State of California

National Disaster Resilience Competition

Phase II
October 27, 2015

California Environmental Protection Agency

Sierra Nevada Conservancy

FR-5800-N-29A2
National Resilient Disaster Recovery Phase II
14.272 -- National Disaster Resilience Competition

State of California

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Exhibit A:
Executive Summary

ExhibitAExecutiveSummary.pdf

EXHIBIT A – EXECUTIVE SUMMARY

The 2013 Rim Fire destroyed 257,314 acres of land in Tuolumne County, and ranks as the third largest wildfire in State history. The fire burned for over two months through large portions of Stanislaus National Forest, threatening surrounding communities and damaging the critical watershed that supplies water to local communities, 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 environmental damage range up to $736 million. Unfortunately, the Rim Fire is not an isolated incident. In September 2015, the Valley and Butte Fires burned over 145,000 acres, destroyed 2,728 structures and resulted in 7 deaths. 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 and related epidemic tree mortality magnifies risk, as the conditions for rapid fire expansion are all-too-ripe.

These fires have serious consequences for local communities, including public health impacts, property damage, and economic disruption. At the same time, these fires also threaten the upper watersheds that form the 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. Wildfire is not the only risk to watersheds; climate models project a future with declining snowpack, rising temperatures, and an increase in the frequency and intensity of extreme events, including

wildfire. Preparing for these changes as the state's population grows to 50 million requires a replicable, innovative, and collaborative program for watershed management and resilience.

The NDRC has provided a unique opportunity to design and, if funded, implement an integrated, replicable model for community and watershed resilience. The Community and Watershed Resilience Program (CWRP) provides an innovative, revenue-generating, scalable, and replicable model that can serve myriad similar regions throughout the Western United States. Developed in partnership with federal and local government agencies, community organizations, and private business, the CWRP is built around partnerships and practices designed to overcome the financial and institutional barriers to sustainable, healthy forests and watersheds. The CWRP will also facilitate the transition to a sustainable forest economy in our rural communities. The State of California has partnered with Tuolumne County and the U.S. Department of Agriculture Forest Service (USFS) to lead this effort. We have engaged with local businesses, non-profit organizations, 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 activities in three integrated pillars:

1. Forest and Watershed Health: thinning, biomass removal, restoration, and reforestation activities in the Rim Fire burn area. Given the certainty of an uncertain future of drought, climate change and wildfire, these activities are designed to improve forest and watershed health and resilience against disturbances.
2. Integrated Biomass and Wood Products Facility: This facility will provide clean power, cooling and heating, and a wood products facility to utilize biomass material removed

from the impacted disaster area. The facility will serve the Rim Fire recovery area, and act as a regional facility to accept thinned biomass from Tuolumne and surrounding counties.

3. Community Resilience Centers: Designed to increase community resilience, these facilities will provide services during an emergency and also provide year-round services, including education and job training to support forest and watershed work and the biomass facility. These facilities will be a model for serving rural communities.

Each of these pillars and activities build resilience individually, but implemented together, they create an economically- and environmentally-sustainable model for community and watershed resilience that reduces the risk of fire and supports local economic development. Through program design and implementation we will work with partners to build a program roadmap and support development of innovative financing tools to facilitate the replicability and scalability of the program.

The State of California, in partnership with Tuolumne County and the USFS, is pleased to present the Phase II application for the National Disaster Resilience Competition. The Community and Watershed Resilience Program is 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 the State's Greenhouse Gas Reduction Fund, State Water Bond Funds, and programs to support bioenergy. The total project cost request is $117 million; the benefit-cost ratio is 1.53. All documentation is located at links within this document or on HCD's NDRC Application Documents webpage.

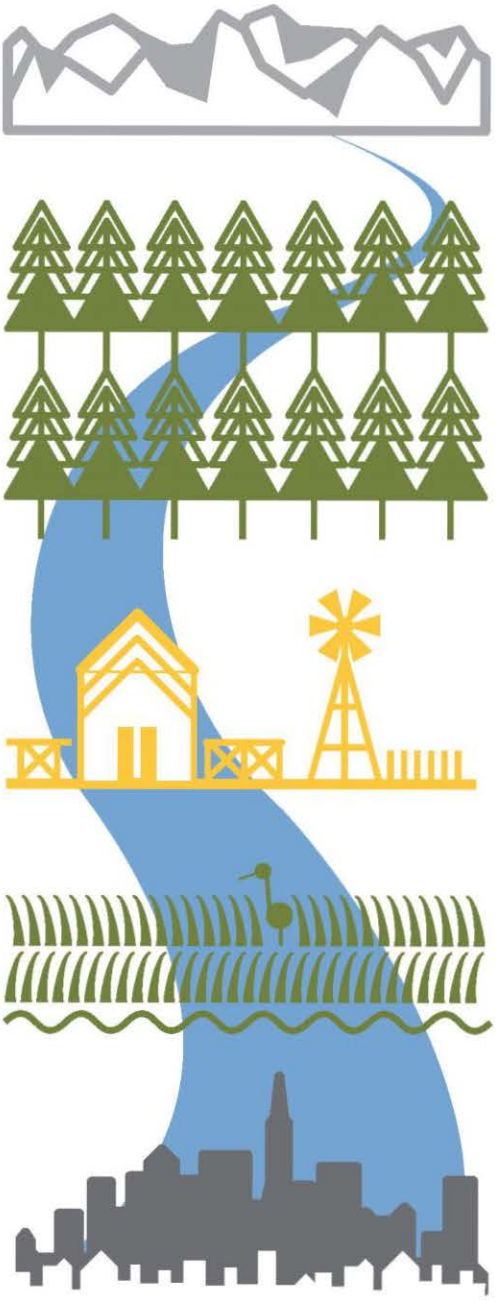

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Exhibit B:
Threshold Requirements

ExhibitBThreshold.pdf

EXHIBIT B – THRESHOLD REQUIREMENTS

The Department of Housing and Community Development (HCD), on behalf of the State of California will follow all applicable laws, regulations, and Executive Orders if awarded, throughout implementation and 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. The applicant is not subject to civil rights matters rendering it ineligible for funding under Section III.C.2. of HUD's FY2014 NOFAs for Discretionary Programs, nor is it ineligible under any other general section threshold.

ELIGIBLE APPLICANT: State of California, Qualifying Disaster Declaration #4158 (The Rim Fire)

ELIGIBLE COUNTY: Tuolumne County

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 and evacuation areas (Rim Fire Burn Scar, Evacuation Areas and Census Tracts - MID-URN Area Map).

Census Tracts 06109002200, 06109004100, 06109003100, 06109003200, 06109004200

ELIGIBLE ACTIVITY

California's proposal includes the following eligible activities:

Project Activity	**Eligible Activity**	**Regulatory Citation**
Forest and Watershed Health	Public Infrastructure	HCDA 105(a)2

Biomass Facility & Wood Products Campus	Public Facilities	HCDA 105(a)2
Community Resilience Center	Public Facilities	HCDA 105(2)

RESILIENCE INCORPORATED

As further described in Exhibit E: Soundness of Approach, completion of the plans and activities proposed in the State's Application 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*, identifies risks and resilience needs across sectors. California also incorporated climate change considerations into the *State Hazard Mitigation Plan* and the California Water Action Plan. California voters showed further support for our critical resources by approving Proposition 1, a 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, further advancing protection for 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 thinning, fuel breaks, reforestation, biomass removal, rangeland improvements and noxious weed treatments. These activities reestablish carbon storage in living trees, help prevent future fires, secure livestock to protect against erosion and damage to forest infrastructure, reduce invasive species, and provide jobs and revenues to help build strong rural economies. This activity furthers the goals of fostering climate-resilient lands and waters, and managing carbon outlined in the White House's Council on Climate Preparedness and Resilience's *Priority Agenda: Enhancing the Climate Resilience of America's Natural Resources*.

The proposed biomass facility will serve the impacted area, as well as the region, providing a marketable end-use for biomass removed within the county, reducing the need for open burning of biomass in the forest. This facility will further increase community resilience by lessening Tuolumne County's reliance on imported energy, reducing greenhouse gases, and producing jobs in the region.

The two proposed Community Resilience Centers (CRCs) will provide social resilience to Tuolumne and surrounding counties. Tuolumne County is a regional leader in responding to disaster, with the region's only food bank and major evacuation center. Therefore, during emergencies in neighboring counties, they often turn to Tuolumne County for support. 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 exacerbated during a disaster. The Tuolumne City location was selected because of its proximity to low- and moderate-income 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 local residents as well as the adjacent county.

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

NATIONAL OBJECTIVE

California has included in this application a request to HUD for a National Objective waiver. The waiver requests that HUD permit the State to use 38% LMI as the definition of Low-Mod Area for projects using the LMA national objective.

As stated below in the Tie-Back section, each of the proposed activities in the Community and Watershed Resilience Program meet the definition of tie-back and therefore, are eligible under Urgent Need. In order to reach the intended low-moderate income beneficiaries, the State would like to carry out the CRC activities under the LMA national objective.

OVERALL BENEFIT

California has included in this application a request to HUD for an Overall Benefit waiver. The waiver requests that HUD permit the State to use 47% of its grant award if both of the Community Resilience Centers are funded, rather than requiring 50% of all funding being used for the LMI national objective. However, if both CRCs are not funded, the State will need to have the Overall Benefit requirement reduced to whatever portion of funding is awarded for the CRC work.

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. Eighty-five percent of the San Francisco Bay Area's water comes from within 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 fires have 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 et al. April 2014). A wildfire the size of the Rim Fire—one of the three biggest fires in California's history —results in an uncontrolled release of massive amounts of stored forest carbon and contributes to the state's greenhouse gas emissions, reinforcing a feedback loop that increases the rate of climate change (Gonzalez et al. July, 2015).

BENEFIT-COST ANALYSIS

The State of California, in partnership with GCR, Earth Economics, and the NDRC steering committee prepared the Benefit Cost Analysis. The NDRC steering committee included: HCD, the Governor's Office of Planning and Research (OPR), the California Environmental Protection Agency (CalEPA), the California Department of Forestry and Fire Protection (CAL FIRE), U.S. Department of Agriculture Forest Service (USFS), the California Conservation Corps, and Tuolumne County. This group completed the BCA to assess the cost effectiveness of the activities included in each of the three pillars (Forest and Watershed Health, Biomass Facility, and Community Resilience Centers.) The team also assessed the cost effectiveness of the integrated program. 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.

