Drought In **Colorado**

Explaining the impacts, challenges and the path forward

Conservation Colorado

Introduction

Rivers and streams are the foundation of a healthy natural environment, providing life to humans, plants and animals. Coursing through the state's stunning landscapes, these waterways carry water through mountains, mesas, forests and deserts, providing life and nourishment for every living being. No river is more important to our state than the Colorado River, which provides 40% of our state's water supply for communities and landscapes in every corner of the state.[1] Climate change, water overuse and severe drought are putting extreme pressure on Colorado's rivers and streams, most notably the Colorado River. Less and less water is available to grow local food, provide drinking water and sustain wildlife. This booklet is a one-stop resource to help you understand drought in Colorado—what it is, how it impacts the well-being of our wild ecosystems and communities and what the future may hold for our rivers and streams.

Colorado River, Fruita

Clear Creek, Golden

Drought Explained

Colorado is in the midst of the worst drought on record, stretching back 1,200 years

Drought occurs when a region experiences less rain and snow than normal. Periods of low rain and snowfall can cause water shortages, crop damage and an increased risk of wildfire. The remedy for a drought is consistent average or above average precipitation in the form of summer rain and winter snow, which Colorado is seeing less of due to climate change. Therefore, society will need to adjust our demands and adapt to a diminishing supply.

The Colorado River provides 40% of the state's water needs and is vital for communities on both sides of the Continental Divide. While the Colorado River is our most important waterway, all of our streams and rivers provide vital water for growing local food including seasonal favorites like Palisade peaches, Pueblo chiles and Rocky Ford melons, drinking water needs, and sustaining wildlife. Starting in the 1930s, Colorado began piping water from the West Slope to the Front Range because there wasn't enough water east of the Continental Divide to meet growing agricultural and municipal needs. Now, for more than 20 years, Colorado's West Slope, an area that generates 80% of the state's water supply, has been experiencing historical drought conditions.[2] With so much demand on our state's limited water resources, droughts have devastating repercussions for humans and the natural environment.

Drought can turn once-fertile areas into deserts, a process called aridification; scientists are worried Colorado is heading in that direction. Drought is not always easy to see, especially when extreme rainfall events of the past decade along with banner snow years like 2023 can give a false impression that there is plenty of water to go around. A closer look shows that early 2023 was only the second time in 23 years that Colorado enjoyed statewide drought-free status.[3] The relief was short-lived. By November, more than a quarter of the state returned to drought. As the frequency and intensity of drought increases, the positive impacts of wet periods will not be enough to combat it.

Farmer's Market, Palisade

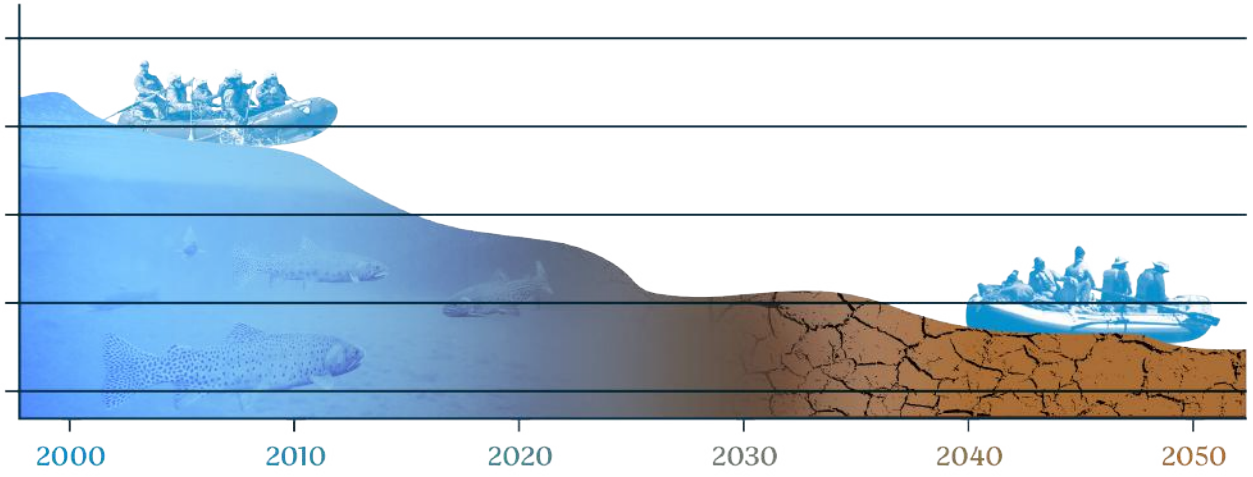
Dolores River

Cody Perry / Rig To Flip

Colorado River Flow

80% of water comes from the west slope

80% of population on the front range



The Colorado River's flow has decreased by about 20% since 2000 and is expected to decrease another 20-30% by 2050


Palisade

Drought Hurts Wildlife, Landscapes And People

Drought is a period of reduced rain and snowfall, which means there's less water to flow across landscapes to replenish rivers and streams. As seen in the accompanying graphic, the Colorado River's flow has decreased by about 20% since 2000 and is expected to decrease another 20-30% by 2050.[4] When streams and rivers run low, wildlife lose habitat and have to compete for dwindling space and food, making it difficult to survive. Even when it starts raining after a drought the parched ground acts like a sponge and soaks up large amounts of water. Rising temperatures result in thirsty trees and plants consuming a lot of this available water before it can reach our rivers.

