

Coyote Gulch



CATEGORY: SNAKE RIVER WATERSHED

Rare earth elements and old mines spell trouble for Western #water supplies — University of #Colorado

Here's the [release](#) from Instarr (Shelly Sommer):

Rare earth elements are finding their way into Colorado water supplies, driven by changes in climate, [finds a new study](#) published in the journal Environmental Science & Technology.

Rare earth elements are necessary components of many computing and other high-tech devices, like cell phones and hard drives. But there is growing recognition that they can be hazardous in the environment even at low levels of concentration.

“This is of concern because their concentrations are not monitored and there are no water quality standards set for them,” says study author Diane McKnight, who is an INSTAAR Fellow and Engineering professor at the University of Colorado Boulder.

The study is the first to look at how rare earth elements move within a watershed that is rich in minerals. It is also the first to investigate how climate change, by altering stream flow and natural weathering processes, is releasing more rare earth elements into streams.



Sampling water quality in the Snake River. Photo credit: Instaar

Diane McKnight has led her students in investigations of water quality in the Snake River watershed of Colorado since the 1990s. Their main focus has been measuring and observing acid rock drainage. In this process, rocks that include sulfide-based minerals, such as pyrite, oxidize when exposed to air and water. The resulting chemical reaction produces sulfuric acid and dissolved metals like iron, which drain into streams. More acidic water can further dissolve heavy metals, like lead, cadmium, and zinc, and as it turns out can carry rare earth elements as well.

“What really controls the mobility of rare earth elements is pH. Acid literally leaches it out of the rocks,” says first author Garrett Rue, who earned a masters degree studying limnology with McKnight and a subsequent PhD from the University of Colorado Boulder.

Acid rock drainage happens naturally throughout the western United States, with its pyrite-rich geology. But historic mines that disturb large amounts of rocks and soil amp up the process dramatically and cause downstream water pollution.

Within the Snake River watershed, towns impacted by acid mine drainage have been forced to adapt to poor water quality. Some former mining boomtowns, like Silverton, import water from distant sources. Others rely on expensive water treatment plants. All fish in the Snake River are stocked, since the water is too high in zinc for any native fish species to survive. The problem is endemic to the western United States, says Rue: “Upwards of forty percent of the headwaters to major rivers in the West are contaminated by some form of acid mine or rock drainage.”

The Snake River has made a good natural laboratory for investigating both, since the Peru Creek part of the watershed was heavily mined, while the Upper Snake River was not. But Rue and McKnight found that both parts of the watershed are now contributing significant amounts of metals downstream, as climate change has brought longer summers and less snow in the winters. Longer, lower stream flows make it easier for metals to leach into the watershed, and concentrate the metals that would otherwise be diluted by snowmelt.

The same processes that mean more heavy metals are finding their way into streams are also acting on rare earth elements. The researchers found rare earth elements throughout the Snake River. “We documented a concentration range of one to hundreds of micrograms per liter—several orders of magnitude higher than typical for surface waters—with the highest concentrations nearest the headwaters and areas receiving drainage from abandoned mine workings,” says Rue.

They also documented that increases in rare earth elements in the Snake River corresponded to warming summer air temperatures, and that rare earth elements are accumulating in insects living in streams at concentrations comparable to other metals such as lead and cadmium shown to be toxic.

“We’re starting to understand that once rare earth elements get in the water, they tend to stay there,” says Rue. “They aren’t removed by traditional treatment processes either, which has implications for reuse and has led some European cities to designate REEs as an emerging contaminant to drinking water supplies. And considering that the Snake River flows directly into Dillion Reservoir, which is Denver’s largest source of stored water, this could be a concern for the future.”

The researchers suggest that investigating and investing in technologies to recover rare earth elements from natural waters could yield valuable commodities and help address the problems associated with acid rock and mine drainage, which are poised to worsen as the climate shifts.

“Rare earth elements are used to make a lot of products. But most of the supply comes from China. So our government has been looking for sources, but at the same time mining has left an indelible mark on the waters of the West,” says Rue. “If we can harvest some of these materials that are already coming into our environment, it might be worthwhile to treat that water and recover these materials at the same time.”

“This problem is getting worse and we need to deal with it,” adds McKnight. “If we can solve the problem holistically, we can have a valuable resource and also think about climate adaptation.”

Posted on **September 14, 2021** by **Coyote Gulch**

Posted in **Climate Change, Colorado Water, Snake River watershed, Water Pollution**

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Snake River #Water District to invest \$38.5 million in infrastructure improvements over next 10 years — The Summit Daily

SNAKE RIVER
WATER DISTRICT

Water System Master Plan
March 17, 2021

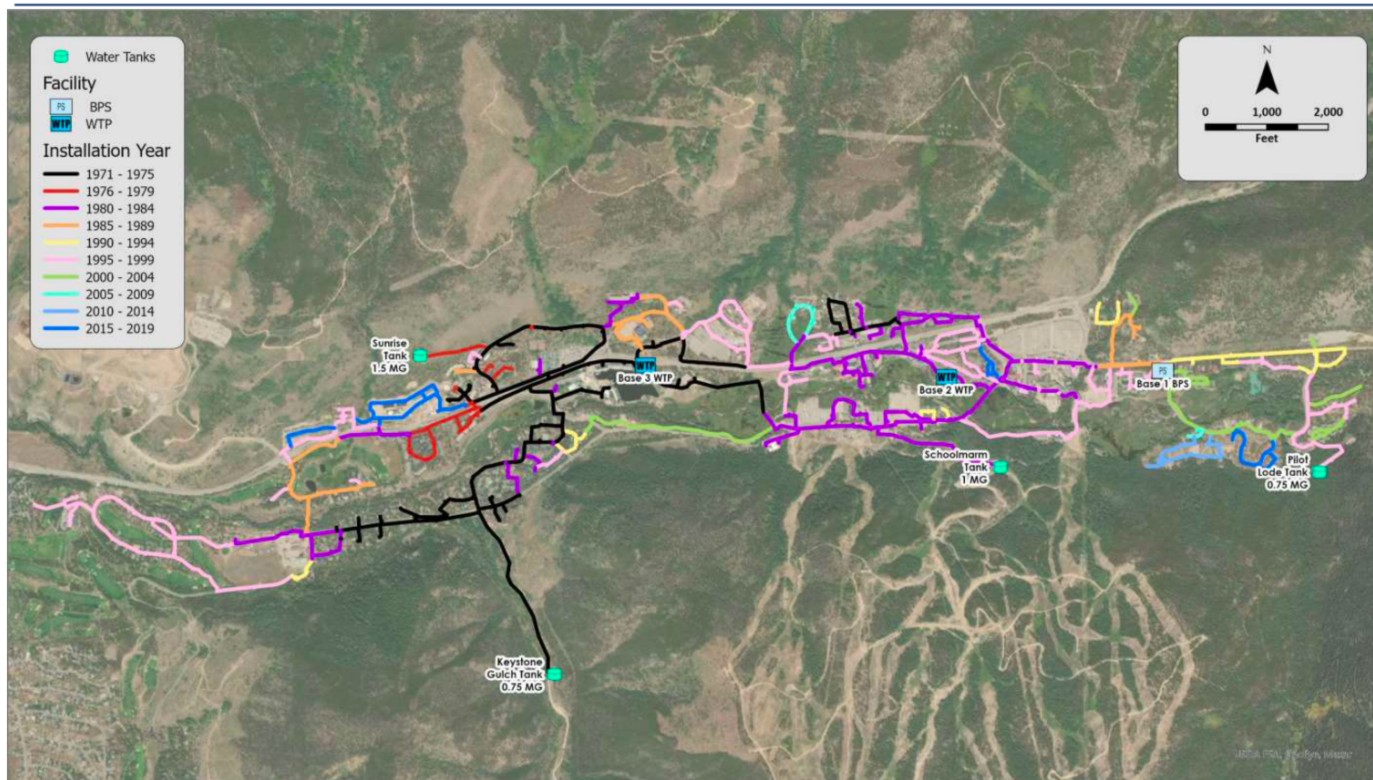


Figure 2-8 – Existing Pipe Age Map

The Snake River Water District will undergo a variety of rehabilitation and improvements throughout the next 10 years based on its [2021 master plan](#).

The district, which provides drinking water to the Keystone valley, underwent a study with an engineering firm to look at its infrastructure's strengths and weaknesses. The idea to look into infrastructure upgrades started about two years ago when the district was notified it had a slight lead exceedance based on two water samples.

Scott Price, executive director and district administrator, said this occurs not because there is an issue with the actual water, but because pipes in some older homes in the area were built with lead and are still in use. If the water sits in the pipes for too long, it can lead to concentrations of lead in the water samples. Price said the Colorado Department of Public Health and Environment has to use the water that first comes out when the faucet is turned on when it tests water samples, which will likely be affected by lead if the water sat unused in old pipes.

The district has three base plants, each with its own storage and water filtration system. The second base, which is also home to the district's office, is likely to need an additional storage tank to serve the high-density area of Keystone Resort, as well as a pump station that can transport water uphill from the third to the second base.

An existing infrastructure issue to address is water pipe breakage, something Price said can cost around 10 times more to fix in the winter than it does in the summer. Engineers looked at which pipes were more likely to break, but also the severity of consequences that can occur from a breakage.

The study prioritized which pipes and fire hydrants in the district would need attention immediately, creating a map showing the different priorities based on each area. The district plans to chip away at these pipe and hydrant upgrades little by little during the 10-year plan.

Meanwhile, the third plant underwent \$8.5 million in upgrades a couple years ago, including a new filtration system. Price said he expects this filtration system to be in compliance for decades to come as water quality regulations get tighter over time...

Price also said that should the base two plant need upgrades — which he is expecting to get a decision from the Colorado Department of Public Health and Environment by the end of the year — the whole district will be able to temporarily operate on the new base three plant.

Lastly, the study showed that the district's Pilot Lode storage tank by the Settlers Creek townhomes will need improvements to its interior lining, as it is around 25 years old and steel constructed.

The study estimates that over 10 years, the district will need about \$38.5 million in work, estimated as follows:

- Pump station from base three to base two: \$1.5 million
- Base two storage tank: \$7.6 million
- Base two groundwater under direct influence compliance: \$11.8 million
- Pilot Lode tank rehabilitation: \$550,000
- Pipeline replacements: \$13.5 million
- Fire hydrant replacements: \$1.6 million

On top of these costs there are several smaller projects included in the master plan that account for the remaining \$2 million of the budget. These estimates cover only the cost of construction, and the district will need to pay more in the coming months for architects and engineers to design the systems...

The plan calls for a 12% rate increase at the start of 2022, and the Snake River Water District's board is currently planning to do 12% increases over the next three years. The base quarterly fee will go from \$65 in 2022 to \$91 in 2024.

The Snake River Water District hasn't increased its water rates in about eight years, which was then only a 3% increase. Prior to that, it hadn't raised its quarterly rates since the 1990s.