The Team solicited the expertise of Earth Economics to complete the BCA. Earth Economics completed an economic analysis immediately following the 2013 Rim Fire. This analysis estimated the environmental losses from the Rim Fire as high as $736 million. The BCA working group conducted meetings relative to each of the three pillars to identify comprehensive lists of the history of hazards associated with each, in addition to evaluating avoided future costs, damages, and community and social benefits. See Attachment F for additional detail.

MOST IMPACTED CHARACTERISTICS

Narrative Description of the Qualifying Disaster

The 2013 Rim Fire burned over 250,000 acres in Tuolumne County. The fire destroyed forests, 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 and private timber and ranch land. The fire burned for over two months, leading to serious economic disruption to residents and local businesses.

Supporting Data

Public Infrastructure The Rim Fire destroyed permanent public infrastructure, including road systems that provide access in to and out of Stanislaus National Forest. The damage resulted from direct fire impacts, but also as a result of changes in the landscape that caused erosion and landslides that undermined the integrity of the system and wear and tear from ongoing fire recovery efforts. The Rim Fire also destroyed rangelands, fencing, and water troughs that had been in use by cattle ranchers under long-term agreements with the USFS and prevented grazing in the forest. 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	USFS-Rim-Roadway/Culvert/Retaining Wall Repair Report
Rangeland infrastructure damage #1 Rangeland infrastructure damage #2	$1,006,350 $661,400	USFS - Rim -Range Infrastructure Repair Report #1 USFS- Rim-Range Infrastructure Repair Report #2

Environmental Degradation Earth Economics estimated the environmental benefit losses from the Rim Fire to be in excess of $100 million, just 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 economies are closely linked to the health of forests through timber and other wood products, tourism and recreation suffered

from business loss and closure, direct public health impacts, and depressed property values. The effects on downstream water storage and supply and the long-term implications for carbon storage have global effects.

XI. MOST DISTRESSED CHARACTERISTICS

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	Workforce	Employed Population	Unemployed (%)	MID-URN vs. Nat'l Avg.
06109002200	3,342	2,821	15.6%	160.8%
06109004100	2,471	2,121	14.1%	145.8%
06109003100	2,140	1,777	17.0%	174.8%
06109003200	2,875	2,435	15.3%	157.7%
06109004200	1,487	1,265	14.9%	153.9%
Burn + Evac Area	6,501	5,477	15.8%	162.5%
Burn + Evac + Evac Warning Area	12,315	10,419	15.4%	158.7%

Prior Environmental Distress The Target Area has suffered prior environmental distress due to drought, previous wildfires, and overstocked forests. Most recently, the County has

requested that Governor Brown declare a State of Emergency due to the large number of dead and dying trees in the County. Tree mortality has been exacerbated by drought and beetle infestation. The dead and dying trees pose a hazard to life and safety, but also constitute an enormous fuel load for a future fire. Pre-Rim Fire tree mortality was high due to drought and associated disease, and possibly a changing climate. The dead and dying trees translated into large amounts of fuel, and set the stage for the Rim Fire.

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 percent 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. After the fire, in addition to direct fire mortality, many surviving trees had been damaged by the fire and died over a period of time. Insect populations 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 burned again in the Rim Fire. Natural regeneration of trees following wildfires that burn as hot the Complex and the Rim fires is often insufficient,

resulting in type conversion from forest to grass and shrub lands, which are more susceptible to high severity fire and store substantially less carbon than healthy forests.

Due to past fire exclusion, declines in timber harvesting and reduced forest management activities, unnaturally dense forests, like the location of the Rim Fire, are common across California and much of the Western United States. Overstocked forests decrease the amount of water absorbed into the soil. In forests with high canopy density, comparatively larger amounts of rain and snow can be captured in the canopy and evaporate rather than making it to the ground and flowing into streams, rivers, and reservoirs (Bales et al. 2011). 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).

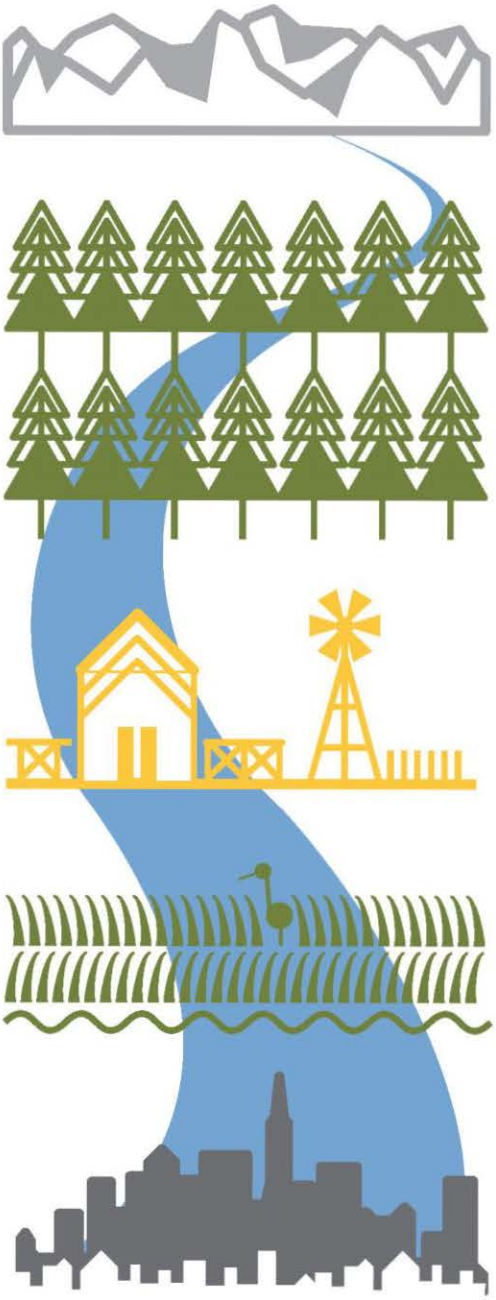
UNMET NEEDS

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." Mitigating these damages will require investments in thinning, reforestation, biomass removal, forest restoration treatments, and sustainable forest management practices. Through 2014 the USFS invested $134 million in Rim Fire Recovery, and will spend $6.7 million beginning in January 2015 to support NDRC activities, for a full description refer to Exhibit F. Additional resources are needed to continue and expand these efforts to mitigate the environmental damages reported in the "Most Impacted – Environmental Degradation" section.



State of California

National Disaster Resilience Competition

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Exhibit C:
Factor 1 - Capacity

ExhibitCCapacity.pdf

EXHIBIT C: CAPACITY

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; development of large scale, high-impact programs; active monitoring of investments; and use of adaptive management tools. The State of California is working with a range of partners to administer the program, provide necessary and appropriate technical expertise, and to engage the local community and broader region.

General Administrative Capacity

California's NDRC application is driven by the State's recovery and resilience needs, and is a natural extension of the State's integrated climate change program that drives cross sector and jurisdiction collaboration. State climate policy comprises not only the landmark California Global Warming Solutions Act, AB 32, but also a climate adaptation strategy that includes *Safeguarding California* and a suite of new laws to codify the State's comprehensive climate adaptation and resilience efforts. These new laws 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 Core Team members are listed below.

The Department of Housing and Community Development (HCD) is the applicant on behalf of the State of California. HCD and 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.

- **HCD** is the applicant of record on behalf of the State of California. HCD will ensure that the grant efforts comply 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 recently formed 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 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. In addition to quickly developing and implementing collaborative and strategic investment programs across funding sources, HCD has a long history of receiving and administrating recovery funding from HUD. HUD awarded the State of CA over $145 million in the first round of Neighborhood Stabilization Program (NSP) funds. The total expenditures (local match, grant and Program Income funds) exceeded $188 million, well within the strict performance

deadlines set in the NSP legislation. Over 1200 units were impacted with NSP funds, providing housing opportunities to households that were at or below 120% Area Median Income. HCD administered $39,531,784 in 2008 DRI funding (received by the Department in 2010), and $15,000,000 in additional DREF funding (also received in 2010). Of that, $41,958,807 has been expended and/or obligated, and the Department is actively working with HUD to receive TA to successfully disburse and complete the DRI and DREF activities and contract.

- **Sierra Nevada Conservancy (SNC)** will administer and coordinate the forest and watershed restoration and biomass facility activities under the CWRP. CWRP is a natural extension of SNC's Sierra Nevada Watershed Improvement Program (WIP). SNC is the lead state agency responsible for implementing the WIP - a coordinated, integrated, collaborative program to restore the health of California's primary watershed - and is an active partner in restoration and forest management projects throughout the Sierra Nevada Region. SNC funds projects to reduce the risk of large damaging wildfires that threaten communities and water supplies, while also providing revenue to local communities and creating job opportunities. SNC manages the $50 million Proposition 84 fund for forest and watershed health and is currently working to distribute $25 million in Proposition 1 funding in the Region. SNC has worked with a range of community, government, and industry stakeholders to identify economic uses for the biomass removed in forest restoration activities. Further experience includes developing, awarding, and managing biomass utilization planning and implementation grants including feasibility and engineering studies to establish biomass facilities. Furthermore, SNC is identified in the California 2012 Bioenergy Action Plan as the state

agency responsible for pursuing funding for forest bioenergy research and implementation and assisting communities with the development of community scale projects. SNC will work in partnership with other State and Federal agencies to complete work under the CWRP.

- **Tuolumne County** will manage the planning and construction of the Community Resilience Centers, which will provide emergency services as well as ongoing educational, economic development, and public services to the community. The County has recent and current experience managing large-scale construction projects, logistics for community engagement efforts, and managing and tracking State and local funds within Tuolumne County. The County also 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. Tuolumne County is currently managing the construction of a 3,000 square 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 71,000 square foot, 224-bed jail facility. 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.
- **OPR** has the 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.

