

Wabamun Nutrient Study 2008 - Summary

Over-enrichment of nutrients and resulting excessive growth of algae (eutrophication) is a pressing issue in many Alberta lakes and is often a driving factor behind the work of local watershed stewardship groups (e.g. Wabamun Watershed Management Council). It is essential to understand the sources of these nutrients (phosphorus being most important) in order to guide short and long-term stewardship activities. At Wabamun Lake, AB, a sampling program was performed back in the early 1980's to determine the main sources of phosphorus entering the lake. Results showed that inputs from the lake mud, large streams and precipitation were the most important sources of phosphorus enrichment to the lake.

To support both provincial and watershed stewardship objectives, Alberta Environment (AENV) updated this monitoring program during the spring-summer-fall period of 2008 (Figure 1). Stream flow was measured and water samples were collected from the largest 7 streams in the watershed as well as from the Wabamun Power Plant ash lagoon effluent and Wabamun Water Treatment Plant. Water in the lake was collected each month from May-October and water exiting the lake at the weir was measured for flow and water samples were collected. Precipitation volume and chemistry was measured near the Keephills Cooling Pond to the southeast of the lake. Other inputs (e.g. groundwater, sewage, minor streams, diffuse runoff) and losses (e.g. groundwater and diversions) were estimated using recent and historical data.

Results showed that much less water and phosphorus was delivered to the lake relative to the rather wet and heavy snowpack years of the early 1980's, however the main sources of phosphorus were similar between studies. Most of the phosphorus (~46%) in 2008 was delivered to the lake from rain directly falling onto the lake surface. Inputs from the largest streams, diffuse runoff and industrial inputs (i.e. ash lagoon and treatment plant) accounted for just 7% of all phosphorus delivered to the lake. Groundwater (8%) and sewage (~2%) rounded out the inputs from around the lake. The balance of phosphorus entering the lake water was from the mud at the bottom of the lake (38%) which can be released throughout the year under certain conditions.

Overall, more phosphorus was delivered to the lake from the watershed and precipitation than what was lost through lake outflow and water allocations. This has implications for longer-term nutrient management at the lake and points to the importance of reducing phosphorous loading from the watershed. Phosphorus in the lake mud is a reflection of short and long-term inputs from the watershed and can be mitigated over the long-term if sediment, less-laden with phosphorus, is delivered to the lake and begins bury current sediments that are saturated with phosphorus. Streams of interest for remediation activities include the stream draining through Ascot, False Creek, Beaver Creek and the stream draining between Whitewood Sands and Fallis.

Wabamun Bacteria Study 2008 - Summary

Certain types of bacteria in recreational waters have the potential to cause health problems in people. Though it is difficult to directly measure the specific bacteria that cause illness, measurement of the bacterium *E. coli* can be used as a general indicator of fecal contamination and risk of illness. When *E. coli* levels reach certain thresholds, local health authorities may post health advisories or close recreational areas to swimming. Sources of fecal contamination to swimming areas may include humans, livestock, pets and waterfowl.

At Wabamun Lake, AB, local health authorities have posted health advisories at some swimming areas in the past 5 years due to high levels of *E. coli*. To help understand the sources of *E. coli* to Wabamun swimming areas, Alberta Environment developed a bacterial monitoring program that could identify the animal that excreted *E. coli* measured in inflowing streams and at swimming areas around the lake (Figure 1). Seven streams and five public swimming areas around the lake were chosen (Provincial Park, Wabamun Beach, Ascot Beach, Camp YoWoChAs, Seba Beach) and water was collected in April and monthly from June to September, 2008 (25 samples total). Levels of *E. coli* were measured and source animals were identified in each sample.

As of December 2008, many of the analyses are still in progress and expected to be completed early in 2009.

If you have any questions or concerns regarding these monitoring programs, please contact:

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