

## SELENIUM IN FISH IN SCHIST LAKE

### QUESTIONS AND ANSWERS REGARDING FISH CONSUMPTION ADVICE

#### What is selenium and how can it affect my health?

Selenium is an essential trace element that plays a major role in the healthy functioning of all living organisms including animals and humans.

Selenium is found in many foods. Some foods rich in selenium include nuts (particularly Brazil nuts), fish (naturally occurring), fortified foods, pork, beef, turkey, chicken, cottage cheese, eggs, brown rice, sunflower seeds, baked beans, mushrooms, oatmeal, spinach, milk and yogurt, lentils, cashews, and bananas.

Not having enough selenium in the diet, termed selenium deficiency, can have significant negative health impacts. However, too much selenium in the diet or from supplements can also have negative health effects. Early health effects from too much selenium include: hair loss/thinning, fingernail changes, and skin changes/rashes. At higher levels of exposure or ongoing exposure there may be gastrointestinal upset, nausea, diarrhea, mental status changes, changes in sensation/neurologic symptoms, fatigue, weakness, increased reflexes, and unsteady gait. Negative health effects occur only with very high levels of exposure or ongoing exposure and symptoms generally resolve once selenium intake is reduced. Many of the symptoms listed above have other more common causes other than selenium excess and it is important to follow up with a healthcare provider to assess any symptoms of concern.

Cases of selenosis (health effects from too much selenium) have occurred in people taking selenium containing supplements in excess, through accidental ingestion of non-food products containing high levels of selenium, or in people who happened to live in an environment that had very high levels of selenium. Selenosis is rare in Canada/North America. However, the range between selenium deficiency and excess is relatively narrow. Humans need some but not too much selenium and being aware of dietary sources that may be higher in selenium is important.

Eating fish is a healthy choice when consumption advice is followed. Based on our current data, the risk of selenosis from eating fish from Schist Lake is low.

#### How did selenium get into the fish in Schist Lake?

For nearly 100 years, Hudbay Minerals Inc. (Hudbay) has owned and/or operated several mines within and in close proximity to Flin Flon, Manitoba.

Wastewater from the Hudbay mining complex is discharged into Flin Flon Creek which flows into Ross Lake, then Ross Creek, and further downstream into the northwest arm of Schist Lake.

Wastewater from the mining complex contains selenium and has likely contributed to an increase in selenium concentrations in fish in Schist Lake.

## **How many fish can I eat safely from Schist Lake?**

Manitoba is recommending that adults consume no more than four meals per month of any type of fish from Schist Lake where one meal is 227 grams (about the size of the person's hand).

Manitoba's advice is based on information from fish collected and tested from Schist Lake, guidance developed through the US Environmental Protection Agency, and in consultation of approaches taken in other provinces such as Saskatchewan.

## **What about children and pregnant individuals?**

Children and individuals who are pregnant are not known to be more sensitive to selenium. Children are smaller and their meal sizes will be smaller than an adult. As a rough guide, one meal of fish for a child is about the size of their hand.

## **Why is this fish consumption advice being issued now?**

Information from fish collected in Schist Lake suggests that concentrations of selenium in fish have increased over time and that concentrations in Schist Lake are higher than in a lake not impacted by the HudBay mining complex. This information was shared with the Manitoba Government in 2023. After analysis and comparison to fish consumption advice used elsewhere, and some additional fish collection, the Manitoba government is recommending that fishers should limit their fish consumption in Schist Lake to no more than four meals per month, regardless of species of fish.

## **How long will this fish consumption advice remain in effect?**

Manitoba is working closely with Hudbay to understand the sources of selenium and how to reduce concentrations in Schist Lake. Manitoba will also collaborate with HudBay to obtain additional data for Schist Lake. Interim fish consumption advice will be updated as additional information becomes available. In the meantime, people should limit their fish consumption in Schist Lake to no more than four meals per month.

## **What about selenium in other lakes in the Flin Flon area? Should I be concerned about eating fish from Lake Athapapuskow?**

Some information is also available on Lake Athapapuskow (downstream of Schist Lake) that suggests that selenium concentrations are elevated compared to historical sampling. However, the concentrations of selenium in fish from Lake Athapapuskow are lower than concentrations in Schist Lake, and risks do not warrant consumption advice at this time. Manitoba will collaborate with HudBay to obtain additional fish tissue data for Lake Athapapuskow.

## **What about other contaminants in Schist Lake? Are there other contaminants in fish that I need to know about?**

Some information is available on other contaminants that may be present in fish such as metals and trace elements (e.g., aluminum, cadmium, cobalt, copper, iron, lead, lithium, manganese, mercury, molybdenum, rubidium, strontium, and zinc). Results will be compared to consumption guidance and advisories will be provided as required.

### **Who regulates mining activities in Manitoba?**

Hudbay is regulated under the federal Fisheries Act (Metal and Diamond Mining Effluent Regulations) and provincially under The Environment Act.

### **When is selenium required to be monitored in fish?**

In 2018, the Government of Canada introduced the Metal and Diamond Mining Effluent Regulations which amended the 2002 Metal Mining Effluent Regulations. Among the amendments were new requirements to conduct studies of selenium in fish tissue as part of the environmental effect monitoring process, if:

- 'Effluent (defined as any seepage or surface runoff containing a deleterious substance that flows over, through or out of the site of a mine) characterization reveals a concentration of total selenium in the effluent that is equal to or greater than 10 µg/L,
- Effluent characterization reveals an annual mean concentration of total selenium in the effluent that is equal to or greater than 5 µg/L, based on a calendar year, or
- The method detection limit used in respect of selenium for the analysis of any effluent sample is equal to or greater than 10 µg/L, or the method detection limit used in respect of selenium for the analysis of at least two of four effluent samples in a calendar year is equal to or greater than 5 µg/L.'

Effluent discharged from the Hudbay mining complex exceeded 10 µg/L several times between 2018 and 2020, which triggered a study of selenium in fish tissue in the following environmental effect monitoring report per the Metal and Diamond Mining Effluent Regulations.

### **Can selenium be reduced in Schist Lake?**

Once selenium gets into a lake, it is difficult to remove. The first step is to reduce the amount of selenium released from mining activities and then, over time, natural processes and remediation technologies can help to reduce selenium concentrations. Ongoing monitoring of selenium in effluent, surface water, sediment, and fish tissue will be required to better understand trends over time and to develop options for remediation. Data provided by Hudbay indicates that, since 1995, average concentrations and loadings of selenium in wastewater effluent from the Flin Flon Tailings Impoundment System have declined, with the lowest levels measured in 2023.