Technical Capacity

The State is working with partners across the Sierra Nevada region to leverage existing efforts and relevant investments 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:

- **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. OPR has access to specialized technical expertise in Cal EPA, the departments of Forestry and Fire Protection, Fish and Wildlife, Water Resources and others.
- **HCD** will facilitate Program implementation, provide contracting and financing support, and bring site, city and regional planning expertise to the Program.
- **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.

- **Local Government Commission (LGC)/Civic Spark** Civic Spark is an AmeriCorps Governor's Initiative that provides Civic Spark members to governments and organizations to promote climate change work. LGC has committed one Civic Spark member to support the start of the Community and Watershed Resilience Program and, pending procurement, additional members will assist with program implementation and scaling.

Activity Pillar 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 fire protection and prevention, green infrastructure and reforestation design, and forest management. 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. CCC hires workers between the ages of 18 and 25 to implement conservation projects. 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.

Activity Pillar 2: Biomass and Wood Products Facility

- **Sierra Nevada Conservancy** will serve as the project manager for the Biomass and Wood Products Facility activity under Phase II of the NDRC.
- **California Environmental Protection Agency (CalEPA)** will partner with SNC on the leadership, planning and development of the Biomass and Wood Products Facility. It will coordinate with 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 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 for siting a biomass and wood products facility on federal land and leverage existing programs and capital for site development.

Activity Pillar 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 county 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. The County will work with a number of community partners to support the design of the CRCs and the programs housed in them.
- **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.
- **Tuolumne County Office of Schools** will work with the County to support educational opportunities through the Community Resilience Centers.
- **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.

Subject Matter Experts and Collaborators

The NDRC development team has worked with a range of partners to scope and develop various elements of the CWRP. Due to State procurement rules, formal partnership agreements are not possible, but each has agreed to work with the State to help develop the proposed program.

- **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.
- **TSS Consultants** is the primary consultant firm in California providing project development, engineering, and design services, environmental and cultural review, and financial consulting for biomass and biofuel facilities.
- **Red Rock Biofuels** is developing facilities to convert woody biomass to renewable diesel and jet fuels. Red Rock staff will aid in assessing site feasibility and biomass feedstock availability, and also has expertise in commercial-scale project development, project financing, design, engineering, and implementation. Red Rock has secured biofuel development funding from federal agencies, including the Departments of Defense and Energy.

Community Engagement and Inclusiveness

Stakeholder engagement is critical to decision-making at the local, regional and State level. The State has actively engaged stakeholder and community organizations needed to successfully implement the proposed NDRC framework. These partners comprise a cross-disciplinary cadre of professionals in the fields of forestry and fire protection, watershed health, climate resilience, energy generation, local government, regional planning, and service provision for seniors and children. All members of the Core Team have staffed, led, attended, and/or managed formal and informal public engagement meetings and workshops. The organizations engaged in the consultation process to determine the resiliency

framework and California's application are listed in Attachment D, Consultation Summary Table section1.2.

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. 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. We have also worked with the Alliance of Regional Collaboratives for Climate Adaptation (ARCCA) to broaden our outreach. ARCCA members include the Sierra Nevada region's new collaborative for climate adaptation and mitigation, Sierra Climate and Mitigation Partnership (Sierra CAMP). We also engaged 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.

Cross-Disciplinary Collaboration The State of California has several forums for cross-disciplinary collaboration. These include the Climate Action Team (CAT), which is comprised of agencies secretaries and department heads across almost all State programs. Subgroups of the CAT focus on specific programs to address climate change. A newly adopted law creates the Integrated Climate Adaptation and Resilience Program, which will work with the CAT to align state, regional, and local adaptation efforts.

Outreach to Vulnerable Populations and Advocates Organizations who serve or advocate for vulnerable populations, including low-income families and seniors, have been engaged

in both phases of NDRC development. The County successfully engaged multiple agencies in the design of the Resilience Centers including Amador Tuolumne Community Action Agency (ATCAA). Many of these organizations will use 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.

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 Community and Watershed Resilience Program. Attachment D provides a complete list of organizations engaged in the process. OPR and HCD led 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, CAL FIRE, SNC, Tuolumne County and SBC.

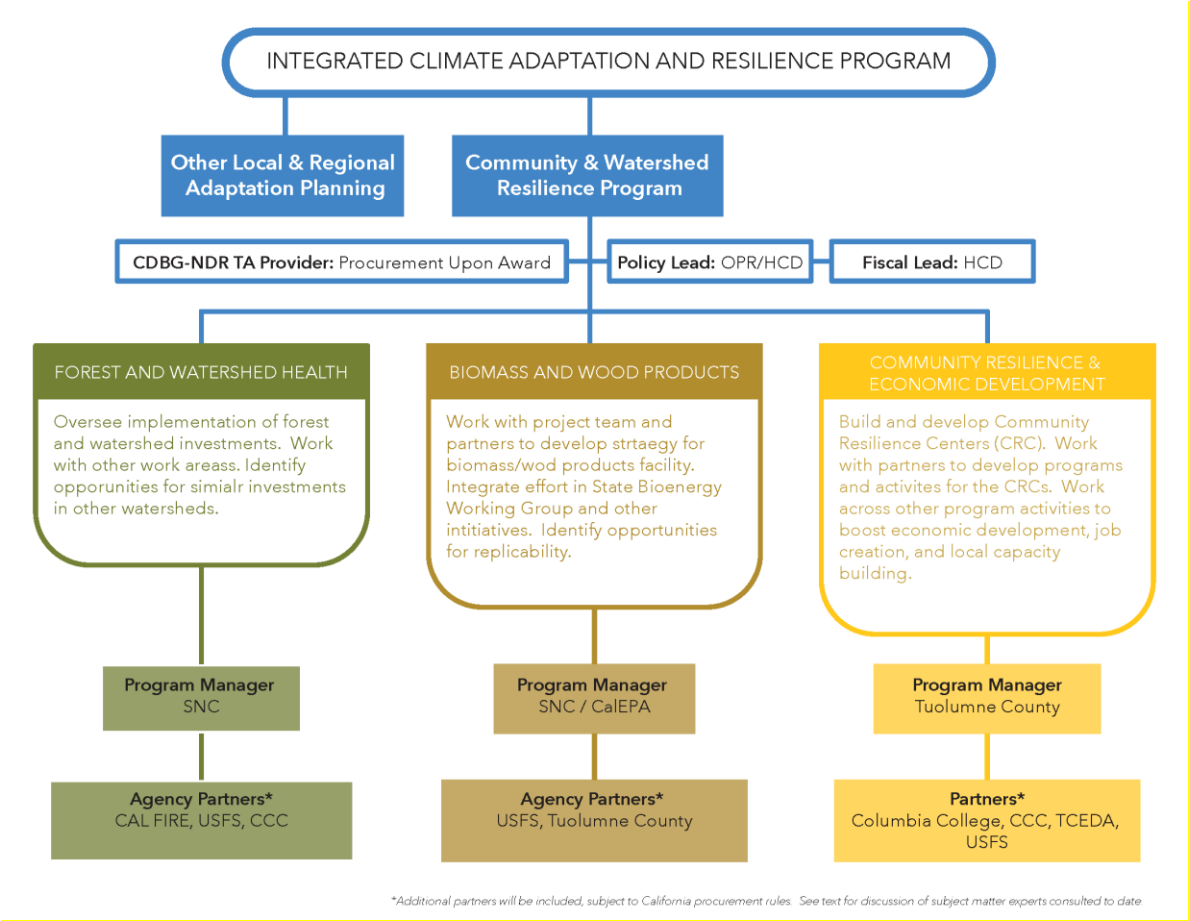
Community Engagement in Rim Fire Recovery and NDRC Application Development California and our partners have great capacity to work with stakeholders to identify specific recovery and resilience needs to incorporate in this application. Tuolumne County leaders regularly engage with their constituents and were a reliable resource, along with State and federal personnel, to community members, businesses, and community organizations during and since the fire, 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.) As part of the engagement process, the Core Team solicited project ideas from stakeholders. This list far exceeded the scope of this application, but is being curated and tracked by the County as an inventory of future action items.

The extensive post-Rim Fire community engagement efforts led naturally into similar efforts for the NDRC. 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.

MANAGEMENT STRUCTURE

In addition to the identified implementation partners, the Team has enlisted a strong roster of partners and collaborators, 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. 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

The following personnel will be key contacts for each partner. Their responsibilities will be to carry out the work described above.

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

Tuolumne County: Maureen Frank, Deputy County Administrator

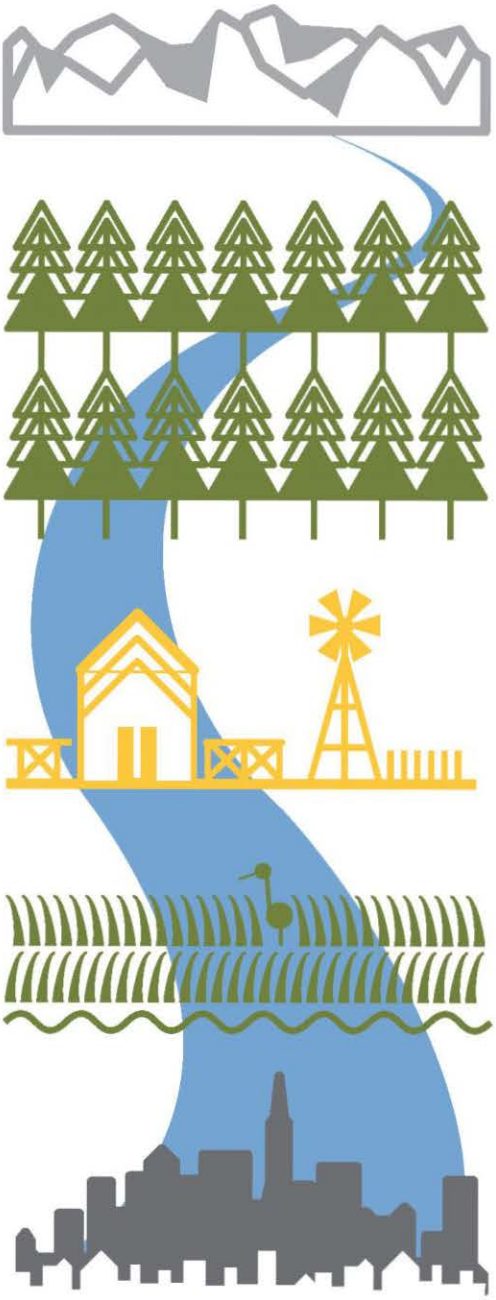
Sierra Nevada Conservancy: Angela Avery, Chief, Policy and Outreach Division