Posted on **August 9, 2021** by **Coyote Gulch**

Posted in **Blue River Watershed, Climate Change, Colorado Department of Public Health and Environment, Colorado River Basin, Colorado Water, Infrastructure, Snake River watershed, Water Treatment**

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#SnakeRiver #Water District to hold public meeting August 4, 2021 on water plans — The Summit Daily



Snake River

From The Summit Daily (Lindsey Toomer):

The Snake River Water District will hold a public meeting at 6:30 p.m. Wednesday, Aug. 4, at its office at 0050 Oro Grande Drive in Keystone.

A presentation will be given on the recently completed water system master plan and upcoming rate changes at the meeting.

Based on the master plan, the district will need to invest about \$38.5 million over the next 10 years to address aging infrastructure, potential trouble areas of the system, capacity and distribution. Its next step is determining how to fund these upgrades through federal and state grants and loans.

Posted on **August 2, 2021** by **Coyote Gulch**

Posted in **Blue River Watershed, Climate Change, Colorado Water, Infrastructure, Instream flow, Snake River watershed, Water Treatment**

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Snake River Water District planning for increased needs in Keystone — The Summit Daily



Snake River

From The Summit Daily (Lindsey Toomer):

The Snake River Water District is planning ahead for increasing water needs in the Keystone area due to population growth over the past decade.

District Executive Director Scott Price said in a statement that the district recently created a water system master plan looking into emerging challenges in the next 10 years. The plan includes a prioritized list of short- and long-term projects.

According to the plan, the district needs to invest \$38.5 million over the next decade to address trouble areas, update the old water treatment plant and add a new pump station and storage tank. The district is currently seeking grants and loans to help fund the improvements. It is also evaluating user rates that have remained unchanged for the past eight years.

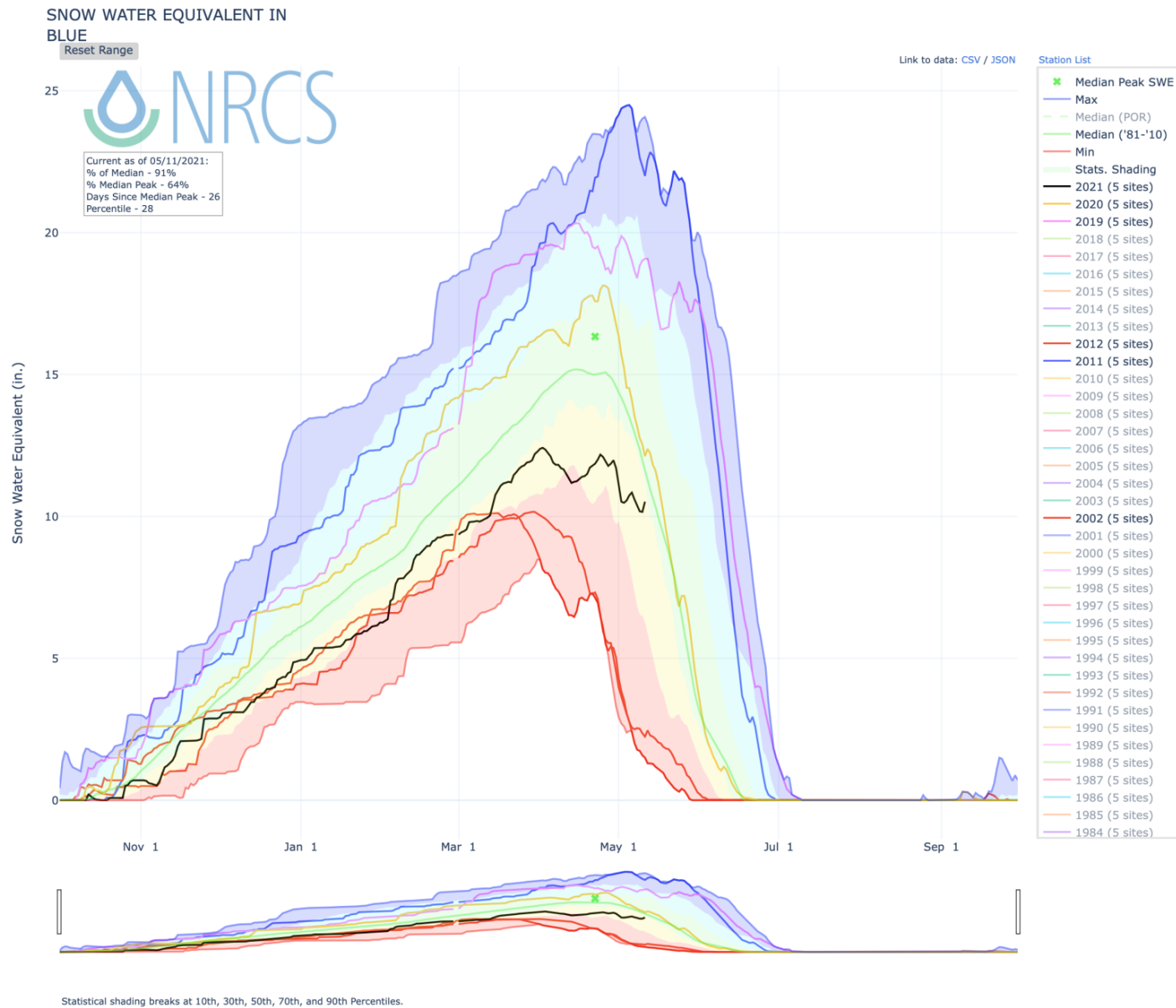
The district will hold public meetings with key stakeholders to discuss the financial plans. There will be two public meetings July 22, including a 1 p.m. livestream on the district's Facebook page and an in-person meeting at 6:30 p.m. at the district's office in Keystone, 0050 Oro Grande Drive.

Posted on **July 8, 2021** by **Coyote Gulch**

Posted in **Blue River Watershed, Climate Change, Colorado River Basin, Colorado Water, Infrastructure, Snake River watershed, Water Treatment**

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**#Drought conditions improve in Summit County, but
#snowpack remains below average — The Summit Daily
#ColoradoRiver #COriver #BlueRiver #aridification**



From The Summit Daily (Taylor Sienkiewicz):

Area snowpack improved in April but is back on a melting trend. According to the latest numbers from the U.S. Department of Agriculture's measurement sites, the snowpack level at Copper

Mountain peaked at the beginning of April at 12.4 inches of snow-water equivalent – the amount of water held in the snowpack. The snow-water equivalent dropped to 10.6 inches in mid-April and increased to 12 inches by Friday, April 30.

The snowpack has declined in May and is currently sitting at 9.8 inches of snow-water equivalent on Copper Mountain, or 82% of the 30-year median. The upper Colorado River basin, which Summit County falls into, is at 65% of normal snow-water equivalent as of May 10.

“Things aren’t looking so good right now,” National Weather Service meteorologist Bernie Meier said. “We’ve melted out about a third of the snowpack already.”

Meier said cool and snowy days like Monday, May 10, slow down the melting process and add a bit to the snowpack, but overall, he expects the snowpack to remain below normal. He said the snowpack usually melts out between June 10 and 20...

According to the National Weather Service’s almanac, only 9 inches of snow was recorded in April at the Dillon Weather Station – almost half the area’s normal April snowfall of 17.3 inches.

So far, May is closer to average with a total of 3 inches as of Monday morning and more on the way with through the remainder of the storm. Through May 10, normal snowfall for the Dillon station is 3.3 inches.

Though not much snow accumulated, drought conditions have improved in Summit County, according to the U.S. Drought Monitor. The county is still in a drought, but the severity has lessened to a severe drought in the northern portion of the county and a moderate drought in the southern portion of the county, according to the Drought Monitor’s severity scale. As of April 27, the northern portion of the county was still in an extreme drought.

U.S. Drought Monitor Colorado

May 4, 2021

(Released Thursday, May. 6, 2021)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	7.84	92.16	79.86	51.85	31.01	16.39
Last Week <i>04-27-2021</i>	1.19	98.81	89.13	60.45	32.13	16.68
3 Months Ago <i>02-02-2021</i>	0.00	100.00	100.00	90.24	70.73	24.79
Start of Calendar Year <i>12-29-2020</i>	0.00	100.00	100.00	93.73	76.17	27.60
Start of Water Year <i>09-29-2020</i>	0.00	100.00	99.29	89.35	52.88	2.64
One Year Ago <i>05-05-2020</i>	23.79	76.21	61.83	40.72	11.34	0.00

Intensity:

None	D2 Severe Drought
D0 Abnormally Dry	D3 Extreme Drought
D1 Moderate Drought	D4 Exceptional Drought

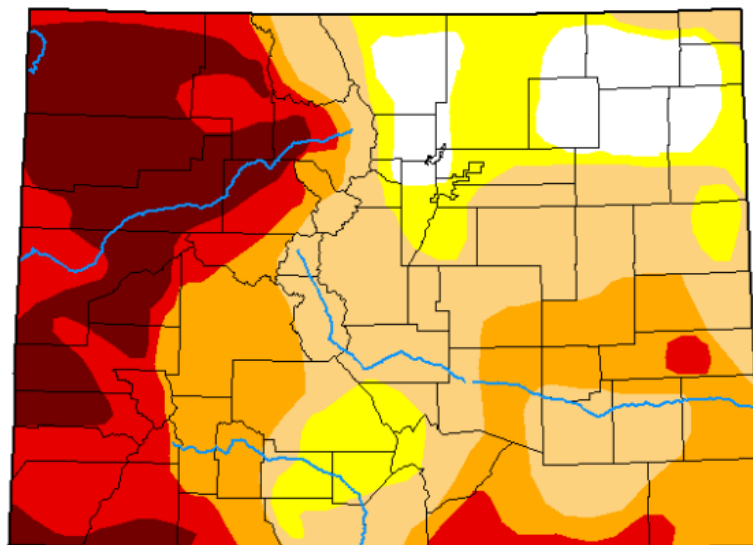
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:

David Simeral
Western Regional Climate Center



droughtmonitor.unl.edu



Colorado Drought Monitor map May 4, 2021.

Posted on **May 11, 2021** by **Coyote Gulch**

Posted in **Blue River Watershed, Climate Change, Colorado River Basin, Colorado Water, Snake River watershed**

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Dillon Reservoir still mainly ice-free for this season



Looking south into the old town of Dillon, soon to disappear beneath the waters of the reservoir, around 1960.

[Sample](#) Denver Water's Historic Photo Archive.

Dillon townsite prior to construction of Dillon Reservoir via Denver Water

From CBS Denver (Matt Kroschel):

Warmer temps have left Dillon Reservoir for the most part unfrozen, typically the large body of water freezes over by the end of December. Not this year, though.

More dry weather and above average temperatures are predicted for the next few days. That leaves open the possibility of breaking the record this year.

