

## **Resilient Lands and Waters Regions**

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\*Lead agency/entity

**California Headwaters Partnership (BOR\*, FWS, USFS\*, CA\*) \*-co-lead agency/entity**

*Identifying areas for restoration at a landscape scale to improve our water quantity and quality, promote healthy forests, and reduce wildfire risk.*

The California Headwaters contribute greatly to the state’s water supply; for example, the Sierra-Cascade watersheds provide drinking water to 25 million people, almost two-thirds of the California population, and the majority of water for irrigated agriculture. The California Headwaters Partnership will take a watershed and landscape-level approach to restoration and will be jointly led by a state and federal planning committee: CA Natural Resources Agency (CNRA); CA Departments of Conservation, Fish and Wildlife, Forestry and Fire Protection and Water Resources (CDWR); the CA Wildlife Conservation Board; the Sierra Nevada Conservancy (SNC); the US Department of Agriculture (USDA) Forest Service (USFS) and Natural Resource Conservation Service; and the US Department of Interior (USDO) Bureau of Reclamation (BOR) and Fish and Wildlife Service.

The California Headwaters Partnership will build upon the many existing collaboratives, providing the opportunity to unify these efforts across the California Headwaters landscape. For example, the SNC and USFS recently launched the Sierra Nevada Watershed Improvement Program (WIP) across a large portion of the California Headwaters landscape to restore the health of California’s primary watershed through coordinating funding and addressing policy barriers across “all lands.” The WIP is organized to coordinate efforts to maximize opportunities connected to existing and future programs, for example, the California Water Action Plan (CNRA, CA Department of Food and Agriculture, CA Environmental Protection Agency), the National Cohesive Wildland Fire Management Strategy (USDA/USDO), and the Western Watershed Enhancement Program (BOR/USFS).

The planning committee agencies and its many partners and stakeholders have several ongoing activities in the region that will inform efforts. A number of active collaboratives are functioning in the Headwaters area, focusing on watershed and forest issues. Examples include: Landscape Conservation Collaboratives (USDO), Integrated Regional Watershed Management groups (CDWR), the Collaborative Forest Landscape Restoration Program (USFS), and many others. In addition, the California Forest Watershed Alliance is a group of state/national organizations focusing on watershed restoration, and includes the Rural County Representatives of CA, the Association of CA Water Agencies, the CA Forestry Association, The Nature Conservancy, and the CA Farm Bureau Federation.

The California Headwaters Partnership will build upon and unify existing collaborative efforts to identify and map areas for conservation, restoration, increased drought resiliency, and maintenance needs designed to reduce the risk of wildfire and restore healthy forests in the headwaters of California. These efforts will improve water quantity and quality, protect

important wildlife habitat, and provide jobs to local communities. Specific goals and examples of implementation include:

- Restoring meadows through removal of invasive species to enhance groundwater recharge; e.g., CDFW awarded \$6 million dollars in its first year of grants from state cap-and-trade revenues.
- Restoring stream channels and maintaining roads to reduce sediment, slow flood water and increase groundwater recharge; e.g., California will implement a \$200 million instream flow program using 2014 water bond funds;
- Restoring forest health to improve snow and water capture and storage, enhance habitat function, and stabilize greenhouse gas emissions; e.g., CalFire will award \$42 million in forestry projects designed to reduce greenhouse gas emissions.
- Preventing further forest fragmentation and degradation;
- Enhancing forest resilience to reduce the risk of high severity wildfire and allow a more natural fire regime through reduction of uncharacteristic fuel loads; e.g., the USFS plans to reduce forest fuels on 20,000 acres per year in the 3 Sierra-Nevada CFLR projects;
- Strengthening collaborative actions to help maintain and develop the capacity of local communities and reduce wildfire risks to communities and natural resources; and
- Improving fish/wildlife habitat health and function to support ecosystem-dependent species.

## **California’s North-Central Coast and Russian River Watershed (NOAA & BLM):**

*Informing coastal and marine resource management, watershed restoration, and optimizing flood control and water supply reliability for users and the environment*

A suite of activities is underway in the North-Central California outer coast and the Russian River watershed to enhance the climate resilience of this landscape. In both the Russian River estuary and outer coast, NOAA and USGS are developing the [Coastal Storm Modeling System and “Our Coast, Our Future”](#) decision-support tool which will provide sea level rise scenarios for local, state, and federal partners to help identify natural resource and infrastructure vulnerabilities, update Local Coastal Plans, and inform coastal and estuarine natural resource planning and management.

