FACT SHEET

What Are Environmental Flows?

Colorado's rivers and streams are well loved for countless reasons—fisheries, recreation, scenic value, and more. But due to factors such as variable climate and drought, as well as dams and diversions to enable water use by farms, cities and industry, streamflows aren't always sufficient or flowing at the right time of year to sustain healthy habitats for fish and wildlife or other ecologic values. **Environmental flows** are the amount, timing and quality of streamflows required to sustain ecosystems and the people who depend on them. Environmental flow protections usually aim to mimic the patterns and functions of a waterway's natural flow pattern.

Climate change projections across much of Colorado indicate a future with earlier runoff and warmer, drier conditions that could result in mismatches between peak flow timing and species' needs, warmer water temperatures, new dry-up points on rivers, and reduced aquatic habitat, increasing the importance of protecting and restoring environmental flows.

ADOBE STOCK

Tools for Protecting Environmental Flows

Instream Flow (ISF) water rights remain in the stream to preserve or improve the natural environment. ISFs are recognized as a beneficial use of water under Colorado law. The only entity that can hold an ISF water right is the Colorado Water Conservation Board.

Bypass Flows allow a required or agreed-upon amount of water to bypass a diversion and remain in the river for the benefit of the environment. Bypass flows can be adjudicated instream flow water rights, water management decisions and practices, or federal reserved water rights.

Wild and Scenic River designation is meant to "preserve selected rivers with outstanding natural, cultural and recreational values in a free-flowing condition for the enjoyment of present and future generations." Colorado is home to just 76 miles of one Wild and Scenic river, the Cache La Poudre. The state doesn't lack eligible rivers, but concerns around water shortage and storage needs have led stakeholders to look for alternatives to Wild and Scenic designation.

Federal Reserved Water Rights are the water rights designated to fulfill the purpose of land set aside by the federal government, such as for Native American reservations or national parks and monuments. Once adjudicated by state courts, they are administered in priority, along with state-based water rights. A federal reserved water right may protect water flows—for example the Black Canyon of the Gunnison and the Wild-and-Scenic-designated reaches of the Cache la Poudre River have federal reserved water rights.

River Science: Water, Sediment and Wood

While water in a stream is critical, flow alone doesn't make a healthy river. Rather, scientists argue that natural flow, sediment and wood regimes together support the physical processes underlying river science, restoration and management. When water managers recognize this, they can make changes, such as depositing sediment where it's lacking and managing environmental flows to move and interact with sediment and wood.

Sediment — such as rocks, pebbles, sands and soils — is transported in a river as water flows. Often, on-channel dams can block sediment, causing loss of fish habitat, bank erosion, and disconnecting a river from its floodplain. Conversely, low flows below dams coupled with too much small particle sediment can cause siltation and habitat loss.

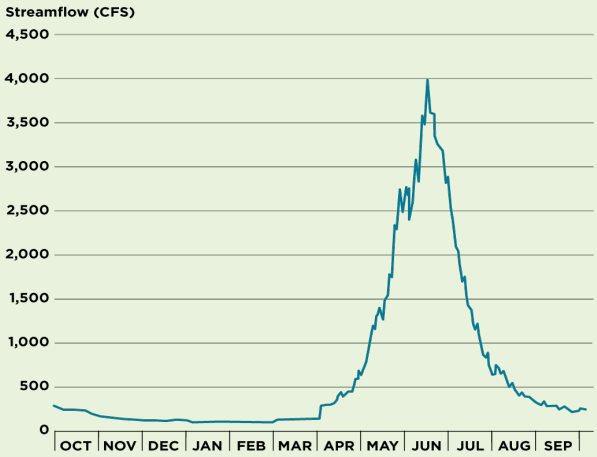
Wood — such as trees, branches and debris flows — is also moved by river flows, but it breaks, decays and changes more quickly than sediment. Wood size, type of tree, rate of decay, transport and storage in a river can add ecological complexity and increase habitat diversity by influencing sediment scour and deposition.

A Natural Hydrograph

A river's natural flow is determined by precipitation and watershed characteristics, but human activities like water withdrawals, storage, and land use have altered many flow regimes, or flow patterns, known as a hydrograph. In Colorado, most rivers, if untouched, would experience strong peak flows in late spring when mountain snow melts, then gradually flows would slow to a base flow level or run dry in places through the fall. Environmental flows are designed to help repair human- and climate-related impacts to streams' natural flow dynamics.

Colorado River Average Daily Flow at Hot Sulphur Springs, 1904–1935

In the early 1900s, the Colorado River's headwaters displayed a nearly natural hydrograph with flows peaking in June, the result of runoff from snowmelt, then tapering off through the fall and winter. Today, with reservoirs and diversions upstream, a hydrograph for this location would show a flatter peak. Between 1950 and 2008, average peak flows remained below 1,000 cubic feet per second (CFS).



Data Source: U.S. Geological Survey; Graph Source: Grand County Stream Management Plan

How Do We Know How Much Water Rivers Need?

Colorado Environmental Flow Tool can help stakeholders and water managers understand high-level flow needs and impairments. It uses hydrologic data, modeled data to project future scenarios, and flow-ecology relationships to assess risks to flow and the environment.

Stream Management Plans are data-driven river health assessments that help communities prioritize how to protect or enhance environmental and recreational assets in their watershed.

Adaptive Management and "Learning by Doing" are management strategies to improve the environment, mitigate environmental impacts, monitor that work, and adapt over time to maximize environmental benefits as conditions and scientific understanding change. This work is often based on the data collected and projects prioritized in a stream management plan.

RESOURCES

The Colorado Water Trust:
https://bit.ly/3vw3iiE

Colorado Water Conservation Board's Instream Flow Program:
https://bit.ly/3eMhRsi

Colorado Environmental Flow Tool:
https://bit.ly/3oPnz4w

Stream Management Plan Resource Library:
https://bit.ly/3vu9yaz

Natural Sediment Regime in Rivers:
https://bit.ly/3qVv2tg

Natural Wood Regime in Rivers:
https://bit.ly/3cSkMob

FRESH WATER NEWS

WATER EDUCATION COLORADO

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