



Dolores River Boating Advocates

# DOLORES RIVER REPORT CARD

## 2023

*An annual assessment of the health of southwest  
Colorado's Dolores River in 2023*



# INTRODUCTION

In this report, we analyze ecological and human-caused management of the lower Dolores River in 2023. While similar to other river report cards, this one will take both dynamic annual factors (e.g., metrics dependent on snowpack and reservoir management) and fixed annual factors (e.g., the presence of McPhee Dam) that collectively define the Dolores River's flows and resulting ecological conditions.

We examine metrics including trans-basin diversions, presence of major dams, as well as water quality, flow regime, native fish abundance, and geomorphology. Each metric will be given a grade from A-F, which will be averaged for a final score.

Dolores River Boating Advocates is a leading voice for the Dolores River and advocates for both the ecological and recreational values the river provides. During releases from McPhee Reservoir, we communicate regularly with boaters and water managers, advocate for environmental flows, and coordinate outreach opportunities to educate the public.

## **hydrograph | noun**

**hy·dro·graph**

**1: a mechanism for recording on a chart the changing level of water (as in a well, reservoir, stream)**

**2: a chart produced by this mechanism**

# SUMMARY

The 241-mile long Dolores River rises in the San Juan Mountains in southwest Colorado. The river tumbles down the river corridor flowing through the town of Dolores, where it meets McPhee Reservoir, built in the 1980's.

The reservoir holds 381,195 acre-feet of water, (on average, one acre foot supplies two families for a year.) Most of the water is used for agriculture in Montezuma and Dolores Counties. Notably, all the water from McPhee Reservoir slated for irrigation or municipal uses occurs in the adjacent watershed and is a significant transbasin diversion.

The water allocated for fish downstream and to other junior water users (including the Ute Mountain Ute Tribe) is shorted during dry years. In wet years when the reservoir fills, additional water is released downstream in what is called a "spill." Water users will receive 100% of their allotted water during these years, but not more. The dam outlets can release up to 5,000 cubic-feet per second (cfs) of water (though the spillways can release much more than that.)

McPhee Dam has changed the 192 miles downstream were significantly since it was installed 40 years ago. Encroaching vegetation has narrowed the river channel, mid-channel gravel and sand bars have decreased in size and native fish populations have declined. The sections below McPhee Dam and above the confluence with the San Miguel, the largest tributary of the Dolores, have been most affected.

The Dolores below McPhee Dam flows through remarkable wildlands, from Ponderosa Gorge, through Slick Rock and the Dolores River Canyons Wilderness Study Area, and then through Paradox Valley. These lands support critical wildlife, fish, and bird species, as well as high levels of biodiversity. When flows allow, this section is considered one of the best river trips in the country.

## Transbasin diversion | noun

trans·ba·sin di·ver·sion

**1: A transbasin diversion is the removal of water from one river basin to another river basin. These diversions of water are 100% consumptive since no water from the diversion will return to the basin of origin's waters as return flow**

# 2023 WATER YEAR

In 2023, the Dolores River watershed received a very healthy snowpack and the best runoff in many years, despite beginning the season with a very low reservoir. According to the Upper Colorado River Basin Forecast Center, inflows to McPhee Reservoir during the 2023 water year were 527,000 acre-feet, or 207% of normal.

Even prior to a release from McPhee Dam, tributaries and drainages were contributing significant flows to the mainstem Dolores.

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Days above 800 cfs: **55**

Days above 1,000 cfs: **43**

Days above 4,000 cfs: **10**

Peak at Gateway (cfs): **6820**



Photo credit: Rig to Flip

**NATIVE FISH**

D

**WATER QUALITY**

B

**RECREATION**

B

**GEOMORPHOLOGY**

D

**TRANSBASIN DIVERSION**

F

**FLOW REGIME**

B-

**LARGE-SCALE DAMS**

F

**OVERALL 2023  
SCORE**

**C-**

# NATIVE FISH

Of the many native fish species in the Dolores River, three are classified as sensitive: the Roundtail Chub, Flannelmouth Sucker, and Bluehead Sucker. Fish populations have been in decline since McPhee Dam was built, and the influence of invasive Smallmouth Bass who prey on young fish, also impede native fish numbers.