Along the outer coast, NOAA’s Gulf of the Farallones National Marine Sanctuary (GNMS) is leading an effort in partnership with the California LCC, Bureau of Land Management, National Park Service, local NGOs, and others to develop California’s first comprehensive, prioritized adaptation implementation plan for the coast and ocean. This plan can serve as a model within California and along coastlines globally. The team recently finalized a Vulnerability Assessment report detailing the process, methodology, and results from a climate vulnerability assessment of 44 focal resources (species, habitats, and ecosystem services) in the study region. *Based on the results of the report, the Climate-Smart Adaptation Working Group will develop and prioritize adaptive management recommendations for the region's management agencies in response to the most impactful climate drivers identified in the vulnerability assessment report, including sea level rise, ocean acidification, precipitation, wave action, and upwelling (which influences sea surface temperature, salinity, dissolved oxygen, currents, mixing and stratification).*

In the Russian River watershed, federal, state and local partners are all working to provide data and tools to enhance resilience to climate and extreme events. For example, NOAA, the Sonoma County Water Agency, the U.S. Geological Survey (USGS), Bureau of Reclamation, California Department of Water Resources and Scripps Institution of Oceanography are working closely with the US Army Corps of Engineers to develop actionable science and methods to support



Forecast-Informed Reservoir Operations (FIRO). The FIRO research will include using Lake Mendocino as a pilot to determine whether more sophisticated hydro-meteorological forecasting data can be used to better inform water management decisions in a manner which reflects current and forecasted conditions. The research is projected to be a five year effort.

In all, priorities for the Russian River watershed include: 1) Rebuilding endangered coho and threatened Chinook and steelhead stocks to sustainable levels through habitat protection and restoration; 2) Improving frost, rainfall, and river forecasts in the Russian River watershed through improved data collection and modeling; and 3) Increasing community and ecosystem resiliency to flooding and drought through improved planning and water management strategies.

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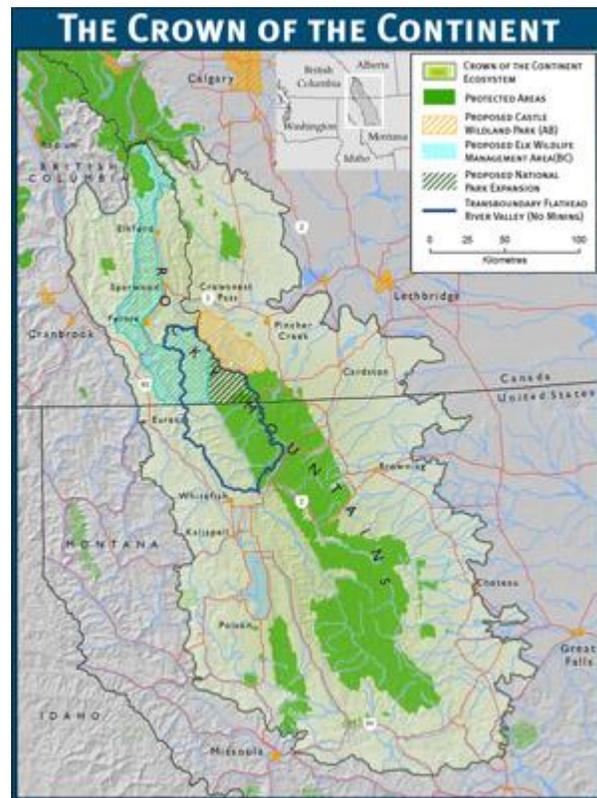
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## Crown of the Continent (NPS\*, MT, USFS, USGS, BC)

*Identifying critical areas for building habitat connectivity and ecosystem resilience*

The long term ecological integrity of the Crown of the Continent is challenged because the region faces intensification in all areas of human activity, including urban and rural residential expansion, increased and diversifying recreational use, intensified demands for resource use and extraction and the growth of the physical infrastructure needed to support all of these. These pressures exist at different intensities in different locales throughout the Crown of the Continent. Increasing human pressures and different agency mandates on a common landscape pose risks to wildlife habitat, ecosystem goods and services and wilderness oriented recreation. To maintain healthy essential ecological systems that include human presence a need exists for transboundary collaborative approaches to ecosystem management at a large landscape scale.



The collaborative management focus of the Crown Managers Partnership (CMP) is the Large Landscape Conservation Initiative (LLCI). The LLCI is a long-term program for the Crown of the Continent, developed by the managers, focused on key **Landscape-scale Environmental Stressors** and corresponding **Environmental Management Targets**. The management targets are either priority species (bull trout, whitebark pine, grizzly bear), or priority landscape processes (water quality/quantity, air quality, fire), that are identified by the CMP agencies as common management priorities that are relevant at the scale of the Crown of the Continent. Landscape stressors are Crown-wide impacts that affect the conservation targets, either individually or cumulatively. The three landscape stressors are; 1) **Climate change**, 2) **Invasive species** and 3) **Land use**.

The CMP is developing environmental management objectives for the targets and stressors. For example, the agency managers in Montana, Alberta and British Columbia, have collectively identified priority conservation areas and mapped them, over-laying the priority areas on an analysis of anthropogenic footprint (see attached).

