

Snake River Watershed Task Force (Colorado) Points to Successful Collaborative Model for Abandoned Mine Reclamation

Stakeholder group worked together for two decades to overcome liability, funding, access, and other challenges to address water quality in one of the state's most impaired watersheds

Of Colorado's over twenty-three thousand inactive mines, the Pennsylvania Mine was long considered one of the most problematic and water-polluting. The Pennsylvania Mine was the largest manmade contributor of acid drainage to one of the state's most damaged watersheds. The story of how nearly a dozen organizations worked together on the cleanup provides valuable lessons for others doing abandoned mine reclamation.

The Pennsylvania Mine lies about 7 miles east of Keystone Resort, 4 miles from Arapahoe Basin Ski Area, 2 miles south of the twin 14ers Grays and Torreys, and just under the towering Continental Divide. Prospectors discovered silver in this area in 1864. In less than a century of digging up silver, gold, lead, copper and zinc and blasting apart rock that had barely moved for millennia, the miners left damage that will last an unknown number of generations. The Pennsylvania Mine, along with dozens of other nearby mine sites, adds toxic levels of heavy metals and acidifies the water flowing into Peru Creek, a tributary of the Snake River, which flows through the resort of Keystone into Dillon Reservoir.



Pennsylvania Mine, Level C Workings (Source: EPA)

Contaminants include aluminum, cadmium, copper, iron, lead, manganese, and zinc, and exposure to high concentrations of these metals can cause irreversible health problems in aquatic animals. Below the Pennsylvania Mine, Peru Creek is devoid of fish, insects, and other aquatic life, a condition that may be due in part to both mine impacts and background (non-mining) associated metals drainage in the Peru Creek watershed. Farther downstream, the Snake River's lower reaches have life, but it is limited in both diversity and abundance, and the fish there must be stocked.

Current environmental regulations require those conducting mining to repair damage to mountains and streams and address the production of acid drainage. But these laws don't make it easy to clean up old abandoned mines, where those who caused the pollution are long gone and can no longer be held responsible. An unintended consequence of the Clean Water Act legislation is the extensive liability risks to agencies and environmental groups interested in doing water quality improvements — effectively preventing voluntary cleanups. In 2000, after years of studies on mining impacts to the watershed, a group of stakeholders formed the Snake River Watershed Task Force to collaboratively explore

and implement the most promising strategies for reducing heavy metal concentrations.

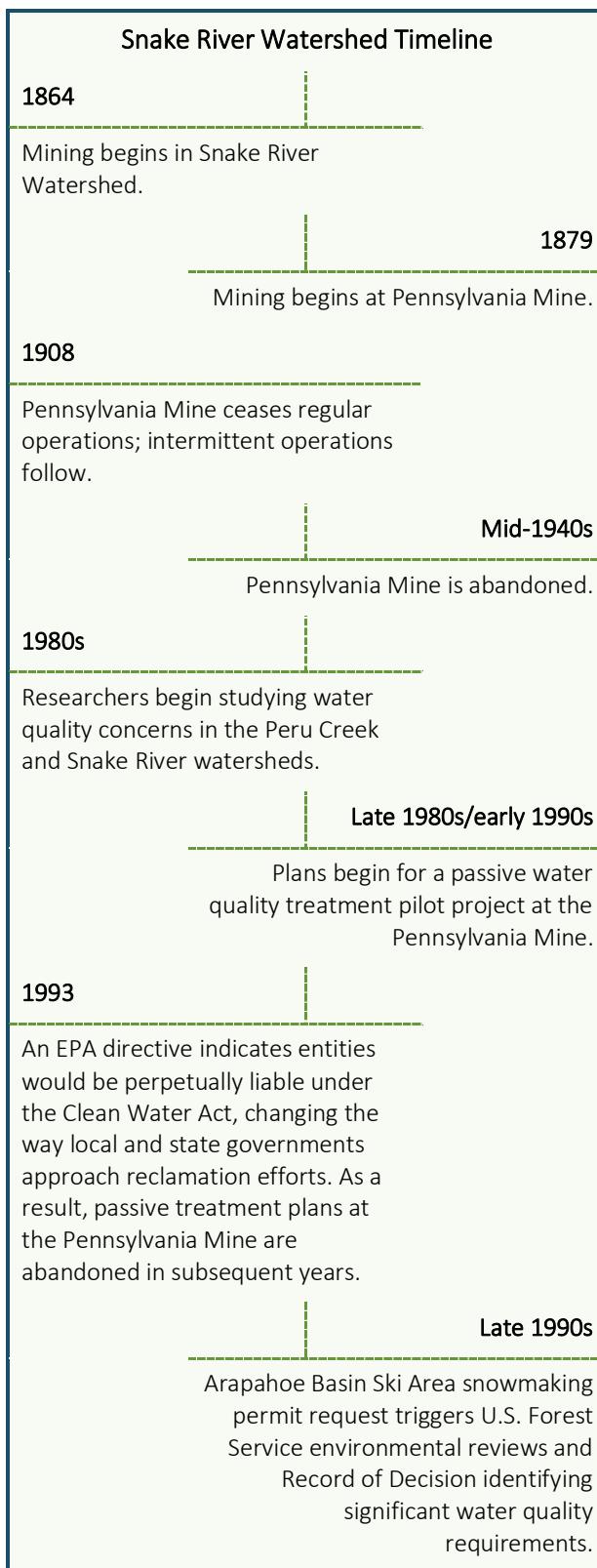
The group included representatives from the *U.S. Environmental Protection Agency (EPA); U.S. Geological Survey (USGS); U.S. Forest Service (USFS); Colorado Division of Reclamation, Mining, and Safety (DRMS); Colorado Department of Public Health and the Environment (CDPHE); Colorado Parks and Wildlife (CPW); Northwest Colorado Council of Governments (NWCCOG); Summit County Open Space and Trails; Trout Unlimited (TU); and local community members and ski areas.* Task force members hoped to improve conditions enough to create a sustainable fishery in the Snake River.

