The Uncompahgre River Watershed in Ouray County

The Basics & A Little Bit More

Compiled by the

Uncompahgre Watershed Partnership

UWP exists to help protect and improve the economic, natural, and scenic values of the Upper Uncompahgre River Watershed. We work to inform and engage all stakeholders and solicit input from diverse interests to ensure collaborative restoration efforts in the watershed.

From a Trickle to a Mighty Flow, Water from the San Juan Mountains Heads toward the Pacific Ocean

wa•ter•shed: (noun) /'wôder SHed'/ an area that collects surface water from rain, snowmelt, and underlying groundwater, that flows to lower elevations. Watersheds can be defined at any scale from less than an acre to millions of square miles. Synonyms: drainage, catchment, basin.

For eons, the Upper Uncompahgre Watershed has been a valuable resource for wildlife and people. Uncompahgre loosely translates to "the warm, red water" in the language of the Ute people, who were the early stewards of the river. In the last few centuries, explorers and settlers developed the watershed's assets. From booming mining days to quieter years after the silver crash and today when tourism is one of the area's biggest draws, residents and visitors have used local waters in many ways.

Like the edges of a big bowl, high mountains cradle Ouray and Ridgway, creating the Upper Uncompahgre Watershed. The Uncompahgre River flows from Lake Como at 12,200 feet, where tributaries, seeps, springs, and groundwater collect in a deep depression formed by glaciers in a high alpine valley of the San Juan Mountains.

From Lake Como to Ouray, the Uncompahgre River flows roughly seven miles north-northwest at a steep gradient through rugged terrain and deep canyons. Snowmelt and rain join the river throughout the watershed but the majority comes from the highest elevations of the San Juans, Sneffels Wilderness, Dallas Divide, Cimarron Range, and Uncompahgre Plateau.

Seasonal creeks and perennial streams collect and carry water into the Unc, as the river is called by many locals. Some water trickles through soils and into the underlying sediment deposits and rock, becoming groundwater. Groundwater usually flows parallel to the surface of the land, supporting springs, wetlands, and stream flows during late summer, fall, and winter.

From the mountaintops to the confluence with the Gunnison River, the Uncompahgre River Watershed covers portions of six counties in addition to Ouray County – over a 1,115-square-mile area – and is part of the Upper Colorado River Basin. The Unc flows north through Ouray and Ridgway, then into Ridgway Reservoir. The river continues north through Colona, Montrose, and Olathe, joining the Gunnison River in Delta.

Flowing through Dominguez Canyon, the Gunnison joins the Colorado River as its largest tributary in Grand Junction. Headwaters that begin in Ouray County continue to combine with water from other drainages as the flow grows through Utah, Arizona, and California on the way to the Pacific Ocean. However, due to population growth, increased usage, drought, and climate change, our water usually doesn't make it to the Gulf of California. Due to monumental water management challenges facing Western states, UWP and local organizations are working with others throughout the state to ensure the precious water resources that originate high in our mountains are available to all water users for generations to come.

Crystal Lake with oxeye daisy on the bottom edge.
Noxious weeds are just one of many threats to watershed health.
Front cover: Lake Como

