes@vanir.com); (Work ) 916-575-8888
- Adele Arnold, Chief Probation Officer, Tuolumne County Probation  
[aarnold@ca.tuolumne.ca.us](mailto:aarnold@ca.tuolumne.ca.us); (Work) 209-533-7500

#### **New County Jail**

- Maynard Feist or Mike Davey, Principal Architects, Lionakis  
[Maynard.Feist@Lionakis.com](mailto:Maynard.Feist@Lionakis.com) or [Mike.Davey@Lionskis.com](mailto:Mike.Davey@Lionskis.com) (Work) 916-558-1900
- Bill Pooley, Undersheriff, Tuolumne County Sheriff's Office  
[bpooley@co.tuolumne.ca.us](mailto:bpooley@co.tuolumne.ca.us) ; (Work) 209-533-5884



## **EXHIBIT D: FACTOR 2 – NEED/EXTENT OF THE PROBLEM**

### **I. UNMET RECOVERY NEED AND TARGET GEOGRAPHY**

#### **i. Identify Specific Target Geography**

The target geography correlates to the footprint of the Rim Fire and the evacuation area, which can be seen in the Maps, Graphics, and Visuals folder.

#### **ii. Narrative Description of Needs**

The state's forested upper watersheds are a critical element of California's complex and drought-stricken water system. Restoration investments in these watersheds build resilience in communities, economies, and people by safeguarding watersheds from fire, pests, and invasive species. The Rim Fire is one in a string of wildfires that have broken records for intensity and size. Incidents like the Rim Fire have cascading effects on water resources and communities long after the fire is gone. The cumulative effects of such events over a period of time can be devastating. These events call for a holistic approach to preventing, managing, and mitigating their effects by enhancing the health of upper watersheds and forests and the resilience of rural communities.

#### **Unmet Need in the MID-URN Area**

Per Exhibit B, the target area for California's NDRC application includes the area of the [2013 Rim Fire and the evacuation areas](#). As described in Exhibit B, the Rim Fire significantly damaged the environment and public infrastructure. The fire burned the landscape, retaining walls, drainage infrastructure, historic sites, and cattle grazing infrastructure. Damage on the landscape has led to erosion and sedimentation into streams and reservoirs, reducing water quality and reservoir capacity. Erosion has





exacerbated road damage caused by the fire and limited access to forest roads. The Fire also caused [extensive damage](#) to the San Francisco Public Utility Commission's hydroelectric infrastructure in the area.

[Earth Economics](#) estimated that in the first year following the Rim Fire, environmental damage measured between \$100 and \$736 million. These estimates are based on analysis of ecosystem services provided by a healthy forest and watershed. Furthermore, the U.S. Department of Agriculture Forest Service (USFS) estimated over \$40 million in lost recreational uses and visitor fees. This estimate is indicative of the impact on the local communities whose economies are tied to the forest through tourism, recreation, associated services, timber, and wood products.

Addressing these unmet needs requires investment to address immediate risks, but also to restore long-term ecosystem services. In the near-term, erosion control measures are needed to prevent infrastructure damage and environmental degradation and sedimentation in downstream water bodies. Investments are needed to support sustainable forest practices that ensure healthy landscapes and support timber and wood product industries. These activities include reforestation of the burned areas, removal of dead wood and establishment of firebreaks to protect reforested areas and critical infrastructure.

The fire also highlighted the need for community infrastructure improvements to increase resilience. During the fire, firefighters and residents regularly had to drive several miles or form cell phone brigades to access cellular or broadband services and communicate with other fire crews, command centers, and personnel delivering supplies. [Data from the California Public Utilities Commission shows](#) that at least 50 percent of the County's population resides in unmet or underserved communications infrastructure areas. The Central Sierra Regional Broadband



Consortium further detailed the need by identifying Pine Mountain Lake, Cold Springs, Pinecrest, and Strawberry as areas of immediate need ([Resolution T-17443](#)).

Water infrastructure also proved to be vulnerable and, in some cases, inadequate. A 15.7-mile long wooden flume, the [Main Tuolumne Canal](#), brings water from the Lyons Reservoir to the local communities. Above ground and [constructed of wood](#), the flume carries water through a steep canyon, which is itself at [high risk of fire](#). In some housing developments near the burn area, fire hydrants and fire suppression infrastructure were also unable to support fire-fighting activities. Wooden flumes are common in rural areas.

### **Impacted and Distressed Characteristics in the MID-URN Area**

Economic and environmental factors already affecting the region accentuated the damage from the Rim Fire. Tuolumne County is an economically fragile area. Unemployment in the Target Area is currently at 15.4 percent, which is 158.4 percent of the national average. The fragility is further enhanced by the nature of the region's workforce. The region's economy is highly tied to the forest through tourism, recreation, associated service industries, timber, and wood products. In 2009, over [20 percent of the workforce](#) was employed in recreation, retail, or accommodation and food services. The workforce is also highly seasonal. The trend in the [size of the workforce](#) in the county, averaged for the 2000 to 2011 time period, peaks between July and October. The Rim fire began right before Labor Day weekend, forcing the closure of hotels, portions of Yosemite National Park, Stanislaus National Forest, and other attractions – at a peak time for tourism, recreation, and employment. Local residents suffered not only from these economic impacts, but also from extensive evacuations, exposure to smoke, and disruptions to work, school, and other activities. These impacts were especially challenging for the elderly, the young, and residents reliant on employment in resource-dependent sectors.



Smoke from wildfires is an acute problem for children, the elderly, the infirm, and people with disabilities. The public health impacts can be severe and continue for several months.

Residents in Tuolumne County have had difficulty obtaining and maintaining homeowner's insurance following the Rim Fire, notably those residents who live at the wildland-urban interface. Access to insurance continues to elude homeowners; lack of insurance will slow economic and physical recovery from the Rim Fire and hinder resilience to similar future incidents. In February 2015, the Tuolumne County Board of Supervisors launched a [community survey](#) to measure the difficulty for County residents having difficulty obtaining and maintaining affordable homeowner insurance due to fire loss concerns by insurance companies. The issue of being dropped by insurers or having rates dramatically increase is ongoing with Rim Fire recovery, and [communities impacted by Butte and Valley fires](#) are experiencing increased insurance bills or being dropped altogether.

As discussed in Exhibit B, in addition to the region's fragile economy, [current drought conditions](#) and the [past history of severe wildfire](#) accentuated the impact of the fire throughout the region.

### **Impacts Beyond the MID-URN Area**

More than [60 percent of California's developed water supply originates](#) in the Sierra Nevada region. When forested areas are exposed to wildfires, impacts on water supply and quality occur due to soil erosion and resultant sedimentation in reservoirs and downstream water conveyance systems (Minear and Kondolf 2009). For example, the impacts from the Rim Fire extend to Don Pedro Reservoir, which provides drinking and irrigation water to the Central Valley, California's agricultural hub. Loss of reservoir capacity to sedimentation is generally ongoing and often permanent (Poff and Hart 2002). The fire also damaged



infrastructure in the San Francisco Public Utility's water and power systems, which originate in Tuolumne County. Thus, building resilience in the upper watershed will have statewide benefits. This work will also provide a replicable model for how investment in ecological disaster restoration and natural infrastructure can support community and state resilience.

Building resilience will also improve state efforts to improve air quality and reduce greenhouse gas (GHG) emissions. Healthy forests play an important role in climate change due to their ability to store carbon. Forests absorb carbon dioxide from the atmosphere through photosynthesis and store large amounts of carbon in living woody tissue. GHG emissions from large, destructive fires like the Rim Fire can rival the annual emissions from large cities. The Rim Fire released millions of tons of smoke over hundreds of miles ([Air Quality Update-August 8, 2103](#), [NOAA News Clip-Smoke](#)) and over 11 million metric tons of GHG emissions, roughly the equivalent of the annual GHG emissions from 2.3 million motor vehicles ([Sierra Nevada Conservancy - Rim Fire Fact Sheet](#)). Dead and dying trees, like those remaining after the fire, can release as much as 4-5 times more GHG emissions than the event itself. These releases occur for many years as the trees decompose ([National Park Service Impacts of Fire Report](#) – pg. 20, 21). Carbon storage will continue to be degraded due to vast treeless landscapes, which impugn both air quality and critical carbon storage ([Quantitative Evidence for the Increasing Forest Fire Severity](#) – pg 13/Report pg 29, highlighted).

### **Comprehensive Risk Approach for Program Development**

The development of the Community and Watershed Resilience Program relies on a comprehensive risk approach informed by historical data and future risk. The risks considered include the risks of wildfire and other disturbances under historic and future conditions. In



developing our program for watershed and community resilience, we will consider these risks systematically.

***Historical Risk Data*** In California forests in the Sierra Nevada, southern Cascade Range, and montane Modoc Plateau, fire is an inherent process that regulates forest size and shapes forest stands (Collins and Skinner 2013). Research by the USFS and the Center for Wildland and Water Resources shows that most fires were low to moderate severity over at least the last several centuries. Historically, these frequent, low-intensity fires maintained relatively open, patchy stands composed primarily of large, fire-resistant trees across much of the landscape. However, past timber harvesting practices and livestock grazing, coupled with over a century of fire suppression have shifted forest structure and composition to the ponderosa pine, Jeffrey pine, and mixed-conifer types currently populating the Sierra Nevada. This shift results in increased density of trees (i.e., trees per acre), smaller average tree diameters, higher proportions of shade-tolerant tree species, elevated surface fuel loads relative to historic conditions, and reduction in heterogeneity across landscapes.

Alongside these changes, the proportion of high-severity fire increased in mixed-conifer forests in the Sierra Nevada from 1984 to 2010 (Collins et al 2011; van Wagtenonk and Fites-Kaufman 2006; and Perry and others 2011). Fire sizes and annual burn area also increased during the same period. These trends are linked to stand- and landscape-scale changes in forest structure and a warming climate. Westerling (2014) shows that the combined long-term impact of human activities increases the risks of large wildfires in many places in ways that cannot be easily reversed.

The State's historic drought conditions have also contributed to unprecedented tree mortality. In April 2015, the USDA and USFS conducted a [Forest Health Protection Survey](#)



of over 4 million acres in the Southern Sierra Nevada, including part of the Stanislaus National Forest showed over 10 million dead trees. This survey was completed before the dry summer. A US Forest Service [survey](#) estimated over 12.5 million dead trees on National Forests alone. These trees present hazards during winter storms and also provide dry fuel that will further exacerbate the threat of large wildfire in the Central Coast and Southern Sierra Nevada Ranges and found that there were approximately 10.5 million dead trees within the 4.1 million acre survey area.

***Future Risk Data:*** The state's series of climate change assessments (described in Phase 1, Exhibit C) have characterized many of the future risks to the MID-URN area and the state, as a whole as a result of a changing climate, among other factors. Future risks include: [increasing temperatures](#); shifts in vegetation and ecosystem composition; increase in the frequency and severity of extreme events, including heat waves, extreme storms, and [wildfire](#); and reductions in snowpack in higher elevations. These assessments also look at the [combined influence of land use, demographics, and climate change on wildfire in California](#). This analysis shows that land use decisions can have a large impact on future wildfire risk.

Drought and climate change are expected to lead to increased fire intensity and areas. Drought has a direct effect on water availability, while fires can have an indirect effect. Reservoir capacity can be jeopardized by repeated sediment flushes associated with fires, into the reservoir. This in turn will diminish water storage and downstream available water for human and agricultural consumption.

***Data to Understand Historical and Future Risk:*** Data and information in this proposal came from peer reviewed research, professional studies, personal communication, agency and academic reports and tools. These data include detailed records of forest growth patterns in



different forest types under different management regimes state-wide and California fire characteristics available from the USFS, CAL FIRE and universities; and the best available data sets on State water resources from the Department of Water Resources. We used tools identified in Exhibit C such as the Climate Change Indicators, Climate Assessments and Cal-Adapt.

The [Rim Fire Environmental Impact Statement](#) provided a wealth of data including ongoing monitoring projects associated with the 2013 Rim Fire. Yosemite National Park is investigating water quality effects of the fire through [long-term monitoring stations](#). We used data from the local area surrounding the Rim Fire or from similar ecological and economic conditions elsewhere in the Sierra Nevada. Seventy Forest Inventory and Analysis Project (FIA) permanent plots were re-measured after the Rim Fire, providing high quality before and after data at the individual tree level.<sup>1</sup> The Sierra Nevada Conservancy is collecting data and information to quantify interventions needed to improve health on other forests in the Sierra Nevada.

In addition to using peer-reviewed data, we communicated with community leaders, stakeholders, the general public, public agencies, and researchers to further understand the threats, hazards, and vulnerabilities associated with the Rim Fire.

By virtue of pertaining to the conditions of the Rim Fire area, these data are considered the most authoritative data available, and the best data for this geographic area. We expect the Program we develop from this data to be applicable to similar communities over a broad area of California and the western montane states.

### **Post-Disaster Threats, Hazards, and Vulnerabilities**

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<sup>1</sup> Fried, Jeremy. 2015. Personal communication. USFS, Inventory and Analysis Unit. Pacific Northwest Research Station, Portland, Oregon.



As stated at the start of this section, the cumulative effects of this complex of problems can be long-lasting and severe; cascading effects persist long after the fire ends, affecting large areas and the local communities within them. This application focuses on a number of post-disaster threats, hazards, and vulnerabilities, including: future wildfire, erosion, sedimentation, invasive species, carbon storage, climate change, economic disruption, and air and water quality. The risks associated with these threats and hazards are exacerbated by several underlying vulnerabilities, including the local economy, unemployment, infrastructure inadequacy, and disadvantaged populations. Data to understand these risks are the same as those outlined above.