Posted on **January 2, 2018** by **Coyote Gulch**

Posted in **Blue River Watershed, Climate Change, Colorado River Basin, Colorado Water, Snake River watershed**

Leave a comment

Peru Basin acid mine drainage cleanup update



Jumbo Mine Cabin in-front of Adit September 25, 2017. Photo credit Environmental Protection Agency.

From the Environmental Protection Agency via Summit County (Brian Lorch):

The U.S. Environmental Protection Agency (EPA) is taking immediate action to perform mine cleanup activities at the Jumbo Mine in Summit County's Peru Creek Basin, approximately seven miles east of Keystone Resort.

The Jumbo Mine, which produced gold, copper, lead and silver, operated from 1915 to 1918. Historic mine operations also generated significant volumes of waste rock and tailings piles. Inactive and abandoned for a century, the mine site was identified in the early 1990s by EPA and the Colorado Department of Public Health & Environment (CDPHE), as well as in the Snake River Watershed Plan, as a significant point-source contributor of metal-contaminated flows into Peru Creek and the downstream Snake River.

Historic hard-rock mining in the Peru Creek Basin left a legacy of contaminated and abandoned mine sites, whose acid mine drainage significantly degrades water quality. Much has been done to study the problems in the Snake River watershed, beginning in the early 1970s. Most studies have focused on the Peru Creek drainage, which is home to the Pennsylvania Mine, the largest, longest-operating mine in the watershed. In coordination with Summit County and the Colorado Division of Reclamation, Mining and Safety (DRMS), EPA completed cleanup actions at the Pennsylvania Mine in 2016.

The Jumbo Mine is another high-priority abandoned mine site in the Peru Creek Basin identified by the Snake River Watershed Coalition as a remediation project site capable of significantly improving water quality in the Snake River watershed.

Summit County purchased the land surrounding the abandoned Jumbo Mine in early 2016 for public open space. A restrictive covenant placed on the adjacent property containing the abandoned mine site allows for EPA's cleanup actions to occur, but also limits the County's liability for the existing environmental issues and associated cleanup actions.

“We had been looking to acquire this piece of property for a long time, recognizing that it has many open space values,” said Brian Lorch, Summit County Open Space and Trails director. “But before we could take steps to purchase the property, we needed to ensure that it could be cleaned up in an economical manner.”

EPA is implementing the cleanup work as a time-critical removal action under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). Last week, the agency began the work, which it plans to complete in about three weeks.

Cleanup activities involve diverting water draining from a mine adit around or over adjacent tailings piles in a limestone and membrane-lined ditch. According to EPA studies, water quality of the adit drainage degrades as it crosses the mine tailings, contributing high levels of suspended and dissolved lead, zinc and other metals into the stream. Diverting drainage around the tailings into a lined ditch should greatly improve water quality.

“The overall approach will help reduce the discharge of metals into Peru Creek,” Lorch said. “A passive treatment approach at the Jumbo Mine site is quite similar to numerous mine cleanups performed elsewhere by the County.”

Since 2001, Summit County has worked with EPA to identify and prioritize mine sites in need of cleanup in the Peru Creek Basin. The County’s proactive coordination with EPA facilitated recent cleanup efforts at the Pennsylvania Mine and numerous other sites in the area.

“We are really happy and grateful to see EPA continue its mine cleanup efforts in the Peru Creek Basin,” Summit County Commissioner Karn Stiegelmeier said. “The Summit County community is very supportive of our efforts to clean up abandoned mine sites on County property, voting in 2015 for a mill levy that provides funding for cleaning up mine-impacted sites.”



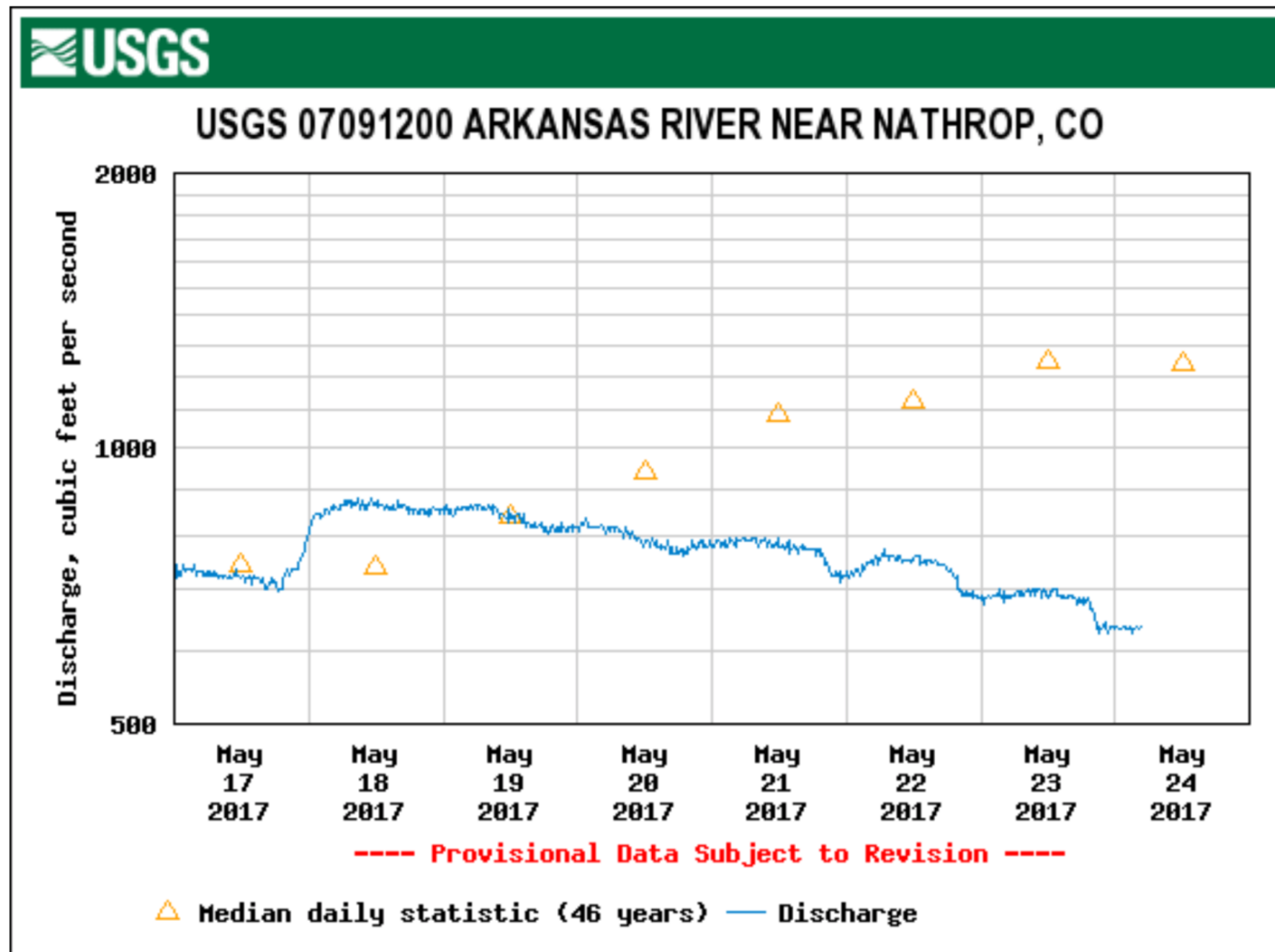
Jumbo Mine looking up at channel liner installation from lower middle section of waste rock pile. Photo credit Environmental Protection Agency.

Posted on **October 20, 2017** by **Coyote Gulch**

Posted in **Blue River Watershed, Climate Change, Colorado River Basin, Colorado Water, Groundwater, Peru Creek Basin, Snake River watershed, Summit County, Superfund, Water Pollution**

2 Comments

#Runoff news: Big expectations for the Arkansas River this season



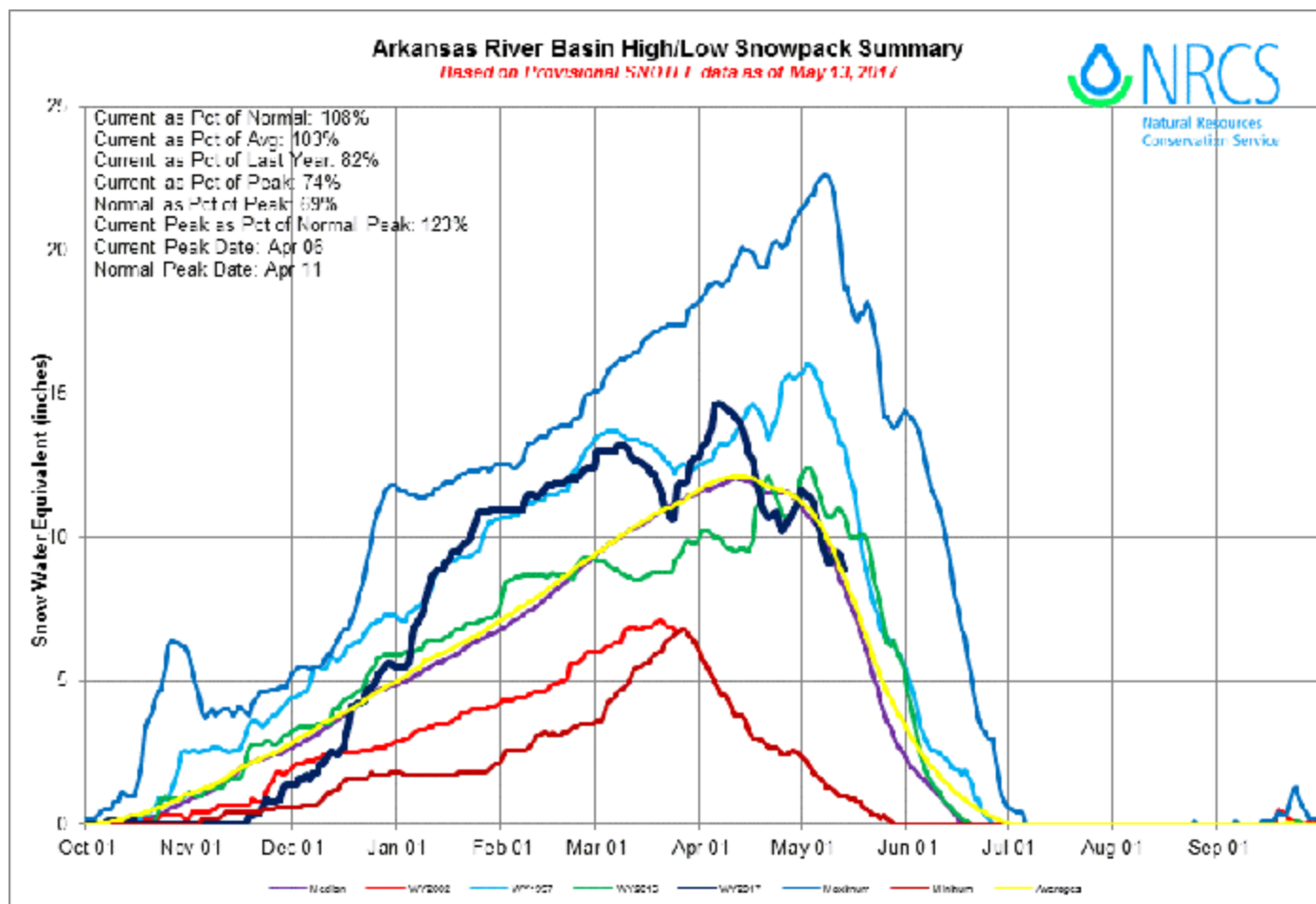
From KRDO.com (Katie Spencer):

“We’re definitely looking at high water this year,” said Dennis Wied, the owner of Raft Masters.