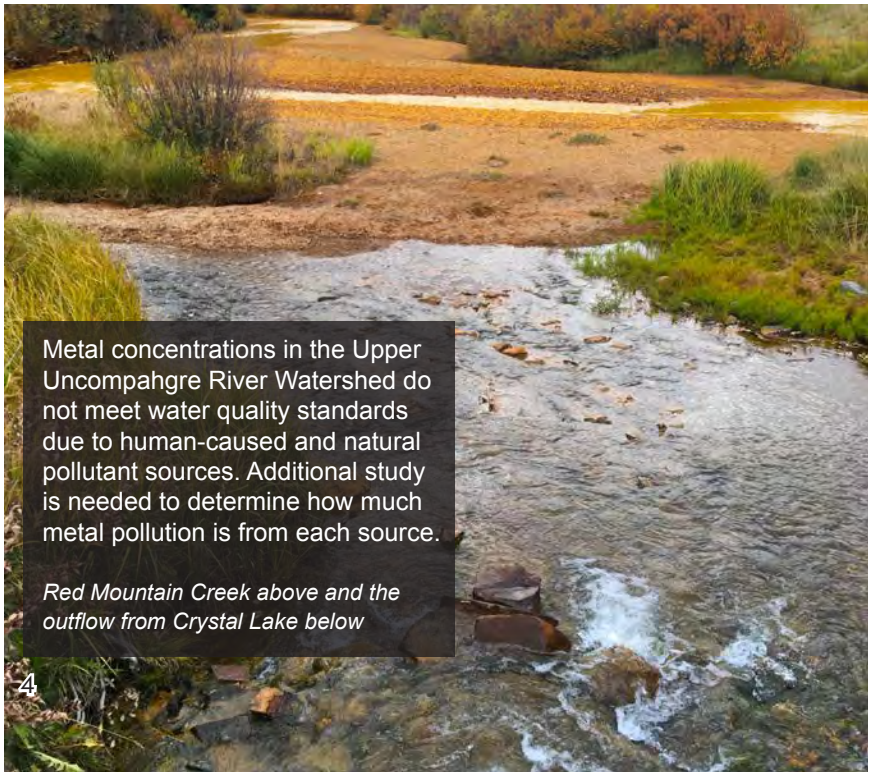
The Impact of Geology on Water

The San Juan Mountains were formed by volcanic activity millions of years ago. Part of the watershed includes the Silverton Caldera and its many rich orebodies including gold, silver, lead, and copper deposits. The natural mineralization and historic mining in the watershed contribute varying concentrations of metals to many water sources.

Glaciers sculpted the landscape further, creating U-shaped valleys in the upper watershed and depositing unconsolidated sand and gravel from igneous, metamorphic, and sedimentary rock formations on the valley floors. Mancos shale is found throughout the lower part of the watershed. Where excess irrigation occurs, the shale can deliver selenium and salts to local waterbodies.

The Reasons behind our Colorful Water

The Uncompahgre River and its tributaries range in color from crystal clear to green, grey, brown, orange, and red. Water enters the various tributaries of the Unc via overland flow that picks up sediments from bare soil and roadways. Sediments are also picked up as water runs across unremediated mine waste and natural rocky outcrops. Acid rock drainage releases acidity and metals that influence water color. Vegetation filters some sediments.



Metal concentrations in the Upper Uncompahgre River Watershed do not meet water quality standards due to human-caused and natural pollutant sources. Additional study is needed to determine how much metal pollution is from each source.

Red Mountain Creek above and the outflow from Crystal Lake below

Uncompahgre River in Ridgway

Factors that Contribute to the Water's Color

- **Sediment suspension** During spring runoff and following large precipitation events, increased water velocities suspend soil, sediment, and organic particles. Suspended sediment creates colors similar to the geology in that area of the watershed.
- **Dissolution and weathering** Pure water is composed of two hydrogen atoms and one oxygen atom. The atoms carry a subtle charge that allows water to act as a solvent. As a result, water naturally accrues minerals, salts, and other compounds as it flows across landscapes and through rock as groundwater. Our watershed's abundance of mineral deposits and hot springs speed up weathering and provide ample opportunity for mineral dissolution, which often colors the water and alters the chemistry.
- **Historic abandoned mines** The remains of mines and the associated waste rock and tailings can increase sediment suspension, dissolution, and weathering. This process, called acid rock drainage, increases the intensity of several water colors, particularly red, orange, and white.
- **Hot springs** The City of Ouray and local businesses manage hot springs, which are a natural source of minerals and salts capable of altering water color. These commercial uses alter natural processes and may improve water color and clarity through active and passive treatment, and by decreasing temperatures before returning water to the Uncompahgre River.
- **Irrigation** Irrigation diversions from less colorful tributaries north of Ouray reduce the volume of clear water that would otherwise dilute the color and metal concentrations in the Uncompahgre River. On the other hand, irrigation can also act as a filter to improve water quality.
- **Ridgway Reservoir** Water storage in the reservoir substantially improves water color and clarity due to settling, dilution, and changes in chemistry.

