

Biomonitoring of Near Shore Nutrient Enrichment Using Benthic Algae



Mark McKenney, President, Osoyoos Lake
Water Quality Society, Osoyoos

Michael Sokal, Ph.D., Ministry of Environment,
Penticton

Vic Jensen, Ministry of Environment, Penticton

The Osoyoos Lake Water Quality Society was founded in 1990 by local residents in direct response to a report compiled by Okanagan University College, in which Osoyoos Lake was described as a ‘nutrient cocktail of nitrates and phosphates’. It is a non-profit, charitable organization with members throughout Canada and the U.S. The Society acts as a voice and monitor organization for Osoyoos Lake, providing comments and advice to municipalities, developers, residents and guests on lake and water quality issues in our area. The Society has cooperatively participated in groundwater and lake monitoring projects for many years, in cooperation with the BC Ministry of the Environment. The Society regularly cooperates with: Osoyoos Oxbows Restoration Society, South Okanagan Similkameen Conservation Program, Washington Lake Protection Society, the Osoyoos Lake Society (Oroville, Washington) and the BC Lake Stewardship Society (founding members).

The main goals of this project are to assess current or potential near shore nutrient enrichment, and evaluate benthic algal biomonitoring protocols for the use in Okanagan basin lakes. Benthic algae are primary producers and are an important foundation of food webs in rivers and the near shore zones of lakes. These algae possess many attributes that make them ideal organisms to employ in water quality monitoring investigations, as they respond rapidly to shifts in environmental conditions. They also have species-specific environmental tolerances and preferences, and may respond predictably and sensitively to changes in lake conditions such as nutrient enrichment, pH, conductivity, organic contamination, pesticides and many other contaminants. As a result, they are among the most widely used indicators of biological integrity and aquatic ecosystem health. Since benthic algae in lakes live in the near shore zone, they are the first to be affected by watershed changes and their community compositions will reflect this. Therefore, using benthic algae in biomonitoring protocols can potentially provide a more sensitive and earlier warning of near shore water quality impairment than phytoplankton (affected by diluted, open-lake water conditions). This work is in collaboration with the BC Ministry of Environment and University of Waterloo (Waterloo, Ontario). Samples taken from 5

Okanagan basin lakes (Osoyoos, Skaha, Okanagan, Kalamalka and Wood), will be analyzed for taxonomy, algal pigments, chlorophyll-a and ash-free dry weight by the Waterloo Environmental Change and Research Laboratory at the University of Waterloo.

To date, all project planning/co-ordination and fieldwork has been completed. The fieldwork was conducted by Ministry of Environment staff and a University of Waterloo researcher. Benthic algae were sampled at 40 sites in 5 lakes. Along with these algal samples, physical measurements and water chemistry samples were collected at each site and in the central part of each lake basin. Samples were then shipped to the laboratories for chemical and biological analyses.

The project is on schedule and should be completed by the end of March 2010. The laboratory and statistical analyses are expected to be completed by February 2010 and a report detailing the findings will be completed by the end of March 2010.

The project is running smoothly, and the only minor obstacle that has been encountered thus far is a change in one field site (north basin of Okanagan Lake) due to shoreline access resulting from the Terrace Mountain Fire. This was easily overcome by using one of the backup sites we selected during the reconnaissance work. We also have an agreement with the laboratories that the work should be completed by February 2010, and we do not anticipate any obstacles in completion of the project.



