Uranium City
Athabasca Working Group
Environmental Monitoring Program

CanNorth

AWG
2014
15 YEARS
Sampling in the Athabasca region since 2000
The Athabasca Working Group (AWG) environmental monitoring program marked its 15th year of sampling in the Athabasca region of northern Saskatchewan in 2014. The program provides residents with opportunities to test the environment around their communities for parameters that could come from uranium mining and milling operations. These parameters can potentially be spread by water flowing from lakes near the uranium operations, and small amounts may also be spread through the air. In order to address local residents’ concerns, lakes, rivers, plants, wildlife, and air quality are tested near the northern communities of Uranium City, Black Lake, Camsell Portage, Fond-du-Lac, Stony Rapids, and Wollaston Lake/Hatchet Lake.

The types of plants and animals selected, the locations chosen for sampling, and the sample collections were carried out by, or with the help of, northern community members. The purpose of this brochure is to inform the public of the results from the 2014 environmental monitoring program and look back on the results of the past 15 years of study in the Uranium City area.
STUDY AREA

Water, sediment, and fish were sampled from a reference waterbody and a potential exposure waterbody in the Uranium City area. Fredette Lake was chosen as the reference site because it is not influenced by uranium operations. Black Bay of Lake Athabasca (Black Bay) is referred to as the potential exposure site because it is located downstream of the active uranium operations in northern Saskatchewan. Air quality is monitored at two locations near the community of Uranium City and plant and wildlife samples are collected each year near the community when available.
The focus of the program is to monitor certain parameters related to uranium operations that are of concern to human and environmental health. These include: copper, lead, nickel, molybdenum, zinc, radium-226, uranium, selenium, and arsenic. All of these parameters occur naturally in the environment and in parts of northern Saskatchewan they can sometimes be found in high amounts.

In order to help establish whether the key parameter levels found in samples are naturally occurring, whether they may be from uranium operations, and whether they pose a risk to the environment, the amounts measured are compared: 1) between reference and potential exposure sites, 2) over time, and 3) to available guidelines.
Water

Water samples were collected in the spring and fall in Fredette Lake (reference) and Black Bay (potential exposure) in 2014. The levels of the key parameters were below the guidelines for the protection of aquatic life and drinking water quality. During the 15 years of sampling for the AWG program, the levels of key parameters have generally stayed the same. The graph below displays similar uranium levels from Black Bay since 2000. The uranium drinking water guideline is 20 micrograms per litre, which is more than ten times higher than any level found in Black Bay during AWG monitoring.
Sediment

Sediment is the mud on the lake bottom. Parameters from uranium operations may be carried by flowing water to lakes where they can be left in the sediment on the lake bottom. It is important to sample sediment because it is a good indicator of the general health of the aquatic ecosystem.

Sediment samples were collected from the same locations used for water sampling in the Uranium City area. Since the AWG program began in 2000, the levels of key parameters have generally stayed the same in Fredette Lake and Black Bay. In addition, the levels of the key parameters were below all available guidelines. As an example, the graph displays the low uranium levels measured in Black Bay from 2000 to 2014.
Fish are an excellent source of protein and high in vitamins and minerals including vitamin D. They are low in saturated fats and cholesterol and are a good source of omega-3 fatty acids\textsuperscript{1}. Samples of lake whitefish and northern pike were captured in Fredette Lake (reference) and Black Bay (potential exposure) in 2014. Often the key parameter levels were lower than the laboratory could measure. Furthermore, the levels of key parameters have not changed much since the beginning of AWG monitoring in the Uranium City area in 2000.

As an example, the graph displays the arsenic levels in both fish species captured in Black Bay from the last 15 years. There is no arsenic guideline; however, the graph shows consistently low levels since AWG monitoring began.

Mercury levels in northern pike greater than 80 cm from Fredette Lake have been naturally higher than other reference lakes in the AWG monitoring program in certain years, but were low in 2014. Though not related to uranium mining and milling, it is recommended that the “Mercury in Saskatchewan Fish: Guidelines for Consumption” document be consulted prior to fish consumption in all areas of Saskatchewan. It is available on the Saskatchewan Environment website: www.environment.gov.sk.ca.

\textsuperscript{1}PHU AHA 2014.
Wild game are an important source of vitamins, minerals, and protein and are low in saturated fats\(^1\).

A moose sample was obtained from the Uranium City area in 2014. The results of the laboratory testing showed that the levels of key parameters were similar to the previous 14 years of AWG monitoring in the Uranium City area.

As an example, the graph displays the amounts of lead in the moose, barren-ground caribou, and lynx samples collected from 2000 to 2014 near Uranium City. Note that not all mammal types were collected each year.

\(^1\)PHU AHA 2005.
Plants

Plants such as blueberries, cranberries, and Labrador tea have traditionally been used for both food and medicine\(^1\). Wild plants are very good sources of Vitamin C, fibre, and carbohydrates\(^1\).

Bog cranberry and Labrador tea samples were collected and analyzed from the Uranium City area in 2014. Blueberries in the Uranium City area were too sparse to be collected in 2014. The levels of the key parameters were often too low to be measured by the laboratory. As an example, the graph displays the nickel levels in all three plant types since 2000 (not all plant types were available each year). Nickel levels have been generally low and have not changed much since the beginning of the AWG monitoring program.

\(^1\)Johnson et al. 1995; NWT 2002.
Air quality was monitored at two locations near Uranium City in 2014 by measuring radon levels. Radon is an odourless and tasteless gas produced by the natural breakdown of uranium and radium-226 in the soil and water. As a result, radon levels are naturally higher in areas where uranium is found in the ground. Seasonal differences may occur because the ground thaws and releases radon gas into the air during the summer months. The graph shows that Uranium City has had generally low levels of radon since the beginning of AWG monitoring. When higher amounts were measured, such as at both stations in 2002, they were low again in the following years. Note that radon detectors are sometimes lost to fire or destroyed by animals, therefore, there are no data for some years.
The AWG program is made possible thanks to the continued involvement of northern residents. Special thanks to Sandy Powder who continues to do a great job collecting AWG samples near Uranium City.
This project was managed by CanNorth, a First Nation environmental services company

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