Water Quality in the Upper Uncompahgre Watershed

The amount of cadmium, copper, lead, silver, zinc, and pH (acidity) in several streams in the Upper Uncompahgre Watershed do not meet standards used to protect aquatic life. Fish, macroinvertebrates, and other aquatic species are often more sensitive to metals than humans because these species spend most of their lives in or near water, including during very sensitive early stages of life. As a result, aquatic-life standards often are more stringent and more protective than human-health standards.

Several streams in the watershed exceed the water supply standard for manganese. This standard is a secondary standard used to protect water aesthetics like color, taste, and odor. It is not a human-health standard.

Information on how specific parts of the Uncompahgre River and its tributaries measure up to water quality standards is available at www.uncompahgrewatershed.org/links.

A Primer on Water Quality Standards

In Colorado, state and federal agencies collaborate to implement the Clean Water Act. Water quality standards are a critical component of pollution control. The following factors are considered when developing water quality standards for any pollutant:

- toxicity and risks affiliated with the pollutant;
- water uses such as agriculture, aquatic life, recreation, and water supply;
- protective level of exposure for each water use; and
- the amount of pollutant present when toxic effects occur. Chronic toxicity occurs over time and affects organism survival, reproduction, and growth. Acute toxicity refers to a lethal dose in sensitive species or portions of the population (e.g. larvae).

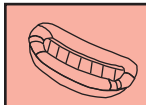
The process to develop water quality standards is complex and evolves as we learn more about biology, toxicology, and techniques used to detect pollutants. Because of the need to protect all water uses, the water use that is most sensitive to a given pollutant is the effective standard for that pollutant. This practice assures that all water uses are protected when the standard for the most sensitive water use is met.

This is a cursory introduction to the Clean Water Act and water quality standards in Colorado. Additional resources are available at the link referenced above this box.

Standards for Common Water Uses in Ouray County

Agriculture standards protect livestock and crops. Sensitive life stages include pregnancy, lactation, and juvenile animals.

Aquatic life standards protect fish, macroinvertebrates (aquatic insects and invertebrates like worms), and riparian birds.