***Known Unknowns:*** Known unknowns include the magnitude and direction of climate changes and its effect on wildfire patterns (Hurteau and others 2013), the extent and severity of future drought, and the carbon storage capacity of future forests. The spatial variability of climate change is difficult to predict, as the direction and magnitude of changes in temperatures and climate are likely to vary in different locations in ways that are not well modeled or understood.

***Who and What are Affected?*** The impacts of wildfire are as diverse as they are severe, affecting not only the communities and the natural and built environment in the immediate vicinity, but further the “downstream” watershed communities and cities, who are also end-users of this water supply. The [Tuolumne watershed is extensive](#), directly serving downstream communities in the San Francisco Bay Area and the Central Valley., in addition to the rural communities within it. The Tuolumne watershed supplies the needs of 2.4 million people in the Bay Area and 550,000 people within the watershed, irrigates more than 300,000 acres of prime agricultural land, and powers two hydropower systems. ([Mount 2010](#)) Given that California is





currently in a prolonged severe drought, [with 5,433 residents without water in the Central Valley](#), the potential for catastrophe across the Tuolumne watershed is increasingly heightened.

These threats, hazards, and vulnerabilities are common in communities and watershed across the Sierra Nevada region. Future risks from the threats, hazards, or vulnerabilities include the cumulative effects of repeated large, high intensity wildfires on local rural economies. Over time and large areas, impacts can include the elimination of resource based companies such as sawmills and contractors. Capacity for resilience and adaptation is strongly influenced by the size and diversity of a community's economic base.

***Magnitude and Likelihood of Risks*** Wildfire, drought, water quality and quantity impairment, carbon storage and climate change, and air quality are all real risks that can prove devastating to rural communities.

***Addressing Threats and Hazards to Meet Unmet Recovery Needs*** Proactive investments in reducing fuel loads in the forest will reduce future fire suppression costs. These savings can then be made available to protect resources with cultural and natural conservation values, to restore forests to a natural fire cycle, and for further tree removal and fuel load reduction. The proposed Program can reduce fire risk by helping low- and moderate-income homeowners and small businesses by removing vegetation to create and maintain 100-foot fire buffers around structures. Wood products from these thinning activities can provide an ongoing source of raw materials for sustainable forest product businesses such as biomass energy. These businesses can drive economic recovery and stability and support local employment in rural areas.

***Disproportionate Impacts*** As mentioned at the start of this Exhibit, wildfire poses significant public health risks, especially to the elderly, children, and the infirm. The economic impacts disproportionately affect workers in tourism, recreation, and service industries, as well as the



timber and wood products industries. The burn area also included tribal lands, historic, sites, and other areas of cultural significance.

***Importance of Addressing This Risk to the State, Region, and Local Community*** By

addressing recovery and resilience, forests and water, economy and health simultaneously, we can implement a Program model that has utility to forested watersheds in the State and the West. The Program has the potential to magnify impacts well beyond the burn area.

***Existing Conditions that Exacerbate Risk and Vulnerability*** California is in the fourth year of a prolonged drought. The drought continues to have a negative impact on sectors such as such as agriculture, forestry and tourism, typically important parts of local economies. The lack of diversity and concentration of resource-dependent industries make local rural communities highly susceptible to the negative impacts of natural disasters such as the Rim Fire.

***Ongoing Work to Address Risks and Barriers to Solution*** Tuolumne County has a number of organizations in place that are working to boost the resilience of the region to wildfires and the resulting infrastructure and economic damage. This includes two FireSafe Councils, which work with homeowners and businesses to develop resilience strategies. The [Southwest Interface Team](#) (SWIFT) is a bi-county collaboration that has worked to develop and maintain a set of strategic firebreaks to protect communities, timber resources, and other vital assets in the region. These efforts provide strong starting points for this work and need to be complimented by investments in additional forest management activities and infrastructure investment to build the region's resilience.

The Stanislaus National Forest has embarked on a significant program of timber salvage, reforestation and rehabilitation after the Rim Fire. Burned material has been removed, to the extent allowed by existing budgets – though more is needed. In these cleared areas, work is



underway to prepare and replant. In the Rim Fire recovery effort, new methodologies for the restoration of the green forest infrastructure are underway, which include a departure from traditional methods. A better diversity of seedlings are being strategically planted with new spacing patterns to promote soil retention and thus water quality, which also will reduce understory growth – a strategy that will promote long-term resilience in both the natural and built environment. Further, CAL FIRE continues to implement fuels reduction projects in cooperation with private landowners to reduce fire impacts.

Rehabilitation and prevention of wildfires are usually limited by budgets, the availability of a trained work force, and adequate infrastructure such as sawmills and bioenergy plants. Our program is capitalizing on ongoing work and building new partnerships to overcome these barriers.

## **II. RESILIENCE NEEDS WITHIN RECOVERY NEEDS**

### **i. Quantify impacts of disaster (actual and w/proposed project)**

The impacts of the Rim Fire, given its vast scale and reach, are difficult to establish in precise monetary terms. However, the analysis performed by Earth Economics in the 2013 Rim Fire Report indicated that the top end of environmental benefit losses approached \$736 million. Further, the direct emergency response to the Rim Fire was \$127 million. FEMA PA funds totaled over \$23 million, largely reimbursements for emergency response and debris clean-up. The total of known costs or lost benefits thus approaches \$1 billion. There are uncertainties associated with establishing firm costs with respect to impacts on community health and economic activity, as this has not been studied or evaluated to date. Given the massive scale of the Rim Fire (over 250,000 acres burned) over a two month period), there is no doubt that the environmental impacts had negative health impacts. The region's economy is heavily linked to



tourism and recreation, including rafting and kayaking, hiking, and mountain biking. The damage from the fire has hindered much of this activity. During the Rim Fire, evacuees did not have a readily available and well-equipped community location to which they could retreat. And, there was no location for those evacuating where they could take pets or domestic livestock. While there were no fatalities associated with the Rim Fire, recent examples in the Valley and Butte Fires have demonstrated the tragic cost of lost human life when residents do not evacuate.

The three pillars of the Community and Watershed Resilience Program would have lessened the impacts of the fire by creating a market for biomass removed from the forest, reducing the fuel load that contributed the fire's severity and providing residents with safe, accessible evacuation sites. While the Program does not represent an overnight solution, the components combine to yield a robust resilience strategy to enhance community safety and forest and watershed health. Had the fire breaks and biomass removal strategies been implemented, the fire would not have grown at such an exponential rate. With sustained periodic thinning throughout, there would have been less fuel for the fire to grow and expand so rapidly. The biomass removal and thinning activities would have fed into the biomass facility on a regular cyclical basis, thus avoiding the tremendous amounts of pollution associated with a mega wildfire. Instead, the biomass would have been turned into energy and useable wood products, yielding a degree of energy independence and revenue generation, and creating lasting numerous long-term jobs in the process. The Community Resilience Centers would have provided a logical fall-back point for members of the community and their pets and livestock, concentrating them in safe places, and allowing first responders to navigate and fight the fire with fewer constraints.

## **ii. Estimate general amount of needed investment in resilience**



The costs associated proposed Program represent the core needs for implementing this pilot project, which totals approximately \$117 million. Through the community engagement process, numerous other resilience needs were identified throughout the County, but due to the parameters of the NDRC were unfortunately unable to be included. Some of these items include installation of fire hydrants, stormwater management infrastructure, communications equipment for first responders, roads to access the forests, community development programming, rebuilding or repairing tourism amenities such as campsites and boat launches, a day care center, a firetruck, replacing water transmission lines, water source development, and more. The total funds that would be needed to address these additional resilience needs would be approximately \$150 million, and the needs of CAL FIRE and the USFS would amount to an estimated additional \$250 million.

### **iii. Describe vulnerable populations and quantify disaster impacts**

LMI and vulnerable populations in Tuolumne County were disproportionately impacted by the Rim Fire. Following the demise of the lumber industry in Tuolumne County, much of the remaining work in the region is seasonal, associated largely with tourism. The LMI population in the County was thus impacted by severe reductions in gainful employment opportunities, given that tourism levels declined immediately following the Rim Fire. There is a significant elderly population in Tuolumne County, as many Californians have chosen to retire to the area due to its rural character and the lower cost of living. The Rim Fire has presented complications for this population as well, as County resources have been dedicated to disaster recovery and there are less funds available for senior services. In addition, while no studies have been done on health impacts among the elderly, it is logical to conclude that the effects of the Rim Fire have likely presented additional respiratory impairments.



#### **iv. Describe factors that enhance or inhibit resilience**

Since the launch of the NDRC, which has included two major wildfire events in the State of California and ongoing severe drought, there has been an increase in inter-agency collaboration at the State level. Governor Brown issued Executive Order B-30-15, which laid out comprehensive steps for addressing climate adaptation and resilience in all state planning and investment. Furthermore, many elements of the Executive Order were codified into law through a series of bills signed in September 2015, seen below in the Exhibit G Factor 5 - Long Term Commitments. One new law creates the Integrated Climate Adaptation and Resilience Program within OPR, which will support local and regional resilience efforts and help to align and coordinate these efforts with State agencies.

The Office of Emergency Services, Governor's Office of Planning and Research, CalEPA, FEMA and other agencies have made a concentrated effort to take proactive steps to learn from past, current and impending disaster and weather events. This includes increased coordination in addressing the Butte and Valley fires, and current discussions around potential flooding from forecasted El Nino storm events. State Water Boards, California Department of Fish and Wildlife and other agencies are expanding traditional recovery efforts to incorporate wildlife habitat corridors and restoration, and the creation of multiple landscape uses.

### **III. APPROPRIATE APPROACHES**

#### **i. General Description of Optimal, Eligible Program Type(s)**

Tuolumne County is rural, spanning 2274 square miles, 1,455,360 acres, with a population base that is distributed in remote and sometimes isolated areas of the county. The optimal, eligible program type which best addresses the resilience needs is one that not only accounts for



the needs of the community, but that establishes a mechanism for the community to work in concert with the natural environment. The State of California's pilot Community and Watershed Resilience Program establishes these mechanisms through its three-pronged approach, which involves Forest and Watershed Health work, identifies a plan to safely and cleanly deal with biomass removal and thinning through the biomass facility, and incorporates community resilience and social cohesion through the multi-dimensional Community Resilience Centers.

## **ii. General Description of Optimal, Ineligible Program Type(s)**

An optimal, ineligible program type would include satisfying the full menu of community, ecosystem, and regional resilience needs discussed previously, which include a long list of very valid needs which unfortunately do not fall under the parameters of the NDRC. Some of these program elements would include the purchase of privately held utilities such as the wooden flumes that carry community water supply, but serve to power the hydroelectric facilities of PG&E. Other needed items that are unfortunately ineligible are community programming for business incubators, and remote health clinics to serve vulnerable populations.

# **EXHIBIT E: FACTOR 3 - SOUNDNESS OF APPROACH**

## **I. PROJECT APPROACH**

### **i. Describe Project(s) (and alternatives)**

As outlined in Exhibits B, C, and D, the Rim Fire is one event in a long history of wildfires in the Sierra Nevada. The, which has intensified under current drought conditions. Since the 2013 Rim Fire, nearly 400,000 acres have burned and hundreds of homes/structures destroyed in large wildfires throughout the State. The NDRC allows the State the opportunity to pilot a model program to link community and watershed resilience that will deliver multiple benefits.



With successful deployment in Tuolumne County, the Program can be adaptively managed and replicated in other watersheds, the backbone of the State's water system..

This program takes on increasing urgency given climate change, which has intensified under current drought conditions. Evidence suggests that climate change will result in more frequent and severe wildfires under a range of plausible future climate situations (Westerling and others 2014). Boosting economic and ecological resilience in the fire area and surrounding communities requires reversing these trends and developing opportunities to increase the strength and resilience of the local communities and economies.

The Community and Watershed Resilience Program (CWRP) is built around three main activity areas that reflect the interdependence of community and watershed resilience and are replicable throughout the State's upper watershed communities. These pillars and their relationships are:

1. Forest and Watershed Health: Support healthy, resilient forests through restoration, reforestation, strategic thinning, and other science-based investments to ensure ecosystem health. Employ local workers and use biomass to support local energy and wood products industry.
2. Biomass and Wood Products Facility: Develop an appropriately-sized and -located facility to utilize biomass removed through forest restoration and thinning. This material will be used to produce wood products (e.g., fence posts, wood shavings) and the residue will be utilized to produce electricity, heating, and cooling to local community. It will also provide local educational, job training, and economic development opportunities.





3. Community Resilience Centers: Develop centers that will serve the needs of rural communities during emergencies, including animal boarding, Wi-Fi and other communication services, and regional mutual aid. Further develop resilience by using these facilities to support year-round educational programs, resilience training, social services including a food bank, and housing training space to support workforce development for forest and watershed health activities, bioenergy, and wood products.

These pillars support the framework that The State of California, Tuolumne County and other federal, state and local partners developed during Phase I framework. This development was based on science-based best practices and community input, to address rural community resiliency and forest and watershed health.

The following describes the project activities within each pillar that were selected for Phase II of the State of California's NDRC application. These projects were carefully selected due to the immediate tie back to challenges faced in the qualifying disaster, with the specific goal to create a replicable framework for Forest and Watershed Health to more quickly adapt to future disasters, while also implementing activities that directly address unmet recovery needs within the disaster impacted area.

### **Activity 1: Forest and Watershed Health**

Forest and watershed health projects are one of the three main pillars of the Community and Watershed Resilience Program. The forest and watershed health projects encompass three main components:

- Removal of dead trees (fuel) for fuel reduction and to support development of a biomass energy and wood products campus,



- Forest restoration and reforestation (planting resilient and diverse forests),
- Developing and reconstructing strategically placed fuelbreaks to provide forest and community protection

Complimentary measures include treatment of noxious weeds, soil erosion control, watercourse restoration, road stabilization, range infrastructure improvements, and meadow and riparian restoration. These activities will occur throughout the entire 254,000-acre Rim Fire burn area. The intent is that this forest management program will become a model for forest management elsewhere, replicable throughout the west.