Wied said he has high expectations for this season.

“This is going to be one of those epic kind of years where the real high water enthusiasts will be out in numbers,” Wied said.

Water flows are about 1,200 cubic feet per second in the Arkansas River right now, but rafting officials say they’re expecting that to grow three times as the snow continues to melt.



Arkansas River Basin High/Low graph May 22, 2017 via the NRCS.

Posted on May 24, 2017 by Coyote Gulch

Posted in Arkansas Basin, Climate Change, Colorado Water, Peru Creek Basin, Whitewater

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#AnimasRiver: Swiping at the EPA was easy enough, but context matters in river spills — The Mountain Town News



Despite lingering problems at many places, the Pennsylvania Mine in Summit County seems to be one place where contaminated water from hard-rock mining a century ago is finally being abated. Photo courtesy of Jeff Graves, Colorado Division of Reclamation, Mining and Safety

Swiping at the EPA was easy enough, but context matters in river spills

It was the cheap story, and none less than the Economist ran with it this week in recapping the mine spill into the waterways of Southwestern Colorado. “Arsenic and lost face,” was the headline over a short story about the troubles stirred up after a contractor working for the Environmental Protection Agency breached a dam holding back the Kool-Aid-looking water in the Gold King Mine above Silverton.

Plenty of people piled on the EPA after the Aug. 5 spill. It seems lots of people hate the EPA—and this was before the Clean Power Plan. “To be accused of unconstitutional overreach is unfortunate,” concluded the Economist. “To give proof of incompetence when faced with such an accusation is unforgivable.”

But the Durango Herald may have been much closer to the truth of the situation when, only a day after the fouled waters reached Durango, it described the EPA as the one “left holding the hot potato.”



Indeed, Silverton and San Juan County had resisted a Superfund designation, afraid of the bad publicity for the community. Instead, there had been what the Herald described as a “piecemeal cleanup effort. ...It was a compromise and gamble,” the newspaper went on to say. “It failed, but there is a valuable lesson that must not be missed amid the finger-pointing and grieving over a river run foul.”

The lesson along the I-70 corridor in Colorado is that the EPA has managed to achieve cleanups where others have bumbled or done nothing. Consider the Eagle Mine, between Minturn and Red Cliff, just around the corner from Vail. Mining ended there in the late 1970s after a century. The mess was designated a Superfund site. But by the winter of

Silverton, Colo., lies at an elevation of 9,300 feet in San Juan County, and the Gold King Mine is more than 1,000 feet higher in the valley at the left side of the photo. Photo/Allen Best

1989-90, the Eagle River looked much like the Animas River of a couple weeks ago. State officials had signed off on a low-cost gamble of their own, sealing the Eagle Mine. This lower-cost solution didn't work. Water contaminated by heavy metals in the mine escaped into the river. At one point, snow at the Beaver Creek Resort, manufactured with water drawn from the Eagle River, had a faint orange hue. It wasn't a year the Denver Broncos were going to the Super Bowl. Then the EPA was called in. Things got fixed—more or less.

That even a well-funded cleanup continues to have problems should be sobering. This week, Todd Fessenden, board president of the Eagle Mine Limited, a group charged with disseminating technical information in ways the layman can understand, sent an e-mail to elected officials in Eagle County assessing the river conditions there, in the wake of the Animas spill.

“What you may not know is that we’ve had more than a dozen spills of heavy metal-laden mine water, or partially treated mine water, in the last 6 years,” he wrote. “Those spills have ranged in magnitude from 0.5 gallons per minute to 428,000 gallons over a 23-hour period. I’ve personally seen the Eagle River run green and the same shade of orange the Animas turned in the last 6 years.”

Still, the river is much better now. Vail seems to have survived just fine, despite the presence of the EPA.

In Summit County, the Pennsylvania Mine was a long-time mess. It's in Peru Gulch, not far from the A-Basin ski area, and upstream from Keystone. The original miners had been gone many decades. A couple had purchased the property for back taxes but, realizing the problems, couldn't unload it. Nobody else would touch it either, because of the liability if something went wrong.

But progress has been made in recent years. The mine less than a decade ago was running red downstream to Keystone and into Dillon Reservoir. It was, as the Summit Daily News noted in a story last week, long one of the most toxic abandoned mines in the state.

Again, the EPA's involvement was crucial for making progress. By stepping in, explained Paul Peronard, the EPA's on-site coordinator at the Pennsylvania Mine, the EPA takes on liability. With the EPA involved, the state will step in and do work, too. "When bad things happen, it becomes the EPA's fault," he explained.

And things can go wrong. "It's like working on the bomb squad. You have a set of techniques, but, every now and then, the bomb goes off," he said.

Jeff Graves, the senior project manager for the Colorado Division of Reclamation, Mining and Safety, said the potential for a "catastrophic release, surge event, whatever you want to call it, will be significantly reduced if not eliminated" by late September.



Portal of the Pennsylvania Mine in Summit County, upstream from Keystone Resort. Photo courtesy of Jeff Graves, Colorado Division of Reclamation, Mining and Safety

The Pennsylvania Mine currently puts 12,000 pounds annually of zinc into Peru Creek. No fish can be found in the creek nor in the Snake River downstream as far as Keystone, where the pollution is diluted. But if not as bad as the Pennsylvania Mine, more than 100 abandoned mines remains in the Snake and Blue River watersheds.

Reviewing the Animas pollution, Wyatt laments the “finger-pointing without putting what happened (at Silverton) into context.” The mining history above Silverton was difficult, with the mines interconnected and covering a broad area.

Lynn Padgett, a geologist, has been studying abandoned mines in the San Juan Mountains since 1990. Elected a Ouray County commissioner in 2009, but has kept after her interest, most recently appearing before a committee of Club 20 meeting in Lake City in support of Good Samaritan legislation.

Good Samaritan legislation would allow third parties to step in and clean up a mine site without incurring liability if something goes wrong, such as occurred at the Gold King Mine, as specified by the Clean Water Act. By Padgett’s rough count, there have been 15 different pieces of legislation have been introduced into Congress over the years—and all have foundered.

“The Clean Water Act is ironically a barrier to having clean water,” she says.

Padgett remembers going to the Gold King Mine in 2012 with then-U.S. Sen. Mark Udall, who had worked to move Good Samaritan legislation. As had several other congressional representatives. The problem always ends up being a concern about potentially responsible individuals being allowed to get duck their responsibilities.

The current proposal is being pushed by U.S. Sen. Michael Bennet and U.S. Rep. Scott Tipton. The legislation would create pilot projects. Other counties have been asked to lend support, and a letter from Pitkin County Commissioner Rachael Richards asks that the pilot be broadened to include the

hard-rock mineral belt of Colorado, specifically including Eagle, Gunnison, Pitkin and Summit counties.

Padgett says the Gold King Mine doesn't provide a good argument against mining. It and most of the other old mines pre-date modern laws that govern mining. "Our problem is these very old, historic mines," she says.

Did the EPA truly mess up, as critics say, or was it, as the Durango Herald said, the party left holding the hot potato? Padgett says she's waiting to get more information.

But like Wyatt and many others, she's worried that too many will draw the wrong lesson from Gold King and the Animas, calling for reduced funding of the EPA by Congress. "That would be the wrong answer," she says.

Posted on **August 23, 2015** by **Coyote Gulch**

Posted in **Animas River Watershed, Blue River Watershed, Climate Change, Colorado River Basin, Colorado Water, Environmental Protection Agency, Peru Creek Basin, San Juan Basin, Snake River watershed, Water Pollution**

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Environment: Bulkhead a big step in Peru Creek cleanup

Posted on **October 20, 2014** by **Coyote Gulch**

Posted in **Blue River Watershed, Colorado River Basin, Colorado Water, Peru Creek Basin, Snake River watershed, Water Pollution**

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Summit County: The Pennsylvania Mine gets plugged

From the Summit Daily News (Ben Trollinger):



Acid mine drainage
Pennsylvania Mine via
the Summit County
Citizens Voice

On Friday, Oct. 17, Stiegelmeier was one of several federal, state and local officials marking a milestone for the centerpiece of the county's current mining cleanup efforts — plugging the Pennsylvania Mine.

About 8 miles east of Keystone, the abandoned mine is Summit County's biggest mess. The mine, considered the worst in the state, spews toxic heavy metal concentrates and acidifies water flowing into the Peru Creek, a tributary of the Snake River, which feeds Dillon Reservoir. Peru Creek is without fish, insects or other aquatic life. The Snake River has life, but it's sparse and found only in the lower reaches. In 2007, a burp of acidic water from the abandoned mine killed fish all the way to Keystone, county officials said.

This past week, the Colorado Division of Reclamation, Mining and Safety finished installing one of two bulkheads, massive plugs of concrete and steel built about 500 feet inside the mine.

According to project manager Jeff Graves, once both bulkheads are installed, toxic burps and blowouts will be a thing of the past.

"That won't happen again — it can't," he said.

The bulkheads prevent water from flowing through the mine. Water will back up inside, reducing the amount of oxygen the metals and sulfides are exposed to, which should improve water quality.

POSITIVE IMPACTS

Though the more than \$3 million project still has far to go, reclamation efforts seem to have had positive impacts already. Last year, the Peru Creek turned reddish-orange seven or eight times. That hasn't happened once this year.

In addition to the bulkheads, new drainage ditches channel water away from waste-rock piles. Those piles have been capped. Eventually, they'll be revegetated. Limestone has also been strategically added to raise the pH of the water, which could help filter out metals into settlement ponds.

Organizations involved in the project include: the Colorado Division of Reclamation, Mining and Safety, the U.S. Environmental Protection Agency, the Colorado Department of Public Health and Safety, the U.S. Geological Survey, the U.S. Forest Service, Summit County Open Space and Trails, Northwest Council of Governments, the Snake River Watershed Task Force, the Blue River Watershed Group and the Keystone Center.

More Peru Creek Basin coverage [here](#) and [here](#).

