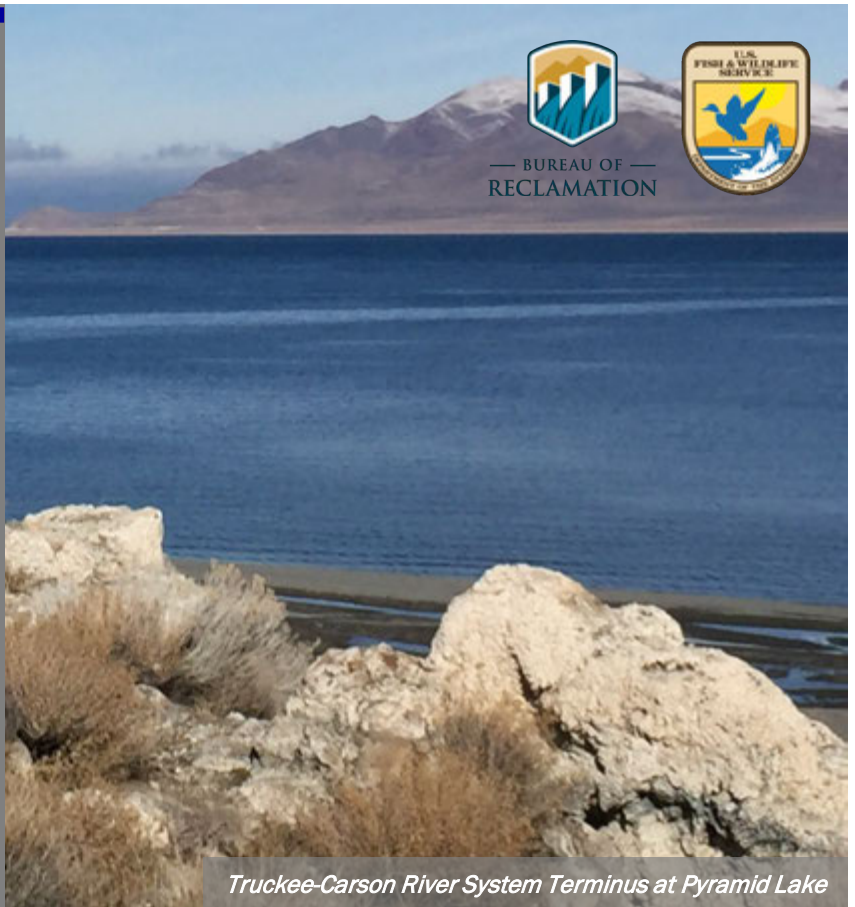


ACTIONABLE SCIENCE

Decision-Making in Snow-Fed, Arid-Land River Systems



Water for the Seasons was a four-year research project focused on developing climate resiliency among managers, water users, and communities along the Truckee-Carson River System. The project was funded by the National Science Foundation (NSF) and the United States Department of Agriculture (USDA). The Truckee-Carson River System became the pilot system to incorporate human decision-making with hydroclimatic models in a collaborative research framework that prioritized the involvement of local water managers, environmental managers, farmers, and Tribal communities. The project integrated hydroclimatic, river, and decision modeling of climate adaptation strategies in a snow-fed, arid-land river system.



BUREAU OF
RECLAMATION



KEY ISSUES ADDRESSED

In 2015, the Truckee-Carson River System in northern Nevada experienced an exceptional drought. There was no measurable precipitation to replenish the river system that numerous local water users depend on. Nevada is the driest state in the US and this high desert region of the Great Basin typically sees little precipitation outside of the winter months. This creates a heavy dependence on snowy winters to provide for the regions water needs. Along the Truckee-Carson River System, many agricultural fields are one hundred percent dependent on water from winter snowpack to irrigate fields in spring and summer.

PROJECT GOALS

- Develop a suite of hydrologic models to simulate water supply and demand for the entire river system
- Facilitate collaborative stakeholder engagement with water users and water managers
- Create a collaborative modeling framework to improve water sustainability, climate resiliency, and interactive decision-making

WORKING TOGETHER

Engaging stakeholders from the beginning of the project to writing the final report, helped the project team find informative and useful results designed specifically for water managers and users.



Low Water Above Lake Tahoe Dam in 2015

PROJECT HIGHLIGHTS

Research Design: Researchers assessed water sustainability in a changing climate, educated a research team on stakeholder equities and priorities, implemented best practices for identifying and engaging stakeholders to collaboratively model river systems, and then ensured the application of the new knowledge to other snow-fed arid land systems.

Co-Production Science Approach: Stakeholders were engaged through the entirety of the project to conduct research that incorporated their knowledge of the river system.

Community Evaluations: Evaluations were completed after each workshop to ensure the involved stakeholders' information needs and interests were understood and met. Other community members also provided direct feedback as results of the project were shared with local jurisdictions, environmental groups, Tribal resource managers, and the scientific community.

Collaborative Modeling: The project integrated a suite of models including climate, hydrologic, decision-making, and economic data as well as primary data collected from local water managers to inform climate resilience and adaptation simulations.

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Photos courtesy of Maureen McCarthy/UNR
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LESSONS LEARNED

The Water for the Seasons collaborative-research approach highlights the benefits of seeking, and interactively responding to community feedback as an integral part of co-developing scientific models.

This collaborative approach built trust between researchers and stakeholders and allowed stakeholders to co-generate more innovative responses and reduce future conflict. This process increased stakeholder understanding of future water supply and use and led to the production of useful extension outreach fact sheets, reports, and training materials for water users and managers.

This participatory framework helped to collectively improve climate resiliency for water users and managers by improving understanding among researchers and stakeholders about the challenges of managing scarce water resources in a changing climate.

Incorporating water managers and users from the beginning of the project produces the most effective and useful information.

NEXT STEPS

- Incorporate into local and regional drought contingency and climate adaptation plans
- Address specific stakeholder considerations such as strategies for alternate or cover cropping, managing aquifer storage, water banking and training arrangements in future iterations of this research
- Adopt the suite of hydroclimatic models to assess sustainability and resiliency among diverse stakeholder groups in other locations

For more information on this project, contact Maureen McCarthy (UNR), Principal Investigator: mimccarthy@unr.edu



Truckee-Carson River System Headwaters at Lake Tahoe