The benefits of biomass removal and salvage logging can be achieved without degrading the productive capacity of soils or ecosystem health. Best management practices will be implemented to mitigate sedimentation and soil erosion. These are standard operating procedures on federal lands and important project design criteria. These projects can also improve road conditions and help keep stream crossings functional. Forest projects like these provide a continual renewable base for strong and diverse rural economies in the form of direct and indirect jobs, wood products for secondary manufacture, and tax payments.

Prior to reforestation and restoration, burned trees must be removed from the landscape, otherwise the resulting landscape will burn more intensely in the future and cause far more long lasting damage to the soils and habitat. Because of the extremely high amount of conifer mortality within the Rim Fire boundary, natural regeneration is sporadic and limited, leaving thousands of acres of brush fields. The lack of conifer seed source across this landscape means it could take centuries for conifers and forested conditions to return here.

The goal of a biodiverse, healthy landscape includes stable soil, resilient vegetation and a mixed conifer forest. Reforestation will utilize a mix of tree species, prioritizing stocking



densities by slope position and aspect and utilizing buffers adjacent to sprouting deciduous trees across this landscape. Large buffers on meadows will promote those unique habitat types and critical hydrologic features. The re-introduction of fire into these stands by year 10 will also help the diversity of spacing and potential impacts of wildfire. Climate change modeling was done specifically for the Rim Fire landscape and that information was utilized to determine where, how dense, and what species to plant.

In order to maintain forest ecosystem health and resilience, it is critically important to keep soil on the hill slopes and out of streams. Soil can take thousands of years to form, and the loss of several inches of top soil in a single wildfire can have devastating impacts on vegetation and the beneficial uses of water, including fisheries and reservoirs that supply drinking water. Watercourses throughout the fire area will be restored to match their natural drainage patterns and provide accommodation for future extreme events predicted in the plan area. Riparian areas impacted by intense wildfire will be rehabilitated and hydrologic function will be restored.

Once plantations are established, fuel management and associated fuel breaks become an even more critical component in protecting these areas from future large fires. Forest projects can complement natural forces to moderate natural events such as wildfire, drought and wind storms. This project is designed to do just that, by re-introducing prescribed fire into this landscape within the next few years and removing biomass to ensure that future fires burn with far less intensity and that future forests survive to maturity.

CAL FIRE and USFS have identified seven important fuel breaks that will enhance the ecosystem, provide protection to communities, and ensure the long-term sustainability of restoration work. Fuel breaks can help maintain carbon storage and reduce greenhouse gas emissions by lowering wildfire intensity and size. Fuel breaks also protect housing tracts and



neighborhoods in areas where fires occur often - such as the Rim Fire - and they provide safe locations for fire fighters to attack wildfires and/or prescribe burn from.

Immediately following the Rim Fire, work was completed under the Burn Area Emergency Rehabilitation (BAER) program. The BAER work focused on erosion control and road stabilization, and was intended to address short-term fire impacts. The Community and Watershed Resilience Program builds on this work to focus on long-term goals for recovery and resilience. In high fire activity years, forest stewardship and restoration budgets on federal lands can be severely depleted in order to meet fire suppression needs. Limited forest budgets result in only a part of the fire area being restored, delaying establishment of conifers. The delay in forest establishment and growth greatly threatens the amount of carbon sequestration that can occur across this landscape. An important part of the Community and Watershed Resilience Program is to provide supplemental funds to enable full reforestation and watershed restoration across the entire fire impacted area. Establishing forests across this landscape is a critical need for human (future jobs, landscape stability, and recreation opportunities) as well as wildlife habitat renewal.

## **Activity 2: Biomass and Wood Products Facility**

The plan to deploy a wood products and bioenergy campus will be accomplished in two phases. In phase one, the state and county, led by the California Environmental Protection (CalEPA) will work with the USDA forest service, CALFIRE, other state agencies with a local presence, tribes, and private landowners to identify land parcels of 10 acres or more for consideration for a multi-purpose wood products and energy facility. Parcels will first be evaluated using geospatial tools for proximity to feedstocks, electricity transmission infrastructure, additional acreage for expansion and community resilience centers, and load base



to make use of the feedstocks. Those parcels will then be further evaluated by experienced wood products and biomass energy developers to expand facility feasibility analysis. TSS consultants, a partner in the NDRC, has worked with wood product and biomass electricity developers throughout California to design and engineer facilities and complete detailed environmental and cultural site reviews for permitting. TSS will facilitate discussions with experienced developers to ensure the financial feasibility and longevity of the use of potential sites.

[SB 1122 \(Rubio\)](#), a law passed in California in 2012, provides a competitive price, or feed in tariff, to be paid by utilities for biomass based electricity facilities up to 3 megawatts in size. Feasibility analyses will begin with the assumption that the 3 MW target is sufficient for NDRC. However, an analysis of feedstock availability could suggest that multiple 3 MW facilities could emerge to help the state achieve a small scale distributed biomass energy industry in forested communities and counties throughout California. Thus, two or more facilities may be feasible within the affected area.

Phase one will also include a feasibility analysis of marketable wood products in Tuolumne County based on the forecasted feedstock supply. The range of potential products includes biochar (soil amendment), fence posts, animal bedding, landscape mulch, particle board, lumber and liquid fuels. Financial analysis templates, currently under development through a public – private partnership, will be used to determine capital costs needs, break-even points and help identify cost savings measures and efficiencies. Because the costs and resource needs to produce each of these products vary considerably, a feasibility analysis will include the market and non-market costs and benefits to select one or more of these products for development.



Upon completion of the feasibility analyses for sites, wood products and energy potential, a range of suitable sites will be selected for formal state and federal environmental and cultural review and development of 30 percent engineering and design plans. The design will include the wood products facility and the adjacent heating, cooling, and electric facility to serve both the wood products facility and adjacent centers, public facilities or homes. Throughout phase one, the state, the county and partners will work with the local community to receive input on design and site selection and build capacity around economic development in the area. The formal environmental and cultural review will initiate a federal and state schedule to permit available sites along with associated formal comment periods.

The conclusion of phase one will include completion of the state and federal environmental and cultural review, final site selection based on the review, project design, financial analysis and site control to allow development.

Phase two will begin with a request for proposals to develop the site according to the accepted project design. Successful applicants will demonstrate financial and technical capacity to build and operate the proposed facility. In support of local self-reliance, the community may choose to be a substantial project partner as owners and operators of the facilities.

The wood products and energy campus is a critical component of the Community and Watershed Resilience Program. Inclusion of this component spurs job creation, diversifies economic development, community engagement, and forest health. Potentially the most critical benefit of such a facility is the support of energy security and independence in a rural community. By cultivating development of local energy generation, the state can support local communities' ability to thrive in the face of natural disasters and climate disruption. With a



localized energy economy, rural communities can better control costs and manage infrastructure to mitigate vulnerabilities to climate change and extreme events.

### **Activity 3: Community Resilience Centers**

The State of California and its NDRC partners have identified a need to increase social resilience and create two physical spaces within Tuolumne County that will serve multiple purposes – both during an emergency and year-round. These facilities will be used as evacuation centers during fires or other emergencies (e.g., cooling centers during extreme heat events). They will also provide space for job training, educational programs from Head Start up to the Community College level, community education on forest health and fire science, commercial kitchens for economic development, and other social services. In a rural community, limited access to services and employment opportunities, increases the potential for disasters to impact the economy and disrupt people's daily lives. The two Community Resilience Centers will serve as a year round asset for residents of Tuolumne County and expand the County's current role as a service center in the greater Sierra Nevada region. The facilities will be ADA accessible and be designed to demonstrate the latest opportunities for energy and water efficiency. One facility will be located in Groveland and the other in Tuolumne City.

Groveland is located along the Highway 108 Corridor, which provides the only access in or out of the area. Groveland is one of the gateway communities for Yosemite National Park. The Groveland CRC will provide housing for the California Conservation Corps (CCC), a State program that which employs low-income individuals and at-risk youth to undertake conservation work, including ecosystem restoration. The CCC has provided staff for the Rim Fire Recovery, including crews from Auburn, Fresno, Redding and Stockton. The CCC will



utilize the Groveland CRC as a staging area for forest and watershed health work proposed under Activity 1, as well as run as well as to run its Backcountry Trail Program, Veterans Fire Corps, Fire Suppression, and Fire Camp Support out of the Facility. The Backcountry trail program has been the hallmark of the CCC, building and maintaining trails throughout the Sierra Nevada; Veterans Fire Corps trains veterans on fire hazard reduction and provides job placement with the USFS and the Bureau of Land Management; Fire Suppression and Fire Camp Support train crews to respond to wildfires, and provide support for other agencies in fire suppression. The facility will contain 16 dorm rooms, 4 beds to a room, housing 40 service members and up to 5 CCC staff, operating 8 months out of the year. Additionally, this facility's commercial kitchen will serve as a base of operations for the South Side Seniors, a community group that provides meals on wheels to the Groveland community.

The second proposed location is Tuolumne City, an unincorporated LMI area within the County, which will serve as a year round Head Start Center. The commercial kitchen within this facility will be operated by Columbia College's Hospitality Management Program, providing catering services to the Head Start Center, and serving as a job-training facility for Tuolumne Residents.

The CRCs will also serve as a regional transportation hubs for both [Tuolumne County Transit](#) and the [Yosemite Area Rapid Transit System \(YARTS\)](#). Currently, LMI and vulnerable populations in Groveland and Tuolumne City experience difficulty accessing services such as health care. There is no hospital or health care clinic in Groveland or in Tuolumne City. The aim of the CRCs is to provide a known and comfortable location for the residents of the region to come to during emergencies, for community events, and for assistance with logistics such as transportation.





## **Alternatives:**

The NDRC team surveyed the community to identify projects that would contribute to resilience in the community and forest. The list of needs is far larger than the projects identified above and included road reconstruction including ingress and egress needs to enhance safety, communication needs, water and stream restoration work, and many others. In all cases, we are in process of identifying or applying for funding to address these needs.

The alternatives to the work above include the following:

***Undertake no resilience work:*** Funds are not available to undertake the landscape scale restoration work proposed or to construct resilience centers. In this case, the forest will remain in its degraded state, which will result in declines in tourism and recreation, reduce water quality due to erosion and sedimentation, and compromised carbon storage. The State and region will also lose the opportunity to pilot a promising model for community and watershed resilience that could have far-reaching benefits.

***Complete no forest and watershed resilience work:*** With no restoration work, the forests will remain in a degraded condition. In addition to the concerns noted above, this will also pose risks to biodiversity and broader ecosystem health. This will also threaten water supply for the local community and millions of downstream users.

***Construct no facility for biomass utilization:*** Without a biomass wood products facility, biomass will be piled and burned in the open. This will result in increased local and regional air pollution.

***Construct no CRCs:*** Without the CRCs, the community and broader region will lack facilities to provide centralized support to community member from Tuolumne County and its neighbors



during an emergency. The community will also lack supportive services and education and training for new economic opportunities.

## **ii. Describe How Project(s) Will Increase Resilience**

***Concept for Resilience:*** The Rim Fire demonstrates the vulnerability of the state's watersheds, resource-based rural economies, and the fragile relationship between the state's people, economy, and its natural resources. This region is also representative of large portions of the western States, so this program will have wide applicability throughout the West.

***Project Ideas for Addressing Unmet Needs:*** This proposal focuses on a multi-pronged program for ecological and economic revitalization, in which the concept of socioecological resilience is central. We defined two elements that are essential for socioecological resilience: promoting social and economic well-being and adaptation, and promoting more natural ecological disturbance regimes. Our program also addresses two key ideas in the 2012 Forest Planning Rule (USDA Forest Service 2012), namely pursuing "opportunities for landscape scale restoration," and emphasizing "wildland fire and opportunities to restore fire-adapted ecosystems." Working forests are increasingly recognized as a beneficial approach to achieving economic prosperity in rural, resource-dependent communities, increasing resilience in the face of future fires and providing forest carbon storage to help mitigate climate change. We are exploring the following elements as part of our approach:

- **Reforestation in the burn area:** The US Forest Service is clearing burned timber and reforesting parts of the burn area. Due to budget and staff limitations, the US Forest Service was unable to access and remove a significant portion of the timber that could have been used for wood products. We aim to leverage private businesses to facilitate more prompt and complete reforestation and salvage of burned trees.



- Thinning for health and fuel reduction, and strategic firebreaks: Additional investments are needed to transition restoration of the burn area alone into activities that will boost resilience in the broader forested area and reduce the risk of future wildfire to the recovery area.
- Strategic firebreaks: will provide protection to communities, businesses, and increase future fire resistance of forests that are vital for the local timber and wood products industry.
- Development of partnerships to manage and utilize biomass: Manage forest biomass to reduce fire risk, develop strategic firebreaks, and enhance watershed health. Develop economic models for using this biomass for bioenergy development within the wood products industry.
- Job training: Work with the forest industry and the California Conservation Corps to develop job training programs in order to develop a deep pool of skilled workers to support forest management activities, including marking trees, thinning, timber harvest, permitting, and biomass utilization. Such a work force will be needed to achieve successful reforestation, tree salvage and erosion control efforts after future wildfires and to manage forests to proactively prevent destructive wildfire.
- Investment in infrastructure to protect communities from wildfire: Ensure that water, communications, and transportation systems are resilient in the face of wildfire and are adequate to support evacuation, access, and fire-fighting activities during a fire.
- Regional coordination and partnerships: Coordinate with other Sierra Nevada communities (and beyond) to share practices and models for managing forest biomass.
- Education: Work with schools and other agencies to inform the public about steps needed to reduce wildfire risk (e.g., defensible space), the natural role of wildfire, and the role of the watershed in protecting the state's water supply and quality.