The task force started by reviewing studies and prioritizing the biggest sources of contaminants. The group implemented some remediation projects in the 2010s — capping mine tailings, redirecting water, and adding limestone treatments — but avoided addressing the problem of draining adits, particularly the Pennsylvania Mine.

The task force's biggest challenges were complexities with the mix of private and public ownership, disagreements about a Superfund listing, concerns about perpetual liability from treating an adit discharge, funding, questions about the cost of reclamation and resultant benefit, and access issues in a remote high altitude setting with no power source. The way this stakeholder collaboration overcame these challenges offers a model for other groups in Colorado and beyond.

Finding Solutions Collaboratively

The mine sites in the watershed were mostly privately owned and surrounded by national forest. Some mine claims are managed by the county as protected open space. The EPA's Paul Peronard said, "Everybody comes into this with their own authority, their own financial constraints, and their own sort of operating culture, so putting it together as a team and



getting that right is not always easy.” However, involving all possible stakeholders from the beginning became foundational to the collaboration’s success. More organizations involved meant more resources available for expertise, funding, and even hands in the field. “If one entity is strapped, others can help,” said

Lauren Duncan, of TU, adding that “reaching out to learn from each other is very valuable and hopefully saves some time.” The task force’s approach also meant it could take advantage of its members’ different strengths, such as collecting and analyzing data, bringing in funding, representing the wishes of the local community, making the land more available through environmental covenants, executing specific aspects of the remediation, and communicating with the public. The EPA’s Peronard said, “You get the best of everybody.”

In the late 2000s, the EPA advocated to designate the Pennsylvania Mine as a Superfund site. This would have given the EPA control, and some task force members said the process would have been more straightforward. However, local leaders fought the designation. They were concerned about the EPA’s timeline and perpetual involvement in the site, along with the potential for a stigma that would discourage hiking, biking, and camping. County officials wanted to retain some local control and preserve the area’s backcountry character, so ultimately all parties chose to continue addressing the cleanup through the task force’s collaboration and through alternatives to Superfund listing.

Without Superfund designation, a big task force challenge was ensuring all of the organizations involved in the cleanup had sufficient liability protection. Again, involving all the stakeholders early helped address this by creating a shared sense of ownership of the cleanup actions taken. Brian Lorch, with Summit County Open Space and Trails, said that reduces the likelihood any party later sues under the Clean Water Act. Jeff Graves, of DRMS, said with this collaborative

Snake River Watershed Timeline

2000

Snake River Watershed Task Force forms to improve water quality in the Snake River Watershed.

2007

Pennsylvania Mine blowout kills fish miles downstream in Keystone.

2009

USGS study breaks down the mineral contributions coming from the watershed’s abandoned mines.

2010-2014

Partners implement additional clean-up activities in Peru Creek watershed at Silverspoon, Delaware, and Brittle Silver mine sites.

2012

Road improvements start so partners can better access the Pennsylvania Mine site.

2013

At least seven smaller blowouts discolor Peru Creek.

2014

High spring runoff destroys part of the access road. Partners rebuild it. First bulkhead installed in the Pennsylvania Mine.

2015

Second bulkhead installed in the Pennsylvania Mine.

2017

Jumbo Mine remediation completed.

2020

Monitoring from 2009-19 shows improvements of some of the heavy metal concentrations below the Pennsylvania Mine.

