Slate Creek Draft TMDL Factsheet

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Division of Water

Slate Creek Antimony, Arsenic and Iron Draft Total Maximum Daily Loads (TMDLs) Summary Denali National Park and Preserve, Alaska

TMDL at a Glance

Waterbody of Concern:	Slate Creek, Denali National Park and Preserve Alaska
Alaska ID Number:	40510-003
Criteria of Concern:	Antimony, Arsenic and Iron
Designated Uses Affected:	(1) water supply, (2) water recreation and (3) growth and propagation of fish, shellfish, other aquatic life and wildlife
Major Source(s):	Historic Mining
Loading Capacity:	6 µg/L Antimony; 10 µg/L Arsenic; 1,000 µg/L Iron
Wasteload Allocation (WLA):	6 µg/L Antimony; 10 µg/L Arsenic; 1,000 µg/L Iron
Load Allocation:	6 µg/L Antimony; 10 µg/L Arsenic; 1,000 µg/L Iron
Margin of Safety:	Implicit
Future Growth:	None
Necessary Reductions:	96% Antimony, 86% Arsenic, 66% Iron

Total Antimony, Arsenic, Iron Measured as Water Concentrations (µg/L)[a]								
Waterbody	**Pollutant**	**Loading Capacity**	**Future WLA**	**LA**	**MOS**	**Future Growth[b]**	**Maximum Observed[c]**	**Percent Reduction to Meet LA**
Slate Creek	Antimony	6	6	6	Implicit	N/A	158	96%
	Arsenic	10	10	10	Implicit	N/A	69.9	86%
	Iron, dissolved	1,000	1,000	1,000	Implicit	N/A	2,980	66%

[a] Applicable water quality criteria for antimony, arsenic, and iron apply year round in Slate Creek; presented as micrograms per liter (µg/L).
[b] N/A = not applicable
[c] Maximum observed after August 2010, which is after the most recent National Park Service restoration activities.

What is the problem with Slate Creek water quality?

Slate Creek is a 2.2 square mile watershed located in Denali National Park and Preserve (DENA) approximately five miles west of Wonder Lake in interior Alaska. The State of Alaska first included Slate Creek on the Clean Water Act (CWA) section 303(d) list as impaired for turbidity in 1994. This original listing was associated with hard rock mining activities in the watershed, resulting in approximately four acres of disturbed area (USEPA 2013).

Subsequent restoration activities improved sediment and turbidity conditions in the watershed. Monitoring indicates that the creek is now meeting the turbidity water quality standard (Brabets and Ourso 2013) and DEC has proposed to remove Slate Creek from the 2012 303(d) list for turbidity (ADEC 2012a).

However, the monitoring effort identified exceedances of the antimony and arsenic water quality criteria. Therefore, the State of Alaska has included Slate Creek on its 2012 section 303(d) list as water quality-limited due to antimony and arsenic and identified the historic mining site as the expected pollutant source (ADEC 2012a). Subsequent data analyses indicated that iron also is not meeting water quality standards. The presence of elevated levels of

antimony, arsenic, and iron indicates the need for a Total Maximum Daily Load (TMDL) and additional restoration in the watershed.

Where does the antimony, arsenic and iron come from?

The upper portion of Slate Creek was the site of a hard rock mine for antimony that closed in 1983. The historic mine site and tailings piles are sources of antimony, arsenic and iron to Slate Creek through both surface and groundwater pathways.

The antimony at the Slate Creek mine was obtained from stibnite (Sb_2S_3) quartz veins. Arsenic and iron are present in the Slate Creek watershed due to pyrite (FeS_2) and arsenopyrite (FeAsS), which are commonly associated with stibnite.

In the Slate Creek watershed, mining was limited to hard rock mining (as opposed to the placer mining for gold that is prevalent in other areas of the Kantishna Hills). Throughout the area past hard rock and placer mining resulted in degraded water quality and riparian zones, mining waste, increased turbidity and heavy metals contamination.

What is a Total Maximum Daily Load (TMDL)?

A Total Maximum Daily Load (TMDL) identifies the amount of a pollutant that a waterbody can assimilate and maintain compliance with water quality standards. It is a "pollution budget" that sets limits on the contributions from anthropogenic pollutant sources to a waterbody. The TMDL includes inputs or loadings from discrete permitted sources, inputs from non-point sources, and a margin of safety. The margin of safety accounts for the uncertainty in the relationship between pollutant loads and the quality of the receiving water body.

A TMDL is established to meet the requirements of Section 303(d)(1)(C) of the Clean Water Act and the U.S. Environmental Protection Agency's regulation that requires the establishment of a TMDL for the achievement of water quality standards when a waterbody is impaired.

What pollution limits does this TMDL set?

The Slate Creek TMDLs are concentration based and set at the most protective water quality criteria. The TMDLs are set at 6 µg/L for antimony, 10 µg/L for arsenic, and 1,000 µg/L for iron. The waste load allocations (for the point sources) and load allocations (for nonpoint sources) are set equal to the concentration-based TMDL numeric targets. These TMDLs included an implicit margin of safety and, because future development is not expected within DENA, there is no reserve allocation for future growth.

When compared to the existing concentrations, necessary pollutant reductions ranged from 66 percent (%) to 96%.

How will the creek's water quality be improved?

The implementation focuses on preventing contaminated runoff from the mine site, management of the creek-bottom iron sediment load and restoration of the riparian area.

How can I learn more about this draft TMDL or make comments?

A public review and comment period for the draft TMDL is underway. Written public comments must be mailed, faxed, e-mailed, or hand delivered to the address below before 5:00 PM on May 21, 2014.

The draft TMDL is available on DEC's website at: http://dec.alaska.gov/water/wqsar/index.htm

or by contacting:

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Answers to commonly asked questions about TMDLs in general can be found on the DEC website at: http://dec.alaska.gov/water/tmdl/pdfs/Commonly_asked_questions_about_TMDLs_Final.pdf