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

References

The following references are available for the two pillar leads of the CWRP:

Pillar Lead	References
Tuolumne County	Beverley Prior- Principal Justice Facilities Studio, AECOM 1999 Avenue of the Stars, Suite 2600, Los Angeles, CA 90067 Beverly.Prior@aecom.com; 213-593-8000 Terry Cox, Executive Director, Cox Consulting P.O. Box 966, Sonora, CA 95370 Cox_Consulting@svcglobal.net; 209-533-8810
SNC	Todd Ferrara, Deputy Secretary, External Affairs, California Natural Resources Agency 1416 Ninth Street, Suite 1311, Sacramento, CA 95814 Todd.Ferrara@resources.ca.gov, 916-653-5792 Jerry K. Bird, Regional Forester's Representative US Forest Service , Pacific Southwest Regional Office 650 Capitol Mall, Suite 8-200, Sacramento, CA 95814 jkbird@fs.fed.us, 916-498-5324
HCD	Dionne Roberts, TDA, Inc. (Training and Development, Inc.) 31 Atkinson Street, Suite B, Laurinburg, North Carolina 28352-3715 DRoberts@tdainc.org, 910-277-1275



State of California

National Disaster Resilience Competition

Phase II
October 27, 2015

Exhibit D:
Factor 2 - Need/Extent of the Problem
ExhibitDNeedExtentofProblem.pdf

EXHIBIT D: NEED/EXTENT OF THE PROBLEM

UNMET RECOVERY NEED AND TARGET GEOGRAPHY

The target geography correlates to the footprint of the Rim Fire and the communities in the mandatory evacuation areas and the evacuation warning areas, displayed in the Maps, Graphics, and Visuals folder. The census tracts in the MID-URN area are: 06109002200, 06109004100, 06109003100, 06109003200, 06109004200.

The State's forested upper watersheds form the critical green infrastructure backbone of California's complex and drought-stricken water system. Restoration investments in these watersheds build resilience in communities, economies, and people by increasing the resilience of watersheds to disturbances such as fire, pests, and drought. The Rim Fire is one in a series of wildfires to break records for intensity and size. These fires can trigger positive feedback loops that have cascading effects on forests, water resources and communities long after the fire is out. The cumulative effects of sequential events can be devastating and widespread. A comprehensive landscape approach to mitigating the effects of these events necessitates enhancing the health and resilience of upper watersheds, forests, and rural communities.

Unmet Recovery 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 did significant damage to the environment and public infrastructure. Rim Fire impacts decimated large tracts of already drought stressed forests, and has led to erosion and sedimentation into streams and reservoirs,

reducing water quality and reservoir capacity, affecting the local community and downstream users. 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 rely on an 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 connect to the forest through tourism, recreation, associated services, timber, and other wood products, such as fence posts, animal bedding, or biochar.

Addressing these unmet needs requires investment to address immediate risks, but also to restore long-term ecosystem services. In the near-term, investments are needed to support sustainable forest management practices on a scale that ensure healthy landscapes and support timber and wood product industries. These activities include thinning overstocked forests, 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, but that are not included in the NDRC. This includes vulnerabilities in communications, transportation, and water infrastructure. Access to communities – both for evacuation and staging of emergency equipment was challenging. 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 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.

Impacted and Distressed Characteristics in the MID-URN AreaEconomic 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 region's workforce and economy, closely tied to the forest through timber and wood products, tourism, recreation, and associated service industries, increases in vulnerability when these forest-based industries and services are impacted by disaster. In 2009, recreation, retail, or accommodation and food services represented over 20 percent of the workforce employment. The workforce is also highly seasonal. Averaged over the 2000-2011 period, the size of the workforce peaks between July and October. The Rim fire began right before Labor Day weekend, forcing the cancellation of hotel and campground reservations and closure of 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.

Since the Rim Fire, residents in Tuolumne County have had difficulty obtaining and maintaining homeowner's insurance. In February 2015, the Tuolumne County Board of

Supervisors launched a community survey to measure the difficulty for County residents obtaining and maintaining affordable homeowner insurance due to fire loss concerns by insurance companies. Access to insurance remains a challenge common to communities impacted by wildfire, including the recent Butte and Valley fires.

As discussed in Exhibit B, in addition to the region's fragile economy, current drought conditions, tree mortality, and the past history of severe wildfires accentuated the impact of fire throughout the region.

Impacts Beyond the MID-URN Area Building resilience in the upper watershed will have statewide benefits. Roughly sixty percent of California's developed water supply originates in the Sierra Nevada region. When forests burn, impacts on water supply and quality occur due to soil erosion and 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 due to sedimentation is often permanent (Poff and Hart 2002). The fire also damaged infrastructure in the San Francisco Public Utility Commission's water and power systems, which originate in Tuolumne County.

Investment in resilience in the State's watersheds will also reduce air pollution and greenhouse gas (GHG) emissions. Healthy forests play an important role in mitigating 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 a single large, destructive fire 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, 2013, 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 even more GHG emissions than the event itself, and 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 – page 13/Report page 29, highlighted).

RESILIENCE NEEDS WITHIN RECOVERY NEEDS

Value of Enhanced Resilience

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 known costs or lost benefits thus approaches $1 billion. Recent extreme fires such as the Valley and Butte fires, with significant loss of homes, each exceed the $1 billion price tag.

The three pillars of the Community and Watershed Resilience Program (CWRP) are designed to reduce the risk, size, and intensity of wildfires; provide economic development opportunities; and support community and ecosystem resilience.

Thinning overstocked forests results in less intense and damaging fires when they occur, and increases the odds of being able to control wildfires at a smaller size. Biomass removal and fuel breaks are designed to reduce the size and intensity of wildfire and to protect communities. Analysis of a neighboring watershed estimated the economic value of undertaking forest and watershed activities like those proposed in the Community and Watershed Resilience Program. This avoided cost study shows that fuel treatments (e.g., thinning) can reduce the size and intensity of wildfires and that the cost savings of these treatment can be up to three times the cost. The beneficiaries of these savings include state and federal governments, residents, timber companies, non-industrial private forest landowners, and utilities. Increased resources to remove biomass (i.e., thinning) creates jobs and can generate revenue through bioenergy and wood products.

The Community Resilience Centers will provide a safe shelter and common 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. Further, throughout the year these CRCs will serve as a platform to enhance community connectivity and social cohesion through needed programs and community workshops – imperative for fostering social resilience in rural communities. Some uses will include workforce training, community workshops, meals on wheels, college courses, and a Head Start program.

General Amount of Needed Investment in Resilience

The costs proposed in the CWRP 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 NDRC limitations prevented their inclusion in final CWRP design. Some of these items include

installation of fire hydrants, communications systems for first responders, forest access roads, community development programming, rebuilding or repairing recreational amenities such as campsites and boat launches, a day care center, fire trucks, replacing water transmission lines, water source development, and more. The total funds that would be needed to address these additional resilience needs exceed $800 million.

Describe Vulnerable Populations and Quantify Disaster Impacts

Low- and moderate-income people (LMI) and vulnerable populations in Tuolumne County were disproportionately impacted by the Rim Fire. As noted above, a large share of employment is associated with tourism and recreation. The LMI population in the County was thus impacted by severe reductions in 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. In addition, while no studies have been done on health impacts among the elderly, it is likely that the effects of the Rim Fire have presented additional health impairments.

Describe Factors That Enhance or Inhibit Resilience

California has experienced several major fires since the 2013 Rim Fire – a situation California Governor Edmund G. Brown has referred to as the "new normal." Response and recovery require unprecedented levels of coordination across local, state, and federal partners. The Office of Emergency Services (OES), OPR, HCD, FEMA and other agencies have made a concentrated effort to take proactive steps to learn from these fires. CAL FIRE, in cooperation with Cal OES, has concluded Post-Fire Watershed Emergency Response surveys of the recent Butte and Valley fires, and will continue to coordinate and track the

implementation of emergency protective measures for identified life safety hazards, and subsequent resource protection measures.

Challenges to achieving resilient communities and watersheds include: inadequate resources and trained personnel to remove biomass from the forest, both in burned and adjacent areas; lack of facilities to process biomass that is removed; and lack of community resources to support education, training, and economic diversification. 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.

The USFS and other landowners are challenged by limited budgets and markets for biomass. Especially during active fire seasons, funding for forest management and fire prevention may be limiting, thus delaying or preventing forest health activities. As these activities are delayed, more fuel builds up and the risk of severe fire increases. Lack of nearby biomass energy or wood products facilities further weakens the demand for thinning. This accumulation of biomass becomes fuel for fires and increases susceptibility to pest invasions, inherently decreasing forest resilience in the face of climate change and under threat of extreme wildfire.

Tuolumne County faces many challenges common to rural communities. Tuolumne County is rural in nature, spanning 2,274 square miles (1,455,360 acres), with a population base that is distributed in remote and sometimes isolated areas of the county. The large area and low population densities make it challenging to get services to all residents who need them, including food and health care services for elderly residents, but also education opportunities to younger residents. The development of community resilience centers

designed around these needs and the structure of the community will help address these challenges. These challenges are not unique to Tuolumne County, but are replicated throughout forested mountain communities in the West. Therefore, there is ample opportunity for replicating this pilot program.

Tuolumne County has a number of organizations in place that are working to boost the resilience of the region from wildfires and the resulting infrastructure and economic damage that came with these disasters. This includes two FireSafe Councils, which work with homeowners and businesses to develop fire resilience strategies. The Southwest Interface Team (SWIFT) is a bi-county collaboration that has worked to develop and maintain a set of strategic fuel breaks to protect communities, timber resources, and other vital assets in the region. In the Rim Fire recovery effort, new methodologies for the restoration of forests are underway, which include a departure from traditional methods. Not knowing what future climates and growing conditions will materialize, a diversity of seedlings are being strategically planted with new spacing patterns to promote soil retention and water quality– a strategy that will promote long-term resilience. CAL FIRE continues to implement fuels reduction projects in cooperation with private landowners to reduce fire impacts near high-risk residential communities.