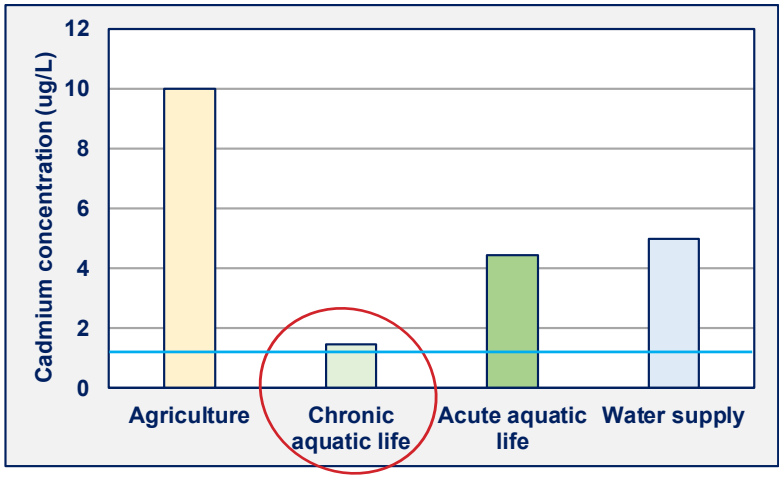


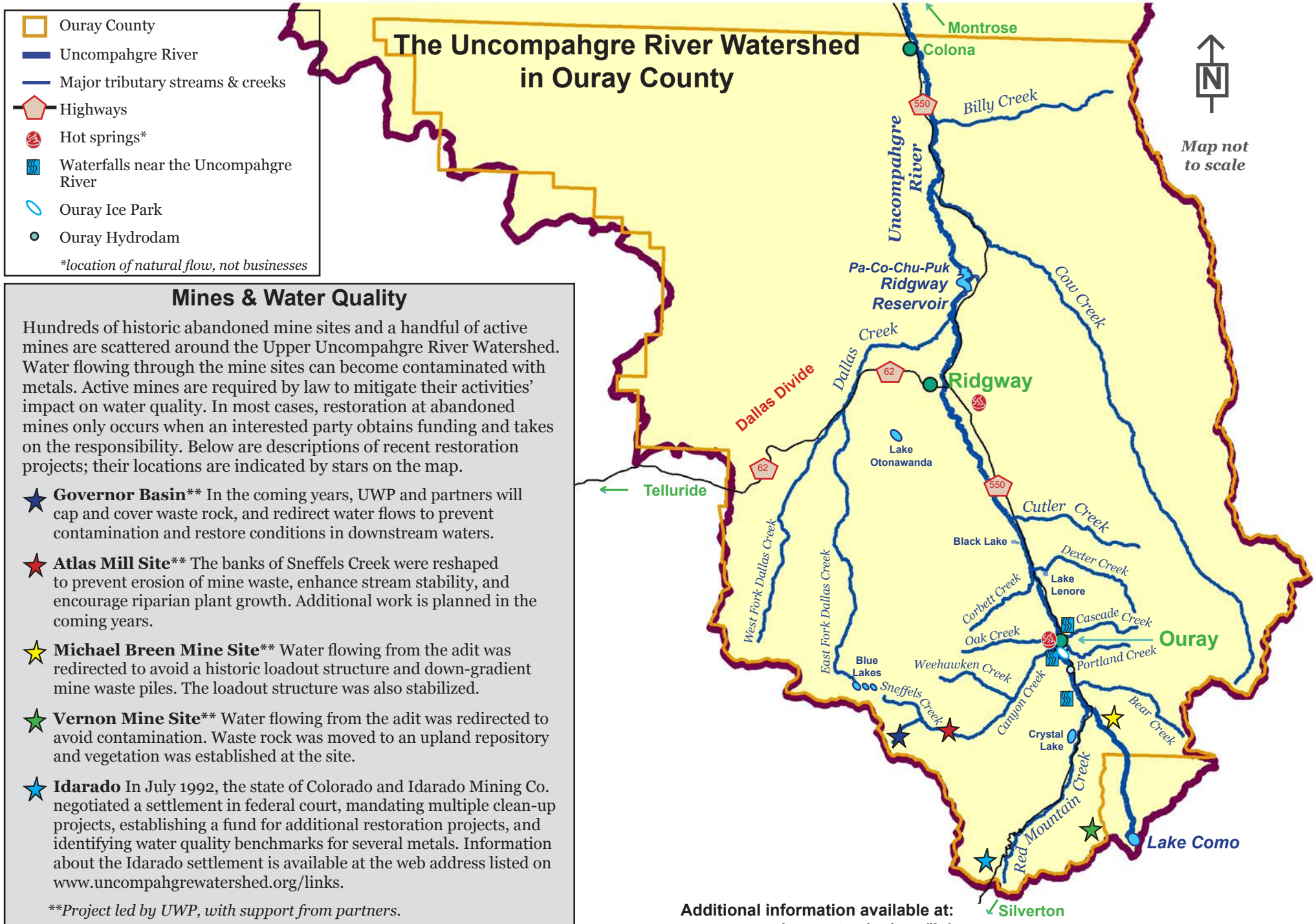
Recreation standards protect recreational users that may ingest small amounts of water while swimming, kayaking, etc. Recreational use is the effective standard for E. coli.

