

Mining Operations

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Recent Water Quality Changes in Northwest Alaska Observations from the Red Dog Mine Area

Michael Rieser

Teck American Incorporated

The water quality in Ikalukrok Creek, a major tributary to the Wulik River in the Northwest Arctic Region of Alaska, has changed significantly since summer 2018. High turbidity was observed in Ikalurkok Creek during the 2019 and 2020 flow seasons, and total dissolved solids (TDS) concentrations at surface water monitoring stations have increased significantly above historical levels.



Figure 2: Station 9 Ikalukrok Creek – July 2019 and July 2020 (ADF&G)

Teck Alaska Incorporated (Teck) routinely monitors surface water in Red Dog Creek and Ikalukrok Creek. During 2020 Teck expanded monitoring to include weekly water sampling from several locations on the Ikalukrok Creek drainage above the Red Dog Creek confluence, and conducted additional field reconnaissance in September. The objective of this monitoring and reconnaissance is to provide information to help identify the mechanisms contributing to the turbidity and elevated TDS in the Ikalukrok and Red Dog Creek watersheds.

Initial observations and laboratory testing of surface water samples indicate that total suspended solids concentrations remain low, suggest that mass wasting or erosion is unlikely to be a significant contributor to changes in water quality. Initial observations and laboratory analyses results indicate the TDS is primarily attributable to sulfate (60% and greater), with calcium, iron, manganese, and magnesium as other major components at percentages varying by location.

The elevated background TDS concentrations in both Red Dog Creek and Ikalukrok Creek have necessitated the reduction or curtailment of treated water discharge from the Red Dog Mine during significant parts of the historical discharge season in 2019 and 2020. This occurred when background TDS levels approached or exceeded regulatory limits at compliance points in Red Dog and Ikalukrok Creek, leaving no assimilative capacity for treated water discharge.

Unusual turbidity has been observed in other drainages in Northern Alaska, including tributaries to the Sag. Initial water sampling by the Alaska Department of Fish and Game indicate water in these areas has elevated iron, magnesium and manganese, and lowered pH levels. In the Northwest Arctic Region, elevated turbidity has been seen in upper regions of the Wulik River, as well as in the Kivalina River.

Late summer is when baseflow contribution to surface waters would be expected to be near a maximum, in particular areas in the upper drainage where taliks are either not present or limited in extent. The field reconnaissance during September 2020 found that tributaries to the Ikalukrok had significantly elevated TDS, as high as 5,000 mg/L, and pH levels as low as 3.

Additional work includes review of current research information on water quality change in the arctic in response to climate change, establishing continuous monitoring stations in the Ikalurkok drainage, and continuing ground temperature measurements in the West Fork Ikalukrok.



Figure 3: Upper Wulik River
August 2020 (NANA)



Figure 3: Canning River Tributary
September 2019 (ADF&G)