2020-2022 were very dry years, therefore sampling opportunities in 2023 allowed aquatic biologists to understand how fish populations responded to extreme low flows.

In 2023, at the Dove Creek Pumps sampling site, only nine fish were caught (including 4 smallmouth bass), where the average caught over the past 30 years was 91. Only 1 Roundtail Chub was found, where on average 62 are found. In Slick Rock Canyon, there was a similarly low number of Roundtail chub captured.

While this year's abnormally cold water temperatures likely played a role in these numbers, it is still quite worrying to see such low population numbers.



Photo credit: Rig to Flip

Photo credit: DRBA

## B

Water quality in the Dolores is generally dependent on a number of factors, both naturally occurring and compounded by humans. A few factors include high levels of salinity, particularly in Bedrock, CO, and extreme fluctuations in water temperatures, especially high water temperatures by the result of frequent, extremely low flows in the spring and summer.)

The best measure of water quality can be found from the state of Colorado and the 303(d) list of impaired waters. Every stream is assessed every 2 years, and the Dolores was last assessed in 2022.

The lower Dolores is mostly considered clean, or is "attaining" standards. However, the reach from Slick Rock, CO to the confluence with the San Miguel was listed as impaired for aquatic life because of dangerously warm temperatures and iron levels. The state also found that high levels of chloride impaired the water supply.

These results show how important river flows are to the overall water quality. While we don't have metrics for 2023, more of the river has good water quality than not, water quality is not the biggest issue for the lower Dolores.

## WATER QUALITY

## D

# RECREATION

Whitewater boating on the lower Dolores River has been called one of the best river trips in the country. Because of the fickle nature of flows and the last-minute nature of releases from McPhee Dam, it can be challenging to plan a trip in advance.

2023 however had quite a long season, with a decent lead up to the release given the phenomenal snowpack. The managed releases spanned April 28 – June 30. The ramp-down was 8 days long with a 115 cfs/day drop. McPhee Reservoir was completely full for 21 days.

Overall 2023 was a great year for recreation, though towards the end of the spill, forecasts were uncertain which lead to a challenge when planning trips because of uncertainty if there would be enough water.

64 days of release

55 days at or above 800 cfs

43 days at or above 1,000 cfs

26 days above 2,000 cfs

18 days at or above 3,200 cfs

10 days above 4,000 cfs

B

Photo credit: DRBA

D

How a river is managed can have a direct impact on the geomorphology of a river, including the shape of the river channel and it's floodplain. Events such as flash floods or the presence of major dams can have profound impacts on a river system by inserting or blocking sediment and In the channels and creating massive fluctuations in the amount of water flowing downstream.

The geomorphology impacts the shape of the channel, fish habitat, riparian habitat and floodplain connectivity, as well as recreation.

Since McPhee Dam was constructed in the 1980's, there have been observed changes to the geomorphology including: the main channel narrowing, loss of side channels, steep vegetation choked banks forming along the river and a decrease in the number of unvegetated sand and gravel bars.

Unfortunately for fish habitat and riparian ecosystems, these trends are not drastically impacted by one good year. Year after year, researchers are finding the Dolores River being "simplified", which is alarming for overall ecosystem health.

# GEOMORPHOLOGY

# TRANSBASIN DIVERSIONS

Water has been diverted out of the Dolores River and into Montezuma Valley for well over 100 years, primarily for agriculture. The first transbasin diversions were constructed in 1886 by a private entity that is currently Montezuma Valley Irrigation Company. These water rights are the highest priority and all occur out of the Dolores watershed and in the San Juan River Basin, which means none of the return flows make it back to the Dolores River.

When McPhee Dam and Reservoir were built, additional water was sent out-of-basin to the Ute Mountain Ute Tribe in Towaoc and to farmers to the north around Dove Creek. **In total, around 87% of the water from McPhee Reservoir on a normal year (without a release) is diverted out of the basin.**

Total active capacity of McPhee Reservoir: **229,200 acre-feet**  
Total transbasin diversions: **200,200 acre-feet**

F

Photo credit: Rig to Flip

B-

A flow regime is defined as “the temporal variability of discharge, particularly the quantity, timing, and variability in flow” (Poff, et al.) In other words, it is the variability of flows in a river or stream annually.