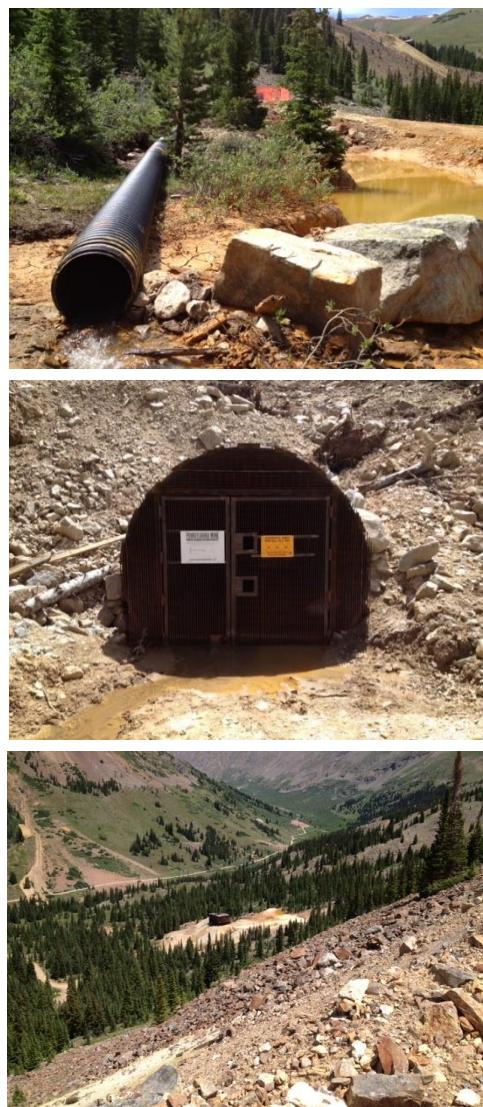
approach “you can share the success and the potential failures, so it benefits everyone in that way. ... You’re not going to throw someone under the bus, which adds a level of comfort for people to be involved ... [and] made individuals more willing to participate because of shared risk.” The EPA utilized a creative approach to providing a liability release mechanism which allowed DRMS to treat water without a permit. Peronard said, “Part of our role was to sort of give an umbrella for everybody to do their part.”

The county also helped reduce legal risk by buying the mine sites from the private property owners to protect as undeveloped public land. Lorch said, “We’ve entered into agreements such that when the property is cleaned up we’ll be future owners of it, which has given the owners the comfort they need” to allow water treatments and other remediation work. Duncan and her TU colleague Jason Willis noted the importance of being able to access different funding sources through the task force’s diverse membership and contribute more funding to the project. Willis said, “Always have more money than you think you need.” The Pennsylvania Mine cleanup cost about \$3.5 million, including about \$1.8 million contributed by the EPA and \$1 million from the state.

The scope of funding and liability protections needed, Graves said, mean longer timeframes for these types of projects. Lane Wyatt, with NWCCOG, said every aspect takes patience, from building the relationships, conducting the studies, and developing the supporting information to designing the engineering for a complex project and finding the money. Duncan agreed and stressed patience as her top key to success. Peronard connected the long project timelines to the importance of involving all stakeholders early, noting that “the good and the bad about mining sites is you most likely have time to get everybody involved.”

With so many stakeholders participating, another significant challenge was agreeing on the end goal and the metrics of success for improving water quality. Studies have pointed to

high enough metal concentrations caused by the natural geology — regardless of human mining or reclamation activity — to prevent fish from spawning and living in Peru Creek. The Snake River, however, should be able to sustain fish after remediation work upstream. The task force decided this would be its goal and it would monitor to see if its upstream efforts reduced heavy metal concentrations and loads. Peronard said, “It’s much easier when you have an end game in mind to then divvy up work and figure out who’s going to do what.”



Pennsylvania Mine, Level F Water Management (top), Level F Portal (middle), View of Level F from Level C (bottom) Source: EPA

