

INTERMOUNTAIN WEST CLIMATE SUMMARY



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Continuing paths and new directions for the Western Water Assessment

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Using multidisciplinary teams of experts in climate, water, law, and economics, the Western Water Assessment works with decision-makers across the Intermountain West to produce useful information about natural climate variability and change. In the West, many of the impacts of climate change will be delivered through changes in the hydrologic cycle that are already affecting, and will continue to affect, our water resources. Since its inception in 1999, WWA has focused on building relationships and research partnerships with water-resource decision-makers.

The Western Water Assessment is now expanding the scope of its research, building on the strengths of researchers in the Intermountain West community. WWA has developed topical themes to encourage interdisciplinary approaches to developing research questions; our intention is for scientists to learn from one another as well as from decision makers, stakeholders, and the public, by including a diversity of players in the process.

Our researchers and our stakeholders have identified the following topical research themes as areas of focus for the WWA:

1. Decision Support for the Colorado River Basin and Headwaters

This theme is designed to provide resource managers with the tools, data, and information about climate that are necessary to support



Figure 1: WWA efforts have contributed to decision making on the Colorado River. Photo: Hoover Dam, Lake Mead.

management decisions. Projects within this theme incorporate collaborative work with decision makers to develop, interpret, and apply climate information. Addressing topics related to understanding, explaining, and resolving issues related to uncertainty are important components. In most cases, water will be the ‘natural resource’ of note. This theme encompasses work that WWA has been pursuing for many years now, particularly in the Colorado River Basin.

Examples of WWA projects for 2009–2010 under this theme:

- Reconciling Colorado River flow projections (continuing project)
- Impacts of coupled climate change and dust deposition on water resources in the Colorado River Basin (new project)
- Colorado River inflows between Lakes Powell and Mead: Past, Present, and Future (new)

2. Climate Adaptation and the Adaptation-Mitigation Nexus

In the climate change vernacular, adaptation refers to the human response to inevitable changes in climate, and mitigation encompasses the suite of efforts to reduce atmospheric concentrations of greenhouse gases. The Intergovernmental Panel on Climate Change (IPCC) and other major organizations tend to treat these two matters independently, although treating these independently in a planning framework can present conflicts. One example is the national investment and interest in biofuels. Although considered a renewable energy technology, dedicated biofuel crops may not reduce carbon when the larger context is considered (e.g. fertilizer and N₂O emissions), and the amount of water needed to grow these crops may expand existing water use. Biofuels may thus trade off one benefit for another, increasing vulnerability. Another example involves water conservation. Conservation that supplies new growth may be mal-adaptive if declining supplies and increased variability occur with climate change.

This research theme is an outgrowth of some limited work we have undertaken on climate adaptation and the water–energy nexus. It is being driven by intense stakeholder interest in exactly how to adapt to climate change given the uncertainties, and how not to adapt. This theme is designed to draw attention to the needs of decision makers to find productive adaptive strategies, to both climate change and natural climate variability.

Examples of WWA projects for 2009–2010 under this theme:

- A drought impact and vulnerability indicator suite (new)
- Energy-water-climate nexus: developing energy-water decision support tools for the Colorado River Basin (new)
- Joint Front Range Climate Change Vulnerability Study (continuing)



3. Ecological Vulnerabilities, Impacts, and Adaptation

Ecological impacts of climate change and variability on Western landscapes are often investigated in isolation, despite the fact that these impacts affect water quality, quantity, ecosystem services, and management of human water infrastructure. For example, the impacts of mountain pine beetle on water supplies are not fully understood, but are presumed to increase runoff and nutrient delivery to watersheds in the short-term. Research areas in need of cross-sector integration include climate change impacts to forests, fires, pests, invasive species, and the ripple effects of these impacts to ecosystem and economic services, energy production, water quality, quantity, and management. Public lands feature prominently in these impacts and include national parks, national forests, BLM land, as well as state holdings. We are particularly interested in the critical ecosystem and economic services provided by public lands. Federal agencies (including BLM) are now required to include climate change in their planning, providing a significant opportunity. There are emerging needs for this research and methods to implement and apply the science in planning strategies. This theme has a significant nexus with the new demand for climate information by federal agencies such as US Fish and Wildlife Service. This work is being driven by the knowledge that ecosystems provide significant services to humans, are understudied, and changes have the potential to significantly impact humans.

Examples of WWA projects for 2009–2010 under this theme:

- Forests, climate and change: implications for water resources and adaptation (new)
- Climate change impacts on public lands in the Upper Colorado River Basin (new)
- Effects of the mountain pine beetle on water quality in Colorado (new)

WWA hopes that expanding its purview will enable Westerners to better deal with the challenges posed by a changing climate. We encourage feedback from IWCS readers.

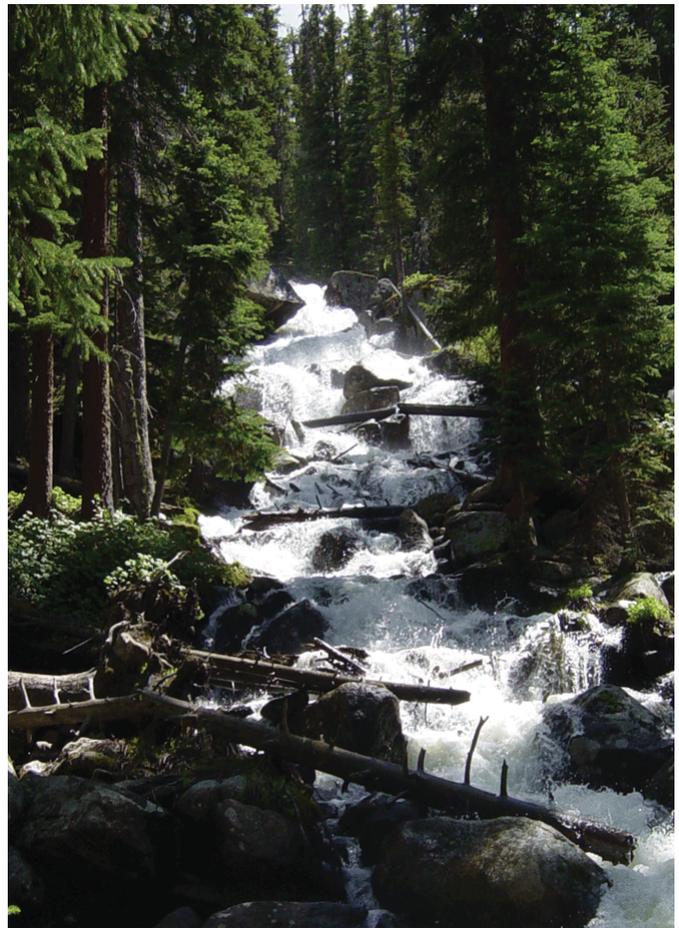


Figure 2: WWA scientists are initiating efforts in Rocky Mountain National Park to study the relationship between pine beetles and water quality. Photo: Rocky Mountain National Park.