In general, a dynamic or non-static flow regime is better for ecological systems and can provide ideal habitat conditions, sediment transportation, improve riparian areas, and provide other critical ecological services. Dammed rivers tend to have less dynamic flow regimes, which lead to simplified river systems (such as the Dolores).

2023 had the most dynamic flow regime in many years, with flows from low elevation snowpack peaking prior to the release from McPhee. Once release began, flows were above 4,000 cfs, and below the confluence with the San Miguel, above 6,000 cfs.

While flows in the spring are almost always the most dynamic, once the spill concluded, a fixed amount was released for the remainder of the year, which does **not** mirror the flow regime above the dam.

## FLOW REGIME



# 2023 SPRING HYDROGRAPHS

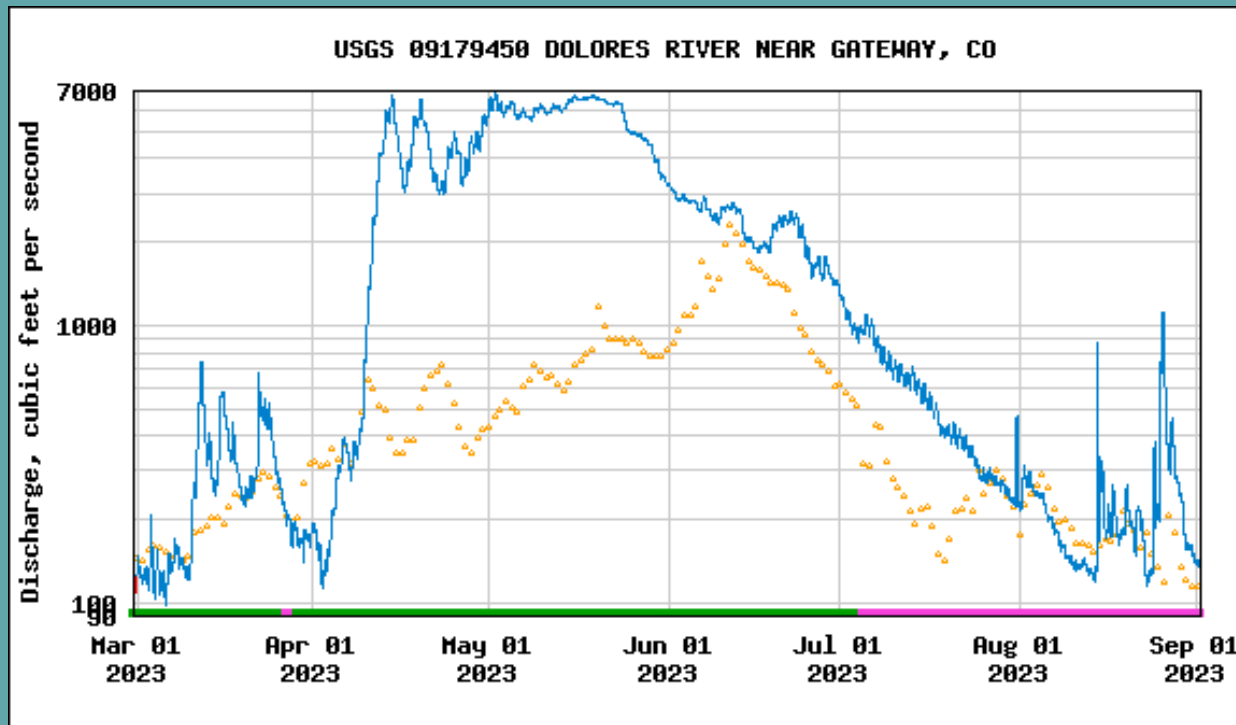


Figure 1: Dolores River at Gateway between March 1-September 1, 2023

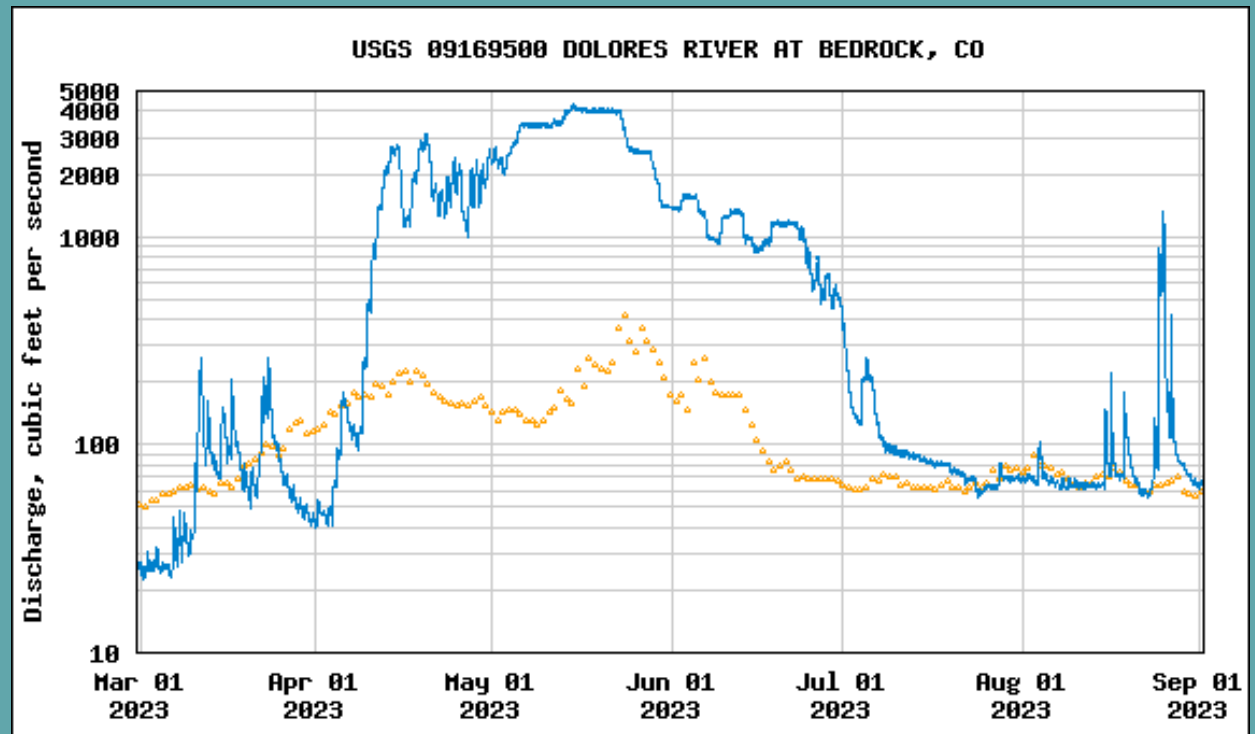


Figure 2: Dolores River at Bedrock between March 1-September 1, 2023

# F

McPhee Dam and Reservoir are the main components of the federal Dolores Project, which was approved as part of the 1968 Colorado River Basin Act under the Colorado River Storage Act of 1956 and funding was approved in the late 1970's, with construction beginning shortly after.

McPhee Dam, is a rolled earthen structure with a reservoir capacity of approximately 381,000 acre-feet. The capacity includes 229,000 acre-feet of active capacity, 152,000 acre-feet of inactive capacity, and 100 acre-feet of dead storage.

The Dolores Project also includes a vast network of canals and ditches that transport water to full-service farmers (i.e., farmers who did not receive irrigation water from Montezuma Valley Irrigation Company infrastructure) as well as south to Towaoc and the Ute Mountain Ute Reservation, who previously had no running water.

Completed in late 1984, with all of the project features online by the late 1990's, the dam completely changed the Dolores River ecosystem. The timing also coincided with the beginning of a 20-year megadrought, exacerbating water shortages.