Water supply standards protect raw drinking water supplies. These standards often include two parts: protecting human health and identifying the maximum contaminate level (MCL). MCL is the legal limit on the amount of a substance allowed in a public water supply. The Safe Drinking Water Act regulates public drinking water supplies.

Cadmium Standards in the Uncompahgre River near Ouray

The chart below shows cadmium standards for water uses (the colored bars) and cadmium concentrations (the blue line) in the Uncompahgre River near Ouray at River Watch station 3586. The standard to protect aquatic life from chronic toxicity (light green bar) is the most sensitive water use. Because cadmium concentrations are less than the chronic aquatic life standard, all water uses are protected. This chart demonstrates how standards work. Similar charts for each pollutant for each stream and river segment in the watershed would not fit into this short booklet. The link on the previous page provides access to additional data.





Mines & Water Quality

Hundreds of historic abandoned mine sites and a handful of active mines are scattered around the Upper Uncompahgre River Watershed. Water flowing through the mine sites can become contaminated with metals. Active mines are required by law to mitigate their activities' impact on water quality. In most cases, restoration at abandoned mines only occurs when an interested party obtains funding and takes on the responsibility. Below are descriptions of recent restoration projects; their locations are indicated by stars on the map.

Governor Basin** In the coming years, UWP and partners will cap and cover waste rock, and redirect water flows to prevent contamination and restore conditions in downstream waters.

Atlas Mill Site** The banks of Sneffels Creek were reshaped to prevent erosion of mine waste, enhance stream stability, and encourage riparian plant growth. Additional work is planned in the coming years.

Michael Breen Mine Site** Water flowing from the adit was redirected to avoid a historic loadout structure and down-gradient mine waste piles. The loadout structure was also stabilized.

Vernon Mine Site** Water flowing from the adit was redirected to avoid contamination. Waste rock was moved to an upland repository and vegetation was established at the site.

Idarado In July 1992, the state of Colorado and Idarado Mining Co. negotiated a settlement in federal court, mandating multiple clean-up projects, establishing a fund for additional restoration projects, and identifying water quality benchmarks for several metals. Information about the Idarado settlement is available at the web address listed on www.uncompahgrewatershed.org/links.

***Project led by UWP, with support from partners.*

Additional information available at:
www.uncompahgrewatershed.org/links

Answers to Some Frequently Asked Questions

What are the main uses of water in our watershed?

Irrigation for farming and ranching uses the most water by far. Homes and other buildings use the next largest amount for drinking, washing, toilets, and other domestic activities. Other water users include hard-rock mines, as well as sand, gravel, and aggregate mining from the river. Recreation and tourism activities are also popular water uses.

Who owns the water?

Land in the watershed is owned by multiple stakeholders including federal, state, and private landowners. Water rights are conveyed independently from land ownership. To use water in Colorado, you must own a water right (or have permission through a right holder) and that right must be in priority.

The Prior Appropriation Doctrine, a key component of Colorado water law, defines water use practices in Colorado. The Colorado Division of Water Resources administers water rights. To learn more about water rights and law, refer to the "Citizen's Guide to Colorado Water Law", which can be found at the website address listed on www.uncompahgrewatershed.org/links.

Where do farmers and ranchers get their water from?

Agricultural users divert water from the Uncompahgre River as well as Cow Creek, Coal Creek, Dallas Creek, and other smaller creeks to support cattle operations and to grow crops, primarily pasture grass-hay. Most often water is delivered via unlined earthen ditches, maintained by water users, to flood irrigate fields.

What is the reservoir used for?

Ridgway Reservoir, constructed in 1987, is owned by the Bureau of Reclamation and operated by the Tri-County Water Conservancy District. In 2014, a hydroelectric facility was installed. The reservoir provides water to downstream agricultural users, and is used to mitigate flooding. Reservoir water levels are based on water releases to satisfy demands from senior downstream water users, power generation, and flood reduction. Dam releases also impact the health of the fishery below the dam and downstream fish populations.

Can we drink water from the river?

