



ALGONQUIN ECO WATCH GROUP

"Headwater Protection"

The hundreds of tiny spring fed lakes and marshes that combine to form the headwaters of the Madawaska, Muskoka, Magnetawan, South, Amable du Fond, Petawawa, Bonnechere and York Rivers are the most precious and irreplaceable asset on the Algonquin Dome. Naturally occurring pure water will undoubtedly become the most sought after commodity in the years ahead and must not be squandered.



This headwater lake in western Algonquin Park had an illegally located logging camp and a haul road situated adjacent to its shore, from which any spilled substance would have seeped into the lake.

The following is a presentation delivered to the Walkerton Inquiry by Algonquin Eco Watch on May 1, 2001, at North Bay, Ontario.

It may truthfully be said "As go the headwaters, so goes the watershed". If pollutants or physio-geographical changes are introduced at the source waters of a watershed, the entire watershed will be affected.

Changes to water may be of two basic types, that is, qualitative changes that affect the chemical or biological quality, or quantitative changes that affect flow patterns and/or volume. While natural occurrences such as wind and flood may be responsible for changes in water quality and quantity, by far the most common cause is interference by humans. It is therefore very important to identify and understand the types of human activities and their possible consequences that may affect headwaters, if we desire to protect pure water sources for the future.

On the Algonquin Dome, which represents the height-of-land between Georgian Bay and the

Ottawa River Valley, are situated hundreds of tiny coldwater lakes and streams that form the headwaters of 8 major rivers; the Magnetawan, South, Amable du Fond, Petawawa, Bonnechere, Madawaska, York and Muskoka. The City of North Bay, situated on the northern extension of the Algonquin Dome, is located on the height-of-land separating two historically significant river systems, the French and Mattawa Rivers. Evaporation of moisture from Georgian Bay-Lake Huron rises through 300m on prevailing westerly winds and condenses over the Algonquin Dome, thus providing much of the moisture, known as "lake effect", necessary to perpetuate the headwater flow for 10 major Ontario rivers.

Between 1998 and 2001, the Lake Huron-Georgian Bay surface level has dropped through more than 2m, significantly reducing the surface area available for evaporation from that water body. The City of Chicago, situated on the shore of Lake Michigan daily removes up to 2.0 billion Imperial gallons of water from that lake for use in the city water and sewer systems. That water is then diverted into the Mississippi drainage, thus depriving the Lake Huron-Michigan Basin of significant inflow. The International Joint Commission (IJC) for water conservation, has so far not seen fit to create a "Water Quantity Board" to guarantee the proper international distribution of water within the Lake Huron-Michigan Basin, even though such boards exist for all other Great Lakes basins. This situation points up the fact that ecosystems do not function in isolation, and in this case could lead to reduced water flows in rivers that source on the Algonquin Dome.

North Bay provides an interesting parallel with Chicago in that this City draws up to 5 and one quarter million Imperial gallons of water from Trout Lake (headwaters of the Mattawa River) daily and diverts the treated effluent into Lake Nipissing (headwaters of the French River). This is locally referred to as an "inter basin transfer", but truly represents a diversion of headwaters.

While all source water originates as atmospheric precipitation, it may exist as either surface or ground water. Surface source water may be stored in swamps or marshes, which act as giant sponges, releasing their water gradually during dry periods. Ground source water may be stored under the earth's surface in aggregate deposits such as drumlins and eskers, or in bedrock fissures, and emerge upward through gravel deposits known as upwellings, lenses, or seeps, which feed tiny headwater creeks or lakes. While surface water tends to follow variations in air temperature, ground water, being stored deep in the ground tends to maintain more even, colder temperatures.

The presence of abundant ground water has given rise to over 200 self-sustaining brook trout lakes on the Algonquin Dome. This much sought-after game fish species will spawn over cold ground water upwellings in lakes, and the newly hatched fry will migrate up tiny inflowing cold-water streams called nursery creeks, where they will spend their first year of life safe from predators.

Since flow within a watershed is generally progressively cumulative downstream, headwater lakes receiving little or no above ground inflow are extremely subject to physical, chemical, or biological trauma, since they have a very low flushing rate. Indeed, physical, chemical or biological changes within the entire basin circumventing these lakes to the adjacent height-of-land may be reflected in lake water quality and quantity for a significant period of time, since these lakes receive their ground water from the surrounding basin.