Posted on **October 20, 2014** by **Coyote Gulch**

Posted in **Blue River Watershed**, **Climate Change**, **Colorado River Basin**, **Colorado Water**, **Peru Creek Basin**, **Snake River watershed**, **Water Pollution**
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USGS: Analysis of Water Quality in the Blue River Watershed, Colorado, 1984 through 2007

Here's the [release](#) from the United States Geological Service (Nancy J. Bauch, Lisa D. Miller, and Sharon Yacob):

Water quality of streams, reservoirs, and groundwater in the Blue River watershed in the central Rocky Mountains of Colorado has been affected by local geologic conditions, historical hard-rock metal mining, and recent urban development. With these considerations, the U.S. Geological Survey, in cooperation with the Summit Water Quality Committee, conducted a study to compile historical



Blue River

water-quality data and assess water-quality conditions in the watershed. To assess water-quality conditions, stream data were primarily analyzed from October 1995 through December 2006, groundwater data from May 1996 through September 2004, and reservoir data from May 1984 through November 2007. Stream data for the Snake River, upper Blue River, and Tenmile Creek subwatersheds upstream from Dillon Reservoir and the lower Blue River watershed downstream from Dillon Reservoir were analyzed separately. (The complete abstract is provided in the report)

[Click here](#) to read the report.

More USGS coverage [here](#).

Posted on **August 26, 2014** by **Coyote Gulch**

Posted in **Blue River Watershed, Colorado River Basin, Colorado Water, Snake River watershed, USGS, Water Pollution**

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Summit County buys mining claims near Montezuma to protect land — Summit Daily News

From the Summit Daily News (Alli Langley/Joe Moylan) via the Glenwood Springs Post Independent:

During the silver mining boom of the 1870s, with a population of just 71, Sts. John was for a short time Summit County's largest town.

The Summit County Open Space and Trails Department recently bought the abandoned townsite and nearby mining claims for \$425,000 from the Tolen family, which owned land in the area since the 1950s.



Snake River

The purchase, finalized July 28, conserves about 90 acres in the Snake River Basin above the town of Montezuma as public open space. The 18 separate parcels have significant wildlife value, according to the Colorado Natural Heritage Program, the U.S. Forest Service and the Snake River Master Plan.

“We are incredibly grateful to the Tolen family for working closely with the Summit County Open Space program to preserve the heritage of Sts. John and this exquisite landscape for the enjoyment of Summit County citizens and visitors alike,” said Brian Lorch, the program’s director. “This is one of the most important and significant acquisitions the program has made in recent years.”

The county acquired the properties using the Summit County Open Space fund, approved by voters in 2008. Breckenridge Ski Resort contributed \$25,000 toward the purchase as part of a deal with environmental groups worried about the impacts of the recent Peak 6 development.

With the acquisition, the county will protect a large portion of the Snake River Basin backcountry and preserve a piece of Summit County history. Lorch said the Sts. John properties are highly valued for their intact historic resources, popularity for outdoor recreation and high-quality wetlands and wildlife habitat...

The Summit County Open Space program acquires lands to protect the scenic beauty, natural habitat, backcountry character and recreational opportunities in Summit County. Funded through property tax mill levies approved by voters in 1993, 1999, 2003 and 2008, the program has protected more than 14,000 acres of open space.

More Blue River watershed coverage [here](#).

Posted on **August 25, 2014** by **Coyote Gulch**

Posted in **Blue River Watershed, Colorado Water, Conservation, Peru Creek Basin, Restoration/reclamation, Snake River watershed, Water Pollution**

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Three-year cleanup targets Summit County's Pennsylvania Mine — Summit Daily News

From the Summit Daily News via The Denver Post:



Pennsylvania Mine
Upper Peru Creek Basin

About 8 miles east of Keystone and a couple of miles south of the 14,000-foot-plus Grays and Torreys peaks, the abandoned Pennsylvania Mine is considered the worst mine in the state. The mine adds toxic heavy metal concentrations and acidifies water flowing into the Peru Creek, a tributary of the Snake River, which feeds Dillon Reservoir.

A three-year, \$3 million cleanup project aims to stop that pollution. The project could serve as a model for future mine reclamation efforts around the state, said Paul Peronard, on-scene coordinator for the U.S. Environmental Protection Agency. The collaborative effort is currently under budget and ahead of schedule, he said, even with the added cost of helping Summit County fix the part of Montezuma Road that washed away in early June.

“This is very much a huge partnership,” said Jeff Graves, senior project manager with the Colorado Division of Reclamation, Mining and Safety.

For decades, government agencies and other interested parties faced issues of liability and funding when trying to tackle the mine’s cleanup.

“It’s quite a conundrum,” said Lane Wyatt, a water-quality expert with the Northwest Colorado Council of Governments. “The problem is you don’t really have anybody to point your finger to in places like this to say, ‘You’re responsible. You got to go clean this up.’ ”

This year the state is working to place one of two bulkheads, or giant concrete plugs, about 500 feet inside the mine. The bulkheads will block water from leaving through one large entry and stop water

| *from flowing freely through the mine, Graves said.*

More Blue River watershed coverage [here](#).

Posted on **August 4, 2014** by **Coyote Gulch**

Posted in **Blue River Watershed, Colorado River Basin, Colorado Water, Peru Creek Basin, Snake River watershed, Summit County, Water Pollution**
[Leave a comment](#)

Colorado: Spring flood cuts off road to Montezuma

Posted on **June 5, 2014** by **Coyote Gulch**

Posted in **Climate Change, Colorado Water, Peru Creek Basin, Snake River watershed**
[Leave a comment](#)

Peru Creek: EPA has been testing treatment and settlement of the acid mine drainage during August

From the Summit Daily News (Breeana Laughlin):



| Throughout August, [Martin McComb], the Environmental Protection Agency's on-scene coordinator, and his team have been diverting the main flow of heavy-metal-laden water coming from the mine away from the poisonous tailings piles. Environmental protection workers also set up a treatment system that raises the PH of the water in an effort to force some of the metals to drop out of it into a settlement pond before heading downstream. "It's all about reducing the amount of

pollution that flows into the creek,” McComb said. “We are dealing comprehensively with what’s on top of the ground as well as what’s below the ground.”[...]

McComb’s EPA team is embarking on phase one of a six-phase cleanup project at the site. In addition to water treatment efforts, the group has spent the past month improving road conditions to allow dump trucks and other heavy machinery access to the site. The cleanup is expected to take three years and will involve numerous agencies, including the Colorado Division of Reclamation Mining and Safety, Summit County, the U.S. Forest Service, the Blue River and Snake River watershed groups and Northwest Colorado Council of Governments. “It’s nice to see there are so many people involved in this project and in this watershed. I think it’s because it’s such a beautiful area, and near where so many people are living,” McComb said. “I hope we can make an impact – and think we already have.”

Cleanup efforts taken under the project plan will be phased over the next several years and will address threats from acidic discharge that is draining from the mine and tailings along with other mine waste found on the surface.

The bulk of the underground mine work will be conducted under the supervision of the Colorado Division of Reclamation, Mining & Safety. This summer, contractors under the supervision of senior project manager Jeff Graves are digging out a collapsed portion of earth that flooded the culvert in the mine’s portal F, and are working to gain easier access into the underground portions of the mine. “They are really knowledgeable about underground work and have a lot of experience,” McComb said. “For us, it’s a good way to partner with people who are specialized and really know what they’re doing.”

More restoration/reclamation coverage [here](#).

Posted on **August 25, 2013** by **Coyote Gulch**

Posted in **Blue River Watershed, Colorado River Basin, Colorado Water, Groundwater, Infrastructure, Instream flow, Peru Creek Basin, Restoration/reclamation, Snake River watershed, Water Pollution**

Restoration: Pennsylvania Mine cleanup to start in earnest beginning this month

From the Summit Daily News (Breeana Laughlin):



Pennsylvania Mine bleeds heavy metals, or acid mine drainage, into Peru Creek and the Snake River. The Snake flows into Dillon Reservoir — a major water source for the Front Range.

The mine operated from 1879 through the early 1900s. Like many mines in the area, it sits in a pristine alpine valley. Today the Peru Creek valley, eight miles to the east of Keystone, serves as a year-round destination for recreation.

The mine is one of the largest contributors of human-caused heavy metal in the Snake River Watershed. Contaminants include aluminum, cadmium, copper, iron, lead, manganese and zinc. Exposure to these metals can cause irreversible and lifelong health problems in humans and wildlife.

This summer, the EPA will prep infrastructure to allow heavy equipment into the mine site in hopes of cutting off pollution sources. Meanwhile, the Colorado Division of Reclamation and Mining Safety will continue underground investigations to pinpoint where the toxic metals are originating and decipher which techniques should be used to best clean up the site...

EPA on-scene coordinator Paul Peronard expects the mine cleanup project to take place over three years, and cost about \$3 million. Progress will be made in “finite, bite-size chunks,” he said...

Workers drilled holes into the ground and used a borehole camera to inspect the inside of the mine. The state-of-the-art technology was combined with maps from the 1920s to create a blueprint of the

mine site...

Stakeholders then came up with a portal rehabilitation project. They dug and cut their way into the mine and installed very large culverts into two mine portals. The work required climbing through “hobbit holes” and dealing with 2 feet of muck, but it allowed researchers to get data about the amount of flow and level of contaminants coming through the F and C portals of the mine – where the bulk of the cleanup work will be done. The water found was “pretty nasty stuff.” The substance was a rusty orange color – very similar to the hue of the excavators on site. Geologists and engineers used dye to track water flows, created settlement ponds and revegetated disturbed areas...

In June, workers will prepare the mine site and stabilize the portals so more detailed underground investigations can be made. Geological engineer Graves’ plan is to install inner and outer bulkheads at the mine. The problem workers have with sealing waterways is a lack of rock and other landmass on top of the mine to contain underground water pressure, he said...

In addition to installing bulkheads in 2014 and 2015, stakeholders plan to cap waste and tailing piles in place with topsoil and vegetation to prevent erosion and contaminants from leaching. Any significant surface water pathways discovered during the underground investigations will also be sealed.

From the Summit County Citizens Voice (Bob Berwyn):

Nearly a century after miners finished digging millions of dollars worth of silver, lead and zinc out of the Pennsylvania Mine, heavy machinery will once again rumble through the high alpine Peru Creek Valley. But instead of burrowing deep into the ground to find precious metals, the workers this time will be trying to clean up the big mess left behind when the mine was abandoned. For decades, water coursing through the mine shafts has been dissolving minerals, resulting in acid mine drainage that pollutes Peru Creek and the Snake River. Concentrations of some metals, especially zinc, are high enough to kill trout...

The cleanup is a partnership between the U.S. Environmental Protection Agency, the Colorado Division of Reclamation Mining and Safety, the U.S. Forest Service, the Colorado Department of Public Health and Environment, and Summit County. For more information about the project please visit: <http://www.snakerivertaskforce.org>.