The Colorado Department of Public Health and Environment (CDPHE) recommends that people do not drink untreated water. Due to the risk of pathogens, like E. coli, giardia, and cryptosporidium, it is never wise to drink untreated water from an unknown spring, seep, or stream.

Metals, which pose an additional health risk, have been found in streams and the Uncompahgre River by volunteer groups and other agencies, who collect samples to characterize water quality. Metal concentrations in some areas of the watershed occasionally exceed human-health and water-supply criteria.

Where does local drinking water come from?

Depending on where you live, drinking water comes from a well, a provider like Dallas Creek Water Company, Tri-County Water Conservancy District, and Project Seven Water Authority, or from municipal systems that rely on springs, groundwater aquifers, and surface-water reservoirs. Municipal water providers in Ouray County do not use the Uncompahgre River as a raw water supply, though infiltration from the river may affect the groundwater quality and some nearby wells.

How does the reservoir change the water quality?

Over time, gravity allows metals and sediment to settle on the bottom of the reservoir. These conditions reduce suspended metal concentrations and substantially improve water quality.

Can we float the river?

Much of the Uncompahgre River from Ouray to Ridgway has no public access because it is on private land. The public can access the river at Rollans Park, Dennis Weaver Memorial Park, and Ridgway State Park.

Trespass in Colorado's waterways is a contentious issue and an area of unsettled law. Generally, recreational use is permitted when a floating craft can pass through the river without contacting the privately-owned river bottom or adjacent land surfaces. Kayaking, floating, and paddling the Uncompahgre River is possible in several locations. People should use their judgment as to whether their skills and river conditions allow them to float safely and without trespass.

...A Few More Answers

Is it safe to play in the Uncompahgre River?

Although metal concentrations are elevated, water quality on most days supports recreational uses like swimming, wading, and floating. Contact with water is not recommended when it is more yellow or orange than usual. The CDPHE recommends washing hands, faces, and bodies thoroughly after contact with untreated water.

Why are there no fish in some areas of the watershed?

The elevated metal concentrations in some portions of the Unc and some of its tributaries don't allow aquatic life to survive, so the fish and macroinvertebrate populations are reduced in many river segments and streams above Ridgway Reservoir. The Dallas Divide side of the watershed has different geology and a lack of mines, so the impact of metals on those streams is much less.

In addition to elevated metal concentrations, the Uncompahgre River between Ouray and Ridgway Reservoir is impacted by water diversions, habitat degradation (e.g. removal of riparian vegetation for pasture, homes, etc.), and channel alterations (e.g. water diversion structures and bridges). As a result, some aquatic species such as trout are limited in the river between Ouray and the reservoir. In late fall, a small population of Kokanee salmon uses the river between Ridgway and the reservoir.

Is there fishing anywhere in the watershed?

Yes, though fish are limited in many areas, excellent fishing can be found at Ridgway Reservoir, the Uncompahgre River downstream of the dam, larger tributaries like Cow Creek, and a few high alpine streams and lakes.

The reservoir is home to brown and rainbow trout, Kokanee salmon, bass, and yellow perch. Pa-Co-Chu-Puk, a section of the river below the dam, is managed as a fishery by Colorado Parks and Wildlife, and is a world-class, catch-and-release fly-fishing area. Links to current fishing regulations and fish consumption advisories are available at www.uncompahgrewatershed.org/links.

Speech Bubble icons by Icons8 at https://icons8.com

How do wildlife and livestock interact with the watershed?

Animals get much of their water from the food they eat (i.e. plants, berries, animal prey, etc.). Wetlands and riparian areas provide habitat for more than 75% of Colorado's wildlife. Keeping the river corridor healthy from top to bottom is critical to animals and plants, especially for several rare or endangered species that live in the Upper Uncompahgre Watershed.