The following human activities have been separated into those which are "compatible" and those, which are "non-compatible" with headwater protection, for discussion purposes:

COMPATIBLE

- Open Water Angling. Many smaller headwater lakes support self-sustaining brook

trout populations, which can continue to thrive, provided that they are not over-exploited. It is well documented that such populations will NOT support winter angling. The use of live bait-fish in such lakes is unwise, as it often introduces predatory or competitive fish species.

- Logging. Logging practices are rigidly controlled in Ontario, with restrictions constantly being updated as new information is found regarding species interaction within ecosystems. Good forest management, which includes proper logging techniques, will perpetuate healthy ecosystems.
- Hunting And Trapping. Hunting and trapping in Ontario are based on accepted biological principles that seek to perpetuate healthy wildlife populations, and go hand in hand with sound ecosystem management.

NON-COMPATIBLE

- Mining, Mining Exploration and Aggregate Extraction. Mining and aggregate extraction within a headwater basin, physically remove part or all of the geological infrastructure, which acts as the storage areas for surface and ground water. These activities will alter surface and ground water flow patterns and volumes forever.
- Shoreline Development. Shoreline development invariably entails the removal of shoreline vegetation, which leads to increased surface water temperature and erosion. In addition, improper functioning of privies, septic beds and gray water cesspools associated with cottage development, often leads to physical, chemical, or biological degradation of lake water. Recent problems with the North Bay water supply may be development related.
- Water Removal/Diversion. The ongoing removal/diversion of water for sale or domestic use from headwater lakes and streams, will not only result in reduced downstream flow, but will also give rise to re-stratification of thermal layers, which invariably works to the detriment of cold water fish species such as brook and lake trout.
- Water Storage/Flow Impediment. The construction of weirs or dams on headwater lakes and streams will not only impede upstream migration of cold water fish species, but will cause increasing surface water temperatures and additional siltation within the basin.

SUMMARY AND RECOMMENDATIONS

The North Bay-Algonquin area has been blessed with a plentiful supply of pure source water. The Walkerton Disaster pointed up the need for constant uncompromising vigilance if we are to protect our pure water sources for the future.

Algonquin Eco Watch has tried to point up some of the problems that may arise if we take pure water for granted. We feel that while such activities as open water (summer) angling, forest management, hunting and trapping can be compatible with the protection of headwaters, mining, aggregate extraction, shoreline development, water removal or diversion, and water storage/impoundment will lead to the degradation of headwaters if the latter activities are allowed.

Brook Trout

Algonquin Park is home to one of the highest concentrations of self-sustaining brook trout lakes in the world.

Spawning takes place over "upwellings" of ground water supplied from adjacent elevated aggregate deposits, such as eskers and/or drumlins. Tiny spring-fed "nursery creeks", some

with a flow of as little as 1 litre per minute, provide feed and protection from predatious larger fish for the newly hatched fry for their first year of life (see photo).

If the adjacent aggregate deposits are disturbed either directly by logging activities, or indirectly by removal of aggregate for the building or maintenance of logging roads, then the flow of ground water to the self-sustaining brook trout lakes can be negatively affected. Algonquin Eco Watch is working actively with Ontario Parks and the Algonquin Forestry Authority to ensure that these precious self-sustaining brook trout lakes are protected for the future.



Tiny coldwater spring fed streams often are too small to show on any map, but may act as brook trout nursery creeks

Algonquin Headwater Survey

The major purpose of this study was to establish baseline data for lakes and streams on watersheds entering Algonquin Park. A secondary aim was to make the same baseline measurements on some of the lakes in the Park itself that are, or in the future could be, subjected to the influence of human activity.

One hundred and eighty-nine lakes and twelve streams were intensively sampled over the course of this 3-year study. The knowledge gained concerning those watersheds flowing into the Park will be useful for comparison with future studies to establish trend information, in an ongoing effort to protect the future quality and quantity of Algonquin Park waters.

Background information and all the data collected have been summarized on a CD, which is available at no charge through our "Contact Us" page on this website.