

Basin Report: Missouri River

The Missouri is the longest river in the United States. It has a watershed of more than 500,000 square miles, includes portions of 10 states and one Canadian province, and encompasses approximately one-sixth of the United States. The Missouri drains the largest watershed within the United States and produces annual yields of 40 million acre-feet. Reclamation has

constructed more than 40 dams on Missouri River tributaries that have helped with agriculture development in the basin. The facilities in the basin also provide significant benefits, including flood control, navigation, irrigation, power, water supply, recreation, fish and wildlife, and water quality. Navigation is important in the lower basin states. Reliable water delivery for agriculture and municipal, rural, and industrial use is important in the upper basin states.

To continue to meet these critical needs and protect natural resources, Reclamation and stakeholders must continually evaluate and report on the risks and impacts of climate change and identify appropriate adaptation and mitigation strategies utilizing the best available science.



Future Changes in Climate and Hydrology

Reclamation's 2016 SECURE Water Act Report identifies climate challenges the Missouri River Basin could likely face:

- Temperatures in the Missouri River Basin are projected to increase by roughly 5°F - 6°F during the 21st century.
- In the Missouri River Basin precipitation is projected to remain variable with a slight increase across the basin by 2070.
- In the Missouri Basin moisture falling as rain instead of snow at lower elevations is projected to increase the wintertime runoff with decreased runoff during the summer.

Future Impacts for Water and Environmental Resources

Historical and projected climate changes have potential impacts for the basin:

- Runoff decreases during the spring and early summer likely translate into water supply reductions for meeting irrigation demands, adversely impacting hydropower operations, and increasing wintertime flood control challenges.
- Warmer conditions might increase fishery stress, increase electricity demand, increase water demands for instream ecosystems, increase potential for invasive species infestations, and further shrink the prairie pothole region.
- Climate changes in the Missouri Basin could lead to declines in basin hydropower generation and moderate decreases in local water supplies.

Missouri River Basin Water Resource Studies

Adequate and safe water supplies are fundamental to the health, economy, and ecology of the United States, and global climate change poses a significant challenge to the protection of these resources. Reclamation is taking a leading role in assessing risks to western U.S. water resources and is dedicated to mitigating risks to ensure long-term water resource sustainability. To accomplish this, Reclamation has conducted or initiated five climate impact and basin studies since 2009 in the Missouri River Basin under its WaterSMART program:

- **Upper Missouri River Headwaters Impact Assessment** - Reclamation is conducting the Upper Missouri River Basin Headwaters Impacts Assessment to determine baseline risks to water supplies and demands to establish a foundation for more in-depth analyses and the development of adaptation strategies in the Upper Missouri River Headwaters Basin Study.
- **Missouri River Basin Headwaters Basin Study** - Reclamation partnered with the Montana Department of Natural Resources and Conservation to fund the study. The study area encompasses the Missouri River basin headwaters in Montana, from the Continental Divide to the Landusky and Mosby Gages, both upstream of Ft. Peck Reservoir.
- **St. Mary and Milk River Basins Study** - Reclamation partnered with the Montana Department of Natural Resources and Conservation to fund the study. The study area encompasses north-central Montana, southern Alberta and Saskatchewan, Canada, and includes the Blackfeet and Ft. Belknap Indian Reservations.
- **Republican River Basin Study** - Reclamation partnered with the States of Colorado, Nebraska, and Kansas to fund the study. The Republican River Basin Study area covers the entire Republican River Basin in eastern Colorado, southern Nebraska, and northern Kansas down to the Clay Center gauging station in Kansas.
- **Niobrara River Basin Study** - Reclamation partnered with the Nebraska Department of Natural Resources and Upper Niobrara, White Natural Resources District, to fund the study. The study area is located along the Niobrara River in northern Nebraska.

Adaptation and Coordination

Where opportunities exist, Reclamation participates in coordinated adaptation actions in response to climate stresses, as well as changes in land use, population growth, invasive species and others. These activities include extending water supplies, water conservation, hydropower production, planning for future operations, and supporting rural water development. Specific examples of coordination and adaptation in the Missouri River Basin include:

- **The National Drought Resilience Partnership (NDRP)**, a partnership of seven federal agencies, conducts pilots to link drought information such as monitoring, forecasts, outlooks, and early warnings with longer-term drought resilience strategies in critical sectors such as agriculture, municipal water systems, energy, recreation, tourism and manufacturing. A pilot study is currently ongoing in the Upper Missouri River Basin. The study is leveraging the climate Impact Assessment and Basin Study in the Upper Missouri Headwaters and the foundation of federal and state partnerships. The pilot initiative is focused on how improved drought preparedness at the local, state, and tribal levels can be achieved through enhanced coordination of federal agency resources.



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