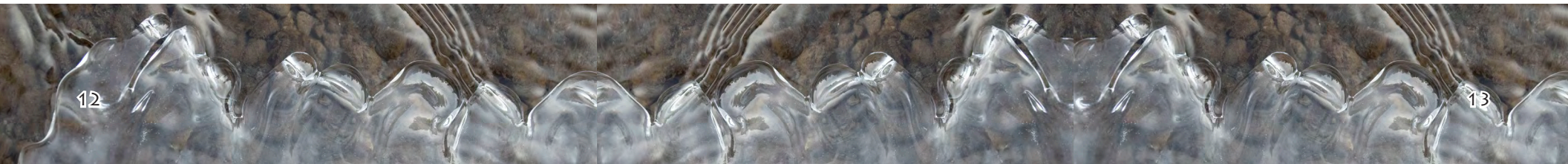
Animals, domestic and wild, can affect water quality. Overgrazing by livestock can create soil compaction that increases runoff and adds more sediment to waterways, but can be avoided with careful livestock management.

Does water quality impact the trees and plants?

In some portions of the watershed, contamination from mine waste or naturally acidic areas preclude plant growth. Other threats to native flora include invasive plant species, like noxious weeds, that compete for scarce water and nutrients. Beetles and other forest pathogens have become more problematic due to both fire suppression, increased temperatures (particularly in winter), and decreased precipitation and water supply attributed to climate change. As a result, large swaths of dead or diseased forests pose a substantial fire risk. Following a large-scale fire, landscapes lack the ability to store water, and are prone to widespread erosion, which can impact water quality.

What does the future hold for our watershed?

While human activity and climatic events have created current watershed conditions – some positive and some negative – we have the opportunity today to ensure each decision made individually and as a community protects and restores water quality and supply. We can also do our best to estimate, prepare for, and prevent future unwanted impacts to the watershed. Changing climate patterns, variable annual precipitation and snowpack, flood risks and erosion, and mining and mining reclamation efforts all have the potential to alter the watershed. Sustainable water management practices, careful development in riparian areas, and a long-term focus on protecting this special resource will ensure that many generations will enjoy the economic, natural, and scenic benefits of our watershed for decades to come.



Ways to Get Involved in Protecting our Watershed

- Conserve water in your daily activities by using low-flow appliances and fixtures, and turning off running water whenever not in use. Find more tips here: www.uncompahgrewatershed.org/ar-wc-tips
- Avoid putting fertilizers, waste, and other pollutants in areas where they will end up in rivers and other water sources.
- Know the quality of the water sources that you use for drinking, recreation, and other activities, so you can protect your health.
- Volunteer at events that focus on improving riparian areas such as the Rollans Park Cleanup in Ridgway and Love Your Gorge day in Ouray.
- Practice the seven principles of Leave No Trace, described here: https://lnt.org/why/7-principles/
- Participate in local trail maintenance groups to address erosion control.
- Support efforts for drought preparedness and water storage in your community.
- Go to public meetings about water use and advocate for wetlands and riparian health, recreation opportunities, smart water management, and responsible wastewater and stormwater operations.

Sneffels Creek; Back cover: Uncompahgre River

Online Resources

SCAN ME

To get more information about watershed conditions, plans for management and restoration, water quality maps, drought, drinking water, recreation, water law, climate impacts, the Colorado Water Plan, and more, please visit **www.uncompahgrewatershed.org/links.**

Published by the Uncompahgre Watershed Partnership (UWP)

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UWP was founded in 2007, and incorporated in 2013 as a 501(c)(3) nonprofit dedicated to understanding, restoring, and protecting the upper Uncompahgre River Watershed.

In collaboration with citizens, nonprofits, businesses, and local, regional, state, and federal government agencies, ongoing projects include mine reclamation, water monitoring and analysis, riparian area restoration, educational activities, river cleanups, and the annual Ridgway RiverFest (www.ridgwayriverfest.org).

UWP relies on the support of volunteers and donors to execute its goals and projects. Please use the contact info on the back cover to learn how to volunteer and donate. Thank you!

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