APPROPRIATE APPROACHES

General Description of Optimal, Eligible Program Type(s)

The optimal, eligible program type that best addresses 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 Community and Watershed Resilience Program (CWRP) is based on investments in forests and public

facilities to support the development of an interconnected system of community, economic, and forest ecosystem resilience. The CWRP 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 systematically considered three interdependent risks: risks of current and future forest conditions, risks to local communities, and risks to the State's water system.

Current and Future Forest Conditions Fire is a natural process in California forests (Collins and Skinner 2013). Historically, frequent, low-intensity fires maintained relatively open, patchy stands composed primarily of large, fire-resistant trees across much of the landscape. However, over a century of fire suppression coupled with reduced timber harvesting, notably on federal lands, have shifted forest structure and composition. This shift has resulted in increased density of trees (i.e., trees per acre), smaller average tree diameters, higher proportions of shade-tolerant tree species, and elevated surface fuel loads relative to historic conditions. 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 Wagtendonk and Fites-Kaufman 2006; and Perry et al 2011). Fire sizes and annual burn area increased during the same period. These trends are linked to stand- and landscape-scale changes in forest structure and a warming climate.

The State's historic drought conditions have also contributed to unprecedented tree mortality. As noted in Exhibit B, these dead trees present represent breeding grounds for

expanding bark beetle populations and provide dry fuel that will further exacerbate the threat of large wildfire.

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 result of a changing climate. 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 at higher elevations. Drought and climate change are expected to increase fire intensity and areas susceptible to fire.

Risks to the Local Community Wildfire poses significant public health risks, especially to the elderly, children, and the infirm. Wildfires also pose risks to homes, businesses, and infrastructure and lead to economic disruptions. The economic impacts disproportionately affect workers in tourism, recreation, and service industries, as well as the timber and wood products industries. The Rim Fire burn area also included tribal lands, historic, sites, and other areas of cultural significance.

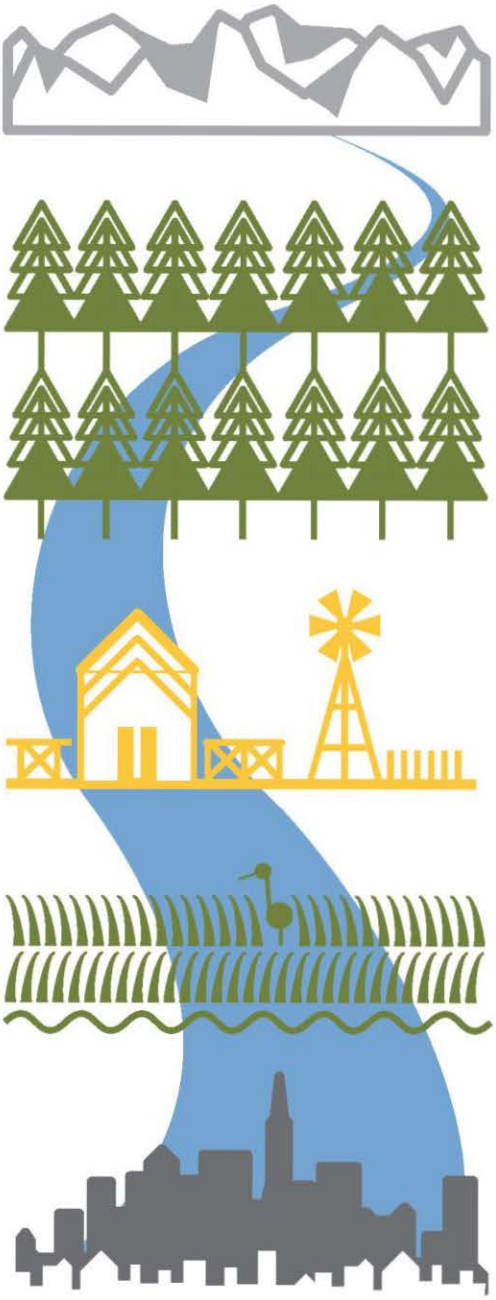
Risks to the State's Water System The impacts of wildfire are as diverse as they are severe, affecting not only the communities and the natural and built environment in the immediate vicinity, but further the "downstream" watershed communities and cities, who are also end-users of this water supply. The Tuolumne watershed is extensive. It 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 watersheds 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.

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, representing substantial, numerous and valid needs, which fall outside the parameters of the NDRC. A description of such activities is included above, but include emergency response and communications equipment, infrastructure investments, and business development programs.



State of California

National Disaster Resilience Competition

Phase II
October 27, 2015

Exhibit E -
Factor 3 - Soundness of Approach
ExhibitESoundnessofApproach.pdf

EXHIBIT E: SOUNDNESS OF APPROACH

PROJECT APPROACH

As outlined in Exhibits B, C, and D, the Rim Fire is one event in a long history of wildfires in the Sierra Nevada, made more intense by the current drought and overstocked forests. Since the 2013 Rim Fire, large wildfires throughout the state have burned nearly 400,000 acres and destroyed hundreds of homes/structures. Successful deployment of the Community and Watershed Resilience Program (CWRP) in Tuolumne County will enable the State to replicate the program in other watersheds, which is even more urgent under changing climate conditions. Research shows that climate change will result in more frequent and severe wildfires under a range of plausible future scenarios (Westerling et al. 2014).

The CWRP integrates three pillars or activity areas that reflect the interdependence of community and watershed resilience. Together, these elements create an economically- and environmentally sustainable program for long-term community and watershed resilience that is replicable throughout the State's upper watershed communities. The NDRC provides a unique opportunity to integrate these elements into a single funding proposal. The three pillars are:

1. **Forest and Watershed Health:** Support healthy, resilient forests through restoration, reforestation, strategic forest thinning, biomass removal and other science-based investments to ensure ecosystem health and services. This pillar provides economic development opportunities to diversify and strengthen local economies.
2. **Bioenergy and Wood Products Facility:** Develop an appropriately scaled and sited facility to use biomass removed through forest restoration and thinning. Thinned

material will be feedstock for wood products (e.g., lumber, fence posts, wood shavings); residue from wood products will be utilized to produce electricity, heating, and cooling for facilities and the local community. This pillar also provides local educational, job training, and economic development opportunities.

3. **Community Resilience Centers:** Develop centers that will serve the needs of rural communities during emergencies. The centers will further support the first two pillars by providing education and job-training opportunities in natural resources and forest and watershed health in cooperation with the California Conservation Corps and local community colleges. The facilities will also other services, including Head Start Program and training space to support workforce and business development.

Projects within each pillar were selected after public solicitation of project ideas and needs from the County, community members, landowners, and State agencies. Projects included in the NDRC were carefully selected to address the unmet recovery needs within the disaster impacted area, with the specific goal of creating a replicable framework for 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.

Activity Pillar 1: Forest and Watershed Health

The forest and watershed health projects encompass five activities:

- Removal of trees for fuel reduction and to provide feedstock for a biomass energy and wood products facility ($13.5 million),
- Forest restoration and reforestation (planting resilient and diverse forests) ($17 million),
- Treatment of noxious weeds ($2.4 million),

- Developing and reconstructing strategically placed fuel breaks to provide forest and community protection ($5.2 million), and
- Reconstruction of rangeland infrastructure destroyed during by the Rim Fire ($1.9 million).

These activities will occur throughout the entire 257,314-acre Rim Fire burn area, alongside a suite of activities funded by other sources, both inside and adjacent to the burn area.

Prior to reforestation and restoration, burned trees are salvaged if possible, to utilize the material and avoid having the burned trees provide fuel for a future fire. Timely conifer reforestation is critical. 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 naturally.

Biomass removal will be accomplished using best management practices, following standard operating procedures on federal land, to mitigate sedimentation and soil erosion. These projects can also improve road conditions and help keep stream crossings functional. The goal of a biodiverse, healthy forested landscape includes stable soil, resilient vegetation and a structurally diverse mixed conifer forest including hardwoods. Large buffers on meadows will promote those unique habitat types and critical hydrologic features. Noxious weed treatments will help to ensure the health of reforested and restored areas.

Once plantations are established, fuel management and associated fuel breaks become an even more critical component in protecting these areas from future large fires. 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 reduce wildfire intensity and size. Fuel breaks also protect housing tracts and neighborhoods in areas where fires occur often and they provide strategic locations for fire fighters to contain wildfires or conduct prescribed burns.

Reconstruction of rangeland infrastructure will allow the continuation of grazing within the national forest. Cattle grazing has long been allowed under agreements between the forest and local ranchers. Reconstruction of destroyed fencing and troughs will ensure that grazing occurs in the most environmentally sensitive manner possible and will protect water sources, restoration areas, and sensitive habitat.

The work proposed for funding under NDRC will be part of a larger effort to restore forest and watershed health. 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.

This work builds on emergency steps taken immediately following the fire. Right after 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. As discussed earlier, limited forest budgets make such long-term work difficult. 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. Linking this work to economic development and job training helps to overcome financial barriers in the long-term.

Benefits to Vulnerable Populations and Section 3 Persons

Local workers will be recruited and trained to complete the forest and watershed work. This will be completed through partnership with the California Conservation Corps (CCC). The CCC will develop job training programs in order to develop a deep pool of skilled workers to support forest management activities, including regulatory approval, 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.

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, involvement in local workforce development and Veterans groups, and postings on the USAJobs.gov website.

Alternatives to Forest and Watershed Health Activities

With no restoration work, the forests will remain in a degraded condition for the foreseeable future. Carbon storage and sequestration will be a mere fraction of the potential

that can be realized in a healthy, growing mixed conifer forest in this area. 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.