Over the past decade, Colorado saw numerous periods of record-breaking summer temperatures. These conditions can be especially harmful to fish like Colorado's iconic native cutthroat trout that need cool water to survive and thrive. Elevated water temperatures result in numerous recreational river closures around the state each year. Closures to fishing, tubing and other river recreation activities threaten the long-term viability of Colorado's $19 billion per year river recreation economy.[5]

Drought doesn't impact everyone equally. Research shows that effects of drought are worse in counties with higher Latino populations, even though those populations tend to use less water than counties with fewer Latino members.[6] A hotter, drier future will usher in higher water demand, shorter supply and increased cost of water. These costs disproportionately impact lower income households. Farmworkers, many of whom are Latino, are especially vulnerable to loss of employment due to water shortages.

Why You Should Care About Drought

A recent analysis showed 30% of Colorado's streams and rivers are failing to meet state water quality standards.[7] Reduced streamflows can worsen existing water quality problems. When a community has poor drinking water quality, their water treatment costs can rise, disproportionately impacting lower income households. Drought also threatens the survival of iconic Colorado wildlife and several threatened and endangered fish species like the Colorado pikeminnow, razorback sucker and humpback chub. Drought doesn't just impact river flows, it also dries out trees and forests, making flora more susceptible to diseases, infestation by insects and devastating wildfires.

WILDLIFE STRUGGLE TO SURVIVE

Wildlife are adaptable to changing environments, but extended drought combined with human development threatens their ability to survive. Drought turns forested lands into drier landscapes and displaces entire populations of animals. Decades of successful conservation efforts protecting Colorado's river-dependent animals could be undone as we move into a drier future. These animals, including the North American river otter, osprey and cutthroat trout face renewed risk of extinction due to climate change-induced drought.

North American River Otters are found in small numbers across western and northern Colorado's rivers, streams and wetlands where they prey on fish, reptiles, and amphibians. These highly mobile and adaptable animals were once pushed to the brink of extinction by hunting, trapping and habitat loss. Otters play a key role in maintaining healthy river ecosystems, but are feeling the pressure of declining stream flows and drought-impacted habitats, jeopardizing decades-long conservation efforts and threatening their survivability in Colorado.

Osprey are majestic birds of prey that nest in tall trees along rivers throughout Colorado. These talented hunters rely on healthy and abundant fish populations to survive and raise their young. Osprey were once an endangered species due to the harmful effects of DDT. A ban on the use of this insecticide and years of conservation efforts helped boost populations in our state. Now, drought threatens their future by dropping stream flows which can cause fish populations to seek better conditions elsewhere, resulting in nesting ospreys losing a key food source for their young.

Cutthroat Trout are one of Colorado's most emblematic species, attracting anglers from across the world and contributing to Colorado's $19 billion river recreation industry.[8] Once considered extinct, tiny populations of San Juan River cutthroat and the greenback cutthroat are now making a tentative recovery, thanks to focused and ongoing protection efforts. These fish require clean, cold water to survive, making them especially sensitive to drought. The threat of rising river temperatures in a hotter and drier climate future creates an uncertain future for the cutthroat trout.

Decreased rain and snowfall mean less food availability for deer and elk trying to bulk up for the winter. These animals can starve to death or may push into the edges of urban and suburban areas to find food, resulting in increased human-wildlife encounters. When bears can't find enough food in the wild, they resort to trash cans, homes and vehicles to find food. The number of negative human-bear interactions often rise during drought years in Colorado, leading to forced relocation or euthanasia for many.

REPERCUSSIONS ON LOCAL RECREATIONAL ECONOMIES

Tourism related to river recreation is a major economic driver in Colorado supporting more than 131,000 jobs and generating over $19 billion a year in economic activity.[9] When drought decreases river flows it limits or stops these activities altogether. In 2012, drought caused a massive decline in whitewater rafting trips, resulting in a $21 million loss of revenue for river outfitters.[10] Extended periods of dry, hot weather lowers stream flows and makes the water temperature too warm for Colorado's cold-water trout populations. When this happens, Colorado Parks and Wildlife will close stretches of river to recreation. This protects fish but harms rural economies that rely on anglers and boaters coming to spend money in local communities.