***Resilience Work Underway*** As discussed in Exhibit D, significant resilience work is underway in Tuolumne County. It is being led by at the local, state, and federal groups. The actions undertaken with this grant will augment existing activities and focus on building partnerships to leverage existing investments and overcome barriers to building resilience.

***Co-Benefits and Integrated Thinking:*** The Community and Watershed Resilience Program is designed around the relationship between forests and communities. The Program is intended to achieve multiple benefits that emanate from the local community and spread down through the watershed to the entire state. The Program is designed around a central goal of reducing risks from wildfires, but to do so in a manner that supports diverse ecosystem benefits, rural economic development, and long-term resilience and sustainability.

### **iii. Describe Benefits to Section 3 Persons and Vulnerable Populations**

All projects will include language on the training, employment and contracting opportunities for Section 3 compliance. This will include required notifications to Section 3 residents about training and employment opportunities generated through NDRC activities. These Section 3 requirement will be consistent with the Section 3 policies currently in place through the California Department of Housing and Community Development. Hiring for activities described in this application will include a Section 3 outreach plan, and coordination with the Mother Lode Workforce Investment Board and Me Wuk Tribal Council.

The USFS and CCC will advertise postings for employment generated by activities outlined in this application, creating a plan to advertise employment opportunities to Section 3 residents within Tuolumne County. The Forest Service recruits prospective full-time, part-time, and seasonal employees through several methods including direct contact with local and regional employment agencies and posting opportunities on their websites, outreach at high



school and college career fairs and other local events, youth employment programs such as Summer of Success, Civilian Conservation Corp and Americorps, involvement in local workforce development and Veterans groups, and postings on the USAJobs.gov website.

#### **iv. Describe How Proposal is a Model (Replicable, Scalable, Integrated)**

Our model program is built around several broad objectives, including: reducing the risk of large, severe wildfires; safeguarding water storage and yields, an increasingly urgent priority in drought-stricken Western states; diversifying and supporting local economies; and increasing the storage of carbon to mitigate climate change. This model is to be deployed in the Rim Fire recovery, but is applicable to numerous other similarly positioned regions throughout the west. This proposal includes the development of innovative partnerships that link forest stewardship with productive uses for forest products, including timber, wood products, and bioenergy, alongside investments in community protection, economic development, and education. These components are not unique to Tuolumne County, but rather are applicable on a broad basis, and once proven in Tuolumne will represent a viable model for replication. What is true in Tuolumne County is a recurring theme throughout the Western United States. There is a tight connection and interdependence between the local community and the forest, and as such community and forest ecosystem resilience go hand in hand. This replicable and durable model can be applied not only throughout California's rural forest communities, but also shared with and implemented in other Western states (see Figure 1).

#### ***v. Describe Project Feasibility and Effective Design***

***Feasibility and Long-Term Resilience*** The Program is designed to demonstrate a sustainable approach for maintaining forest and watershed health and community resilience. The goal is to move from a reactive model to one that is proactive and takes an integrated approach to



resilience. The program requires both an initial up-front investment to jump start forest health efforts and to address the many decades of fuel build-up. After that initial investment, the goal is to implement a free-standing community and watershed resilience program for forest health that is economically viable and durable. Natural systems are dynamic, therefore our Program will require long-term monitoring and adaptive management. The funds provided through the National Disaster Resilience Competition will help develop the capacity, partnerships, and a trained local workforce to undertake this maintenance.

## **vi. Describe Consultation and Coordination with Regional Partners**

### **Consultation**

The Rim Fire is an entry point through which we can examine dimensions of resilience that are of concern statewide: wildfire, drought, water quality, water supply, and rural economic development. Therefore, in developing this Phase II proposal, we have consulted with a broad group of stakeholders in Tuolumne County, the surrounding region, and the rest of the state. In an effort to use the model developed in this proposal as a case study for Western States, we have also reached out to multi-state organizations including the Pacific Coast Collaborative (PCC), Alliance of Regional Collaborative for Climate Adaptation (ARCCA), and the Western Governors Association (WGA).

***Outreach, Stakeholders, and Collaboration*** As described in Exhibit C and outlined in Appendix I, we have had broad-ranging consultation in developing our approach. These conversations have included stakeholders from many parts of the community and broader region, including local government, education, environmental organizations, fire prevention and safety groups, economic development organizations, community organizations, the agriculture,



forestry, and wood products industries, local and downstream water utilities, and concerned citizens. We have also engaged with consultants, private business, and researchers.

***Engagement and Collaboration Moving Ahead California*** and Tuolumne County will continue an interactive and collaborative dialog with the community moving ahead. A 10-member steering committee will advise the State on results-based outcomes, outreach, engagement, systems strategies, resilience planning, and implementation of the grant activities.

Leadership partners include the County of Tuolumne, US Forest Service, Sierra Business Council, Local Government Commission, Yosemite-Stanislaus Solutions Partnership, the Amador Tuolumne County Action Agency, LoCAL FIRESafe Councils, and PolicyLink. Though this process, we will work iteratively to identify and co-create, with the community, discrete work streams for more focused engagement. Four focus areas under initial consideration are: Outreach and Engagement; Social Equity, Workforce Development, and Economic Opportunity; Natural Systems and Resources; and Built Environment and Infrastructure.

The project will use professional facilitation coupled with a data-sharing platform to facilitate broad engagement, transparency, and accessibility to the process. This will include the use of Data Basin throughout Phase 2 proposal development, project design, selection, and implementation. Developed by the Conservation Biology Institute, [Data Basin](#) is an innovative web-based spatial visualization and analysis platform for conservation planning and decision making. Data Basin was designed to improve data accessibility and integration supported by a platform that is extremely easy to use and one that supports user collaboration at many levels. California recently used Data Basin for a [complex, multi-objective, stakeholder process](#) and has prioritized building this capacity into all place-based planning processes.



***Results of Collaboration and Engagement*** The residents and businesses in Tuolumne County and other forest communities have an intimate understanding of the interdependence between the forest, the watershed, the local economy, and the broader state. Our conversations with stakeholders and partners have been a tremendous asset to the development of this proposal. In particular, these engagements have provided the following:

- A better understanding of the range of economic and infrastructure damage of the Rim Fire,
- Infrastructure deficits, including inadequate water, communications, and transportation systems that place communities at risk,
- Ideas for new projects, partnerships, and collaborations that will sustainably support the local economy, forest and watershed health, and ecosystem resilience, and
- An understanding of collaborative efforts and work already underway in Tuolumne County and the surrounding region, which creates a strong foundation for the work being developed through this proposal.

#### **vii. Maps, Drawings, Renderings**

Maps, drawings, renderings, and other graphical representations of the overall project or target area are optional, but encouraged. See the submission instructions the Application and Submission Requirements section of the NOFA. A full review of Tuolumne County, the identified target areas, proposed project locations, and graphics depicting the Program can be found here (Dropbox link).

## **II. BENEFIT-COST ANALYSIS**

The complete detail of the methodology and narrative associated with the working benefit cost analysis for each of the three pillars and including the aggregated total can be found





in Attachment F. A brief snapshot of the activities and their corresponding core resilience values is presented there, along with calculations in development for resilience, environmental, social and economic values.

The total benefits of each of the three activity areas and their associated life cycle costs are presented in the table below, alongside the benefit cost ratio (BCR) for each activity. The combined total benefits, life cycle costs, and aggregated BCR is presented in the final row of the table. The ideal range for evaluating cost efficiency is a value between one and three. The overall project benefit cost ratio of the Community and Watershed Resilience Program is 1.10.

#### **Working BCA Table**

<b>2015 Dollars</b>	<b>Forest &amp; Watershed Health</b>	<b>Biomass &amp; Wood Products</b>	<b>Community Resilience Center</b>	<b>TOTAL</b>
<b>Lifecycle Cost (Total)</b>	\$54,798,876	\$79,900,000	\$29,000,000	\$163,698,876
<b>Lifecycle Costs (Present Value)</b>	\$42,924,258	\$37,736,016	\$26,216,263	\$106,876,537
<b>Project Benefits (Present Value)</b>	\$44,567,179	\$62,409,791	\$10,240,224	\$117,217,195
<b>Benefit Cost Ratio</b>	1.04	1.65	0.39	<b>1.10</b>
<b>Net Present Value</b>	\$1,642,922	\$24,673,775	(\$15,976,039)	\$10,340,658

### **III. SCALING/SCOPING**

#### **i. Narrative Description of Priorities**

The Community and Watershed Resilience Program is an interrelated set of activities, and is a dynamic and adaptive model which ultimately relies upon each component for successful implementation and institution of community and environmental resilience. While all of the activities are of equal priority, the shovel readiness factor associated with each prioritizes



its implementation schedule. , and two of the components are phased. The project will initialized with the activity most time-sensitive and also most ready for work – in the forest and watershed. The CRCs and the biomass facility and wood products campus are designed to be phased. The CRCs will undergo further community engagement to involve citizen participation in the final design. The full scale and scope will be refined to meet the needs of these rural communities, which may include portions of the initial construction design.

## **ii. Identify opportunities for Scaling Proposed Project(s)**

As mentioned previously, this pilot Program is scalable within itself at the community level, within the county, and within neighboring counties. The forest and watershed health work feeds into the biomass facility, which once fully functional can produce additional revenue streams and generate sufficient electricity to be sold back to the utility companies via SB1122. This model can be scaled up at the existing facility, to add additional 3 MW components, with a maximum of approximately four segments. The conditions are ripe to prove this model as a viable system, and once proven, it will represent and attractive investment opportunity for private capital markets. The reach of this model extends across not only vast portions of California, but the expanses of the wooded Western United States.

## **IV. PROGRAM SCHEDULE**

### **i. Detailed Schedule for Completion of Proposed Activities**

Upon award, the three pillars of the Program will all be ready to engage on different levels. The Forest and Watershed Health portfolio of activities is immediately ready for roll-out, as the longer this work waits the more perilous will be the consequences. Following award, the Biomass and Wood products Campus will initiate Phase one, which involves site selection,



permitting, engineering and design, which would require approximately 12-16 months. Phase two of build-out would require an estimated 12-14 months as well. While an initial scope and design exists for the Community Resilience Centers, the County would undertake an initial six month phase one period to continue outreach and engagement efforts and seek stakeholder input from residents of Tuolumne County with respect to programming needs and final design criteria. The California Team is considering a micro ‘Rural Rebuild by Design’ process wherein the community presents additional ideas on resilience features to be incorporated in the final design. In total, the Program would initiate in early 2016 and complete construction by late 2019.

## V. BUDGET

### i. Budget in DRGR Format

The following budget is provided for initial illustrative purposes, and the final budget in DRGR format will be provided for final application submission. The simplified line items represent cost estimates for implementation of each of the three pillars of the Program.

Preliminary Budget - Estimated Program Costs	
Simplified Line Item	Cost
Forest & Watershed Health	\$ 40,000,000.00
Biomass and Wood Products Facility	\$ 22,000,000.00
Community Resilience Centers (2)	\$ 55,000,000.00
<b>Est. Total</b>	<b>\$ 117,000,000.00</b>

### ii. Narrative Description of How Budget Was Developed



For each of the activity areas associated with the three pillars, the corresponding members of the California Team provided the respective values based upon their professional experience with past engagements, market rates, input of design and engineering professionals. The estimated total of \$40 million for Forest and Watershed Health portfolio of activities includes the assessments of the USFS and CAL FIRE, with input of the CCC, given their collective experience implementing similar measures in the recent past. The Biomass Facility and Wood Products Campus, with an approximate cost of \$22 million, was established with the input of CalEPA and OPR, in concert with TSS Consultants, based in a California-based firm with deep experience in design and implementation of similar facilities. The estimated total of \$50 million for the Community Resilience Centers in Groveland (with CCC outpost) and Tuolumne City were developed with the professional construction design input of Vanir Construction Management, who have a long track record of large-scale capital projects in Tuolumne County. Given the scale and scope of the Program, and the need to provide training and oversight to partners in a rural setting, the Core Team is allowing for a contingency of ten percent of the sum of the three activity areas for project delivery and administration needs.

### **iii. Sources and Uses Statement (inclusive of all funding)**

The California Team is still finalizing potential direct and supporting commitments, and at the time of the publication of the public comment draft the sources and uses statement was still in development pending the outcome of these efforts.

## **VI. CONSISTENCY WITH OTHER PLANNING DOCUMENTS**

### **i. Consolidated Plan and/or Regional Sustainability Plan (HUD-2991)**



Tuolumne County, the most impacted and distressed target area outlined in this application, is a non-entitlement jurisdiction, is considered an eligible jurisdiction to receive State-administered funds through the State of California's 2015-2020 Consolidated Plan.<sup>2</sup> All proposed NDRC activities are directly tied to the most impacted and distressed target area within Tuolumne County.

Tuolumne County, the most impacted and distressed target area outlined in this application, is a non-entitlement jurisdiction, and is considered an eligible jurisdiction to receive State-administered funds through the State of California's 2015-2020 Consolidated Plan. All proposed NDRC activities are directly tied to the most impacted and distressed target area within Tuolumne County.

## **ii. Mitigation Plan**

As of June, 2015 the State of California has a FEMA-approved Enhanced State Mitigation Plan. The Tuolumne County Board of Supervisors adopted the Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan on December 4, 2012.<sup>3</sup> The plan's goals are in alignment with the proposed activities of the NDRC specifically though minimizing the level of damage and losses to people, critical facilities and infrastructure due to wildfires (Goal 5).