More Snake River Watershed coverage [here](#) and [here](#).

Posted on **June 2, 2013** by **Coyote Gulch**

Posted in **Blue River Watershed, Colorado River Basin, Colorado Water, Peru Creek Basin, Snake River watershed, Water Pollution**

[Leave a comment](#)

Snake River: USGS — Warmer Temperatures Likely Driving Increase of Metal Concentrations in Rocky Mountain Watershed

Here's the [release](#) the United States Geological Survey (Heidi Koontz/Jim Scott):



Warmer air temperatures since the 1980s may explain significant increases in zinc and other metal concentrations of ecological concern in a Rocky Mountain watershed, according to a new study published in the journal *Environmental Science and Technology*, led by the U.S. Geological Survey and the University of Colorado, Boulder.

Rising concentrations of zinc and other metals in the upper Snake River just west of the Continental Divide near Keystone, Colo., may be the result of falling water tables, melting permafrost, and accelerating mineral weathering rates, all driven by warmer air temperatures in the watershed. Researchers observed a fourfold increase in dissolved zinc over the last 30 years during the month of September.

“This study provides another fascinating, and troubling, example of a cascading impact from climate warming as the rate of temperature-dependent chemical reactions accelerate in the environment, leaching metals into streams,” said USGS Director Marcia McNutt. “The same concentration of metals in the mountains that drew prospectors to the Rockies more than a century ago are now the source of toxic trace elements that are harming the environment as the planet warms.”

Increases in metals were seen in other months as well, with lesser increases seen during the high-flow snowmelt period. During the study period, local mean annual and mean summer air temperatures increased at a rate of 0.2–1.2 degrees Celsius per decade.

Generally, high concentrations of dissolved metals in the upper Snake River watershed are the result of acid rock drainage, or ARD, formed by natural weathering of pyrite and other metal-rich sulfide minerals in the bedrock. Weathering of pyrite forms sulfuric acid through a series of chemical reactions, and mobilizes metals like zinc from minerals in the rock and carries these metals into streams.

Increased sulfate and calcium concentrations observed over the study period lend weight to the hypothesis that the increased zinc concentrations are due to acceleration of pyrite weathering. The potential for comparable increases in metals in similar Western watersheds is a concern because of impacts on water resources, fisheries and stream ecosystems. Trout populations in the lower Snake River, for example, appear to be limited by the metal concentrations in the water, said USGS scientist Andrew Todd, lead researcher on the project.

“Acid rock drainage is a significant water quality problem facing much of the Western United States,” Todd said. “It is now clear that we need to better understand the relationship between climate and ARD as we consider the management of these watersheds moving forward.”

In cases where ARD is linked directly with past and present mining activities it is called acid mine drainage, or AMD. Another Snake River tributary, Peru Creek, is largely devoid of life due to AMD

generated from the abandoned Pennsylvania Mine and smaller mines upstream, and has become a target for potential remediation efforts.

The Colorado Division of Reclamation Mining and Safety, in conjunction with other local, state and federal partners, is conducting underground exploration work at the mine to investigate the sources of heavy metals-laden water draining from the adit. The study conducted by Todd and colleagues has implications in such efforts because it suggests that establishing attainable clean-up objectives could be difficult if natural background metal concentrations are a “moving target.”

Collaborators include USGS, CU Boulder and the Institute of Arctic and Alpine Research (INSTAAR). The data analyzed for the study came from INSTAAR, the USGS and the U.S. Environmental Protection Agency.

From the Summit Daily News (Paige Blankenbuehler):

Rising concentrations of zinc and other metals in the upper Snake River west of the Continental Divide near Keystone may be the result of falling water tables, melting permafrost and accelerating mineral- weathering rates — all driven by warmer air temperatures in the watershed...

High concentrations of dissolved metals in the upper Snake River watershed are the result of acid rock drainage, according to the research. The drainage is a result from past and present mining activities.

More water pollution coverage [here](#).

Posted on **September 13, 2012** by **Coyote Gulch**

Posted in **Blue River Watershed, Climate Change, Colorado River Basin, Colorado Water, Groundwater, Infrastructure, Peru Creek Basin, Snake River watershed, USGS, Water Pollution**

Leave a comment

Peru Creek basin: Summer restoration work will include opening the Pennsylvania mine for a look-see

From the Summit County Citizens Voice (Bob Berwyn):



One part of the planned work involves moving some of the waste rock from the mine away from running water, a technique that has proven successful in other remediation projects. A collaborative task force including local, state and federal stakeholders have been grappling with the pollution for years, as cost estimates for a cleanup have soared.

This summer, the various parties collaborating on the cleanup will also try to enter the old mine itself to try and figure how water moves through the shafts and tunnels. That may help the experts figure out if they can permanently block the water coming out of the mine with a bulkhead, according to Lane Wyatt, a water expert with the Northwest Colorado Council of Governments. “That’s the big thing, is opening up the Penn Mine ... that’s kind of exciting, going in see what’s going on in there. That might help us develop some remedial options based on more than just guessing,” Wyatt said.

Other potential remediation options include a water treatment facility, or perhaps even trying to block or divert water before it gets into the mine.

“The Forest Service has been involved in looking for ways to clean up the Penn Mine for many years. This is a great step forward,” said acting Dillon District Ranger Peech Keller.

More Snake River watershed coverage [here](#) and [here](#).

Posted on **May 27, 2012** by **Coyote Gulch**

Posted in **Blue River Watershed, Climate Change, Colorado River Basin, Colorado Water, Groundwater, Infrastructure, Peru Creek Basin, Restoration/reclamation, Snake River watershed, Water Pollution**

Restoration: Partial cleanup of Saints John Mine in Summit County planned for summer

From the Summit County Citizens Voice (Bob Berwyn):



Beautiful as Saints John Creek may look, it's heavily polluted with cadmium, copper, lead and zinc that leaches into the water from weathered waste rock and from the underground workings of the former mine. Concentrations of some of the metals, especially zinc, are so high that the water is deadly to fish and to the aquatic bugs they feed on. As a result, the short stream segment has been listed as impaired since 1998.

This summer, the Colorado Division of Reclamation, Mining and Safety plans to start cleaning up the mess with an ambitious \$500,000 restoration project that involves moving some of the exposed tailings away from the water to an upland repository, where they'll be capped and covered with native vegetation.

State officials may also divert some of the water pouring out of an old mine opening to prevent the water from coming in contact with the weathered rock. Altogether, they hope the work will reduce the amount of dissolved zinc in the water by about three pounds per day. Zinc is particularly toxic to trout, impairing their ability to breathe.

More water pollution coverage [here](#).

Posted on **May 23, 2012** by **Coyote Gulch**

Posted in **Blue River Watershed, Climate Change, Colorado River Basin, Colorado Water, Snake River watershed, Summit County, Water Pollution**

Frisco: 'My best guess is we won't fill Dillon Reservoir' — Bob Steger (Denver Water)



Grays and Torreys, Dillon Reservoir May 2017. Photo credit Greg Hobbs.

Here's a [recap](#) of the State of the River meeting held yesterday in Frisco, from Bob Berwyn writing for the *Summit County Citizens Voice*. Here's an excerpt:

With an early March meltdown of the snowpack and continued above-average temperatures, the outlook isn't good, said Blue River water commissioner Troy Wineland, warning that the entire state and region are facing a severe drought. "The time for action is now," Wineland said, speaking at the annual State of the River meeting in Frisco, co-sponsored by the Colorado River Water Conservation District and the Blue River Watershed Group. Wineland commended Denver Water for its early Stage 1 drought declaration and urged the local water community in Summit County to get on the same page with conservation measures. An inconsistent response to the drought could send the wrong message to residents and visitors, he added.

While reservoir levels are still higher than average, many high country reservoirs aren't likely to get much fuller than they are now, said Bob Steger, manager of Denver Water's raw water supply. "My best guess is we won't fill Dillon Reservoir," Steger, said, pointing to a graph that suggested Dillon won't climb much above the level it was as of May 8.

More Blue River watershed coverage [here](#).

Posted on May 9, 2012 by Coyote Gulch

Posted in **Blue River Watershed**, **Climate Change**, **Colorado River Basin**, **Colorado River Water Conservation District**, **Colorado Water**, **Denver Water**, **Infrastructure**, **Instream flow**, **Snake River watershed**, **South Platte Basin**, **Transmountain/transbasin diversions**

[Leave a comment](#)

New Colorado Geological Survey study identifies geology as culprit for poor water quality in some headwaters streams

From the Summit County Citizens Voice (Bob Berwyn):



Frequently, acid rock drainage from natural sources and mine sites combine to cause severe downstream water quality problems. In these situations it is important to distinguish the natural, or background, water quality so that realistic clean- up goals for water quality can be set.

Peru Creek and the Snake River are a perfect example of this combination. The abandoned Pennsylvania Mine is thought to contribute a significant amount of acid mine drainage to water that is already tainted. As a result, the water downstream is toxic to trout and other aquatic organisms. Various agencies and groups have been wrestling with cleanup scenarios for decades.

The research explains that rocks in parts of Colorado's mineral belt were altered by intensely hot water circulating in the earth's crust, often associated with volcanic activity during Colorado's geologic past.

These hydrothermal alteration changed the composition of the rocks by dissolving some minerals and depositing others.

In the affected areas, the process deposited metal-sulfide minerals, commonly pyrite (fool's gold), in the rocks. When these rocks are exposed at the surface, they interact with oxygen and the iron sulfide "rusts" to form iron oxide minerals, creating striking yellow, orange, and red colors – similar to the oxidation of metal in an old rusty car.

Acid rock drainage occurs when the sulfur that is displaced by the oxygen combines with water to form weak sulfuric acid. The acidic water then dissolves minerals from the bedrock, often adding significant amounts of dissolved metals to these headwater streams. Natural acid rock drainage has been active in Colorado for thousands, possibly millions of years.

More water pollution coverage [here](#).

Posted on **November 21, 2011** by **Coyote Gulch**

Posted in **Blue River Watershed, Climate Change, Colorado River Basin, Colorado Water, Groundwater, Peru Creek Basin, Restoration/reclamation, Snake River watershed, Water Pollution**

Colorado Division of Reclamation, Mining and Safety officials are exploring the Pennsylvania Mine to try to determine how to lessen acid mine drainage from Peru Creek into the Snake River

From the Summit Daily News (Janice Kurbjin):



The mine is among nearly 400 others in the area, but is the main target for stream improvements that don't involve actually treating the water — cost and liability assumed under current law inhibits a third-party treatment system. “We see a noticeable spike (in zinc concentrations) when Peru Creek runs by the Pennsylvania Mine,” said Ryan Durham, remedial project manager with the Environmental Protection Agency...