Jason Houston / TNC

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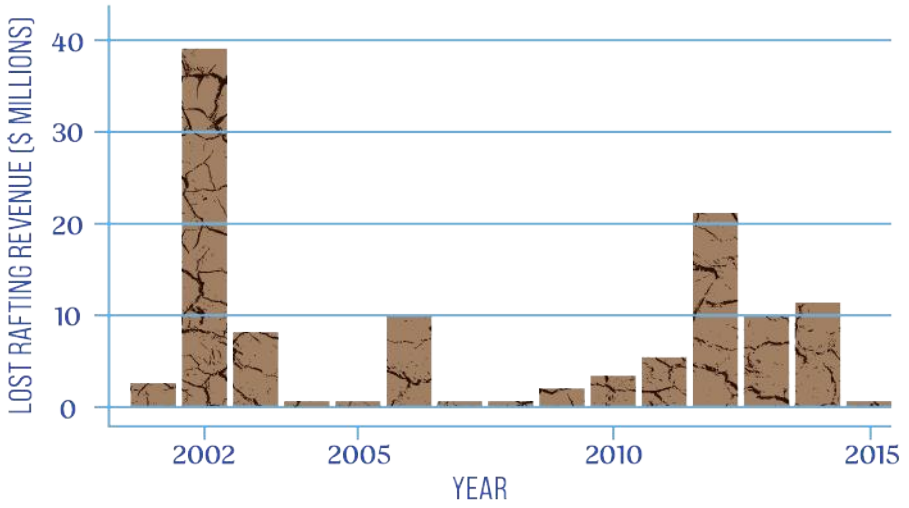

In 2002 and 2012, drought caused a massive decline in whitewater rafting trips, resulting in a $60 million loss of revenue for river outfitters

the 20

Largest wildfires have occurred since 2001

INCREASED WILDFIRE RISK

Drought conditions contribute to an increased risk of wildfires because when an area experiences drought, the lack of rain leads to drier landscapes. This dryness affects plants and soils, making them much more susceptible to catching fire. For example, during the summer of 2020, Colorado didn't receive its usual amount of precipitation. This resulted in extremely dry conditions, which were ideal for wildfires to ignite and spread. That summer Colorado experienced the three largest wildfires in state history: the Cameron Peak fire (208,913 acres) in Larimer County, the East Troublesome fire (193,812 acres) in Grand County and the Pine Gulch fire (139,007 acres) in Mesa County.[11]

The impact of wildfires extends beyond the immediate damage to the environment. When their habitats are destroyed by fire, animals are forced to flee and find new areas to live. This relocation is challenging, as they must compete for limited food and water resources in their new surroundings. Fish and other aquatic animals have an especially tough time as ash and sediment wash into streams, clogging fish gills and making whole sections of river uninhabitable. This contamination not only affects wildlife but also can degrade the quality of water available to downstream communities.

1,463,217 Total acres lost including wildlife habitats =

Three largest wildfires in state history

Fire	*Acres Burned*	*Year*
Cameron Peak Fire	208,663	2020
East Troublesome Fire	192,560	2020
Pine Gulch Fire	139,007	2020

All occured during historic drought

Human Activities Amplify Drought Effects

Decisions around how humans manage rivers and water supply can make drought more intense. The dams and reservoirs that provide dependable water for cities, towns, agriculture and recreation can worsen drought impacts. Our control over how water moves in and out of reservoirs can negatively impact ecosystems. By filling reservoirs during snow melt, we reduce periods of natural high flows needed to maintain fish habitat and benefit river health. In some places, hardly any of the water captured by a reservoir makes it downstream. Instead, it is routed through pipelines, canals and ditches to supply farms and growing cities. The Dolores River, one of Colorado's geological and recreational gems, and McPhee Reservoir provide a cautionary tale for the way that human demands for water can intensify the impacts of drought. Annual flows on the Dolores River are significantly reduced and the river rarely sees any water below McPhee Reservoir in years with drought. The annual reduction of flows on the Dolores River, following construction of the dam in 1984, results in overly-narrow channels choked with invasive plant species like Tamarisk, regular fish kills and limited opportunities for boaters and other recreational users.

The paved expanses of urban areas can negatively impact water supplies and water quality by limiting how much water can reach the soils beneath, preventing the groundwater recharge necessary to supply streams during low-flow periods. Pollutants carried to rivers by these urban areas runoff are less diluted when streamflows are diminished by drought. It's often said, the solution to pollution is dilution, but low river flows are less capable of diluting, threatening water supplies, especially those most vulnerable, living in communities with multiple sources of air and water pollution. Also, water intensive landscaping in cities and towns requires construction of more reservoirs and diversion of more water from overstretched streams and rivers.

