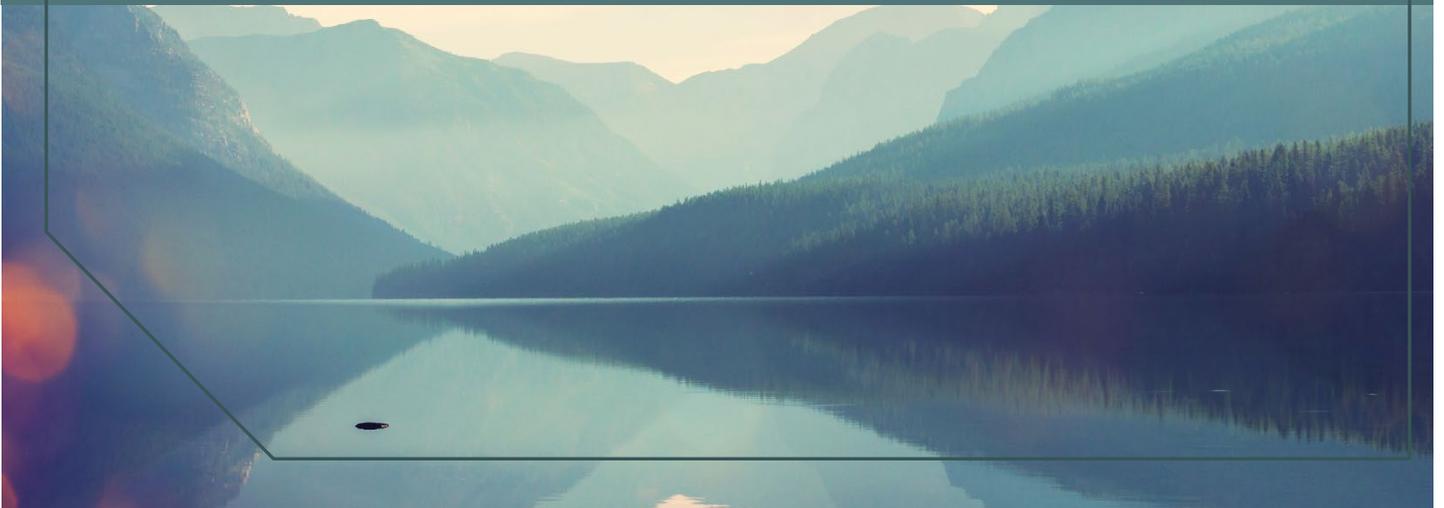


June 23, 2020
Water Policy Interim Committee
Jason Mohr

CLIMATE AND WATER RIGHTS (DRAFT)



STUDY OF CLIMATE AND WATER RIGHTS

A COMMITTEE SELECTION

As part of its 2019-20 work plan, the Water Policy Interim Committee is studying climate and water rights during the 16-month interim period. This paper is a summary of the research considered by the committee, as well as committee findings, recommendations, and legislation.

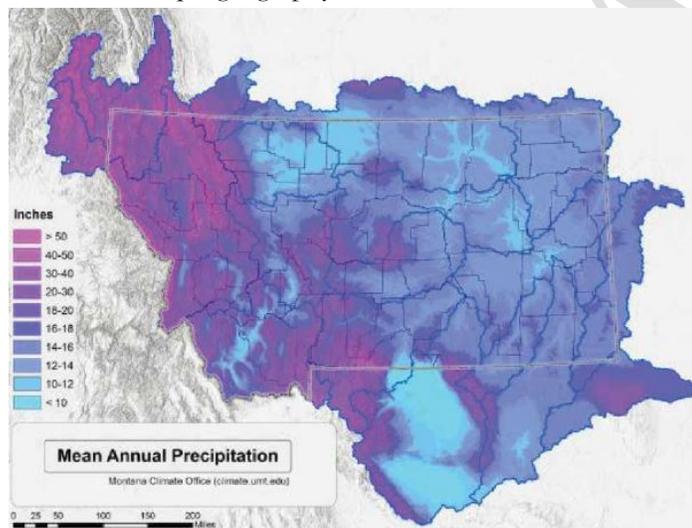
MONTANA CLIMATE ASSESSMENT

The Montana Institute on Ecosystems' Montana Climate Assessment¹ represents the first major attempt to quantify the effects of climate change specifically for Montana. Various university faculty, students, state and federal agency researchers, non-profit organizations, resource managers, and citizens researched and wrote the assessment over a two-year period.²