Some experts contend that the hillsides above Peru Creek are rich with metals that leach naturally, but most officials on this particular project agree that while there may be natural metal deposits occurring to make the creek a consistently uninhabitable place for fish, it's likely the mine is a big player in sending metals downstream and causing low pH in the water. Downstream, in the Snake River above the Dillon Reservoir, the water is diluted enough by clean stream inflows for fish to live and reproduce...

The proposed next step should allow further investigation of the amount of water that actually discharges from the mine (including groundwater sources), where and in what condition the water enters the mine, flow paths within the workings, and the accessibility of the mine's innards. The end goal is finding a feasible control remedy. Proposed solutions currently include building a bulkhead to

protect against surge events, sealing entry sources so clean surface water isn't contaminated and, separating clean water paths from dirty water paths to consolidate the waste.

More water pollution coverage [here](#).

Posted on **July 26, 2011** by **Coyote Gulch**

Posted in **Blue River Watershed, Climate Change, Colorado River Basin, Colorado Water, Peru Creek Basin, Snake River watershed, Summit County, Water Pollution**

[Leave a comment](#)

Snake River: Rising levels of zinc may be due to climate change

From the Summit Daily News (Janice Kurbjun):



Nearly 2,000 miles of waterways in Colorado are affected by acid rock drainage, said Diane McKnight, who co-authored the study. "Spring runoff is happening longer," Shaw said, which means the water runs slowly into the ground instead of along its surface in one spring melt. It passes over mineralized rocks, leeching the minerals into the streamflow as it moves. Crouch said the earlier snowmelt also means drier streambeds in September and October, which could increase metal concentrations. It's a smaller scale of what was observed during the 2002 drought, in which prolonged dry conditions allowed the harmful chemical reactions to occur in areas where water once was, and will be again.

More Snake River coverage [here](#) and [here](#).

Posted on **December 22, 2010** by **Coyote Gulch**

Snake River: Rising levels of zinc may be due to climate change

From [Science Daily](#):



The study focused on the Snake River watershed just west of the Continental Divide near Keystone, Colo., where CU-Boulder researchers have observed a four-fold increase in dissolved zinc over the last 30 years during the lowest water flow months, said Caitlin Crouch. Crouch, a master's degree student who led the study, said the high levels of zinc affect stream ecology, including deleterious effects on microbes, algae, invertebrates and fish. The team speculated the increased zinc concentrations may be tied to changes in groundwater conditions and stream flow patterns caused by climate change and the associated snowmelt that has been peaking two to three weeks earlier than normal in recent years, largely because of warming air temperatures. The result is lowered stream flows and drier soils along the stream in September and October, which increases metal concentrations, said Crouch. "While most of the talk about climate change in western waterways is about decreasing water quantities, we are evaluating potential climate influences on water quality, which is a whole different ball game," she said...

The zinc in the Snake River watershed is primarily a result of acid rock drainage, or ARD, which can come from abandoned mine sites along rivers or through the natural weathering of pyrite in the local rock, said Crouch. Sometimes enhanced by mining activity, weathering pyrite forms sulfuric acid through a series of chemical reactions, which dissolves metals like zinc and carries them into the groundwater. McKnight, also a fellow of CU-Boulder's Institute of Arctic and Alpine Research, said there are nearly 2,000 miles of waterways in Colorado affected by ARD...

The elevated zinc in the Snake River comes from several ARD sources, said Crouch. Crouch's study site — where an increasing trend in zinc concentrations is sustained by groundwater discharge — is above the Peru Creek tributary to the Snake River, where natural pyrite weathering is thought to be the main source of ARD. Peru Creek is largely devoid of life due to ARD from the abandoned Pennsylvania Mine and other smaller mines upstream and has been a target for potential remediation efforts.

McKnight said another factor involved in rising zinc levels in the Snake River watershed — which runs from the top of the Continental Divide to Dillon Reservoir — could be the result of the severe 2002 drought in Colorado. The drought significantly lowered waterways, allowing more pyrite to be weathered in dry soils of the watershed and in wetlands adjacent to the stream.

More Snake River watershed coverage [here](#) and [here](#).

Posted on **December 19, 2010** by **Coyote Gulch**

Posted in **Blue River Watershed, Climate Change, Colorado River Basin, Colorado Water, Infrastructure, Instream flow, Peru Creek Basin, Restoration/reclamation, Snake River watershed, Water Pollution**

[Leave a comment](#)

The Colorado River District is kicking off a grant program for water resources projects

From email from the Colorado River Water Conservation District (Martha Moore):



The Colorado River District is accepting grant applications for projects that protect, enhance or develop water resources within the 15-county area covered by the District. This includes all watersheds in north- and central- western Colorado, except the San Juan River basin.

Eligible projects must achieve one or more of the following:

- develop a new water supply
- improve an existing system
- improve instream water quality
- increase water use efficiency
- reduce sediment loading
- implement watershed management actions
- control tamarisk
- protect pre-1922 Colorado River Compact water rights

Past projects have included the construction of new water storage, the enlargement of existing water storage or diversion facilities, rehabilitation of non-functioning or restricted water resource structures and implementation of water efficiency measures and other watershed improvements. Such projects that utilize pre-1922 water rights will be given additional ranking priority over similar projects that do not. Each project will be ranked based upon its own merits in accordance with published ranking criteria.

Eligible applicants can receive up to a maximum of \$150,000 ((or approximately 25% of the total project cost whichever is less, in the case of smaller projects this percentage may be slightly higher) for their project. The total grant pool for 2011 is \$250,000. Application deadline is Jan. 31, 2011.

More Colorado River basin coverage [here](#).

Posted on **December 1, 2010** by **Coyote Gulch**

Posted in **Blue River Watershed, Castle Creek Watershed, Climate Change, Colorado River Basin, Colorado Water, Conservation, Crystal River, Dolores River Watershed, Eagle River Watershed, Fraser River, Fryingpan Watershed, Gore Creek Watershed, Gunnison River Basin, Peru Creek Basin, Roaring Fork Watershed, San Miguel Watershed, Snake River watershed, Uncompahgre River Watershed, White River Basin, Yampa River Basin**
[Leave a comment](#)

Summit County: Education in Action program

From the Summit Daily News (Drew Anderson):



The program aims to engage students in the process of dealing with a socio-environmental issue from varying points of view. In this instance, students learned about mining and water quality issues surrounding the Pennsylvania Mine and the Snake River Watershed...

After learning about the issue, students were accompanied by Keystone Science School educators to local bodies of water such as French Creek, Miner's Creek and Tiger Dredge to take water samples. Students tested the samples for heavy metals or abnormal pH levels and compared their results to samples tested by Colorado Mountain College. Field work proved to be the students' favorite part of the program. "Going out and testing the water was the best part," said SMS student Elle Dice. "It was kind of cold, but it was fun." [...]

After reviewing the results, students played the parts of stakeholders to the Pennsylvania Mine situation. Roles included county commissioners, biologists, environmental protection agency representatives and Montezuma residents, among others. In a mock town hall meeting, the students recommended a solution based on the perceived motivation of their stakeholder role. The students widely agreed that bioremediation — the use of natural filtration systems to absorb heavy metals — was the best solution to the problem. Next spring some of the students will return to the creeks from

which the samples were taken to plant willow seeds and enact other forms of bioremediation to the affected water flows...

For more information about the Keystone Science School and the Education in Action program, visit www.keystone.org/cfe/kss or e-mail Miller at dmiller@keystone.org.

More education coverage [here](#).

Posted on **November 24, 2010** by **Coyote Gulch**

Posted in **Blue River Watershed, Climate Change, Colorado River Basin, Colorado Water, Education, Peru Creek Basin, Snake River watershed, Water Pollution**

[Leave a comment](#)

Denver Water's proposed rate increases attract the focus of councillor Jeanne Faatz

From The Denver Daily News (Peter Marcus):



The Board of Water Commissioners will hold a public hearing on Wednesday, as well as again next Wednesday, before voting on the proposal. The plan calls for an average increase for next year of \$41 per year for Denver customers, or an increase of about \$3.40 per month. The increase would be more than 10 percent for next year and comes as Denver Water officials warn that consumers may see an increase of 31 percent over the next three years. If approved, the increased water rates would take effect in March 2011.

Suburban residential customers would see an average increase of about \$2.66 per month, or about \$32 per year.

The proposal has already made a splash with Denver City Council members – but not the kind of splash that Denver Water would have liked. In addition to raising concerns over the impact a rate increase could have on constituents, Councilwoman Jeanne Faatz took the opportunity last month to raise questions over the organization of the Denver Water board itself.

Currently, the Board of Water Commissioners is a five-member board that is appointed by the mayor of Denver. Faatz questioned whether it wouldn't be a better idea to switch to a board that is elected by the people, to perhaps better represent the interests of voters.

“Our same people are paying these rates and they have definitely let us know that they are not interested in increased taxes and we have tried to listen to that and be responsive, and they're not interested in higher fees, and yet you all just pretty much as an enterprise get to set what you set and charge them,” Faatz told Denver Water officials at a City Council briefing last month.

More Denver Water coverage [here](#).

Posted on **November 12, 2010** by **Coyote Gulch**

Posted in **Blue River Watershed, Cherry Creek Watershed, Climate Change, Colorado River Basin, Colorado Water, Denver Water, Eagle River Watershed, Fraser River, Green Mountain Reservoir, Gross Reservoir Expansion Project, Infrastructure, Instream flow, Snake River watershed, South Platte Basin, Summit County, Transmountain/transbasin diversions**

[Leave a comment](#)

William Bergman (Snake River Water District) receives 2010 Distinguished Board Member Award from The Special District Association of Colorado

From the Summit Daily News:

The award was announced at the SDA Annual Conference which was held in Keystone, September 22-24. Bill has been instrumental in supporting policy implementation for the District which pertains specifically to the District's water rights and future water supply. Bill supports district administrators by striving to keep water rates affordable while encouraging capital projects that increase the quality of service. When asked to share their feelings about Bill, the District staff said, "Bill is a remarkable Board member. His ability to discern a solution, render advice with inflection and simplify a problematic situation makes working with him a pleasure. Under no circumstances does Bill convey judgment or carry a personal agenda into the boardroom. Bill brings a sense of humor into any conversation which incites just the right amount of comic relief into a complex discussion. Bill leads from the wisdom he has obtained throughout a lifetime of legal and business knowledge, service to his community and personal experience."



More Snake River watershed coverage [here](#).

Posted on **October 12, 2010** by **Coyote Gulch**

Posted in **Blue River Watershed, Colorado Water, Snake River watershed**

[Leave a comment](#)

Saguache County: The EPA and Trout Unlimited reach agreement for cleanup on Kerber Creek

From the Summit County Citizens Voice:



The cleanup agreement is for Kerber Creek, at the north end of the San Luis Valley, where Trout Unlimited and the EPA have struck a deal that will shield the conservation group from potential liability as it works to clean up mine tilings along a 17-mile stretch of the creek.