Animas River, yellow-orange toxic waste from abandoned mines

Pollutants carried to rivers by runoff from these urban areas are less diluted when streamflows are diminished by drought

Dolores River

Cody Perry / Rig To Flip

A Look Into The Future

HIGHER DEMANDS ON LESS PREDICTABLE WATER SUPPLIES

The impacts of climate change on Colorado are happening now with more of the state's annual precipitation falling as rain rather than snow. Snowpack is melting sooner in the spring and peak runoff arrives one to four weeks earlier. In a hotter and drier future, scientific measurements and models indicate streamflows and water availability will significantly decrease. Warmer air temperatures mean more frost-free days and longer growing seasons, more evaporation and drier soils. These combined effects will contribute to lower streamflows, threatening drinking water supplies, the ability to grow local food and have a healthy, vibrant natural environment. The message from the climate science community is clear: the droughts we are experiencing today are likely a mainstay of the future.

Colorado's cities and rural communities must plan for a future with higher demands on less predictable water supplies. By 2030, Colorado's population is expected to grow to 6.4 million.[12] A growing population and a shrinking water supply will force tough decisions about how we use and allocate water among humans and ecosystems. Drought will make these decisions harder and more pressing. Although drought is already impacting Colorado, it's not too late to act. Updated laws and programs can help Colorado do more with less water, but they need public support to be enacted. Advocate to your elected officials to prioritize addressing drought, share this resource with others to spark conversations about solutions, and get involved with advocacy efforts at ***www.conservationco.org***. Together we can combat drought to ensure a better future for all.


Jason Houston / TNC

About Us

Conservation Colorado is the largest statewide environmental organization in Colorado. We work to protect Colorado's climate, air, land, water, and communities.

We play a unique role in Colorado because we bring people, policy, and politics together. This means that our work is focused on organizing communities, influencing decision-makers, and electing conservation-minded leaders. We believe that achieving racial, social, and environmental justice are critical to our mission.

HOW TO GET INVOLVED

The work we do to protect Colorado's land, air, water, climate, and communities is made possible by YOU! Here's how you can get involved:

- **Donate**
  We can't do the work you've read about in these pages without the support of people like you. Visit **conservationco.org/support** to make your contribution.

- **Sign up for our emails**
  Stay up to date with important conservation work across the state and get alerts to take action and help us support communities and the environment. Sign up today! **conservationco.org/join-us/**

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PHOTOGRAPHY

Courtesy of Jason Houston/TNC and Cody Perry/Rig To Flip

REFERENCES

1. "Colorado River Basin" by the Colorado Water Conservation Board. Webpage. <cwcb.colorado.gov/colorado-river>
2. "Public: New Colorado Water Plan needs more urgency and accountability" by Jerd Smith. Published in Water Education Colorado. Oct. 19, 2022. <www.watereducationcolorado.org/fresh-water-news/public-revised-colorado-water-plan-needs-more-urgency-and-accountability>
3. "Drought Information and Resources" by the Colorado Climate Center. Webpage. <climate.colostate.edu/drought_info.html>
4. "Colorado River Basin: A River in Crisis" by The Nature Conservancy. Aug. 28, 2022. <www.nature.org/en-us/about-us/where-we-work/priority-landscapes/colorado-river/colorado-river-in-crisis>
5. "Colorado Rivers Key to Economy" by Business For Water Stewardship. Webpage. <businessforwater.org/co-rivers-key-to-economy>
6. "Colorado Latino Climate Justice Policy Handbook" by Protégete. Online publication. <https://conservationco.org/wp-content/uploads/2022/11/11.17-V2-PROTEGETE_HANDBOOK.pdf>
7. "Integrated Water Quality Monitoring & Assessment Report 2020" by the Colorado Department of Public Health and Environment. Online publication. <spl.cde.state.co.us/artemis/heserials/he715012internet/he7150122020internet.pdf>
8. "Colorado Rivers Key to Economy" by Business For Water Stewardship. Webpage. <businessforwater.org/co-rivers-key-to-economy>
9. Ibid.
10. "How Drought Impacts Colorado's Outdoor Recreation Industry" by the Colorado Water Conservation Board. May 5, 2020. Online publication. <storymaps.arcgis.com/stories/89d3c72cedef4ce2945ad9ef12df0b6e>
11. "Historical Wildfire Information" by the Colorado Division of Fire Prevention & Control. Webpage. <dfpc.colorado.gov/sections/wildfire-information-center/historical-wildfire-information>
12. "Colorado's population growth hit a wall. Here's what to expect in the coming decades" by John Aguilar. Published in the Denver Post. Jan. 24, 2023. <www.denverpost.com/2023/01/24/colorado-population-growth-slowed-2021/>

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