

Snake River Watershed Task Force Core Team Meeting
USFS Region 2, 740 Simms St, Golden, CO 80401
October 29, 2015
Meeting Summary

Participants

Thomas Chapin (U.S. Geological Survey), Jeff Graves (CDRMS), Bill Jackson (U.S. Forest Service), Brian Lorch (Summit County Open Space & Trails), Ben McGee (U.S. Geological Survey), Paul Peronard (Environmental Protection Agency), Mark Rudolph (Colorado Department of Public Health & Environment), Rob Runkel (U.S. Geological Survey), Bill Schroeder (Environmental Protection Agency), Paul Semmer (U.S. Forest Service), Tim Steele (TDS Consulting, Inc), Andrew Todd (U.S. Geological Survey), Lane Wyatt (Northwest Colorado Council of Governments), Julie Shapiro (Keystone), Jonathan Geurts (Keystone)

Action Items and Next Steps

- See table below for site-specific action items determined as part of the Snake River Watershed Plan review.
- Data coordination and compilation - Rob Runkel will coordinate data on conductivity and heavy metals from multiple sources, compiling it with help from Andrew Todd and Ben McGee through the interagency agreement with EPA. The data compilation will be available for interpretation by all parties; Lane Wyatt and Tim Steele will help with interpretation.
- Watershed monitoring and assessment – Core team members will be working to develop a plan to transition from EPA-funded short-term monitoring to a long-term, low cost, equipment/conductivity-based monitoring approach for sampling in the watershed (including downstream of the Peru Creek confluence)
 - Ben McGee, Bill Schroeder, Thomas Chapin, Rob Runkel, Lane Wyatt, and Tim Steele will work together on this task
 - First step is to review conductivity and metal data
 - Second step is to develop an approach to test in the next 1-2 years, including sampling to flesh out correlations at sites, determining an appropriate number of sampling sites and intervals, and matching sites with the best equipment for each; EPA funding can support this phase as long as the phase points toward an EPA exist strategy for monitoring and helps support EPA clean up objectives
 - Third step is to implement long-term plan with identified funding
 - River Watch, Colorado Mountain College, or local high schools might be able to lend volunteers to gather measurements.
 - The Core Team will meet again in the February-April time window to review the compiled data. Keystone will schedule the meeting.
- EPA will update the Snake River Watershed map to include all of the sites mentioned in the Watershed plan, adding in an inset of the Pennsylvania Mine area.
- Lane Wyatt will compose a letter of support for the Jumbo Mine work for the SRTF Core Team to sign and send to the EPA.

Discussion Notes

Julie Shapiro led a brief round of introductions and reviewed the meeting agenda.

Pennsylvania Mine Update

Jeff Graves reviewed a graph of the water pressure changes behind the two bulkheads installed in the adit at F level. Both of the bulkheads are now sealed, and the pressure is currently 34 PSI indicating about 80 feet of head behind them. A data logger on the flume will continue to gauge the flow, which is currently 11 gallons per minute and appears to be coming through the rock vein structure. About half of this flow appears to be meteoric in origin and half from the pressurized pool within the mine. Injection wells and a bulkhead for C level are planned to finalize work on the Mine. Jeff has been walking the area and will continue to monitor the hillside for springs but at present has found none.

Paul Peronard reviewed the groundwork his team performed during the summer. The serpentine pond and three others outside the Pennsylvania Mine’s F-level portal have been retained. Areas around the F and C levels and the old mine site have been revegetated. Additional work has been done up Cinnamon Gulch to redirect mine drainage away from the waste rock pile. Above the Delaware mine, the team built an underflow-overflow macadam dam in an old mill pond and lined it, directing the outflow through limestone rock. This alteration has raised the pH of the flow a full point over previous levels. Paul anticipated starting work on the Jumbo mine in the summer of 2016.

Team members discussed the updates, reaching the following conclusions

- The USGS has conducted spring and fall sampling, including post-bulkhead synoptic sampling. Rob Runkel will distribute the results to the team via email as a spreadsheet when the lab is finished processing them.
- Both of the F-level bulkheads are currently operating at less than 5% of their design capacity and have the ability to back up water to level C, but it is not likely to happen. Nevertheless, a C-level bulkhead is a smart next step.
- The risk and damage associated with putting a bulkhead into the Jumbo Mine may not be worth the reward. An anoxic drainage system, which will settle out pollutants and raise the pH of the drainage, may be the best solution.

