Executive Summary: Preparing for Climate Change in the Klamath Basin of Southern Oregon and Northern California

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Full modeling results and report available at:
http://www.nccsp.org/scientific_knowledge
http://climlead.uoregon.edu/node/136

EXECUTIVE SUMMARY

The Klamath Basin of southern Oregon and northern California is rich in history, culture, and natural resources. This report explores how the local communities and natural resources of the Klamath Basin are expected to be affected by climate change and identifies approaches to preparing for such changes. Many impacts from climate change are already becoming apparent, such as an increasing average global temperature, rising sea levels, earlier snow melt, loss of snow pack, and changing precipitation patterns and storm frequency. Without severe cuts in greenhouse gas emissions, these impacts and others will continue to accelerate and negatively affect local communities and natural resources. While efforts to reduce emissions of greenhouse gases are essential to prevent the most severe impacts, we must also take proactive steps to prepare for the impacts of climate change already inevitable due to emissions that have previously been released.

This report is the result of a collaborative effort. The USDA Forest Service Pacific Northwest Research Station developed projections for the potential future climate of the Klamath Basin. The University of Oregon's Climate Leadership Initiative and the National Center for Conservation Science & Policy presented these projections to local leaders and experts in the Klamath Basin through a series of workshops. Leaders and experts used these climate projections to identify likely changes to natural (aquatic and terrestrial species and habitats), built (infrastructure), economic (agriculture, forestry, business, etc), human (health, educators, and emergency services), and tribal (resources of cultural and indigenous community importance) systems. The leaders and experts then developed recommended strategies and actions to prepare communities and natural resources for those changes.

Future Climate of the Klamath Basin

Three global climate models (CSIRO, MIROC, and HADCM) and a vegetation model (MC1) were used to project future temperature, precipitation, vegetation, runoff, and wildfire in the Klamath Basin. All three climate models projected an increase in annual average temperatures compared to baseline temperatures (2.1 to 3.6° F [1.1 to 2.0° C] increase by mid-century and 4.6 to 7.2° F [2.5 to 4.6° C] by late century). Summer warming was projected to be greater than warming during other seasons.

Projections for annual average precipitation ranged from an overall reduction of 11% to an increase of 24%. All three models agreed that future summers are likely to be somewhat drier (a decrease of 3% to 37%) than past summers.

Vegetation model results indicated a shift in growing conditions in the Upper Basin that could favor grasslands in areas currently suitable for sagebrush and juniper. In the Lower Basin, conditions are projected to favor oaks and madrone, while conditions for maritime conifer forest (redwood, Douglas fir, and Sitka spruce) are projected to decline. The vegetation model also projects 11 to 22% greater area burned by wildfire by late century.

Recommended Actions for Preparation Across Systems

Through a series of workshops in the Klamath Basin, participants made recommendations for how to prepare for the changes expected under climate change. While recommendations were made for each specific system, many recommendations provide co-benefits across multiple systems and sectors. The strategies and actions suggested by workshop participants are likely to increase the resilience and resistance of local communities and natural resources to climate change. A summary of recommendations includes the following:

Natural Systems:

- Protect areas with cooler water as air and water temperatures rise. These include stream and lake areas with groundwater-fed springs and well-developed bank vegetation.
- Decommission and re-contour non-essential roads to reduce overall impacts of erosion and sedimentation during severe storm events.
- Reconnect rivers with floodplains, restore wetlands, and restore stream-side areas to hold more water during floods and increase groundwater recharge.
- Protect intact habitats such as roadless areas that provide strongholds for many native species.
- Reseed areas after disturbance with locally-collected, native seeds to re-establish plants that occur in the area and limit the spread of invading species.
- Develop new partnerships across agencies, Tribes, and landowners to encourage landscape-scale planning across jurisdictional boundaries.

Built Systems:

- Increase reliability of water supply and decrease the likelihood of flooding by restoring wetlands, constructing bioswales, and restoring floodplains and stream-side areas.
- Provide incentives for water conservation to reduce water demand and increase natural water storage.
- Provide homeowners with assistance in lowering their energy use to reduce reliability on services that may be interrupted.
- Replace undersized culverts to prevent road-stream crossing failures during floods.
- Expand rail use to increase energy efficiency of local and regional transportation and decrease reliance on the road network.
- Reduce the building of homes in fire prone and flood prone areas to keep communities safe and decrease the demand on emergency services.

Economic Systems:

- Retain resiliency of natural systems so they continue to provide ecosystem services such as clean water supply, flood buffering, and timber production so that the communities and industries they support are maintained.
- Identify and take advantage of new renewable energy markets to reduce reliance on energy systems that may be disrupted and to build a local energy economy.

- Support the growth of small farms that provide local produce to improve food security and nutrition within communities.
- Retain large tracts of forest lands through carbon credits or limits on subdivisions as a means to reduce the risk of fire and the costs of emergency services as well as develop a carbon sequestration program.
- Promote tourism for activities like birding and cycling to expand the local economy while other industries, such as forestry, may decline due to climate change.
- Increase size and resiliency of commercially harvested fish populations through stream and watershed restoration activities to re-establish this sector of the economy.

Human Systems:

- Improve detection of, and response to, new diseases and disease vectors to quickly protect communities from emerging health threats that occur due to warmer temperatures.
- Provide incentives for more efficient homes that would reduce the impacts of severe heat on local populations.
- Increase passive cooling and air conditioning in public places to minimize severe heat impacts to the health of community members.
- Update emergency plans to reflect increased likelihood of severe weather, floods, and wildfires.
- Engage with and communicate among community groups (faith-based organizations, nonprofit groups) to assist governments in emergency response (e.g., distributing supplies in response to flooding events and identifying and assisting people at risk from severe heat).

Tribal Systems:

- Improve communication among state and federal agencies and tribes to allow for tribal input to planning processes and broaden community buy-in.
- Investigate feasibility of carbon credits for preserving forests on tribal lands to increase carbon sequestration and improve the local economy.
- Provide incentives for private landowners to cultivate culturally important species of plants and wildlife and allow for tribal use.
- Acknowledge the value of traditional ecological knowledge in managing natural ecosystems and protect such knowledge from misuse.

The recommendations made by local leaders and experts represent a sample of potential actions and strategies that could be taken in the Klamath Basin to prepare for climate change. Heat waves, severe precipitation events, and prolonged drought are all expected to increase as a result of climate change. By increasing the resilience of natural resources, the local economy, and local communities to such changes, the potential negative impacts of climate change would be reduced, thereby maintaining the quality of life that Klamath Basin residents currently enjoy.