Activity Pillar 2: Biomass and Wood Products Facility

Development of a biomass and wood products facility will create a market for biomass removed from the forest through initial and ongoing forest health work and provide local economic development opportunities. Development of a wood products and biomass energy campus will be accomplished in two phases:

1. Phase 1 ($6 million): Feasibility analyses, feedstock assessment, siting, environmental review, and permitting
2. Phase 2 ($16 million): Facility construction and operation

Phase One: The Sierra Nevada Conservancy, in partnership with the California Environmental Protection (CalEPA), will work with the USDA Forest Service (USFS), CAL FIRE, tribes, and private landowners to identify land parcels of 10 acres or more for evaluation for a multi-purpose wood products and energy facility. Parcels will first be reviewed using geospatial tools for proximity to feedstock, electricity transmission infrastructure, acreage for future expansion and proximity to Community Resilience Centers or other load centers with need for generated electricity, heating, and cooling. Parcels will be further assessed by wood products and biomass energy developers for overall site potential. TSS, an experienced bioenergy consultant, has provided pro bono technical support in developing this scope of work.

Senate Bill 1122 (Rubio), a law passed in California in 2012, provides a competitive price, or feed in tariff, to be paid by utilities for biomass-electricity facilities sized up to 3 megawatts. A detailed feasibility analysis will be performed using public input to determine feedstock availability while ensuring sustainable forest health and preventing over-harvest of woody biomass. Results of the analysis will aid in determining the County's capacity for one or more stationary small-scale facilities or a combination of stationary facilities and mobile air burners to manage biomass supply in the forest. To complement this process, phase one will include consultation with the California Independent System Operator and Pacific Gas and Electric to determine the interconnection requirements and potential costs for integrating one or more stationary and mobile facilities with electric transmission infrastructure. If necessary, a formal interconnection study will be prepared in phase one.

Phase One will also include a feasibility analysis of marketable wood products in Tuolumne County based on sustainable feedstock supply. The range of potential products includes biochar (soil amendment), fence posts, animal bedding, landscape mulch, wood pellets, lumber, pellets, composite/particle board, and liquid fuels. Because the costs and resource needs to produce each wood product varies considerably, a feasibility analysis will include the market and non-market costs and benefits to select one or more of these products for development. The financial analysis will include capital cost needs, break-even points, and cost-saving measures and efficiencies. Red Rock Biofuels, a collaborator that produces jet fuel from woody biomass, will provide guidance on necessary feedstock supply and condition for production of liquid fuels.

Upon completion of the feasibility analyses for sites, energy potential and wood products, 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. Full review of multiple sites will be necessary to allow for final site selection(s) that meet public needs and ensure forest resilience by sizing facilities to prevent over-harvest. The design will include the wood products facility options and the adjacent heating, cooling, and electric facility to serve both the wood products facility and nearby 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 on multiple sites, final site selection based on the review, project design for wood product and energy facilities, financial analysis, a possible completed interconnection study, and site control to allow development. Site control may range from completed plan amendments on county or state-owned lands, executed contracts with tribes or private landowners, or land use permits/special use permits and associated plan amendments on federally managed lands.

Phase Two will begin with a request for proposals to develop the facility according to the proposed project design. The proposal request will require applicants to devise and demonstrate a business model that incorporates the use of feedstock from the NDRC forest health activities in the early years of operations and the proposed sources of feedstocks for the ensuing years of operation to ensure continued investment in defensible space, forest management, and landscape resilience. 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.

Benefits to Vulnerable Populations and Section 3 Persons

The proposed approach for a biomass and wood products facility introduces innovation and economic diversity to Tuolumne County. While biomass electricity plants and sawmills exist in California, no facilities scale forest health activities. Nor do any current facilities employ combined cooling, heating, and electricity technologies. The development, building and ongoing operation of the facility will supply jobs to the local area. The innovative nature of the proposed approach will ensure that the training and jobs created allow replication of the CWRP approach in other forested communities.

Public health will benefit from the development of a facility. Currently, trucks carrying biomass feedstocks through small mountain towns and on steep roads pose risks to local residents and tourists traveling in the area. By siting smaller facilities closer to the forest, fewer truck trips will be necessary to transport materials to facilities at lower elevations, thereby supporting public safety and protecting health through reduced truck trip emissions.

Further, a local facility can provide an economic driver for private landowners to clear defensible space and protect their homes and businesses. A successful biomass and wood products facility will further protect public health with the air quality benefits of using best available emissions control technology in a closed environment to manage biomass feedstocks.

Alternatives to a Biomass and Wood Products Campus

Without a local biomass wood products facility, biomass will be piled and burned in the open or trucked long distances. This will result in increased local and regional air pollution. Open burning also poses a risk of fire in the forest. The facility also provides a delivery point for residue cleared through the forest health activities, spurring ongoing investment in forest health after the completion of NDRC funding.

Activity Pillar 3: Community Resilience Centers

Tuolumne County is a rural county with a population spread over 2,274 square miles. Given limited infrastructure, providing emergency response and evacuating residents during a fire is extremely challenging. These challenges also make provision of services difficult during non-emergencies as well. To address these challenges, the State worked with Tuolumne County to identify needs to help build resilience for residents, local business, and local government. The resulting concept was to invest in Community Resilience Centers (CRC) that provide resources during an emergency event including fire, but also extreme heat or flooding, and also serve the community year-round. These facilities will be used as evacuation centers during fires or other emergencies and 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,

business development training, and other social services. The facilities will be constructed to demonstrate state of the art energy and water efficiency measures.

Serving a dispersed rural community with a single facility is challenging given limited public transportation and small capacity roads, therefore, two locations were identified that would best meet the needs of the MID-URN area. One facility (Groveland, discussed in more detail below) would also provide housing for the California Conservation Corps (CCC) to develop a locally-based crew to support the forest and watershed work and to assist in the operation of facilities during and emergency. The CCC is a State program that employs low-income individuals and at-risk youth to undertake conservation work, including ecosystem restoration

Recognizing that designing a public facility to serve multiple purposes in a rural community is challenging and the limited time frame of the NDRC development process, each Community Resilience Center is being proposed as a two-phase activity:

1. **Phase 1:** Further community engagement to site, delineate service needs and opportunities, and finalize design to meet those needs. This phase would build on the principles of Rebuild by Design to engage residents, community groups, business, and elected officials to hone in on the best design to enhance community resilience.
2. **Phase 2:** Construction and operation of the facility.

Groveland Community Resilience Center ($33 million construction cost) Groveland is located along the Highway 120 Corridor, a narrow winding road that provides the only access in or out of the area, and that also serves as an entryway to Yosemite National Park. Given its location, the Groveland CRC would provide a nearby center that would enable residents of the south county area to evacuate and avoid clogging roads needed for

emergency vehicles. Similarly, the facility can provide educational opportunities and public services for residents who otherwise have limited access to services located in other parts of the County.

The Groveland CRC will provide housing for the CCC. 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 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.

The facility's commercial kitchen will serve as a base of operations for the South Side Seniors, a community group that provides the Meals-on-Wheels program to the Groveland community. Training rooms will also be available for business development assistance provided by the Tuolumne County Economic Development Administration, educational programs from Columbia College, Head Start, and other service providers.

Tuolumne City Community Resilience Center ($16 million construction cost) Tuolumne City is an unincorporated LMI area within the County. This center will serve as a social hub for the community of Tuolumne City and surrounding areas. A variety of services and programs will be provided at this facility on a year round basis. Just as in the Groveland

CRC facility, the following could be provided: senior programs, job training, cooking classes, commercial kitchen, immunization clinics, town hall meetings, business incubator services and rabies clinics.

Both CRCs will also serve as a regional transportation hubs for both Tuolumne County Transit and the Yosemite Area Rapid Transit System (YARTS). Currently, it is difficult for LMI and vulnerable populations in Groveland and Tuolumne City to access 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. The implementation of these activities will naturally create a social network and cohesion around a central location. Neither Groveland nor Tuolumne City has facilities that can provide this important resiliency benefit.

Benefits to Vulnerable Populations and Section 3 Persons

As noted above, the CRCs provide an excellent and critical opportunity for local residents to connect, learn, prepare and support each other. At the current time, services and activities are offered in dispersed locations, which make accessing them challenging, especially for elderly or low-income residents who face transportation limitations. Job training and educational programs will provide new economic opportunities in this County, which faces high unemployment.

Tuolumne County has long required local and low-income preferences in procurement of design and construction contracts. Their most recent use of this process is in the $49 million jail facility the County is currently constructing. As with the jail project, given the high dollar bonding requirements, a developer with the capacity to obtain a bond at that

level may need to be procured from outside the area, however the County will require local subcontractors to be included and preferred in the construction procurement process.

Alternatives to the CRCs

Without the CRCs, the community and broader region will lack facilities to provide centralized support to community members from Tuolumne County and its neighbors during an emergency. The community will also lack supportive services, better transportation options, and education and training for new economic opportunities. Without the CRC in Groveland, the CCC will not have a location to develop a locally based work crew to support the forest and watershed health work.

Metrics for the Community and Watershed Resilience Program

The table below identifies the suite of metrics that will be employed to evaluate the Community and Watershed Resilience Program.

	Resiliency Value	**Environmental Value**	**Social Value**	**Economic Revitalization**
Forest and Watershed Health	Acres treated Acres of fuel breaks	Acres treated Miles of fencing installed	CCC crews work-hours Inmate crew work-hours	Forest visit stats Grazing use Revenue from timber sales
Biomass and Wood Products	Biomass processed	Biomass processed	Electricity generation	Jobs created Revenue from wood products

Community Resilience Centers	Services offered Service uptake	Energy consumption Water consumption	Services offered Service uptake	Students enrolled in courses

Alternative to the Community and Watershed Resilience Program

The CWRP proposes an integrated set of activities to meet unmet recovery needs and build resilience in the forest, watershed and community. Each piece functions on its own, but together they reinforce and support one another. If no funds are made available to complete the work, the forest will remain in its degraded state, which will result in declines in tourism and recreation, reduced water quality due to erosion and sedimentation, and severely curtailed carbon storage and sequestration. 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.

Describe How Proposal is a Model (Replicable, Scalable, Integrated)

As previously stated, the goals of this program are applicable throughout the Western United States. This proposal includes the development of innovative partnerships that link forest stewardship with productive uses for forest raw materials, including lumber, other wood products, and bioenergy, alongside investments in community protection, economic development, and education. Once demonstrated in Tuolumne, the CWRP will represent a viable model for replication. There is a tight connection and interdependence between the local community and the forest; community and forest ecosystem resilience go hand in hand.