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<sup>2</sup> <http://www.hcd.ca.gov/housing-policy-development/housing-resource-center/reports/fed/docs/state-of-ca-2015-2020-conplan-final.pdf>

<sup>3</sup> <http://www.tudwater.com/agendas/2012/Dec/5Dec112012.pdf>



## **EXHIBIT F: FACTOR 4 – LEVERAGE**

### **I. FINANCIAL COMMITMENTS**

Pending final confirmation and potential legislative outcomes, to be finalized by October 27<sup>th</sup>.

### **II. SUPPORTING COMMITMENTS**

#### **Leverage**

*Partners and Resources* As mentioned in the Exhibit C, California and Tuolumne County have developed a broad set of partners for this effort. These partnerships will be very important as we look to develop an ongoing program to support local residents, forest health, and related industries. Partners provide expertise and financial resources. The [USFS](#) has already invested \$134 million in Rim Fire Recovery and is committed to investing nearly \$10 million more.

In 2015 the USFS is spending or has spent \$9,814,655 on Rim Fire recovery activities in a broad array of supporting activities that directly function in concert with the Community and Watershed Resilience Program. This list includes repair of damaged road infrastructure, hand-treated invasive weed removal, trail repair of over 20 miles, administering and monitoring hazard tree removal and timber sale, restorative tree planting, environmental review assessments, meadow and spring assessments, design and permitting for 13 project sites, two OHV restoration projects, replacing boundary markers, surveying and monitoring, mapping, community, engagement, and surveying and monitoring for botanical, wildlife, stream, meadow, spring and cultural resource projects.

Further, the USFS recovery activities that support the California NDRC Community and Watershed Resilience Program in 2015 are truly robust, incorporating a broad swath of agencies, NGOs, and volunteer groups. The supporting leverage values from the USFS are as



follows: \$1.6 million for removal of 21,335 ccf of biomass; \$750,000 for monitoring and surveying support crews; \$497,750 to remove 6,500 ccf of biomass to a facility; \$217,750 for site prep for volunteer tree planting on 241 acres; \$75,800 for seedlings for volunteer tree planting; \$8,929 to support volunteer planting on 3 acres; \$38,757 for Americorps botany protection project; \$1,000 in materials donated for botany protection project; \$189,000 CCC trail repair; \$11,073 for volunteer trail work and invasive weed removal; \$4,037 for Modesto Circle of Life Church volunteer work of 100 lbs of invasive weed removal; \$86,592 for inmate forest work including fence replacement, trail building, bear box and campground site work, tree cookies and materials fabrication; \$41,735 in volunteer labor for interpretive work, 350 lbs of weed removal, trail projects, trail inventory, monitoring and mapping, and debris removal; \$24,000 of private and foundation funds to hire a volunteer coordinator for Tuolumne River Trust.

Additional sources have funded diverse supporting activities in the Rim Fire footprint area, in a variety of efforts focused on recreational access and features, public facilities, and water quality. These supporting leverage values are as follows: \$10,000 for 10 miles of OHV trail repair and maintenance, funded by Calif. Off Highway Motorized Vehicle Grant Funds; \$30,000 OHV Restoration Project- Restoration of approximately 15 miles of unauthorized OHV routes; \$50,000 OHV Development Project- New construction of OHV trail re-routes to avoid sensitive areas, eliminate unsustainable hillclimbs, and improve safety, 2 mile route; \$30,000 from Outfitter/Guide Fees will fund management of the Tuolumne Wild & Scenic River to include river patrols, trash cleanup, noxious weed removal, resource surveys, and trail projects. The San Francisco Public Utilities Commission has provided at total of \$387,773 to support the following: watershed protection by Recreation Program (\$62,183); Sweetwater Campground



Well and Electrical – replace and upgrade water system at campground to serve as water supply during wildfire suppression (\$120,000); Lower Cherry Aqueduct EA – reviewed Hetch Hetchy Water and Power’s EA to utilize the aqueduct to provide drinking water to watershed end-users (\$202,590). The California State Parks Off-Highway Motor Vehicular Recreation Grants has provided \$216,722, which includes the following: Ground Operations – trail monitoring, maintenance, re-route/reconstruct trails, signs, education (\$156,015); Law Enforcement – trail signs, patrolling, enforcement, education (\$20,120); Ferretti Off Highway Vehicle Restoration Project, block and decommission unauthorized routes (\$19,302); Reynolds Development Project, re-route and construct new OHV trail (\$21,285).

A total of \$510,634 from RO CIP Projects has been dedicated to work within the Rim footprint, which includes the following: Rim Fire Interpretive Panels, still in progress, wildfire education at Rim of the World Vista (\$50,000); vault toilet replacement, 7 new vault toilets installed in November 2014 (\$260,634); bear-proof food lockers – installed by the Tuolumne County Sheriffs Inmate Crew at 3 campgrounds along the Tuolumne Wild & Scenic River (\$28,000); trail work completed by CCCs – repaired, rerouted, reconstructed, and storm-proofed approximately 30 miles of trail, this is in addition to the volunteer work (\$170,000); campground signs – replacement signs for those burned at South Fork Campground (\$2,000). Further, SNC has funded \$88,035 for technical restoration and/or preliminary engineering designs, regulatory permitting, and remaining clearances for follow-up site improvement activities for four meadows (Wilson Meadow and Upper, Middle, and Lower Meadows on a tributary to Cherry Creek), ten springs, and two undersized culverts on Granite Creek and a tributary of Granite Creek on Forest System Road 1N96 in the Lower Cherry Creek watershed.





While there are no dollar values yet appropriated for 2016, it is worth noting that the USFS will maintain the Rim Fire Recovery as a top priority, and plans to address the following needs: reforestation surveys and post project monitoring (botanical, wildlife, streams, meadows, springs and cultural resource); design and permitting of 9 projects, start implementation of over 20 meadow and spring projects; administer and monitor timber sale and hazard tree removal; respond to comments and complete reforestation Environmental Impact Statement; provide oversight of contracted range allotment environmental review document; start Noxious Weed Environmental Impact Statement; layout and map unit boundaries, for bio-mass removal; keep the public informed, conduct workshops, open houses, write article, put on presentation, interview; manage workload related to seven permitted uses and FEMA funding; coordinate with researchers and create map products; evaluation and monitoring reporting; repair a bridge; replace landline/boundary placards, and monuments; repair trails; repair 300 miles of road; plant 500 acres of trees with volunteers; partnership and volunteer coordination, and grant writing.

***Co-Benefits and Financing During*** and after the Rim Fire, local homeowners and businesses struggled to obtain insurance. The Tuolumne County Board of Supervisors led a study session devoted to understanding the impacts of insurance issues on local residents and businesses. The Supervisors also engaged with local real estate and insurance agents. The Leadership Team has initiated conversations with the California Insurance Commissioner's office. We will continue to work with these organizations to better understand and resolve insurance issues in the area.

Building resilience in the forest ecosystem through stewardship and management activities will benefit numerous stakeholders in the area and beyond. This includes local residents and businesses and downstream water users.



The state and USFS have explored different financing mechanisms for natural resource protection, including Environmental Impact Bonds (EIB). Through an EIB, an initial investment in forest stewardship will result in cost-savings in reduced fire-fighting costs, which can then be passed on to investors. Investment in the Rim Fire recovery area will enable available funds to be used in other regions to replicate our approach and program. These funds include the USFS's Rim Fire recovery funds and CAL FIRE's grant program funds made available through the Greenhouse Gas Reduction Fund (GGRF) and other sources. Proactive investments in sustainable forest management will prevent future wildfire, which will allow for State, federal, local, and private investments to go further.



## **Exhibit G: Factor 5 - Long-Term Commitment**

### **I. COMMITMENT TO RESILIENCE**

#### **i. Update on Phase I Commitments**

California has demonstrated a strong commitment to increasing the resilience of the state's natural resources, infrastructure, people, and communities. The State developed its adaptation plan, Safeguarding California, which is now being translated into action and investment on the ground. California is committed to maintaining these investments and programs as part of its comprehensive approach to addressing climate change.

#### **Long-Term Commitments for Watershed and Community Resilience**

Federal, state, and local agencies are already making significant investments to boost the resilience of our target area. The following is a list of significant or major steps that have already been taken or are in the planning stages to increase the resilience in our target area:

1. The USFS are continuing a program of reforestation, erosion control, rehabilitation, and timber salvage in the area of the Rim Fire.
2. The California Department of Forestry and Fire Protection (CAL FIRE) is implementing a fire prevention and fuel reduction project in the target area. The project consists of fuel breaks that are intended to slow the advance of an approaching wildfire and allow firefighters to control the fire before it impacts nearby residential communities. The project consists of cutting, piling, and burning or chipping vegetation that is encroaching and re-growing in the Rim Fire Contingency Line. The planned start date is July 1, 2015 and initial work will take 24 months, with 5 years for maintenance.



3. Two FireSafe Councils work in Tuolumne County, along with a multi-county collaborative (SWIFT). All are taking steps to reduce the vulnerability of key commercial areas, housing, and infrastructure to future wildfire. This includes investment in strategic firebreaks, creation of defensible space, and community education and outreach.
4. The Climate Action Team Forest Carbon Plan will outline a concrete strategy for reducing greenhouse gas emissions and increasing carbon storage in California forests. It will be completed in May, 2016.
5. The Sierra Nevada Conservancy Watershed Improvement Program is a coordinated, integrated, collaborative program of projects to restore the health of California's primary watershed. It will identify and quantify the necessary level of restoration, increase investment in restoration activities, and identify and address state, federal, and local policy barriers to proactively managing our watersheds. The Program will achieve these goals through science-based strategies that are collaboratively developed at the watershed scale to create resiliency at the regional and state scales.

### **Baseline and Goal Metrics**

CAL FIRE has established a baseline and goal for the work that they are doing in the region. The baseline condition is the current state of the fuel breaks within an area, consisting of piled vegetation from suppression of the Rim Fire, without maintenance of the firebreaks there will be significant encroachment and re-vegetation of the fuel breaks.

The goal metric for CAL FIRE's ongoing work is to develop a fuel break that hits the following goals:

1. Substantially free of piled vegetation,



2. Understory vegetation up to six feet removed, and
3. Achieves widely spaced trees at least 24 feet apart.

## **ii. Actions Taken since NOFA Publication**

### **Tuolumne County Water Management Plan**

City, county and water district management have strived for years to create a unified vision for water management in Tuolumne County. In 2013, the Board of Supervisors voted to resurrect the county water agency “to ensure adequate water suppliers to meet the diverse needs of a healthy and economically viable community.” The agency’s Water Policy Advisory Committee acknowledges the need for a unifying vision but they also recognize this would involve a cross-discipline, multi-jurisdictional collaborative process. In November of 2014, they also conceded that outside professional facilitation would be necessary to move the initiative forward. The goal would be to discuss the hydrologic changes currently being experienced in the county and to consider potential future changes and their impacts. Systems awareness will help inform policy decisions and master planning.

### **Environmental Impact Bond (EIB) and Downstream Beneficiaries**

The goal of this project is to invite downstream beneficiaries to participate in a regional, cross-sector collaboration to discuss the environmental services provided by the Sierras and the current crisis facing those natural resources. One innovative concept to explore is the Environmental Impact Bond (EIB) that Private Capital for Public Good (pc4pg) crafted to increase the pace and scale of fuels reduction and forest restoration work in the Sierras. This “Pay for Success” concept is a new financing tool that essentially allows



the U.S. Forest Service to borrow from future wildfire fighting accounts to fund current wildfire prevention work. It is much cheaper to implement wildfire prevention treatments than to suppress fires, rehabilitate landscapes, and reconstruct destroyed buildings and infrastructure. An EIB could turn these savings into a stream of revenue, which is used to pay back the investors who provided the initial funding for the wildfire prevention treatments. The investment coalition, pc4pg acquired support for the EIB from a range of stakeholders, including Senior Policy Advisors at the White House and the U.S. Forest Service, portfolio managers of socially responsible investment firms, and professionals with experience creating innovative financial instruments.

### **Tuolumne County Sustainability Council**

The goal of this project is to create a cross-agency collaboration that will address climate change impacts and resilience work in the Sierra foothill region. Similar to the Association of Bay Area Governments (ABAG) and the Bay Area Ecosystem Climate Change Consortium (BAECCC), this cross-sector collaboration would organize around the responses to these questions:

1. What are the key climate adaptation/resilience projects or initiatives your agency/organization is implementing that could have the potential for significant impact if replicated across the Central Sierra foothill region?
2. What official climate planning has been conducted in your agency/organization?
3. What structure, if any, exists in Tuolumne County for local agencies and stakeholders to work together on climate action?
4. How could a Central Sierra information and assistance “hub” best help to advance your agency/organization’s climate adaptation resilience efforts?



The components of resilience work – awareness, diversity, readiness, responsiveness, revitalization – are not the same as disaster preparedness or emergency response. Hazard mitigation and climate change adaptations are also different, though integrating adaptations into mitigation planning makes common sense. Understanding resilience concepts is central to good planning and essential to developing a resilience mindset. One objective for this project would be to jumpstart climate change adaptation and resilience planning by intentionally organizing a Sustainability Workgroup that would connect with regional resource agencies like the Sierra Business Council and the Sierra Nevada Conservancy for training and planning assistance. An outcome would be the integration of locally approved climate adaptations into city and county general plans, urban water management plans and other relevant local plans.

**Executive Order B-30-15:** Governor Brown issued Executive Order (EO) B-30-15 on April 29, 2015. EO B-30-15 established a mid-term greenhouse gas emission reduction target. EO B-30-15 also established a multi-part resilience program. This includes direction for state agencies to incorporate climate change into all state planning investment, to prioritize the use of natural and green infrastructure, and to use full life cycle cost accounting in infrastructure planning decisions. OPR is leading a Technical Advisory Group to assist in the implementation of the Executive Order.

