DIGGING DEEP

HEAVY METALS AND revegetation of the natural boreal forest

In Flin Flon, Manitoba, forest fires anduster damage have harmed the natural boreal forest ecosystem, which has been negatively impacted by previous mining. Restoration efforts rely on a clear understanding of the soil chemistry and acid-sulfate soils found within these regions. Researchers from the University of Saskatchewan and ESL collected sulfate samples from both the surface and at depth at 7 different locations in the affected area. Their findings can provide useful information to both mineral deposit owners and environmental regulations. In Flin Flon, Manitoba, forest fires and smelter damage have harmed the natural boreal forest. Two sites contained stable zinc forms that were less toxic to organisms. This is likely due to a combination of the sub-Arctic climate and soil acidity. Researchers from the University of Saskatchewan identified interactions between mercury and selenium in boreal soils, suggesting that selenium can cancel the toxicity of mercury compounds. The studies of selenium compounds for populations exposed to high levels of mercury are needed because they have proven to be toxic to contaminants from these areas. Revegetation efforts rely on a clear understanding of the boreal forest and soil chemistry.

MINING AND REMEDIATION

MERCURY TOXICITY IN ZEBRAFISH

High levels of mercury can lead to problems like liver damage and other serious health problems. With the application of CLS techniques, detailed understanding of toxic metals like mercury in Moscow have been possible. Zebras are a common model for understanding early development and mental toxicity. Researchers from the University of Saskatchewan identified interactions between mercury and selenium in local wildlife, suggesting that selenium can cancel the toxicity of mercury compounds. The studies of selenium compounds for populations exposed to high levels of mercury are needed because they have proven to be toxic to contaminants from these areas. Revegetation efforts rely on a clear understanding of the boreal forest and soil chemistry.

ARSENIC-ABSORBING FROGS

Arsenic poisoning is a worldwide problem as many countries such as Bangladesh, India, Taiwan, and China are dealing with extraneous contamination issues in their environment. External factors, like mining, mining, emissions, and other environmental impacts contribute to the arsenic poisoning. Zebras are a model because they have proven to be toxic to contaminants from these areas. Revegetation efforts rely on a clear understanding of the boreal forest and soil chemistry.

EFFECTS OF URANIUM MILLENTAILINGS

A partnership with Vale Incorporated

Nickel is one of Canada’s most important mineral resources, but the potential cancer risk from poorly controlled compounds of concern to the mining industry is important. Assembly work on nickel mining, emissions, and other environmental impacts contribute to the arsenic poisoning. Zebras are a model because they have proven to be toxic to contaminants from these areas. Revegetation efforts rely on a clear understanding of the boreal forest and soil chemistry.

TRACKING Selenium IN WETLANDS

A partnership with Cameco

Selenium is a byproduct of coal mining that can accumulate in the food chains of environments exposed to elevated levels. By favoring animals, such as fish, amphibians, and birds, selenium is most susceptible to high levels of activity. Cameco Environmental Services Ltd. used the CLS to assess the behaviour of selenium in the wetlands of the Elk River Valley of British Columbia. The research has led to the conclusion that selenium is stored in various wetlands, and in various forms. This information is key when determining methods of effective bio-remediation that have a minimal impact on wildlife.

PROTECTING CANADA’S MINERAL SECTOR

A partnership with Vale Incorporated

About 10 million Canadians depend on groundwater for safe drinking water. Insight into the exact ongoing chemistry of the groundwater is key when determining methods of effective bio-remediation that have a minimal impact on wildlife. Uranium producer AREVA maintains ISO 14001 Environmental Accreditation using synchrotron data.

STUDYING TRACES OF MOLYBDENUM IN URANIUM MILL TAILINGS

Saskatchewan is the world’s leading uranium producer and currently holds 70% of Canadian uranium mine and mills are located in northern Saskatchewan. Uranium ore milling, or tailings, is exercised in a corrosive open pit mine where tailings represent the upper half of tailings sites. In order to ensure the long-term health of tailings sites, investigators analyzed samples from these areas to determine the risk of these compounds to humans. Researchers from the University of Saskatchewan identified interactions between mercury and selenium in boreal soils, suggesting that selenium can cancel the toxicity of mercury compounds. The studies of selenium compounds for populations exposed to high levels of mercury are needed because they have proven to be toxic to contaminants from these areas. Revegetation efforts rely on a clear understanding of the boreal forest and soil chemistry.

PROTECTING OUR GROUNDWATER

A partnership with Arena

The CLS allows researchers to understand the chemistry of mine tailings and effluents, thereby better managing risks to the environment. Using techniques such as X-ray Spectrometry, researchers can study the chemistry of mine tailings and determine if metals in the tailings are stable or transitory. The CLS can provide additional information on the nature of vanadium tailings to help remediate the affected areas and reduce the toxicity of these compounds. Uranium producer AREVA maintains ISO 14001 Environmental Accreditation using synchrotron data.

REDDUCING MINING POLLUTION

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MINING AND REMEDIATION

Sustainable at Portland State University

U.S. Fish and Wildlife Service

Sustainability at Portland State University

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