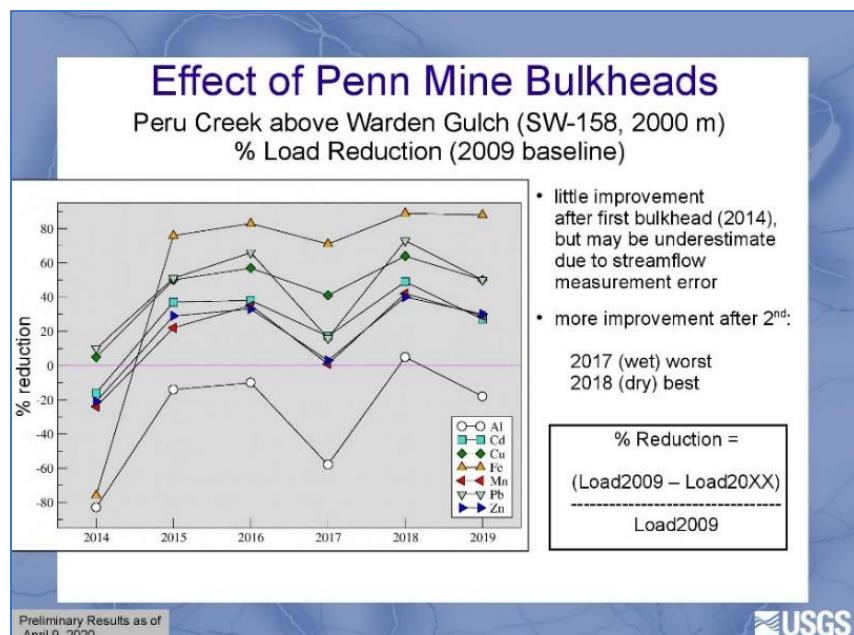
Monitoring through 2019 has shown substantial reductions in copper, iron, and lead loads and smaller reductions for several other metals below the cleanup work at the Pennsylvania Mine. The water's acidity has decreased but less than predicted. The task force has grappled with recent data that indicates large natural sources of metals may mean water quality standards for most of the metals will never be met in the watershed. Task force members noted that it may take many years, maybe generations, to understand the impacts of the cleanup work and to see significant improvements in the water quality. Still, members overwhelmingly felt the collaboration has been successful. Wyatt said the bigger Pennsylvania Mine project enabled smaller projects on other mine sites in the watershed. Rob Runkel, with the USGS, said, "Even if we're not improving the water quality all the way down, there's still a benefit in preventing the bigger releases." The Snake River hasn't seen any blowouts causing fish kills or discoloring the water since the Pennsylvania Mine's first bulkhead was installed in 2014.

The Pennsylvania Mine is on a steep slope at nearly 11,000 feet, and the watershed's high altitude and rocky backcountry terrain have presented unique challenges. The area is covered in snow most of the year, prone to avalanches, and accessed via one rough road in the summer and early fall. At the same time, the watershed's scenery and proximity to the Front Range attracted researchers from Colorado's universities and made travel easy and desirable for task force members based in Colorado's biggest cities. The watershed's location in Summit

County was also helpful because the county is affluent, has mine expertise, and is focused on environmental protection.



Inspecting the bulkhead shortly after pouring (Source: EPA)



When the task force's conversation turned to improving the access road to the Pennsylvania Mine, county officials objected because the local community didn't want to draw more recreators and developers to the area and an improved road would be expensive to maintain. The task force was able to find a solution by splitting the cost of improving the access road between the county and the EPA and deciding to improve the road only to the mine and then not maintain it after the project ended. In 2014, the year the first bulkhead was scheduled to be installed at the Pennsylvania Mine, high spring runoff washed away a significant chunk of the access road and a bridge, threatening the project. The county and the EPA partnered to rebuild the road and bridge and kept the cleanup on

track. Peronard said the project came in on time and under budget despite the road troubles.

That could be in part because of the individuals in the collaboration, who have largely stayed the same. Runkel said, “If you don’t have people there year after year, you’re continually starting over.” Other task force members agreed that the consistency of participation was helpful. Beyond that, members highlighted the importance of engaging individuals who approach with cooperative attitudes and are focused on solutions. Graves said, “Sometimes it’s not even agencies — having the right agencies at the table — it’s having the right people at the right agencies that are willing to move forward” and allow others “to take the lead in areas where they have particular expertise.” Peronard added that all the task force participants have been eager and willing to step back, look at the big picture, and be flexible with their needs, and he said these qualities were necessary to finish the project.

Finally, task force members said working with an independent third-party facilitator was another key to success. Several said the group’s facilitator, the Keystone Policy Center, kept members organized and focused and helped the group maintain momentum. “It really helped to have the task force and Keystone involved ... keeping track of things and maintaining communication between the stakeholders,” Wyatt said. “Having a central administrator was helpful.”

Keys to Success

- Involve all possible stakeholders from the start to share risk and develop a breadth of expertise and funding resources
- Engage individual stakeholder representatives who are willing to focus on solutions, think creatively, defer to others’ expertise, and learn from and help each other
- Expect a long timeline and have patience
- Use a third-party facilitator to keep the group organized and focused on next steps

Scaling the Approach

Ultimately, the task force’s collaborative approach has left a legacy beyond its cleanup efforts: it has redefined the way abandoned mine reclamation is done in other parts of Colorado and produced a replicable model for groups around the state and the country. Duncan called the approach “the future of how we do these cleanups and how we work better currently.” Other task force members called the collaboration groundbreaking for daring to jump into the liability quagmire and for pooling its resources to find funding, address risk, and share ownership of success. Willis said, “Relying on other people and other organizations that have expertise on certain things, or funding to do this, is really the way to do it, and the Snake River Task Force has done an excellent job over the years.” Colorado now has an ongoing statewide collaboration to address abandoned mine issues called the Mixed Ownership Group, and Graves said it uses a similar model as the task force.