*The priority conservation areas were identified as critical areas for increasing habitat connectivity (reducing fragmentation) and increasing intactness for key fish and wildlife species, across the scale of the Crown of the Continent.*

## Addressing Climate Risks

There is strong science to support that the Crown of the Continent is a “resilient landscape” with respect to the both vulnerability and resiliency to climate change. It is warming at 2-3 times the rate of the global average, and by 2030, the glaciers are no longer predicted to exist in Glacier National Park, one of the core, protected areas within the CCE. Again, through a collaborative prioritization, the CMP has identified the following management targets with respect to the risks and uncertainties from climate change in the CCE; 1) Aquatic Invasive Species (AIS), 2) Whitebark pine, 3) Cold-adapted native salmonid species, 4) Invasive plants, 5) Fire, and 6) Meso-carnivores. We describe below initiatives on for AIS and cold-adapted native salmonids.

### **Aquatic Invasive Species**

Over the last three years the CMP, with multi-jurisdictional partner support has developed a robust AIS program for the CCE. With support from the GNLCC and CMP agency partners, we have developed a collaborative management protocol for AIS in the Crown, successfully launched a pilot program for AIS detection dogs at inspection stations in AB and MT, and will be undertaking focus-group testing. These pilots are part of the CMP, Province of Alberta, State of Montana, and Flathead Basin AIS strategies. The objectives for AIS are based on a crown-wide strategy for keeping new invaders out through coordinated perimeter defense, early detection and rapid response.

### **Cold-adapted Native Salmonids**

We have work underway to collectively prioritize a suite of management actions aimed at increasing resiliency to climate change by piloting adaptation projects for westslope cutthroat and bull trout. With partners, we convened strategic workshops on Climate Change Adaptation (March, 2014 – Missoula) and Native Salmonids (November 2014 – Kalispell) designed to develop consensus on applied management actions, given climate change scenarios for the Crown. In 2015-2016, the CMP is working with partners to prioritize pilots for westslope cutthroat and bull trout that will increase resiliency, focus on securing and restoring critical habitat and protecting native (non-hybridized) populations.

## **PARTNER LIST**

### **CA Headwaters**

#### **Russian River**

##### **North-Central California Coast and Russian River Partners**

###### **Federal:**

U.S. Army Corps of Engineers  
NOAA National Marine Fisheries Service  
NOAA Office of National Marine Sanctuaries  
NOAA National Weather Service  
NOAA Office of Oceanic and Atmospheric Research  
NOAA Office of Coastal Management  
NOAA Office of Program Planning and Integration  
Federal Emergency Management Agency  
U.S. Geological Survey  
USDA Natural Resource Conservation Service (Sonoma and Mendocino Offices)  
U.S. Fish and Wildlife Service  
U.S. Fish and Wildlife Service – Landscape Conservation Cooperative  
National Park Service  
Bureau of Land Management  
Bureau of Reclamation

###### **State Agencies:**

California Department of Fish and Wildlife  
California Coastal Commission  
California Coastal Conservancy  
California Department of Parks and Recreation  
Department of Water Resources  
Sonoma Resource Conservation District  
Gold Ridge Resource Conservation District  
Mendocino Resource Conservation District  
Ocean Protection Council

###### **Local/County Agencies:**

Sonoma County Water Agency  
Sonoma County Permit and Resource Management District  
Sonoma County Agricultural Preservation and Open Space District  
Marin County Planning Agencies

##### **Mendocino County Russian River Flood Control and Water Conservation Improvement District**

Tribal

Dry Creek Rancheria Band of Pomo Indians

Universities:

UC Berkeley  
UC Davis Cooperative Extension (Sonoma and Mendocino)  
U.C. Davis Bodega Marine Laboratory  
U.C. San Diego SCRIPPS Institution of Oceanography  
Stanford University

Agriculture:

Sonoma County Wine Grape Commission  
Sonoma and Mendocino County Farm Bureaus

**NGOs:**

Point Blue  
Farallones Marine Sanctuary Association  
EcoAdapt  
Trout Unlimited  
The Nature Conservancy  
National Fish and Wildlife Foundation  
Russian Riverkeeper  
Center for Ecosystem Management and Restoration

**Crown of the Continent**

Alberta Cows and Fish
Alberta Environment and Sustainable Resource Development
Blood Tribe Land Management
Canadian Council on Invasive Species
Cardston County
City of Lethbridge
Confederated Salish and Kootenai Tribes
Department of Natural Resources and Conservation
Flathead Basin Commission
Flathead National Forest
National Park Service -Glacier National Park
Government of Alberta
Great Northern Landscape Conservation Cooperative
Lethbridge Northern Irrigation District
Lewis and Clark National Forest
MD of Pincher Creek
MD of Ranchland

Miistakis Institute of Calgary
Ministry Forests Lands and Natural Resources
Montana State University
Mount Royal University
Natural Resources Conservation Service
NPS, Rocky Mountain CESU
Parks Canada/Waterton Lakes National Park
Powell County Weed District/Blackfoot Challenge
Regional District of East Kootenay
Government of British Columbia
The Wilderness Society
U.S. Fish & Wildlife Service
U.S. Geological Survey
University of Alberta
University of Calgary
University of Lethbridge
University of Montana
US Fish & Wildlife Service
USFS, Region I Northern Region
USGS Northern Rocky Mountain Science Center
Blackfeet Tribe