Presentation on Monitoring Technology

Thomas Chapin presented on high resolution automated water sampling and conductivity monitoring technology. MiniSippers gather 5 mL water samples, which are separated by N2 bubbles in a 500 foot length of tubing. They can be deployed for up to twelve months, cost about \$2500 each, and gather data that approaches to within 10% of agreement with EPA grab samples. In Peru Creek, conductivity tends to correlate closely to heavy metals. Therefore, a \$750 Hobo conductivity logger may be a more cost effective device for long term monitoring of key locations. To monitor locations where precise measurements don’t matter as much as reconnaissance for significant changes in pollutants, a Stream Temperature Intermittency and Conductivity (STIC) logger may be sufficient. A STIC is small, costs \$70, and can be affixed to the streambed with a zip tie and a section of rebar.

Review of Snake River Watershed Plan

Team members reviewed the status of work performed on Priority One sites listed in the Snake River Watershed plan. Their conclusions are listed in the table below.

Priority One Site	Work Status
<i>Pennsylvania Mine</i>	F-level bulkheads and site revegetation are complete. A C-level bulkhead and injection wells are planned. Long-term monitoring needs to be established.
<i>Jumbo Mine</i>	Surface control, e.g., an anoxic drainage system, is planned for installation the summer of 2016.
<i>Sts. John Mine</i>	Site alteration and revegetation has gone according to plan. A feasibility

	assessment may be undertaken next summer to redirect drainage to the other side of the hill, perhaps to Burke Martin mine (Jeff, Andrew)
<i>Blanche Mine</i>	A.K.A. BLMA 1 – The mine is on USFS land. To remedy, the drainage needs to be redirected around the waste pile. The EPA will contribute money for a removal assessment.
<i>Warden Gulch</i>	Most mines are dry, with one draining a high iron concentration at less than 5 gallons per minute. This team may need to catalogue the effect and leave it alone
<i>Delaware Mine</i>	Need to redo the pond, which could be added to Jumbo Mine work. The drainage rate of 10-15 gallons per minute is probably not large enough to justify other work.
<i>Brittle Silver Mine</i>	The drains that have been installed function well, but the hillside needs more of the same. This site needs to be added to the map.
<i>Silver Spoon Mine</i>	Done for the present. Drainage was redirected as a part of Cinnamon Gulch work, will monitor effects before evaluating the need for more work.
<i>Cinnamon Gulch</i>	Done for the present.
<i>Lancaster Mine</i>	Team members will ask Jim Shaw, Olivia Garcia, who know more, but a removal assessment is likely needed.
Additional Concerns	
<i>Upper Snake River above Deer Creek</i>	Diane McKnight and her student at CU Boulder have characterized the drainage. Most of the effect is from natural sources, which this group should seek to quantify but not fix.

Monitoring

Team members discussed the best approach to monitoring and assessment going forward. Comments included the following.

- The group identified the need to update the Snake River Watershed map and to compile data into a single platform (see next steps, above).
- The EPA can fund monitoring so long as it is linked to a clean-up project either in the future, in progress, or no more than two years in the past. The two years of follow-up measurement after the Pennsylvania Mine work might help to calibrate a collection of STIC instruments. Seed funding for ongoing measurement would be easier to secure if the group has a plan to continue measurement going forward.
- The group outlined phases for developing a long-term, low-cost monitoring (see next steps, above).

Other Updates

Team members offered updates from their own organizations. These included the following.

- Tim Steele will be presenting a comparison between monitoring on Clear Creek and the Snake River at the American Water Resources Association meeting in Denver on November 18th.
- The Pennsylvania Mine public tour was a success. About ten members of the public attended, plus four more from academia, and members of the press.
- Thomas Chapin is working to establish a local volunteer monitoring program in Illinois Gulch near Breckenridge.
- Andrew Todd mentioned a new paper that observes fish switching from in-stream to out-of-stream (i.e. airborne, drop-in) food sources as water quality decreases.

- Bill Jackson announced that the USFS will find a suitable replacement to the Core Team for Brian Lloyd, who has retired.
- Brian Lorch let the team know of Summit County's intent to purchase the clean portions of the Jumbo Mine property from the current private owner, who will retain land immediately surrounding the adit.

Adjourn