The assessment analyzed recent climate trends and projected future climate conditions. The assessment is divided into three impact areas—impacts to Montana's water, forests, and agriculture. It also identifies major knowledge gaps and areas for future research. Although all issue areas are certainly related, the committee focused on the impacts to Montana's water.

OBSERVED CLIMATE TRENDS

Montana's unique geography makes it the headwaters for three major river basins—Missouri, Snake/Columbia, and



Saskatchewan. The Continental Divide "splits the state into climatically distinct western wet and eastern dry regions" and is subject to "diverse weather systems that originate from the Pacific Ocean, the Arctic, and sometimes subtropical regions."³

Energy from the sun—or more specifically how solar radiation is reflected, absorbed, transformed, re-radiated—drives the climate in Montana and elsewhere. Historical weather records since 1950 show a rise in temperatures across the state's seven climate divisions, averaging an increase of annual average temperatures of 2-3 degrees.⁴ Average annual precipitation has not changed since 1950, although average winter precipitation has generally decreased, and spring precipitation has increased.

¹ The Institute on Ecosystems is based at Montana State University and the University of Montana.

² Cathy Whitlock, Wyatt F. Cross, Bruce Maxwell, Nick Silverman, Alisa A. Wade, Institute on Ecosystems, *2017 Montana Climate Assessment*.

³ Cathy Whitlock, Wyatt F. Cross, Bruce Maxwell, Nick Silverman, Alisa A. Wade, Institute on Ecosystems, *Executive Summary, 2017 Montana Climate Assessment*, 7.

⁴ Cathy Whitlock, Wyatt F. Cross, Bruce Maxwell, Nick Silverman, Alisa A. Wade, Institute on Ecosystems, *Executive Summary, 2017 Montana Climate Assessment*, 8.

PROJECTIONS FOR MONTANA'S WATER

The observed trends in temperatures and precipitation are expected to continue through the end of this century, and the effects of these trends will "likely result in additional stress on Montana's water supply,"⁵ including:

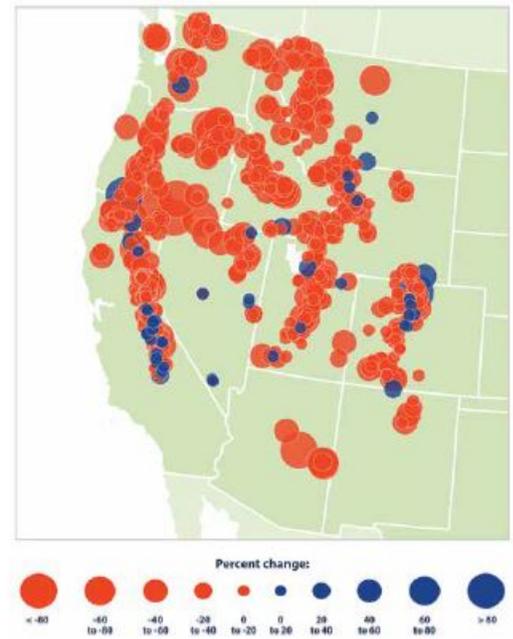
- A continued decline in mountain snowpack
- Reduced snowpack at mid and low elevations
- Earlier snowmelt and an earlier peak in spring runoff
- Reduced late-summer water availability in snowmelt-dominated watersheds
- Increased demand for groundwater

As a result, years-long droughts will continue to be a natural feature of Montana's climate, and the frequency and duration of late summer and early fall droughts will likely increase.⁶

These effects are not consistent across the state. For example, while snowpack today is approximately 80 percent of its observed 1930s value, the impacts will be more pronounced west of the Continental Divide, especially below 6,000 feet in altitude. And groundwater in Montana's irrigated valleys may be protected by seepage from ditches and canals, which recharge these valley aquifers and make those less susceptible to drought.⁷

Examination of irrigation canals may help water users balance the efficiency of a project (which may be improved by lining a canal) with the benefits of leakage (which may recharge the aquifer). Frequent monitoring of flow data at strategic locations such as turnouts over several years can identify operational changes that further improve canal efficiency, as well as aid response to changes in precipitation and climate.

