



NPS

Soda Butte Creek: Before and After Reclamation

Soda Butte Creek

Soda Butte Creek is a mountain stream that flows from the Absaroka and Beartooth mountains northeast of Yellowstone National Park (NP) to meet the Lamar River in the park. The McLaren Mill and Tailings site near Cooke City, MT leached metals into Soda Butte Creek for more than 80 years. The Montana Department of Environmental Quality (MTDEQ) put the creek on the 303(d) list of impaired waters due to metal contamination from the abandoned mine.

The Cleanup

Between 2010 and 2014, MTDEQ's Abandoned Mine Lands Section completed a reclamation of the former mill and tailings site. They removed one-half million tons of mine tailings, treated 110 million gallons of contaminated water, and restored more than 1,500 feet of the Soda Butte Creek stream channel. The five-year reclamation cost about \$24.5 million; details of the cleanup can be found at <http://deq.mt.gov/Land/abandonedmines/mclaren>.

Highlights

- Soda Butte Creek was the most polluted stream entering Yellowstone National Park due to metal contamination from the abandoned McClaren Mine site.
- NPS and MTDEQ monitored water quality in Soda Butte Creek following reclamation of the McClaren site and restoration of the main creek channel.
- Soda Butte Creek will be the first Montana water body to be removed from the 303(d) impaired streams list following the successful reclamation of an abandoned mine.



Soda Butte Creek downstream of the McLaren tailings impoundment in 2008 shows contamination by orange-colored iron (left) that is not evident in 2013 (right) following the cleanup. TOM HENDERSON/MTDEQ

Water Quality Monitoring

Following the cleanup, National Park Service and MTDEQ scientists regularly monitor water quality in the upper Soda Butte Creek basin. Specific objectives of the project are to

1. compare metal concentrations from a location downstream of the McLaren site before and after the completion of reclamation work,
2. inventory metals throughout the upper Soda Butte Creek drainage to determine basin-wide water quality, and
3. assess sediment chemistry in Soda Butte Creek and tributaries to consider other sources of metals after the reclamation.

History

1869 - Prospectors found gold near Soda Butte Creek



1882 - Cooke City, MT platted and named after Jay Cooke, Jr.



1988 - Historic fires heightened concern over McLaren site threats to Yellowstone River



2000 to 2010 - Pre-reclamation water quality monitoring by USFS



2010 to 2014 - McLaren Mill Tailings reclamation completed by MTDEQ



1861-1870	1871-1880	1881-1890	1891-1900	1901-1910	1911-1920	1921-1930	1931-1940	1941-1950	1951-1960	1961-1970	1971-1980	1981-1990	1991-2000	2001-2010	2011-2020
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1872 - Yellowstone National Park established March 1 by President Ulysses S. Grant



1934 to 1953 - McLaren Gold Mine Mill operation



2015 to 2016 - Post-reclamation water quality monitoring by NPS and MTDEQ



2018 - Delisting of Soda Butte Creek from the MTDEQ 303(d) list (pending public comment/EPA approval)

Timeline photos courtesy of MTDEQ, Cooke City Montana Museum, and NPS.

Water Quality Before

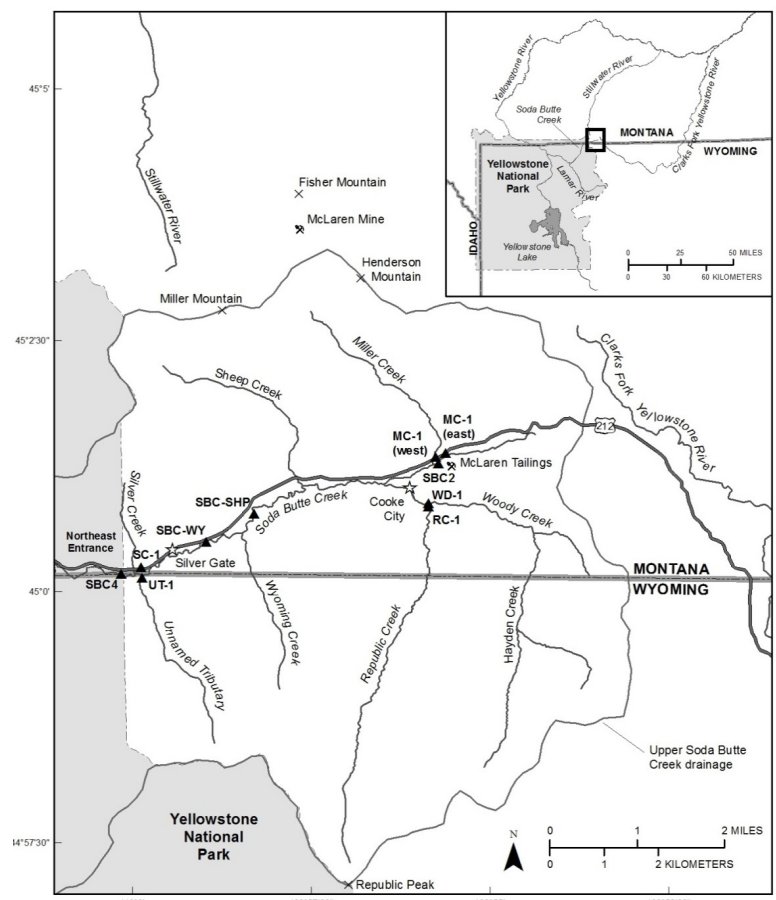
Between 2000 to 2010, water quality was assessed on 31 occasions in Soda Butte Creek below the former mill and tailings site (SBC-2 on map) and where it enters Yellowstone NP (SBC-4). Below the mill and tailings site levels of iron, copper, lead, and manganese regularly exceeded the Montana and US EPA's water quality standards. At the park boundary, exceedances of these metals were far less common.

Water Quality After

After reclamation, 11 sampling events (2015 and 2016) confirmed that metal levels (copper, lead, and manganese) below the former mill and tailings site (SBC-2) were well below the maximum allowed by state and federal standards. Copper exceeded standards only once. At the Yellowstone NP boundary (SBC-4), iron exceeded state standards on two occasions. Iron in Soda Butte Creek is readily traced to Woody Creek and an unnamed tributary (see map), neither of which has any identified mine-land disturbances. Iron entering the park in Soda Butte Creek now appears to be principally from natural geological sources.

Delisting

The reclamation of McLaren site and restoration of Soda Butte Creek is a milestone in water quality improvement. Based on our collaborative monitoring, MTDEQ determined that metal levels in the creek are much improved and largely meeting state and federal standards. Soda Butte Creek became the first Montana water body recommended for delisting from the 303(d) impaired waters list following the successful reclamation of an abandoned mine. Pending public review, and formal EPA approval, Soda Butte Creek will be officially delisted. NPS and MTDEQ will continue to assess water quality conditions at Yellowstone's northeast boundary and to carry out follow-up studies related to the successful McLaren Tailings Reclamation Project.



Upper Soda Butte Creek (SBC) watershed. Sampling locations. MC-1 east and MC-1 west (two forks of Miller Creek above the SBC confluence), SBC-2 (SBC below McLaren site), WD-1 (Woody Creek above Republic Creek confluence), RC-1 (Republic Creek above Woody Creek confluence), SBC-SHP (SBC below Sheep Creek), SBC-WY (SBC below Wyoming Creek), UT-1 (unnamed tributary near the Yellowstone NP boundary), SC-1 (Silver Creek), and SBC-4 (SBC at the Yellowstone NP boundary).

For More Information:

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Full Report:

https://www.nps.gov/articles/parkscience34-1_9-21_henderson_et_al_3871.htm