### **iii. Actions to Be Taken within One Year of Award Announcements**

- **Proposition 1 Awards**

**Integrated Regional Water Management:** Approved by voters in November 2014, Proposition 1 funds are dedicated for Integrated Regional Water Management planning and implementation



efforts within hydraulic regions identified in the 2013 California Water Plan. Tuolumne County is located within the Mountain Counties hydraulic region and is eligible for \$13 million in Integrated Regional Water Management funds.<sup>4</sup> The first round of award is expected to be made in late 2015 or early 2016.

**The Department of Wildlife and Fisheries** is administering a Watershed Restoration & Delta Water Quality and Ecosystem Restoration Grant Program, funded by Proposition 1. \$24 million is available for the Watershed Restoration Grant Program. Funds will be used to protect lands within watersheds, habitat restoration, conservation and enhancement. Awards will be made in December 2015.<sup>5</sup>

The **Sierra Nevada Conservancy** was awarded \$25 million in Proposition 1 funds, and will allocate \$10 million in grants in its first round of funding. Projects will include fuel treatment to reduce wildfire risk, protect watershed health, forest health, protect life and property, and reduce greenhouse gasses.<sup>6</sup> Award for applications submitted September 1<sup>st</sup>, 2015 will be authorized in either December 2015 or March 2016.

### **Rural Resilience Project**

This project aims to increase levels of collaboration, adaptive capacities and a systems-level perspective in an effort to progress the many rural communities in the Sierra Nevada that have stalled out on climate change adaptation efforts. The goals will be to evaluate, design, and implement climate change adaptations; prepare the physical infrastructure; and prepare Sierra

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<sup>4</sup> <http://www.water.ca.gov/irwm/grants/prop1index.cfm>

<sup>5</sup> <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=105001&inline>

<sup>6</sup> <http://www.sierranevada.ca.gov/other-assistance/applying-for-a-grant/prop1gg.pdf>





Nevada communities to come together to make collaborative decisions in times of stress and disaster. This will be accomplished through community-based leadership gatherings to understand how complex civic systems differ from traditional organizational models and to understand why those differences require cross-sector collaboration to achieve community resilience and sustainable change.

## **II. COMMITMENT CATEGORIES**

### **i. Lessons Learned from Developing/Implementing Proposal**

In developing and implementing this proposal, the State of California has realized many lessons that may be acted on improve resilience and recovery. Foremost, where wild fire is concerned, the state acknowledges that it is imperative that action be taken preceding these types of disasters by thinning and/or plowing forest and dry rural landscape to reduce fuel loads on both public and private land, – so if fire strikes, the destruction can be limited.

The Boles Fire that devastated Weed, CA serves as an example for resilience in small, remote, rural communities. These local communities must be engaged early and on a very visible scale. Moving forward, as the state faces future fire events, and recovery from the recent Butte and Valley fires, sharing lessons learned is critical to recovery:

- Community Engagement through a Long Term Recovery Group
- Organize community volunteers to prioritize local needs, resources
- Create a record keeping system for tracking, matching and reporting on funding received in partnership with local philanthropy



- Importance of community-driven, but state supported recovery planning efforts with extensive community engagement, including a central location for public information

As seen in Valley (Lake County) and Butte (Calaveras County), a resiliency plan must also have a regional component. The State learned that there are insufficient hotels, motels or shelters in rural or remote areas to handle the displaced. Additionally, services for taking displaced pets and livestock are limited and may need to be arranged far from the county in which the disaster occurred.

## ii. Legislative Actions

California is a national leader in Climate adaptation and has several legislative actions that support the NDRC framework presented in this application that are pending:

- **SB 246** creates the Integrated Climate Adaptation and Resilience Program within the Governor's Office of Planning and Research. The Program would serve as a clearinghouse for information on local and regional climate adaptation and resilience and serve as a liaison between local and regional programs and State agencies. Enrolled on 9/10/15, signed into law on 10/8/15 by Governor Brown.
- **Senate Bill 379** requires local governments to address climate change in the Safety Element of their General Plan. Enrolled on 9/2/15, signed into law on 10/8/15 by Governor Brown.
- **Assembly Bill 1242** requires the CA Natural Resources Agency to update the *Safeguarding California* Plan every three years, and directs the Strategic Growth Council



to ensure that funding programs are consistent with *Safeguarding California*. Enrolled on 9/11/15, awaiting signature from Governor Brown.

### **iii. Raising Enforceable Standards**

**General Plan Guidelines Update:** The Governor’s Office of Planning and Research has been engaged in a thorough update of the *General Plan Guidelines (GPG)*. The new GPG will include resources, data, tools, and model policies to help cities and counties update their general plans and address climate change goals and adaptation.

***Tuolumne County General Plan Update: Includes a Water Resource Element, updated in August 2015 that outlines Water Harvesting and Storage incentives and provides for Greywater Irrigation in areas allowed by jurisdictional water and sewer providers.***

### **iv. Plan Updates or Alignment**

#### **Refer to Factor 5: Phase 2 in NOFA for additional information and Guidance**

Tuolumne County is currently in the process of updating its General Plan Environmental Impact Report. The Final EIR will be available in December 2015, with public meetings occurring in December 2015/January 2016.

The activities proposed within this application align with the draft General Plan update including the Economic Development, Natural Resources, Water Resources and Public Facilities Elements.

- Economic Development: commitment to align County resources with agencies providing job training and business development for the Central Sierra Nevada region
- Natural Resource: support biomass energy facilities, manage invasive plants and vegetation removal for fuel reduction, and balance conservation with fire hazard reduction.



- **Water Resource:** Align goals with climate adaptation strategies at the state level, support water harvesting and storage, develop policies and programs to adapt to extreme climate effects such as drought and flooding.
- **Public Facilities:** Support the use of shared facilities for community uses, job training programs and collaboration with Columbia College facilities and educational programs.

**Environmental Goals and Policy Report:** The EGPR will provide an overview of the state's environmental goals, providing keys steps to achieving these goals, and develop a framework of metrics and indicators to help inform decision making, at all levels, to help track progress toward reaching environmental and climate change goals. Schedule for adoption is to be determined.

**General Plan Updates Associated with Housing Element Updates:** The Department of Housing and Community Development will update its general plan requirements, which are tied to the housing element law schedule. These include the land use element updates for disadvantaged communities, flood and fire. The 5th cycle updates of the housing element are completed or approaching completion, which triggers these general plan amendments. Various state agencies will coordinate to assure their completion over the next year.

**Safeguarding California – Implementation Action Plans:** A 2014 supplement to California's 2009 Climate Adaptation Strategy implemented through the California Natural Resources Agency and one of the main pillars of California's climate change strategy. A recent executive order commits to an aggressive mid-term 2030 GHG target, updates every three years of the Safeguarding California (next in 2017), prioritized investment and decision making on adaptation and new sector implementation plans by the end of 2015.



**Assembly Bill (AB) 32 Scoping Plan:** The California Air Resources Board (CARB) will launch a process to develop a new plan for meeting the State’s GHG emission reduction goals. This process will include developing a GHG emission reduction framework for natural and working lands.

**Forest Carbon Plan:** The California Department of Forestry and Fire Protection is currently developing a plan to provide forest carbon targets and an array of strategies to promote healthy forests that protect and enhance forest carbon, outline a broader range of forest environmental services (e.g., watershed protection) and support biomass utilization. The Plan will be completed in 2016.

#### **v. Financing Actions that Increase Resilience**

Currently there are several financing actions in development to find additional funding streams to continue the important work in rural communities and in the forest and watershed that serves the State. Working with local and regional business incubators in Tuolumne County, the CWRP, will strive to expand financing opportunities for local small business and start-ups, with workforce development opportunities included. This will entail a Restoration and Stewardship Economy that will strive to further monetize the valuable future work done in the forest and watershed. In the interim, the State and County will collaborate to identify funding opportunities through traditional means and grant opportunities. The long-term goal is that financing for these actions will be pursued through eventual revenue generation of the Biomass facility. In addition, the State is partnering with [Blue Forest Conservation](#) to develop mechanism to attract private capital for forest and watershed work, based upon the pay for performance model.



## **Attachment D: Consultation Summary**



State of California

National Disaster Resilience Competition Phase II

Public Comment Draft

October 9, 2015

<b>PHASE I Citizen Participation and Consultation Summary</b>			
<b>Agency Name or Stakeholder Group</b>	<b>Agency Type - Target Population (if applicable)</b>	<b>Type of Outreach</b>	<b>Method of Notification - materials provided</b>
American Red Cross	nonprofit social sector	January 15 Meeting	PowerPoint presentation
AT&T	For-profit telecommunications company	January 15 Meeting	PowerPoint presentation
California Department of Forestry and Fire Protection (Cal FIRE)	State government	January 15 Meeting	PowerPoint presentation
California Department of Housing and Community Development (HCD)	State government	January 15 Meeting	PowerPoint presentation
City of Berkeley	Municipal government in Alameda County	January 15 Meeting	PowerPoint presentation
City and County of San Francisco/Hetch Hetchy	municipal government/water agency	January 15 Meeting	PowerPoint presentation
City of San Jose	Municipal government in Santa Clara County	January 15 Meeting	PowerPoint presentation
Crook Ranch	Private cattle ranch	January 15 Meeting	PowerPoint presentation
Ericson Ranch	Private cattle ranch	January 15 Meeting	PowerPoint presentation
Evergreen Lodge	Private hotel	January 15 Meeting	PowerPoint presentation
Groveland Community Services District	Local water utility company	January 15 Meeting	PowerPoint presentation
Highway 108 Fire Safe Council	Nonprofit organization	January 15 Meeting	PowerPoint presentation
Me-Wuk Tribe	California Indian Tribe	January 15 Meeting	PowerPoint presentation
Office of Planning and Research (OPR)	State government	January 15 Meeting	PowerPoint presentation
Pacific Gas and Electric	For-profit utility company	January 15 Meeting	PowerPoint presentation
Rosasco Ranch	Private cattle ranch	January 15 Meeting	PowerPoint presentation

Sierra Pacific Industries	Private lumber company	January 15 Meeting	PowerPoint presentation
Strawberry Music Festival	Local music festival	January 15 Meeting	PowerPoint presentation
Southwest Interface Team (SWIFT)	Collaboration of government and community based organizations	January 15 Meeting	PowerPoint presentation
Tuolumne County Community Resource Agency (TuCare)	County government community resource agency	January 15 Meeting	PowerPoint presentation
Tuolumne County Administration	County government	January 15 Meeting	PowerPoint presentation
Tuolumne County Agricultural Commission/Air Pollution	County department	January 15 Meeting	PowerPoint presentation
Tuolumne County Board of Supervisors	County governing board	January 15 Meeting	PowerPoint presentation
Tuolumne County Cattlemen's Association	Local ranching organization	January 15 Meeting	PowerPoint presentation
Tuolumne County Chamber of Commerce	Local chamber of commerce	January 15 Meeting	PowerPoint presentation
Tuolumne County Community Resources Agency	County government community resources agency	January 15 Meeting	PowerPoint presentation
Tuolumne County Economic Development Authority	County government	January 15 Meeting	PowerPoint presentation
Tuolumne County Farm Bureau	nonprofit organization promoting agricultural interests	January 15 Meeting	PowerPoint presentation
Tuolumne County Fire	County government	January 15 Meeting	PowerPoint presentation
Tuolumne County Fire Chief's Association	Nonprofit organization of county fire chiefs	January 15 Meeting	PowerPoint presentation
Tuolumne County Human Services Agency	County human services agency	January 15 Meeting	PowerPoint presentation
Tuolumne County Public Health Officer	County department of public health	January 15 Meeting	PowerPoint presentation



Tuolumne County Sheriff's Office	County law enforcement	January 15 Meeting	PowerPoint presentation
Tuolumne County Superintendent of Schools	Local School district	January 15 Meeting	PowerPoint presentation
Tuolumne County Transportation Agency	County government	January 15 Meeting	PowerPoint presentation
Tuolumne County Visitors Bureau	Nonprofit organization	January 15 Meeting	PowerPoint presentation
Tuolumne Utilities District	County water utility company	January 15 Meeting	PowerPoint presentation
Turlock Irrigation District	Water utility company (outside Tuolumne County)	January 15 Meeting	PowerPoint presentation
Twain Harte Community Services District	Water utility company in Tuolumne County	January 15 Meeting	PowerPoint presentation
Yosemite Gateway Partnership	Nonprofit organization	January 15 Meeting	PowerPoint presentation
Yosemite Lakes	Recreational vehicle resort and campground	January 15 Meeting	PowerPoint presentation
Yosemite National Park, US Park Service	National Park	January 15 Meeting	PowerPoint presentation
Yosemite Stanislaus Solutions	Nonprofit organization	January 15 Meeting	PowerPoint presentation
University of California Cooperative Extension	Educational institution	January 15 Meeting	PowerPoint presentation
California Environmental Protection Agency (CAL EPA)	State government	January 15 Meeting	PowerPoint presentation
United States Forest Service	Federal government	January 15 Meeting	PowerPoint presentation
Tuolumne River Trust	Nonprofit organization	January 15 Meeting	PowerPoint presentation
Mariposa County	County adjacent to Tuolumne County	January 15 Meeting	PowerPoint presentation
Sierra Nevada Forests and Communities Initiative Coordinating Council	Interest group addressing issues affecting forest health, fire and related economic development	January 28 Organizational Meeting	Requested input.