## DAMS

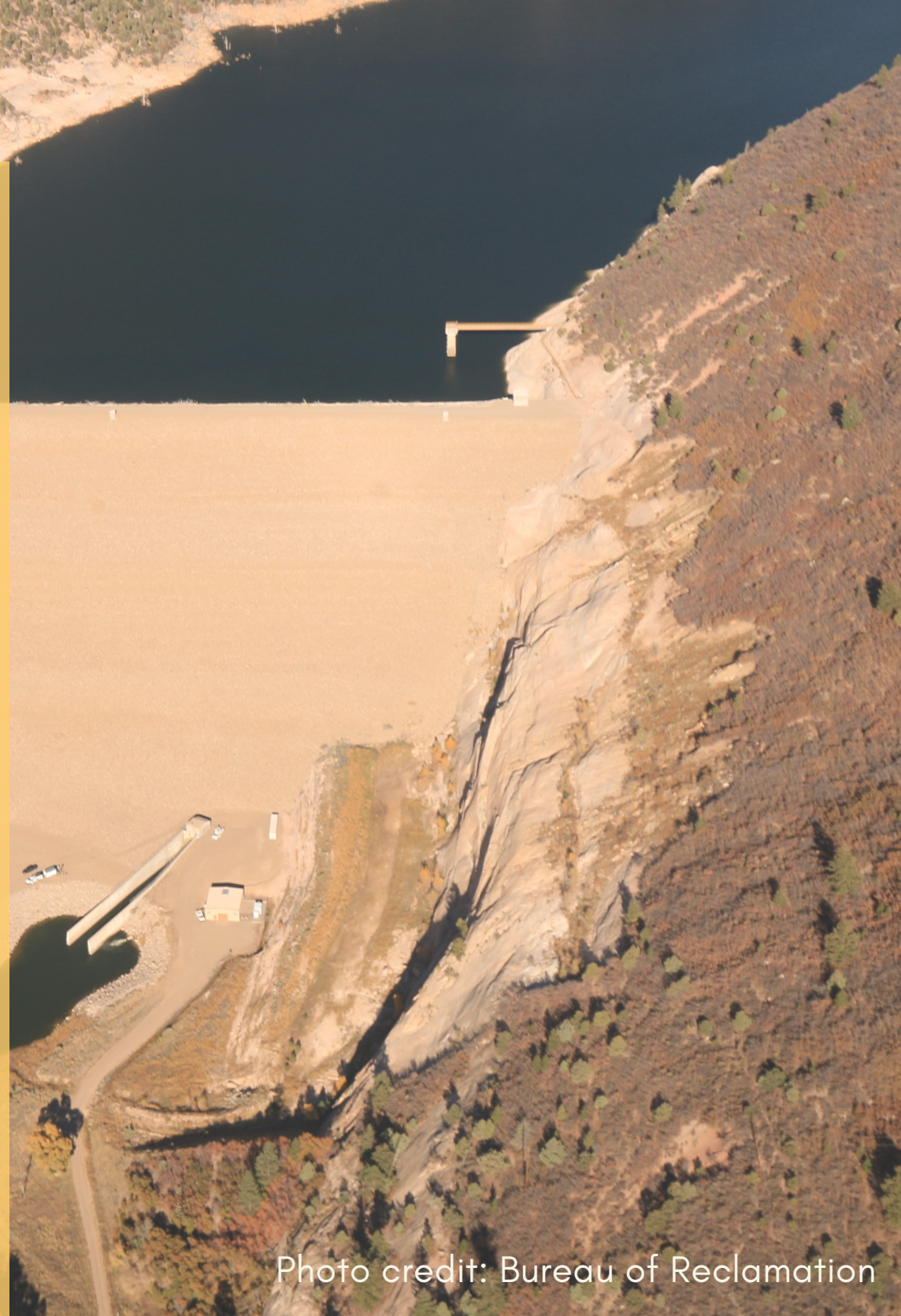


Photo credit: Bureau of Reclamation

# ADDITIONAL RESOURCES:

The Dolores Project  
Garrit Voggeser  
Bureau of Reclamation History  
2001

The Dolores River  
Dolores River Adaptive Management  
Support  
Fort Lewis College  
<https://www.fourcornerswater.org/dolores-river>

How's My Waterway?  
Environmental Protect Agency  
<https://mywaterway.epa.gov/community/dolores,%20co/overview>

2023 Dolores River Spill Debrief  
October 11, 2023  
Dolores River Boating Advocates  
<https://www.youtube.com/watch?v=64C5I2SDpcs>





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