The agreement could serve as a model for similar projects in Summit County, especially in the Snake River Basin, where cleanup efforts have been stymied by strict Clean Water Act provisions that shift liability for any pollution releases after a cleanup to the entity that does the work. The local **Blue River Watershed Group**, for example, is planning several projects similar to the work being done in the San Luis Valley.

Since 2008, Trout Unlimited and its partners have spent more than \$1.3 million on restoration efforts along Kerber Creek. Working with the Bureau of Land Management, Colorado's Nonpoint Source Program, the Natural Resource Conservation Service, and local landowners, the goal is to treat 60 acres of mine tailings using lime, limestone and compost, and to restore the stream for fish and wildlife habitat. "Thousands of miles of headwater streams in the West are either threatened or dead as a result of historic mining pollution, and without Clean Water Act liability protection, Good Samaritans' hands are tied," said Russell. "If they try to treat the draining water to remove metals and improve water quality, they become liable for that water for ever. That's a risk no entity has yet been willing to take."

More restoration coverage [here](#).

Posted on **August 26, 2010** by **Coyote Gulch**

Posted in **Blue River Watershed**, **Climate Change**, **Colorado Water**, **Peru Creek Basin**, **Rio Grande Basin**, **Snake River watershed**, **Summit County**, **Water Pollution**

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Restoration: Should the Pennsylvania Mine in the Peru Creek Basin become a superfund site?

From the Summit County Citizens Voice (Bob Berwyn):



Reclamation experts with the federal agency's regional office say a Superfund designation could be the best way to get the money needed for a comprehensive cleanup, but some local officials aren't sure they want the environmental stigma of a Superfund site in their backyard — or a massive industrial water treatment facility and a major service road in the Peru Creek backcountry, which has been the focus of long-term open space preservation efforts...

But focusing resources through the Superfund program could be the best, and maybe the only option to do some sort of meaningful remediation in the tainted basin, especially as some of the latest studies show continued degradation of water quality. "In certain months, the peak concentrations for metals have been increasing ... They're creeping up and we don't know why," said U.S. Geological Survey researcher Andrew Todd. "Right now, it's just looking at dots on a plot," he said...

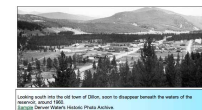
Most of the metals pollution in the Snake comes from Peru Creek, both from abandoned mines in the basin, as well as from natural sources, as water trickles over highly mineralized rocks. Concentrations are so high that Peru Creek is biologically barren, with no fish or aquatic insects in the tainted water. Even several miles downstream at Keystone, the concentrations of metals exceed state and federal limits set to protect aquatic life. The pollution in Peru Creek is so intense that there's probably little chance of establishing a self-sustaining fishery directly in that tributary. Even with a cleanup at the Pennsylvania Mine, many other sources of pollution, including natural ones, remain. "I think even with a cleanup, you'd have a biologically dead situation up there," said Steve Swanson, head of the Blue River Watershed Group...

But at least some of the experts are convinced that they could design and build a functional treatment system that would reduce metals loading downstream, with the ultimate goal of establishing some sort of self-sustaining fishery in the reach from Keystone downstream to Dillon Reservoir.

More Peru Creek Basin coverage [here](#) and [here](#).

Summit County, Keystone Resort and Denver Water ink agreement for snowmaking supply

From the Summit Daily News (Julie Sutor):



The resort relies on water from the Roberts Tunnel, owned by Denver Water, to blanket its slopes in white every year through early-season snowmaking. Keystone is allowed to pump as much as 1,500 acre feet from the tunnel between Sept. 1 and March 31 each winter. Denver Water needs to make repairs on the Roberts Tunnel, which draws about 54,000 acre feet per year from Dillon Reservoir to supply municipal water to the Denver Metro Area. The tunnel is 50 years old and requires valve replacements at its east end — a project that must be performed while the tunnel is drained, thus rendering water unavailable for Keystone during construction. The repairs were originally scheduled to begin on Nov. 1 and last throughout the winter until April 4, 2011. “That would impact an entire season of Keystone’s snowmaking, which is essential to guarantee good snow by the holidays,” Summit County manager Gary Martinez said...

So Keystone and Summit County have negotiated a deal through which the resort will pay Denver Water \$120,000 to postpone work on the Roberts Tunnel until Dec. 16. The delay will allow Keystone to draw water through Dec. 15. Denver Water is still planning to finish construction by April 4, 2011, in time to capture spring runoff and fill reservoirs with water for summer use. The Keystone funds will cover the added costs of completing the project on a tighter timeline. In the event that construction isn’t done by the April deadline, and Denver Water loses the opportunity to store spring runoff, both Summit County and Keystone will make up for the deficits with water from Clinton Reservoir and Dillon Reservoir for up to three years. “This is an example of the county putting our

water portfolio to good use. It would be really tough for our revenue budget to have Keystone fall flat because of an inability to make snow,” Martinez said.

More Summit County coverage [here](#) and [here](#).

Posted on **July 30, 2010** by **Coyote Gulch**

Posted in **Blue River Watershed, Colorado River Basin, Colorado Water, Denver Water, Infrastructure, Snake River watershed, South Platte Basin, Transmountain/transbasin diversions**

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Snake River watershed: Hands on science project

Here's a [recap](#) of a recent science project that saw students scattering about 4 different sites in the Snake River watershed, from Bob Berwyn writing for the Summit Daily News. From the article:

Helped by teachers, parents and staffers from the Keystone Science School, about 100 students from Summit Middle School set up research stations last Friday around Keystone at four different sites to measure dissolved oxygen and zinc levels, look for aquatic insects and take other measurements...

To measure the speed of the river's flow, the students marked off a 50-foot section with red flags, then dropped apples into the water and used a stopwatch to time how long it took — about eight seconds — for the fruit to float downstream. During the next few weeks, the students will analyze the data in the classroom and put together a report of their findings, said science teacher Brian Richardson. Along with a hands-on lesson in scientific research methods, the students found out that there just isn't much life in the Snake River around Keystone. The students who were looking for bugs came up empty handed. Seeping from the abandoned mine upstream, concentrations of zinc and other metals exceed state and federal limits, in violation of the Clean Water Act...

The Pennsylvania Mine has been fingered as one of the main sources of pollution, but smaller mines in the basin, as well high levels of natural minerals, also contribute to the problem. The long-range goal is improve water quality in the Snake River to a level that could sustain a natural fishery, said Jean Mackenzie, an EPA researcher who has led recent federal cleanup efforts. Years ago, state environmental experts and local volunteers teamed up to try and treat the water with some man-made wetlands and a passive treatment system, but the scale of the problem overwhelmed those efforts...

The current focus is on trying to pinpoint exactly how the polluted water flows through the Pennsylvania Mine and from other polluted drainages in the area. Some of the most polluted water could be diverted away from Peru Creek, experts said. Another option is to move some of the waste rock from the mine away from the water to reduce the amount of pollution reaching the stream.

More Peru Creek Basin coverage [here](#) and [here](#).

Posted on **October 1, 2009** by **Coyote Gulch**

Posted in **Blue River Watershed, Colorado Water, Education, Peru Creek Basin, Snake River watershed, Water Pollution**

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Summit County: Peru Creek Basin cleanup

Check out the [photos](#) from the Peru Creek Basin and Snake River from the *Summit Daily News*. From the article:

Currently, a group of researchers with the U.S. Geological Survey, the U.S. Environmental Protection Agency and the Colorado Department of Public Health and Environment is experimenting with traceable dyes to pinpoint the path of the pollution. The work could help establish the best options for cleaning up Peru Creek and the Snake River. Options include diverting clean water flowing into

the mine, moving piles of waste rock away from the water and, ultimately, direct treatment of polluted water flowing out of the mine.

More Peru Creek Basin coverage [here](#) and [here](#).

Posted on **September 16, 2009** by **Coyote Gulch**

Posted in **Blue River Watershed, Colorado Water, Groundwater, Peru Creek Basin, Snake River watershed, Water Pollution**

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Peru Basin: Dye test starting September 9

From the Summit Daily News (Bob Berwyn):

State and federal experts will use three types of dye to trace water flowing through the abandoned Pennsylvania Mine, above Keystone near the headwaters of the Snake River...The Sept. 9 study will try to pinpoint underground pollution sources and identify ground water flow pathways that may be sources of water in contact with polluted...The study is expected to last approximately two years or until the dye has been observed in subsequent samplings from the monitoring locations.

More Peru Creek watershed coverage [here](#) and [here](#).

Posted on **September 3, 2009** by **Coyote Gulch**

Posted in **Blue River Watershed, Colorado Water, Peru Creek Basin, Snake River watershed**

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Peru Creek Basin: Efforts at restoration paint a costly and complicated picture

Many Colorado water watchers were hoping that the restoration work up in the Peru Creek Basin would be a successful demonstration project for good samaritan efforts at mine cleanup. What has been shown is that restoration projects related to past mining activity are complicated and costly. Current estimates for cleaning up the runoff and drainage in the basin is at \$20 million. Here's a [report](#) from Bob Berwyn writing for the Summit Daily News. From the article:

That amount includes construction and annual operations and maintenance for as long as 20 years, but it's still much higher than expected. When Trout Unlimited entered the picture, there was speculation that a treatment plant could be built for under \$1 million. "All the work that's been done up there paints a much more dire picture of what we need to do," [Trout Unlimited's Liz Russell] said. He said the stakeholders working on the cleanup had also hoped that Congress would have passed some Good Samaritan legislation by now. Such a liability limiting law would have eased the cleanup process by enabling a nonprofit to work on remediation without fear of being pinned with responsibility for the cleanup work forever.

One option that's not on the table anymore is a Superfund designation for the Pennsylvania Mine. EPA officials previously suggested a Superfund listing would loosen up federal funding for a cleanup. But county officials were not keen on the idea of Superfund status for the mine, preferring to explore alternate options instead.

This summer, some of the research at mine is focused on treating other sources of pollution in the area besides the mine itself. State and federal experts are teaming up to find sites for repositories, where some of the mine waste could be stored in a place where running water can't get to it. That could help reduce metals-loading into Peru Creek.

The Snake River is showing signs of making a comeback. From the sidebar to the article linked above:

*Latest survey shows promising signs of recovery
Trout populations in the Snake River appear to be making a comeback after a surge of pollution two years ago all but wiped out most of the fish. Colorado Division of Wildlife biologists recently surveyed a stretch of the river running through Keystone Resort and found evidence that some rainbow trout survived over the winter.*

More Peru Creek Basin coverage [here](#).

Posted on **August 15, 2009** by **Coyote Gulch**

Posted in **Blue River Watershed, Climate Change, Colorado River Basin, Colorado Water, General Mining Act of 1872, Peru Creek Basin, Restoration/reclamation, S.796, Hardrock Mining and Reclamation Act of 2009, Snake River watershed**

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