Governor's Office of Emergency Services	State government	January-February Conversations	Requested input.
Natural Resource Committee	Community Group	January-February Conversations	Requested input.
Resource Advisory Committee	Community group for Secure Rural Schools/Community Determination Act	January-February Conversations	Requested input.
Tuolumne County Water Policy Advisory Committee	Community advisory group	January-February Conversations	Requested input.
Tuolumne/Stanslaus Integrated Regional Water Management Authority	Utility district	January-February Conversations	Requested input.
Tuolumne County Multi-Jurisdictional Hazard Mitigation	Multi-jurisdictional committee	January-February Conversations	Requested input.
Tuolumne County Habitat for Humanity	Nonprofit organization	January-February Conversations	Agenda item
Tuolumne County Ministerial Association	Ministerial association	January-February Conversations	Agenda item
Interfaith Community Social Services	Social services organization	January-February Conversations	Agenda item
Tuolumne County Ombudsman	Social services organization	January-February Conversations	Agenda item
Tuolumne County Catholic Charities	Social services organization	January-February Conversations	Agenda item
Tuolumne County Veterans Service Office	County government	January-February Conversations	Agenda item
Infant/Child Enrichment Services	Nonprofit organization	January-February Conversations	Agenda item
Area 12 Agency on Aging	Joint Powers agreement social service organization	January-February Conversations	Agenda item
Sierra Senior Providers	Nonprofit organization	January-February Conversations	Agenda item
Amador Tuolumne County Action Agency	Joint Powers agreement social service organization	January-February Conversations	Agenda item

Mother Lode Job Training	Workforce Investment Board job center	January-February Conversations	Agenda item
Social Services Transportation Advisory Committee	Advisory Committee to local government	January-February Conversations	Agenda item
Tuolumne County Transportation Council	Local government	January-February Conversations	Agenda item
California Conservation Corps (CCC)	State government	January-February Conversations	Agenda item
California Department of Transportation (CalTrans)	State government	January-February Conversations	Agenda item
Charlson Cattle	Private cattle company	January-February Conversations	Agenda item
California BioDiversity Council Interagency Alignment Team	Interagency group including state, federal and local government	February 19 Organizational Meeting	Agenda item
Tuolumne County Superintendent of Schools	Local school district	March 2 Public Hearing (In English and Spanish)	Noticed from February 18-March 13, 2015, throughout the State, Tuolumne County offices, Tuolumne-Union Democrat newspaper (three times); posted on California Department of Housing and Community Development web site; sent to list serves of HCD and Governor's Office of Policy and Reserach; posted on Tuolumne County web site; posted in three newspapers of general circulation (three times)
Columbia College	Community college	same as above	same as above
Give Someone a Chance	Nonprofit homelessness organization	same as above	same as above

Southwest Interface Team (SWIFT)	Collaboration of government and community-based organizations	same as above	same as above
Tuolumne County	County government	same as above	same as above
CT Bioenergy Consulting	For-profit consulting firm	same as above	same as above
Tuolumne County Community Resources Agency	County government community resources agency	same as above	same as above
Georgetown County School District	Local school district	same as above	same as above
Tuolumne County Fire Department	County government	same as above	same as above
Tuolumne County Transportation Commission	County government	same as above	same as above
Tuolumne County Economic Development Association	County government	same as above	same as above
Tuolumne Band of MeWuk	California Indian Tribe	same as above	same as above
Catholic Charities	Nonprofit social services organization	same as above	same as above
James Dambacher Construction	For-profit construction firm	same as above	same as above
Hotel Charlotte	For-profit hotel	same as above	same as above
Groveland Area Partnership	Nonprofit community-based organization	same as above	same as above
Cal FIRE	State government	same as above	same as above
US. Forest Service	Federal government	same as above	same as above
Tuolumne Utility District	County government	same as above	same as above
McCaffrey House inn	For-profit hotel	same as above	same as above
Telele Foundation	Nonprofit corporation	same as above	same as above
Sierra Watershed Progressive	For-profit corporation	same as above	same as above
Yosemite Stanislaus Solutions (YSS)	Nonprofit corporation	same as above	same as above

Tuolumne County Alliance for Resources and Environment (TuCare)	Nonprofit corporation	same as above	same as above
Groveland Trail Heads	Nonprofit educational organization	same as above	same as above
California Department of Fish and Wildlife	State government	same as above	same as above
Peter and Penny Jelito	Private citizens	same as above	same as above
Karen Seals	Private citizen	same as above	same as above
Cvcvy Seals	Private citizen	same as above	same as above
Sparq Environmental, Inc	Private consulting firm	same as above	same as above
Big Oak Flat/ Groveland USD	Local school district	same as above	same as above
Central Sierra Environment Resource Center	Nonprofit organization	same as above	same as above
Tuolumne County Board of Supervisors	County governing board	same as above	same as above
Tuolumne County Cattlemens' Association	Local ranching organizations	same as above	same as above
Frank Miellesen	Private citizen	same as above	same as above
Tuolumne County Visitors Bureau	Nonprofit organization	same as above	same as above
Yosemite Chamber of Commerce	local Chamber of commerce	same as above	same as above
General Public	General Public	March 3 Public Meeting/Webinar	Public Webinar to provide opportunity for out-of-area citizens to provide input. The webinar was noticed as part of the public notice for the public hearing of March 2, 2015. Also posted on HCD and Tuolumne County web sites.
<b>Phase II - California State Citizen Participation and Consultation</b>			

<b>Agency Name or Stakeholder Group</b>	<b>Agency Type - Target Population (if applicable)</b>	<b>Type of Outreach</b>	<b>Method of Notification - materials provided</b>
Louise Bedsworth, Governor's Office of Planning and Research	Statewide planning	Core Team Member	Core Team Member
Susan Naramore, CA Department of Housing and Community Development	Affordable housing and homelessness	Core Team Member	Core Team Member
Maureen Frank, Tuolumne County	Local Government	Core Team Member	Core Team Member
CAL EPA - California Environmental Protection Agency		Core Team Member	Core Team Member
Helge Eng, CalFire - California Department of Forestry and Fire Protection	State Forestry and Fire Protection Agency	Core Team Member	Core Team Member
Claire Long, Stanislaus National Forest, US Forest Service	Federal Forestry and Fire Protection Agency	Core Team Member	Core Team Member
Erin Healy, California Conservation Corp	Workforce development	Core Team Member	Core Team Member
Jim Branham, Sierra Nevada Conservancy	Economic Development and Environmental Conservation	Core Team Member	Core Team Member
Sierra Business Council	Regional Business Association	Core Team Member	Core Team Member
GCR Incorporated	Consultant		
Tuolumne County Sheriff's Office	Law Enforcement	Meetings 6/24/2015; 7/6/2015	PowerPoint Presentation and NDRC Project Overview
Tuolumne County Fire Warden	Fire First Responders	Meetings 6/24/2015; 8/17/2015	PowerPoint Presentation and NDRC Project Overview
Tuolumne Parks and Recreation District	Parks and Recreation	Meetings 6/26/2015; 6/29/2015; Presentation at the TPRD meeting on 7/8/2015	PowerPoint Presentation and NDRC Project Overview

Tuolumne County Economic Development Authority	Economic Development	Meetings 6/26/2015; 8/17/2015	PowerPoint Presentation and NDRC Project Overview
Tuolumne Utilities District	Infrastructure--power	Meetings 6/29/2015; 7/9/2015; 8/7/2015	PowerPoint Presentation and NDRC Project Overview
Tuolumne County Transit Authority	Infrastructure--transportation	Meetings 6/29/2015; 8/7/2015; 8/17/2015; 8/31/2015	PowerPoint Presentation and NDRC Project Overview
Tuolumne County Community Resource Agency	Infrastructure--transportation	Meeting 6/29/2015; 8/7/2015	PowerPoint Presentation and NDRC Project Overview
Tuolumne County Sonora Fairgrounds	Community facilities	Meeting 6/29/2015	PowerPoint Presentation and NDRC Project Overview
Tuolumne County Ambulance	Fire First Responders	Meeting 6/30/2015	PowerPoint Presentation and NDRC Project Overview
Tuolumne County Health and Human Services Agency	Health and Human Services Agency	Meeting 6/30/2015	PowerPoint Presentation and NDRC Project Overview
CA NDRC Working Forest Group	Forest and Watershed Health	Teleconference 7/1/2015	PowerPoint Presentation and NDRC Project Overview
Groveland Resident	Forest and Watershed Health	Meeting 7/9/2015	PowerPoint Presentation and NDRC Project Overview
Tuolumne County Visitor's Bureau	Economic Development	Meeting 8/17/2015	PowerPoint Presentation and NDRC Project Overview
Mother Lode Job Training	Economic Development	Meeting 8/17/2015	PowerPoint Presentation and NDRC Project Overview
Mi-Wuk Tribe	Fire Protection	Meetings 8/17/2015	PowerPoint Presentation and NDRC Project Overview
Tuolumne County Chamber of Commerce; Governmental Affairs Council	Economic Development	Presentation at their meeting on 8/17/2015	PowerPoint Presentation and NDRC Project Overview
US Forest Service	Civic Spark (AmeriCorps)	Meeting 8/17/2015	PowerPoint Presentation and NDRC Project Overview
Tuolumne County Natural Resources Committee	Forest and Watershed Health; Bioenergy	Meetings 6/9/2015; 7/14/2015; 8/11/2015; 9/8/2015	PowerPoint Presentation and NDRC Project Overview

Tuolumne County Resource Conservation District	Forest and Watershed Health; Bioenergy	Meetings 6/9/2015; 7/14/2015; 8/11/2015; 9/8/2015	PowerPoint Presentation and NDRC Project Overview
Southwest Interface Team (SWIFT)	Collaboration of government and community based organizations	Meetings 6/9/2015; 7/14/2015; 8/11/2015	PowerPoint Presentation and NDRC Project Overview
CT Bioenergy	Forest and Watershed Health; Bioenergy	Meetings 6/9/2015; 7/14/2015; 8/11/2015	PowerPoint Presentation and NDRC Project Overview
Amador-Tuolumne Community Action Agency	Food bank and other nutrition services	Meetings	NDRC Project Overview, Request for Input
First 5	Children services	Meetings	NDRC Project Overview, Request for Input
Tuolumne County Superintendent of Schools	K-12 Education	Meetings	NDRC Project Overview, Request for Input
Columbia College	Community College Education	Meetings	NDRC Project Overview, Request for Input
Sierra Resource Management	Education	Meetings	NDRC Project Overview, Request for Input
Big Dreams	Handicapped access	Meetings	NDRC Project Overview, Request for Input
Groveland Community Services District	Local water utility district	Meeting	NDRC Project Overview, Request for Input
Southside Senior Services	Senior nutrition and other services	Meeting	NDRC Project Overview, Request for Input
Interested Public	Residents	Public Meetings, 6/17/15	NDRC Project Overview, Request for Input
Groveland Community Services District	Local Government	Public Meeting 6/26/15	NDRC Project Overview, Request for Input
CalTrans	State Transportation Planning Agency	Public Meeting 6/26/15	Same as above
Tuolumne River Trust	Nonprofit environmental organization	Public Meeting 6/26/15	Same as above
GAP		Public Meeting 6/26/15	Same as above



Pine Mountain Lake Association	Homeowners Association	Public Meeting 6/26/15	Same as above
MLE, Inc.		Public Meeting 6/26/15	Same as above
GAINS		Public Meeting 6/26/15	Same as above
IMVO		Public Meeting 6/26/15	Same as above
No organization	residents	Public Meeting 6/26/15	Same as above
Dori's Tea Cottage	Local Business	Public Meeting 6/26/15	Same as above
Chamber of Commerce	Local Business Association	Public Meeting 6/26/15	Same as above
VGP		Public Meeting 6/26/15	Same as above
Conifer Communications	Local Business	Public Meeting 6/26/15	Same as above
TCTC		Public Meeting 6/26/15	Same as above
Tuolumne County Visitors' Bureau	Regional Tourism	Public Meeting 6/26/15	Same as above
Serendipity	Local Business	Public Meeting 6/26/15	Same as above
The Cub Inn Bed and Breakfast	Local Business	Public Meeting 6/26/15	Same as above
Yosemite Stanislaus Solutions (YSS)	Nonprofit organization	Public Meeting 6/26/15	Same as above
Groveland Trail Heads	Local Business	Public Meeting 6/26/15	Same as above
Southside Senior Services	Vulnerable Populations: Nutrition services for seniors	Public Meeting 6/26/15	Same as above
Telele Foundation	Nonprofit organization	Public Meeting 6/26/15	Same as above
Pine Mountain Custom Rentals	Local Business	Public Meeting 6/26/15	Same as above
Groveland Residents	Residents	Public Meeting 6/30/15	Same as above
Tuolumne Trust		Public Meeting 8/17/15	Same as above
Tuolumne River Trust	Local Environmental Group	Public Meeting 8/17/15	Same as above
USFS	Federal forestry and fire protection agency	Public Meeting 8/17/15	Same as above
CT Bioenergy Consulting	Business	Public Meeting 8/17/15	Same as above
CSERC		Public Meeting 8/17/15	Same as above
Southside Seniors Services	Vulnerable Population: Nutrition services to seniors	Public Meeting 8/17/15	Same as above
YFSSC		Public Meeting 8/17/15	Same as above

Pine Mountain Lake Association	Homeowner Association	Public Meeting 8/17/15	Same as above
Big Dreams	Vulnerable Population: handicapped accessibility	Public Meeting 8/17/15	Same as above
Amador-Tuolumne Community Action Agency	Vulnerable Populations: various services to LI	Public Meeting 8/17/15	Same as above
First 5 Tuolumne County	Vulnerable Population: Nutrition services to children	Public Meeting 8/17/15	Same as above
Tuolumne Band of MeWuk	Tribal government	Public Meeting 8/17/15	Same as above
City of Sonora	local government; regional collaboration	Public Meeting 8/17/15	Same as above
Sparq Environmental Inc.	For-profit consultant	Public Meeting 8/17/15	Same as above
Tuolumne County Farm Bureau	local agricultural organization	Public Meeting 8/17/15	Same as above
Tuolumne County Board of Supervisors	local government	Public Meeting 8/17/15	Same as above
TCTC		Public Meeting 8/17/15	Same as above
Business Owner/TH Fire Department		Public Meeting 8/17/15	Same as above
Tuolumne County Radio		Public Meeting 8/17/15	Same as above
Tuolumne County Fleet/CRA		Public Meeting 8/17/15	Same as above
Tuolumne County Fire		Public Meeting 8/17/15	Same as above
Twain Harte CSD		Public Meeting 8/17/15	Same as above
Cal Fire/TCFD		Public Meeting 8/17/15	Same as above
Tuolumne County Sheriff's Office		Public Meeting 8/17/15	Same as above
Mother Lode Fairgrounds		Public Meeting 8/17/15	Same as above
SWP/Telee/Evergreen		Public Meeting 8/17/15	Same as above
Tuolumne County		Public Meeting 8/17/15	Same as above
Tuolumne County Animal Control		Public Meeting 8/17/15	Same as above
MeWuk Fire Protection District	California Indian Tribe	Public Meeting 8/17/15	Same as above

