

Selenium in Fish Tissue

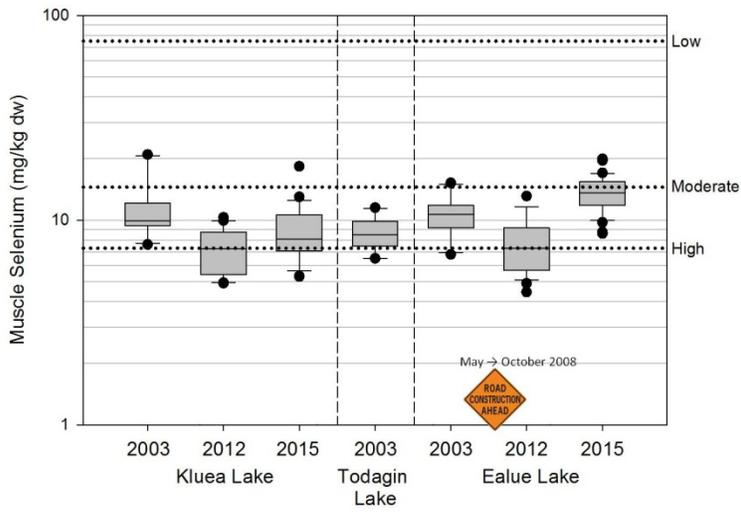
As part of the environmental studies for the Red Chris mine, researchers measure concentrations of elements in fish in Kluea and Ealue Lakes. These studies are conducted to document conditions prior to any potential mine-related changes. Because mines are often developed in areas with naturally high mineral content, the studies are an important part of interpreting the monitoring conducted after mining begins. Sampling is also conducted at reference sites so that changes in conditions in the environment not influenced by mining can be registered, which by extension helps in interpretation of effects that may be directly related to mining.

One of the elements monitored in lake fish is selenium. Selenium is an essential nutrient with known health benefits, but excessive intake can have negative health effects. British Columbia has health-based screening values for selenium to identify levels that may be of concern for low, moderate, and high consumption of fish by people. The BC Ministry of Health and local health authorities conduct an evaluation to determine whether further action is necessary when levels are greater than the screening values.

Studies in Ealue Lake (a reference site not directly affected by Red Chris mine) in 2012 and 2015 found that selenium in rainbow trout was elevated compared to other parts of the province (Figure 1). The average selenium concentration in rainbow trout fillet in Ealue Lake was 7.3 milligrams per kilogram on a dry-weight basis (mg/kg dw) in 2012 and 13.4 mg/kg dw in 2015. There is no known connection between mine development and selenium concentrations in Ealue Lake, so the difference between years is considered to be natural year-to-year variability. Concentrations of selenium in water were below BC water quality guidelines and were essentially unchanged from 2012 to 2015.

All fish sampled in both years were lower than the BC screening value for low fish consumption (75 mg/kg dw). All fish sampled in 2012 were also lower than the screening value for moderate fish consumption (14.5 mg/kg dw), although the maximum concentration measured in 2015 was greater than this screening value. In addition, some of the fish sampled in 2012 and all fish sampled in 2015 were greater than the screening value for high fish consumption (7.3 mg/kg dw). Comparison to the high fish consumption screening value is based on eating 220 grams (about half a pound) of fish per day, 365 days per year. It is important to note that concentrations higher than this screening value do not necessarily mean that a health risk exists – being above a screening value is a prompt to evaluate concentrations further. The BC Ministry of Health has been informed of these findings and will evaluate whether further assessment is necessary to ensure protection of people with a high-fish diet.

Red Chris mine and the Environmental Oversight Committee (joint committee of Red Chris and Tahltan) will continue to monitor selenium and other elements in water and fish around the mine, and will report back to the community with relevant findings.



Rainbow Trout sampled from Ealue Lake

Figure 1. Selenium concentration levels in fish muscle in area Lakes, compared to BC health screening values for low, moderate, and high fish consumption.

