# WyACT: Wyoming Anticipating the Climate-Water Transition

June 2024

**The mountains in western Wyoming serve as headwater regions for major river basins in the United States. Climate-driven changes to the water supply impact not only the immediate region, but densely populated downstream regions as well.**

## About the Project

WyACT (**Wy**oming **A**nticipating the **C**limate-Water **T**ransition) is an interdisciplinary five-year National Science Foundation-funded project led by the University of Wyoming. Over 100 researchers, students and staff from 16 University departments have participated so far. WyACT partners with Wyoming communities, practitioners, and decision-makers to understand, anticipate, and prepare for significant changes in climate and water, and the impacts of those changes on interconnected human and natural systems. The work concentrates on the headwaters of important river systems in western Wyoming: Snake River, Wind River, and Green River.

**WyACT works with partners in an integrated and collaborative approach to produce knowledge that is: scientifically sound | relevant | actionable.**

## What we do

Our activities work towards the goal of understanding the interactions of social and ecological systems, so we can make better predictions about potential futures.

**Refining climate projections to anticipate changing water resources and their impacts**

We have fine-tuned existing climate model outputs to be more relevant and specific to Wyoming residents. We use these regionally relevant data in our hydrological, ecosystem and socio-economic models and make them accessible in a climate-change information database (wyadapt.org). Research teams are exploring how climate change affects hydrology, ecosystems, wildlife, and human communities.

**Exploring human responses to changes in water resources and related risks**

We examine human values, information sources, vulnerabilities, and decision-making around water in Wyoming. This generates critical input for our integrated modeling, which in turn will enhance our understanding of future changes in the interrelated systems.

## How we do it

We partner with groups at the forefront of changing water resources in Wyoming, such as sovereign tribes, agencies, organizations, and communities. Their diverse knowledge and perspectives are key to understanding and responding to complex challenges and help generate more robust outcomes.

- **Collaborative approach**
  We co-produce knowledge to create outcomes that are useful and usable for decision-making.
- **Community engagement**
  We leverage model outputs with place-based and practical knowledge to imagine a range of scenarios about climate-driven changes to water resources as a way to prepare for an uncertain future.

These collaborative and transdisciplinary approaches, along with empirical studies and integrated modeling of interrelated natural and social systems, represent the synthesis of WyACT actionable science and engaged community efforts.

## Areas of Expertise in the Project

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| Ecological Sciences | Economy | Indigeneous and Religious Studies |
| Social Sciences | Watershed Hydrology | ...many more |

## Sustainable Outcomes

The project is establishing three ongoing centers at the University of Wyoming:

The **Center for Climate, Water, and People (CCWP**) will sustain and extend WyACT's applied research, climate services, and educational work. The CCWP is driven by a vision where all Wyoming and Western residents thrive amid a changing climate. It will partner with communities and decision-makers to foster interdisciplinary research, education, and climate service offerings related to the challenges and opportunities posed by shifts in climate and water availability.

The **Socio-Environmental Observatory Network (SEaSON)** aims to provide trusted, high quality, freely available data and information on coupled human-environment systems and their responses to changing water availability. SEaSON monitors changes to watershed health, ecological disturbances, and community responses and feedbacks. Environmental sensors and observations record hydrological storage and flows, lake and stream ecological states and fish population changes, forest structure and function, and human movements, perceptions, and experiences.

The **CoLaborative for Intersectoral Modeling of the Earth System (CLIMES)** will develop national leadership in integrated human-earth systems modeling. The lab will provide quantitative, computational projections of regionally relevant environmental futures for Wyoming and beyond. It will produce innovative research with practical applications, aiming to make a real difference in how we understand and respond to environmental change.

## Selection of Groups Interacting with WyACT

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| Bureau of Reclamation | Greater Yellowstone Coalition |
| Jackson Hole Land Trust | The Nature Conservancy |
| NPS - Grand Teton National Park, Greater Yellowstone National Park | Northern Arapaho and Eastern Shoshone Tribes |
| Protect Our Water Jackson Hole | Snake River Headwaters Watershed Group |
| Snake River Fund | Teton County/Town of Jackson |
| Teton Science Schools | Trout Unlimited |
| USFS – Bridger Teton National Forest, Shoshone National Forests | USGS Water Science Center |
| Wyoming Association of Rural Water Systems | Wyoming Association of Conservation Districts |
| Wyoming Game & Fish | Wyoming Department of Environmental Quality |
| Wyoming State Engineer's Office | Wyoming Outdoor Council |

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