Tuolumne County Resource Conservation District	Local government	Public Meeting 8/17/15	Same as above
Summersville High School		Public Meeting 8/17/15	Same as above
Tuolumne County Community Resource Agency (TuCare)	County government community resource agency	Public Meeting 8/17/15	Same as above
Grazing Permittee		Public Meeting 8/17/15	Same as above
DMEADS/GSCA		Public Meeting 8/17/15	Same as above
Columbia College	Community College	Public Meeting 8/17/15	Same as above
TEDA, Inc.		Public Meeting 8/17/15	Same as above
Central Sierra Connect		Public Meeting 8/17/15	Same as above
GSAC		Public Meeting 8/17/15	Same as above
No organization	3 Residents	Public Meeting 8/17/15	Same as above
Sonora Area Foundation	Community Resilience Center	Foundation Funders meeting	NDRC Project Presentation
Tuolumne County Behavioral Health Director	Mental Health services	phone call and emails	Project briefings and outreach discussions
Tuolumne County Housing Assistance Director	Affordable Housing services	phone call and emails	Project briefings and outreach discussions
Tuolumne County Continuum of Care	Mental Health and Housing services	phone call and emails	Project briefings and outreach discussions
Tuolumne County Chamber of Commerce	Business Association, Regional Stakeholder	Phone call; email	
Tuolumne River Trust	Environmental group, Regional Stakeholder	Phone call; email	
Sierra Business Council	Regional Business Association; Regional Stakeholder	Phone call; email	
Modesto Irrigation District	Water District (Tuolumne source watershed); Regional Stakeholder	Phone call; email	
Turlock Irrigation District	Water District (Tuolumne source watershed); Regional Stakeholder	Phone call; email	

San Francisco Public Utilities Commission	Water District (Tuolumne source watershed); Regional Stakeholder	Phone call; email	
Rural Counties Representatives of California	Association of Local Government; Regional Stakeholder	Phone call; email	
Sierra Nevada Conservancy	Regional Stakeholder	Phone call; email	
Housing California	Affordable Housing and homelessness; Statewide Stakeholder	Phone call to coordinate outreach during public comment period	
California Coalition of Rural Housing	Affordable Housing and farmworker housing; Statewide Stakeholder	Phone call to seek contacts in region; and email	
Legal Services of Northern California	Legal assistance to low income populations; Statewide Stakeholder	Phone calls	
California Rural Legal Assistance	Legal assistance to low income populations; Statewide Stakeholder	Phone call; email	
County Behavioral Health Directors Association	Mental Health providers; Statewide Stakeholder	Phone calls; email	
California Bioenergy Association	Statewide association; Statewide Stakeholder	Phone calls; email	
California Forestry Association	Statewide association; Statewide Stakeholder	Phone calls; email	

## **Attachment F: Benefit Cost Analysis**



State of California

National Disaster Resilience Competition Phase II

Public Comment Draft

October 9, 2015

## ESV Methods - Narrative

Two scenarios were developed for the project area:

1. "No Action" – representing the extent and severity of a typical 30-year fire event in the project area over the next 30 years if no action is taken.
2. "With Action" – representing the extent and severity of a typical 30-year fire event in the project area if the forest treatments described in the "Forest and Watershed Health" are carried out.

CalFIRE and U.S. Forest Service staff modeled these scenarios and provided results to Earth Economics. Results included total acreage burned by burn severity (measured as basal area loss), structures lost, people displaced, and firefighting and cleanup costs for a typical 30 year event under both scenarios. For the purposes of the ecosystem service analysis, Earth Economics used acreage lost by burn severity:

**Table 1 - Description of Fire Scenarios**

	Burn Severity			
	0% BA Loss	0-25% BA Loss	25-75% BA Loss	75-100% BA Loss
Scenario	Area (Acres)			
"No Action"	60,132	12,559	10,710	70,685
"With Action" Biomass Removal and Fuel Breaks	45,099	9,420	8,033	53,014

Next, Earth Economics estimated the burn severity of by area of vegetation type. Because the models did not provide estimates at this level of detail, Earth Economics assumed that the acreage of burn severity by vegetation type due to the fires in both scenarios would proportionally be the same as that experienced in the Rim Fire. Results of this assumption are provided in tables 2 and 3 below for each scenario.

**Table 2 - "No Action" Scenario - Area of each Land Cover by Basal Area Loss (%)**

	Area (Acres)			
	0% BA Loss	0-25% BA Loss	25-75% BA Loss	75-100% BA Loss
Land Cover				
Grassland	2,336	668	893	7,726
Herbaceous Wetland	110	35	31	140
Lake	297	27	14	18
Riparian	73	12	7	33

River	104	9	6	6
Shrub	2,427	863	1,150	14,020
Forest Broad Leaf	8,467	2,511	2,070	13,762
Forest Coniferous	46,318	8,433	6,538	34,981
<b>Total</b>	<b>60,132</b>	<b>12,559</b>	<b>10,710</b>	<b>70,685</b>

**Table 3 - "With Action" Scenario - Area of each Land Cover by Basal Area Loss (%)**

	Area (Acres)			
	0% BA Loss	0-25% BA Loss	25-75% BA Loss	75-100% BA Loss
<b>Land Cover</b>				
Grassland	1,752	501	670	5,795
Herbaceous Wetland	82	27	23	105
Lake	223	20	10	14
Riparian	55	9	6	24
River	78	7	5	4
Shrub	1,820	648	863	10,515
Forest Broad Leaf	6,350	1,884	1,552	10,321
Forest Coniferous	34,738	6,325	4,904	26,236
<b>Total</b>	<b>45,099</b>	<b>9,420</b>	<b>8,033</b>	<b>53,014</b>

The definition for each land cover type is provided in the table below.

**Table 4 - Land Cover Definitions**

Land Cover	Description and Layer(s) Used
Grassland/Meadow	Includes annual and perennial grasslands that dominate major regions around coniferous forests.
Herbaceous Wetland	Includes wetlands dominated by herbaceous meadow vegetation. Includes areas where total herbaceous wetland vegetation coverage is greater than 20%.
Shrub	Contains areas dominated by shrubs less than 5 meters tall. This class includes chaparral shrubs and mixed montane shrubs.
River	Includes stream and creek systems and sometimes areas of open water.
Lake	Includes areas of open water, generally with less than 25% cover of vegetation or soil.
Riparian	Riparian areas alongside riverine and wetland regions. Exists through various altitudes

Forest (Broad Leaf and Mixed)	Includes a mixture of aspen, blue oak woodlands, and montane hardwoods that occur sporadically throughout National Parks Service and Forest Service lands.
Forest Coniferous	Include many conifer dominated vegetation types such as Blue Oak-Foothill Pine, Closed-Cone Pine-Cypress, Douglas Fir, Jeffrey Pine, Lodgepole Pine, Ponderosa Pine, Red Fir, Sierran Mixed Conifer, and Mixed Montane Hardwoods Conifers.

Benefit Transfer Methodology was applied to estimate the total ecosystem service value loss before and after the Rim Fire. Benefit Transfer Methodology is a federally-accepted economic valuation methodology that utilizes local values where possible, and previous valuation studies of similar goods or services in comparable locations where local values are not available. These valuation studies each utilize one of eight primary valuation techniques, which include market pricing, cost avoidance, replacement cost, travel cost and contingent valuation.

In 2013, Earth Economics created a dataset of economic values that was used to estimate damages to natural capital due to the Yosemite Rim Fire. The resulting study<sup>a</sup> was used to support the State of California’s successful application for a Major Disaster Declaration. This same dataset was used for this study.

Transferred values from the Rim Fire study were converted to 2015 dollars per acre per year, representing the annual flow of value generated by a single ecosystem service on a specific land cover each year. Combining the available ecosystem service values (water regulation, habitat, recreation, etc.) for a single land cover yields a total value for that land cover in dollars per acre per year.

Monetary values were calculated for 10 out of 18 identified categories of environmental benefits (also called “ecosystem services”) identified. Eight categories of ecosystem services damaged by the fire were not estimated. A valuation of one or more environmental benefits for each of the eight land cover types burned by the fire was completed. The ten environmental benefits valued were: (1) air quality; (2) carbon sequestration; (3) flood protection; (4) erosion control; (5) biological control; (6) water filtration; (7) pollination; (8) habitat and biodiversity; (9) property and aesthetic values; and (10) recreational values. The eight land cover types were: (1) grassland/meadow; (2) herbaceous wetland; (3) shrub; (4) river; (5) lake; (6) riparian; (7) forest broad leaf and mixed forest; and (8) coniferous forest.

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<sup>a</sup> Batker, D. Christin, Z., Schmidt, R., de la Torre, I., 2013. The Economic Impact of the 2013 Rim Fire on Natural Lands. Earth Economics, Tacoma, WA.



The table below summarizes the range of values for each land cover type, expressed in \$/acre/year:

**Table 5 - Value by Land Cover**

Land Cover	Low ES Value (\$/acre/year)	High ES Value (\$/acre/year)
Grassland	\$2,384	\$5,397
Herbaceous Wetland	\$1,909	\$75,167
Lake	\$1,533	\$46,946
Riparian	\$731	\$5,058
River	\$176	\$39,179
Shrub	\$24	\$1,672
Forest Broad Leaf	\$210	\$11,738
Forest Coniferous	\$974	\$4,940

Ecosystem service functions are impaired or enhanced by changes in land cover types or qualities. Forest areas, immediately after a fire, for example, have less biodiversity than an untouched forest. Within a few years, a burned area may have more biodiversity with pioneer species and greater light penetration, and then decline if a dense stand of similar aged trees grows without thinning. The relationship between BA Loss and ecosystem service function capacity requires further study. Each ecosystem will have different function losses and will regain (or not regain) those functions over time at different rates.

The BA Loss is a coarse, rapid assessment of real fire damage to vegetation. Based on expert judgment, a coefficient was adopted to represent the loss of ecosystem services according to BA loss. The table below provides estimates of the decline in ecosystem service function and carbon storage capacity with each level of BA Loss.

**Table 6 - Ecosystem Service Function Capacity at BA Loss**

BA Loss	Ecosystem Service Function Capacity
0%	100%
0 - 25%	90%
25 - 75%	50%
75 - 100%	10%

Ecosystem service losses for the fire in each scenario were estimated by multiplying the acreage of each unique landcover/BA loss combination in Tables 2 and 3 by the value range in Table 5, and then weighting each value according to the coefficients associated with the BA Loss (Table 6). Total losses for each fire were then estimated.

Results indicate that damages to ecosystem services in the “No Action” scenario would range from \$58,241,659 to \$427,960,162, while damages to ecosystem services in the “With Action” scenario would range from \$43,681,714 to \$320,973,600. This result suggests that “With Action” scenario would avoid damages compared with the “No Action” scenario. Table 7 summarizes these avoided damages in a one-time 30-year event, and average avoided damages over 30 years.

**Table 7 - Avoided damages to ecosystem services in "With Action" scenario**

	Low	High	Average
<b>Avoided damages in a 30 year event</b>	\$14,559,945	\$106,986,562	\$60,773,253
<b>Average avoided damages per year over 30 years</b>	\$485,331.48	\$3,566,218.73	\$2,025,775

## Carbon Methods - Narrative

Stored carbon biomass provides economic value by contributing to climate stability. In this study, the economic value avoided carbon emissions was calculated for the “With Action” scenario compared with the “No Action” scenario. U.S. Forest Service data on the carbon content of different forest stand ages for each forest type, combined with pre-fire timber diameter size data and burn data, were used to compare pre-fire carbon storage with post-fire carbon storage in both scenarios. Dollar values were estimated for each ton of carbon lost into the atmosphere for each fire scenario. The low value (\$12.83) used was the market value of carbon in the California cap-and-trade. The high value (\$51.34) used was the EPA’s social cost of carbon.

Results indicate that damages due to carbon emissions in the “No Action” scenario would range from \$66,615,989 to \$273,445,618, while damages due to carbon emissions in the “With Action” scenario would range from \$49,962,548 to \$205,086,482. This result suggests that “With Action” scenario would avoid damages compared with the “No Action” scenario. Table 7 summarizes these avoided damages in a one-time 30-year event, and average avoided damages over 30 years.

	Low	High	Average
<b>Avoided damages in a 30 year event</b>	\$16,653,441	\$68,359,136	\$42,506,289
<b>Average avoided damages per year over 30 years</b>	\$555,114.71	\$2,278,637.86	\$1,416,876

## Implan Methods - Narrative

To monetize economic impacts, an IMPLAN analysis was conducted. IMPLAN is an input-output model used widely by government, non-profit, and private industries. The use of this input-output model can help to illustrate potential impacts from proposed investment choices. First, the cost values of each project component were placed into the related sectors in IMPLAN. Once the project costs were allocated to a specific sector, IMPLAN was used to calculate job creation, regional sales per sector, income generation, and total value added.