We are integrating two critical elements to enhance the potential for replicating the Community and Watershed Resilience Program: innovative financing and regional collaboration.

Innovative Financing A major challenge to replicating this work will be financing to support investment in forest and watershed health. The biomass and wood products campus is one element of developing an economically sustainable model. We have explored the potential to attract outside investors for forest and watershed restoration work. To that end, we have engaged a team of subject matter experts to explore how to use the CWRP work in the Rim Fire area as a pilot for innovative investment tools. This team includes pay-for-success environmental investors at Blue Forest Conservation, researchers from UC Merced and UC Davis, and the U.S. Forest Service. We will be using available resources to quantify the environmental benefits of this work and contracting mechanisms, which can be used as a basis of a pay-for-success investment model. Using project as a proof of concept could prove invaluable to replication throughout watersheds in California and the Western United States.

Regional Collaboration The Rim Fire is an entry point through which we can examine dimensions of resilience that are of concern statewide: wildfire, drought, forest health, 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) and the Alliance of Regional Collaborative for Climate Adaptation (ARCCA).

As we move ahead, both groups will provide venues to share knowledge and identify opportunities for replication. We will also integrate the work of Civic Spark members to work across the regions. Civic Spark is an AmeriCorps Governor's Initiative that started in California in 2014. Members are deployed throughout the State to support local climate change planning. The Local Government Commission is already committed to allocating a portion of a CivicSpark Resilience Fellow's time to urban rural adaptation issues, specifically in support of NDRC. Beginning in November 2015 a CivicSpark Fellow based in Sacramento will be working with local and state partners - including OPR on coordination activities. Additional funds provided through NDRC will be used to engage Civic Spark members in Tuolumne County and with other partners to monitor the NDRC work and develop partnerships and materials to support program's ability to be replicated.

Feasibility and Long-Term Resilience

The Program is designed to demonstrate a sustainable model for maintaining forest and watershed health and community resilience. The goal is to move from a reactive model to one that is proactive, forward-looking 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.

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. Core team members include the State agencies listed in Exhibit C, Tuolumne County, US Forest Service, Tuolumne County Economic Development Authority, and other local groups. The phased approaches for the CRCs and biomass facility will provide immediate opportunities for engagement.

Maps, Drawings, Renderings

A full review of Tuolumne County, the identified target areas, proposed project locations, and graphics depicting the Program can be found in Attachment E.

BENEFIT-COST ANALYSIS

The complete detail of the methodology and narrative associated with the working benefit cost analysis (BCA) for each of the three pillars (Forest and Watershed Health; Integrated Biomass and Wood Products Facility and Community Resilience Centers) and including the aggregated total can be found in Attachment F. While benefits of many of the proposed activities are well-documented, there are many benefits to the Community

Resilience Centers that are difficult to quantify. These include: the value of evacuation services; improved social cohesion due to year-round services; improved access to services and technology; and the value of educational programs. These challenges are further discussed in Attachment F.

The total benefits of each of the three pillars 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 overall project benefit cost ratio of the Community and Watershed Resilience Program is 1.53.

Discount Rate = 7% Project Life = 30 Years	**Forest & Watershed Health**	**Biomass & Wood Products**	**Community Resilience Center**	**TOTAL**
Lifecycle Costs (2015 $)	$54,348,010	$73,330,800	$103,890,000	**$231,568,810**
Lifecycle Costs (Present Value)	$41,416,603	$38,182,459	$69,281,397	**$148,880,459**
Project Benefits (Present Value)	$134,984,276	$53,969,024	$39,247,170	**$228,200,470**
Net Present Value	$93,567,673	$15,786,565	$30,034,227	**$79,320,011**
Benefit Cost Ratio	**3.26**	**1.41**	**0.57**	**1.53**

The table above presents results using a seven percent discount rate. Given the long-term benefits of this investment and that these benefits will affect generations to come, a lower discount rate is likely more appropriate. Repeating the analysis with a 3 percent discount rate results in a BCR of 2.04 for the overall program, and a BCR of 4.62 for forest and watershed health; 1.69 for biomass and wood products, and 0.82 for the community resilience centers.

SCALING/SCOPING

Performed separately, each of the activities within the pillars presented in this proposal will increase resilience. However, the integration of the three is the key to its broader success. The Community and Watershed Resilience Program is an interrelated set of activities, which ultimately relies upon each component for successful implementation and institution of community and environmental resilience. Implementing work in each of the three areas will provide the opportunity to demonstrate how each of the elements can work with the other (e.g., job training feeding into forest and watershed health work; contracting needs for getting material from the forest and watershed work to a biomass facility). Understanding and demonstrating the mechanics of these interconnections will be invaluable for replication of this program to neighboring counties and the broader region.

Understanding that HUD reserves the right to scale down funding in given areas, we think that it is important that some level of investment is made in each area. The NDRC provides a unique opportunity to develop this program in an integrated manner and take advantage of the synergies that are present if all three pillars are developed together. At a minimum, the following elements are needed to demonstrate the power and replicability of this integrated approach:

- Biomass thinning, reforestation, and restoration: These activities are shovel ready and time-sensitive.
- Biomass/wood products facility: Such a facility will demonstrate the economic benefits to the community and support ongoing forest and watershed health initiatives.
- Workforce training location and program: These programs will be necessary to ensure there is an adequately-trained and –sized workforce to complete forest and watershed health work and will provide direct benefit to local residents and the economy.

Working together, these three elements demonstrate the environmental benefits and economic potential for replicating and scaling this program to the broader region.

PROGRAM SCHEDULE

Detailed Schedule for Completion of Proposed Activities

Upon award, the three pillars of the Program will all be ready to begin. The Forest and Watershed Health portfolio of activities is immediately ready to begin, 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. An initial scope and design exists for the Community Resilience Centers. However, the County will undertake an initial 6-month 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. The Program will initiate in early 2016 and complete construction by late 2019.

BUDGET

Budget in DRGR Format

Community and Watershed Resilience Program DRGR Budget Template						
Project Number	**Activity Number**	**Project Title**	**Activity Title**	**Responsible Organization**	**Project Budget**	**Activity Budget**
		Overall Budget			$117,000,000	
1-Jan		Administration			$5,850,000	
	1-01-AD		Administration	HCD		$5,850,000
2-Jan		Public Facilities & Improvements			$111,150,000	
	1-02-UN		Restoration and reforestation	SNC		$12,825,000
	1-02-UN		Biomass removal and thinning	SNC		$16,150,000
	1-02-UN		Strategic fuel breaks	SNC		$4,940,000
	1-02-UN		Rangeland improvements	SNC		$1,805,000
	1-02-UN		Noxious weed treatment	SNC		$2,280,000
	1-02-LMA		Groveland CRC & CCC *(Phase I & II)*	Tuolumne County		$35,245,535
	1-02-LMA		Tuolumne City CRC *(Phase I & II)*	Tuolumne County		$17,004,465

	1-02-LMA		Biomass Facility & Wood Products Campus (*Phase I & II)*	SNC		$20,900,000

Narrative Description of How Budget Was Developed

For each of the activities included in CWRP, members of the California Team worked with subject matter experts to develop budget estimates. 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, a California-based firm with experience in design and implementation of similar facilities, including one in a neighboring county. The estimated total of $55 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, the Core Team is allowing for a contingency of ten percent for project delivery and administration needs.

The ongoing operations and maintenance costs are not included in NDRC request in the proposed budget (though are included in the BCA). Once built, both of the CRCs and the Biomass Facility will generate revenue that will largely offset or cover all of these costs. In addition to committing to budget for these costs for the CRCs, Tuolumne County will utilize

the various meeting rooms and meeting hall spaces within the CRCs for rental by community groups, special events, and conferences – which will generate approximately $1.3 million in rental usage (see CRC Fac Rental tab in BCA spreadsheet – Attachment F - BCA Worksheet). Once operational, the Biomass Facility and Wood Products Campus will realize revenue generation from sales of wood products, electricity generation, and heating and cooling. The design of the Biomass Facility and Wood Products Campus will contribute to the economic model being developed through this Program.

Sources and Uses Statement (inclusive of all funding)

Community and Watershed Resilience Program - Sources and Uses

Sources of Funding	
Forest and Watershed Health	
CDBG-NDR	$ 40,000,000
Subtotal =	**$ 40,000,000**
Community Resilience Centers	
CDBG-NDR	$ 55,000,000
Subtotal =	**$ 55,000,000**
Biomass Facility and Wood Products Campus	
CDBG-NDR	$ 22,000,000
Subtotal =	**$ 22,000,000**

Total Sources =	**$ 117,000,000**

Uses of Funding	
Forest and Watershed Health	
Restoration and Reforestation	$ 13,500,000
Biomass Removal and Thinning	$ 17,000,000
Strategic Fuel Breaks	$5,200,000
Rangeland Improvements	$ 1,900,000
Noxious Weed Treatments	$ 2,400,000
Subtotal =	**$ 40,000,000**
Community Resilience Centers	
Groveland (CRC & CCC)	$37,100,563
Tuolumne City (CRC)	$17,899,437
Subtotal =	**$ 55,000,000**
Biomass Facility and Wood Products Campus	
Biomass Facility and Wood Products Campus	$ 22,000,000
Subtotal =	**$ 22,000,000**

