



*Serpent River  
Watershed  
Monitoring  
Program*

 **Billiton**



**Denison Mines  
Limited**

In 1997, Rio Algom Limited and Denison Mines Limited initiated a project to conduct a comprehensive ecological assessment of the Serpent River Watershed. The scope of the ecological assessment and the procedures to be used were reviewed and approved by federal and provincial government regulatory bodies.

The program, called the "Serpent River Watershed Monitoring Program (SRWMP)" represents one of the most comprehensive monitoring studies conducted in Canada. The study was designed to examine each level of the ecosystem, the water, the sediment in the lake bottoms, the insects and other animals called "benthic invertebrates" that live in the sediment, the health of the fish and the potential effects on wildlife and people who eat the fish.

The SRWMP was conducted for the first time in the fall of 1999. The objective of the program was to assess the conditions in the watershed relative to the closed mines and provide the basis for future comparisons to assess cumulative effects (positive or negative) of the mine decommissioning plans. The water quality component is done on an annual basis and the sediment, benthos and fish studies will be conducted again in 2004.

The study was conducted in twenty lakes and over twenty-five stream locations along the Serpent River and its tributaries, including upstream lakes and streams (referred to as "background" lakes and streams) that define natural, undisturbed conditions. The information (data) produced from this study has been exhaustively analyzed and evaluated in comparison to background conditions and government standards. The data were integrated, like pieces of a puzzle, to give an overall picture of the health of the Serpent River Watershed.

The study confirmed that the Serpent River Watershed represents a healthy ecosystem with fish that are safe to eat and water that meets health-related drinking water standards.

The data confirmed that, although the water quality is influenced by the old mine sites, the watershed ecology does not seem to be affected. The substances that are elevated to the greatest extent tend to be salts such as sulphate that have low toxicity. Throughout the watershed, radium, uranium and metals content in the water, fish, and wildlife are typically below levels that cause biological effects.

Similarly, the concentrations of mine-related substances, such as salts, in sediments were also higher downstream of the mines than at upstream, background locations. However, the results of the benthic invertebrate studies (the animals which live in the sediments) showed healthy communities throughout most of the watershed. Other supporting analysis confirmed that while the concentration of some substances may be higher in the sediment than in the upstream water bodies, they are not in a form or at a high enough level to cause

an effect even to the animals that spend their whole lives in them.

It is expected that the concentrations throughout the watershed will continue to decrease even further over time now that the mines are no longer operating and have been properly decommissioned.

Studies of fish health (growth, reproduction and abundance) indicated no differences between fish in upstream (background) lakes and fish in lakes downstream of the mines. These results were compared to a federal government database for fish from background lakes and rivers in northern Ontario and this comparison showed that the fish from the Serpent River Watershed lakes were as healthy as fish living in these other background lakes and rivers in northern Ontario.

Testing of sport fish tissue in twenty lakes in the Serpent River Watershed showed that tissue metal and radionuclide concentrations were typically hundreds to thousands of times less than levels that could be harmful to humans. This confirmed that people can safely eat fish collected downstream of the mines without risk of mine-related adverse health effects. Similarly, wildlife populations in the watershed are not likely to be harmed by eating local plants or fish or drinking the water.

Rio Algom, recently amalgamated with a company called Billiton Base Metals, and Denison are proud of these results and the companies will continue to monitor and report the conditions in the watershed to ensure the legacy their restoration plans will leave – the Serpent River Watershed, a healthy ecosystem.