A 2017-19 study of Farmer's Canal off the West Gallatin River identified reaches of the canal that gained or lost water as it traveled on its 10-mile diversion, which serves 14,000 acres.⁸ This information may allow irrigators—and policy makers—to affect and benefit water users far beyond its irrigated acres.



Trends in April snowpack in western U.S. (Mote and Sharp (2016))

POLICY INQUIRIES

The Montana Climate Assessment predicts the state will continue to face years- or decades-long drought. This "persistent drought" is expected to challenge water policy makers—and perhaps force changes. As the assessment states:

⁵ Cathy Whitlock, Wyatt F. Cross, Bruce Maxwell, Nick Silverman, Alisa A. Wade, Institute on Ecosystems, *Executive Summary, 2017 Montana Climate Assessment*, 14.

⁶ Ibid. More analysis and discussion specific to water issues begins on page 71 of the *2017 Montana Climate Assessment*.

⁷ Testimony of Wyatt F. Cross to WPIC, Sept. 10, 2019.

⁸ Presentation of John Metesh, Montana Bureau of Mines and Geology, to WPIC, Jan. 7, 2020.

In the past, Montana often addressed drought and flooding as temporary emergencies, with reactionary responses to an immediate crisis. Over the past decade, western water planners have learned that the best time to prepare for the impacts of drought or flooding is before those events occur.⁹

The Montana State Water Plan includes some of this "drought resilience" planning, specifically related to increasing water storage.

But not only will Montanans' reliance on the state's natural systems be challenged: The very basis of the state's legal construct for the distribution of water—the prior appropriation doctrine—could also come under pressure.

INCREASED STORAGE?

Dozens—or even hundreds—of dams store or impound water in Montana to help supply water to users during peak summer demand. Montana is home to some of the largest water impoundment projects in the country. Among these are Fort Peck

Lake—Montana's largest water body and the fifth-largest reservoir in the United States—and Hungry Horse Reservoir, the 22nd largest.¹⁰ The Bureau of Reclamation also stores more than 1 trillion gallons of water at 13 major reservoirs, which feed 400,000 acres, or 625 square miles.¹¹ The Department of Natural Resources and Conservation operates 31 impoundments, marketing billions of gallons for thousands of acres.¹²

Increasing storage through impoundments remains an option for meeting future water demands. State water planners see opportunities on major river systems with

small existing storage capacities compared to the total flow, including the Gallatin, Big Hole, Upper Clark Fork, Bitterroot, and Blackfoot rivers.¹³ Although more limited, some eastern streams could provide reservoir opportunity, such as Horse Creek, Flatwillow Creek, Judith River, and the streams from the Little Rocky and Bears Paw mountain ranges.¹⁴

Montana reservoirs holding more than 5,000 acre feet of water (1.6 billion gallons).
(Montana State Water Plan)

Congress and the Legislature would have to approve major new projects, which would have a high price tag and face some regulatory requirements that many existing projects did not, including environmental, recreational, and location issues.

⁹ Cathy Whitlock, Wyatt F. Cross, Bruce Maxwell, Nick Silverman, Alisa A. Wade, Institute on Ecosystems, *2017 Montana Climate Assessment*, 125.

¹⁰ <https://www.nwo.usace.army.mil/>

¹¹ Testimony of Chris Gomer, Bureau of Reclamation, to WPIC, Jan. 7, 2020.

¹² <http://dnrc.mt.gov/divisions/water/projects>

¹³ Department of Natural Resources and Conservation, *Montana State Water Plan (2015)*, 60-61.