Total Uses =	**$ 117,000,000**

CONSISTENCY WITH OTHER PLANNING DOCUMENTS

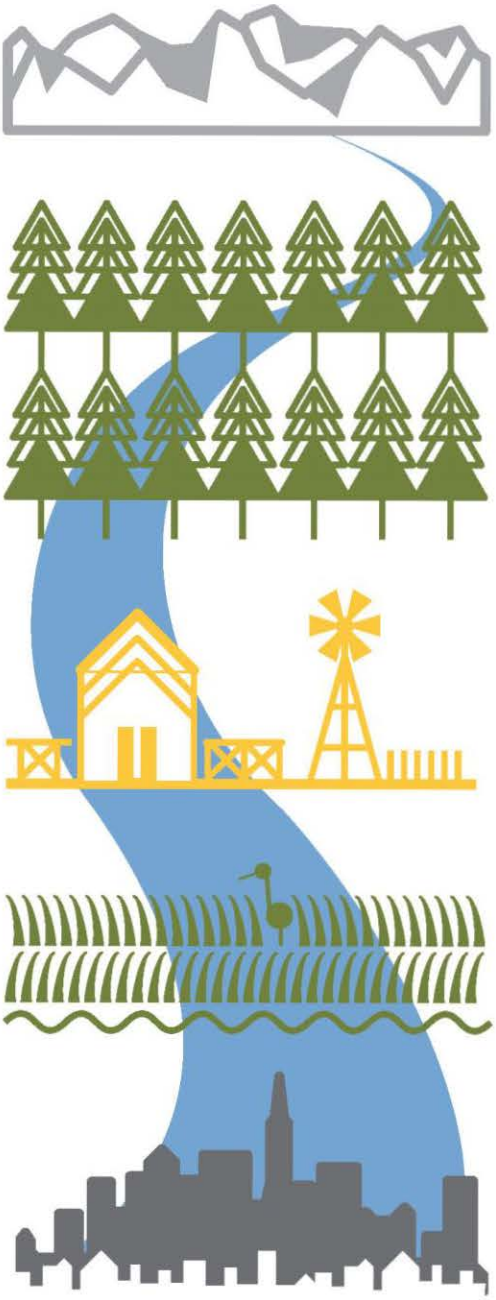
Consolidated Plan and/or Regional Sustainability Plan (HUD-2991)

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. All proposed NDRC activities are directly tied to the most impacted and distressed target area within Tuolumne County.

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. The activities proposed for the Community and Watershed Health Resilience Program are in alignment with both the State and County's Hazard Mitigation Plans, by minimizing the level of damage and losses to people, critical facilities and infrastructure due to wildfires.



State of California

National Disaster Resilience Competition

Phase II
October 27, 2015

Exhibit F:
Factor 4 - Leverage and Outcomes
ExhibitFLeverageandOutcomes.pdf

EXHIBIT F: LEVERAGE

FINANCIAL COMMITMENTS

Extensive federal, state and local resources have been committed to Rim Fire recovery since 2013, but damages estimated at $178 million present a challenge for a rural county with limited resources. This section outlines funds already expended on forest and watershed recovery, and funds committed by partner organization to support the Community and Watershed Health Resilience Program.

SUPPORTING COMMITMENTS

Partners and Resources As mentioned in Exhibit C, California and Tuolumne County have developed a broad set of partners for the NDRC. Partners provide expertise and financial resources. The USFS has invested $134 million in Rim Fire Recovery since 2013, and will invest $6.7 million (see Attachment B) invested within the Rim Fire footprint to support NDRC activities between January and December 2015.

In addition to committing its own funds, the USFS has secured a total of $1,235,129 to support Rim Fire Recovery including Off Highway Motorized Vehicle Grant Funds, SF Public Utilities Commission, California State Parks; the USFS has also applied for funds from Proposition 84 and Proposition 1 for creek, spring and meadow restoration in and around the Rim Fire footprint.

The USFS's 2015 investments have supported vegetation management, restoration and reforestation for the forest and watershed in the Rim Fire burn area. Activities have included biomass removal, site preparation for tree planning, trail repair and fence work. The USFS will commit the following resources starting in March 2016 through September 2019 that will directly support the Community and Watershed Resilience Program:

- $2.5 million beginning in March 2016 and ending in October 2016 for forest restoration and watershed protection
- $2.8 million beginning in January 2017 and ending in November 2017 for resilient restoration and facility upgrades addressing Rim Fire damage
- $3.5 million beginning in January 2018 and ending in December 2018 for large landscape scale analysis and vegetation management.
- $3.2 million beginning in January 2019 and ending in September 2019 for infrastructure rehabilitation and ecosystem resilience.

Additional program support will be provided by the Local Government Commission's commitment of a Civic Spark Resilience Fellow to CWRP implementation between November 2015 and September 2016 found in Attachment B. This fellow will provide over 300 hours of service to program start up and implementation, which is valued at over $12,000.

Co-Benefits and Financing As noted earlier, the Tuolumne County Board of Supervisors led a study session devoted to understanding the impacts of insurance issues on local residents and businesses and engaged with local real estate and insurance agents. The Core Team continues to work with California Insurance Commissioner's office to better understand and resolve insurance issues in the area.

The state and USFS are exploring different financing mechanisms for natural resource protection, as noted in the Soundness of Approach (Exhibit E). Investment in the Rim Fire recovery area will enable available funds to be used in other regions to replicate our approach and program, including 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.

State of California

National Disaster Resilience Competition

Phase II
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Exhibit G:
Factor 5 - Long-Term Commitment
ExhibitGLongTermCommitment.pdf

EXHIBIT G: REGIONAL COORDINATION AND LONG-TERM COMMITMENT TO RESILIENCE

Update on Phase I Commitments

Phase 1 included commitments to continue work on Rim Fire recovery, to continue fuel break development, and to develop a Forest Carbon Plan. Updates on several commitments are included below. Others remain in progress.

1. **Ongoing USFS work:** The USFS is continuing a program of reforestation, erosion control, rehabilitation, and timber salvage in the area of the Rim Fire. The Forest has established long-term working relationships with Columbia College and the California Conservation Corp to assist with project implementation and monitoring. Through a Large Landscape Scale effort, the Forest is moving forward with analyzing the watershed areas adjacent to the Rim Fire for the potential to take action to reduce the probability of wildland fires.
2. **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. Initial work will take 24 months, with 5 years for maintenance.
3. **Forest Climate Action Plan** The Forest Climate Action Team's Forest Carbon Plan will outline concrete strategies to meet greenhouse gas emissions reductions targets, as identified in the California Air Resources Board 2016 Scoping Plan Update, and increase carbon storage in California forests. An internal draft Forest Carbon Plan is under review, with

public release and meetings scheduled for early 2016. A completed draft will follow the release of the Scoping Plan update in the latter half of 2016.

Baseline and Goal Metrics

The baseline and goal for CAL FIRE's work remains the same as in Phase 1, which are to develop fuel breaks that are:

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.

Actions Taken since NOFA Publication

Many actions underway at the local and state level will support CWRP implementation – several that have begun since Phase 1.

Executive Action

Executive Order B-30-15: Governor Brown issued Executive Order (EO) B-30-15 on April 29, 2015. EO B-30-15 established a 2030 greenhouse gas emission reduction target and a multi-part resilience program. This program 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.

Legislative Actions

The following pieces of legislation were signed into law:

- **Senate Bill 246** (signed 10/8/15) 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.

- **Senate Bill 350** (signed 10/7/15) increases procurement of electricity from renewable resources from 33 to 50 percent.
- **Senate Bill 379** (signed 10/8/15) requires local governments to address climate change in the Safety Element of their General Plan.
- **Assembly Bill 1482** (signed 10/8/15) 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*.

Raising Enforceable Standards

General Plan Guidelines Update: The Governor's Office of Planning and Research updated the *General Plan Guidelines (GPG).* The new GPG includes resources, data, tools, and model policies to help cities and counties update their general plans and address climate change goals and adaptation. A public review draft of the GPG was released on October 12, 2015.

Plan Updates and Alignment

Tuolumne County Water Management Plan: 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," and in November of 2014, engaged professional facilitation to move the initiative forward. The goal is to discuss the hydrologic changes currently being experienced in the county and to consider potential future changes and their impacts.

Tuolumne County General Plan Update*:* Tuolumne County is currently in the process of updating its General Plan. The Final EIR will be available in December 2015, with public

meetings occurring in December 2015/January 2016. Updated to the General Plan include the following:

- 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.

Safeguarding California – Implementation Action Plans: A 2014 supplement to California's 2009 Climate Adaptation Strategy implemented through the California Natural Resources Agency (CNRA) and one of the main pillars of California's climate change strategy. Implementation Action Plans have been developed for each sector and were release for public comment in October 2015.

Assembly Bill (AB) 32 Scoping Plan: The California Air Resources Board (CARB) launched a process to develop a plan update for meeting the State's 2030 GHG emission reduction goals. This process will include developing a GHG emission reduction framework for natural and working lands. A kick-off workshop was held on October 1, 2015.

Forest Carbon Plan: As noted above, an internal review draft of the Forest Carbon plan is under review. A final draft will follow the release of the Scoping Plan update in late 2016.

Lessons Learned

An unprecedented level of collaboration and coordination went into the preparation of this proposal. The process provided important lessons in developing a place-based resilience program

that integrates across sectors and levels of governments in a manner that will be replicable for other communities. Many of these were reinforced through ongoing engagement with Weed, California in their recovery from the Boles Fire. There have been several important outcomes:

- The concept of comprehensive or landscape-scale forest health management, rather than several disparate management actions, now permeates discussions and funding considerations within CAL FIRE, CalEPA, the California Natural Resources Agency, and the California Air Resources Board.
- Partnerships are developing to institutionalize community engagement and long-term resilience into long-term disaster recovery.
- The need to incentivize or encourage local communities to develop visions for resilience before the disaster.
- Tuolumne County is considering how to integrate resilience into existing plans and documents.

The NDRC process and work in Weed have also provided some practical lessons, including:

- Use of 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.

Actions to Be Taken within One Year of Award Announcements

Proposition 1 Awards

Approved by voters in November 2014, Proposition 1 funds supporting the development of a sustainable water systems and include the following programs:

Integrated Regional Water Management funds support 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 to apply for $13 million in Integrated Regional Water Management funds. The first round of award is expected to be made in late 2015 or early 2016.

The Department of Fish and Wildlife is administering a Watershed Restoration & Delta Water Quality and Ecosystem Restoration Grant Program. $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.

The **Sierra Nevada Conservancy** will distribute $25 million in Proposition 1 funds. Projects will include fuel treatment to reduce wildfire risk, protect watershed health, forest health, protect life and property, and reduce greenhouse gasses. Applications were submitted September 1st, 2015 and awards will be authorized in either December 2015 or March 2016.

Financing Actions that Increase Resilience

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. 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 collaborating with Blue Forest Conservation to develop a mechanism to attract private capital for forest and watershed work, based upon the pay for success model.