¹⁴ *Ibid.*

Recent policy action allows for rehabilitation and enlargement of facilities. The Reclamation Safety of Dams Act will eventually rehabilitate and increase the capacity of Fresno Reservoir in north-central Montana by raising the dam height by 5 feet.¹⁵ The DNRC is considering a similar course of action at Ruby, Painted Rocks, and East Fork reservoirs.¹⁶

Another approach may be to increase natural storage and artificial aquifer recharge. According to the State Water Plan:

Existing natural systems, such as riparian areas, floodplains and wetlands act to slow runoff and promote groundwater recharge; effectively storing water and releasing it slowly back to the surface water system. In this way, these natural systems fill a role similar to traditional reservoirs. The hydrologic characteristics of these natural systems also improve water quality.¹⁷



Some are already bringing "natural storage" to the landscape. The Big Hole Watershed Committee has led projects reconstructing stream channels, removing placer mine tailings, removing conifers, and planting willows on Oregon Creek and French Gulch. The projects are expected to saturate wetlands and floodplains, providing fish habitat, riparian vegetation, and increased natural storage.¹⁸

WPIC members walk along Oregon Creek (LEPO)

FLEXIBLE PERIOD OF USE?

One observed climate trend is that in some drainages, spring runoff is occurring before the start of a water right holder's period of use. The 2017 Montana Climate Assessment states:

Historical observations show a shift toward earlier snowmelt and an earlier peak in spring runoff in the Mountain West (including Montana). Projections suggest these patterns are very likely to continue into the future as temperatures increase.¹⁹

The effect of this "will reduce late-summer water availability in snowmelt-dominated watersheds."²⁰ This effect may negatively affect irrigation rights.

¹⁵ Testimony of Chris Gomer, Bureau of Reclamation, to WPIC, Jan. 7, 2020.

¹⁶ Testimony of Jan Langel, DNRC, to WPIC, Jan. 7, 2020.

¹⁷ Department of Natural Resources and Conservation, *Montana State Water Plan (2015)*, 69.

¹⁸ Montana Watershed Coordination Council, *Missouri Headwaters Watershed Tour brochure (2019)*.

¹⁹ Cathy Whitlock, Wyatt F. Cross, Bruce Maxwell, Nick Silverman, Alisa A. Wade, Institute on Ecosystems, *2017 Montana Climate Assessment*, 72.

²⁰ *Ibid.*

An element of a water right is its "period of use." Montana statute does not refer specifically to a "period of use,"²¹ but the term does appear in administrative rule,²² which the DNRC uses to set a date range for a new irrigation right based on a climatic designation.

Although not addressed in state law, department policy does not allow a user to change a period of use outside the originally defined water right. A water user would need to apply for a new water right with the earlier period of diversion or use or file a change application to add storage to the existing water right. This stored water could potentially be used before the next year's period of diversion.²³

Agencies in at least 5 Western states must approve a change in a "period of use." Idaho, Colorado, Utah, Wyoming, and Washington use slightly different terminology,²⁴ but essentially a change in "period of use" triggers those states' change of use process.²⁵ In Montana, a "change in appropriation right" is defined as a change in the place of diversion, place of use, purpose of use, or place of storage. These uses may need further clarification in Montana statute.

FINDINGS, RECOMMENDATIONS, LEGISLATION

Findings, recommendations, and legislation are pending committee action.

²¹ Statute uses various phrases such as "times of use" (section 85-2-224, MCA), "inclusive dates during which the water is used each year" (section 85-2-234, MCA), "length of time" (section 85-2-316, MCA), and "starting and ending date of the proposed use of water" (section 85-2-410, MCA).

²² Admin. R. Mont. 36.12.112.

²³ Email from James Ferch, DNRC, to WPIC staff.

²⁴ Colorado refers to a change in "time of use," Washington includes season of use within "purpose of use," and for Wyoming a "change use" limits a new use to the same period of time. Water Policy Interim Committee memo, "Comparison of Change of Water Right Processes in 6 States," July 2018.

²⁵ Legislative Environmental Policy Office memo to WPIC, "Flexible Periods of Use," Dec. 16, 2019.