



How is Our Lake Doing?

A Report to the Residents by the Fraser Basin Council

PART I THE STUDY

INTRODUCTION

Shuswap Lake supports a wide range of recreational, economic and tourism activities in British Columbia's Interior.

In recent years, as the population of the area has increased, some concerns have begun to emerge regarding the long-term water quality of the lake. While many residents have expressed a general concern regarding water quality, the specific extent and nature of water quality impacts has not been well understood. This lack of information makes it difficult to develop effective solutions to enhance and protect the lake's water quality.

The Fraser Basin Council responded and, in its Five Year Action Plan, committed to the following:

"The Fraser Basin Council will examine the issue of deteriorating water quality in Shuswap Lake and assess the degree of community support for resolving the issue. If necessary, the Council will facilitate the development of a community-based, multi-stakeholder process to resolve the impacts."

This report is one step towards the accomplishment of that objective.

WATER QUALITY STUDY

With support from the Fraser Basin Council, Thompson-Nicola Regional District and University College of the Cariboo, a project was completed last spring, which summarized Ministry of Environment water quality studies in Shuswap Lake from 1985 to 1998. (Mara Lake is undergoing a similar compilation, but those figures are not available as of this report.)

The Fraser Basin Council, Columbia-Shuswap Regional District and the Ministry of Environment are also doing surveys of the licensed septic systems and a survey of near-shore soil types and their carrying capacity, on selected portions of the lake.

These projects are an effort to better understand the link between water quality and near-shore land use. Such information will give all interests an improved ability to protect water quality. In the longer term, the Fraser Basin Council will assist all interests to work together to identify specific opportunities for protecting the water quality of the lake and associated social and economic values.

DIFFERENT REGIONS DIFFERENT PRESSURES

Shuswap Lake can be divided into five main sections: Salmon Arm (Tappen Bay), Sicamous Arm, Anstey Arm, Seymour Arm and the West Arm. The lake's southern arms receive water from the Shuswap, Salmon, Eagle and Adams rivers while the Seymour and Anstey rivers feed the northern arms. Numerous creeks, including Scotch, White, Celista and Tappen, also flow into the lake.

These regions are geographically distinct and fed by different tributaries. As a result each of the regions of the lake experiences different water quality challenges and may require different approaches to addressing water quality problems.

For example, agricultural activities affect the water in the Shuswap River, the Salmon River and Tappen Creek, while transportation routes impact the Eagle River. The Anstey and Seymour Rivers, as well as Scotch Creek and the Adams River, drain forested lands and are influenced by forest harvesting activities. The Anstey, Seymour and Sicamous arms are deep and sparsely developed areas of the lake, although their unpopulated bays are drawing an increasing number of tourists. This increased use makes for a potential cause for concern. Along with an existing headwater community, there is also a scattering of provincial marine parks evident on Seymour Arm.

On the opposite side of the lake is Salmon Arm's Tappen Bay area. Highly developed and with relatively shallow water, this bay receives water from the Salmon River and White Lake, as well as input from a municipal sewage treatment plant. Contaminated agricultural and urban runoffs are suspected contributors to the groundwater and the numerous streams that drain into the bay.

The West Arm features extensive lakeshore development consisting of permanent and seasonal homes, commercial businesses, resorts, campsites and marinas. Ground and surface water feeding into Shuswap Lake is also influenced by human activities, including septic disposal, runoffs from paved and gravel roads, and land clearing for subdivision. In addition, with the exception of areas of very steep terrain, development pressure on all regions of Shuswap Lake is increasing.

JURISDICTION

To understand some of the challenges facing Shuswap Lake, it's important to understand how various levels of government share jurisdiction over land and water use in the region. The federal government regulates rail transportation, fisheries management and recreational boating, including the use of houseboats. Meanwhile, the provincial government oversees highways, forestry activities, agriculture, inland fish, wildlife, waste disposal and health issues, such as septic tank use and the provision of drinking water.

The Columbia Shuswap Regional District and municipal authorities, including the Districts of Salmon Arm and Sicamous, are responsible for planning as well as implementation of provincial regulations. Both Salmon Arm and Sicamous have sewage treatment facilities which process residential liquid waste. First Nation governments at Adams Lake, Neskonlith and Little Shuswap are responsible for development and planning on band lands adjacent to the lake. Because the jurisdiction over land and water use and management in the region is scattered among many orders of government, so too are the tools needed to protect water quality. Developing solutions will require collaboration among all interests towards a common vision.

PART II RESULTS

When envisioning a healthy lake, think of a garden. Certain nutrients and conditions are needed to make vegetables or flowers prosper. Without air, sunlight and the necessary nutrients, little will grow. Conversely, if too much is added to the soil, the garden could become unhealthy. As every green thumb comes to know, the key to gardening is striking a delicate balance. The same is true for Shuswap Lake. Though not specific to Shuswap Lake, the Province of British Columbia has established guidelines for determining the amount of phosphorous, nitrogen (ammonia and nitrates) chlorophyll and chloride in a lake. These guidelines also indicate acceptable levels of conductivity and pH. For the Fraser Basin Council project report, these parameters were compared at 23 different deep- and shallow-water sites. The selected study areas are representative of Shuswap Lake's five major sections: Salmon Arm (Tappen Bay), Sicamous Arm, Anstey Arm, Seymour Arm and the West Arm. The Ministry of Environment collected all of the report data between 1985 and 1998, adding to research begun in the 1970s. The list of specific parameters for the report was selected because, together, these criteria can reflect human-influenced changes.

RESULT EXPLANATIONS

The water quality studies undertaken over the past 20 years look at a number of different criteria, used to assess water quality. Phosphorous stimulates the growth of algae and, thereby, decreases water clarity and the amount of oxygen available to other life in the water. Aesthetic concerns, as well as worries about aquatic life, are the reason phosphorous levels are monitored constantly. Nitrogen and related compounds are also nutrients and can come into a lake from a variety of sources such as agriculture and forestry runoffs, septic systems and plant and animal sources. Chlorophyll levels are the most direct measure of algae growth in any given area. Chloride is present in very limited levels naturally; high levels may be an indication of pollution from sources such as sewage discharge, septic systems and salt runoffs from roads. Conductivity is the measure of electron flow and increases with temperature. Higher levels of specific conductivity have been linked to higher levels of dissolved solids. PH is the measure of acidity or alkalinity. Most aquatic organisms require a certain pH in order to survive.

THE RESULTS

Generally, the shallow water sites are beginning to show deterioration in water quality. Since these sites are the areas of the lake most accessed by residents and visitors, these results and their implications for social, economic and environmental sustainability should be of importance to the general public.

SALMON ARM

As the most highly impacted area of the lake, Salmon Arm consistently shows higher levels of nitrogen, phosphorous and chlorophyll. The shallow-water test site near the community of Salmon Arm has consistently high chlorophyll, nitrogen and phosphorous levels, while pH levels at the site have leveled in the acceptable range. Chloride and specific conductivity levels at the site have increased over time while ammonia rates have decreased. In the rest of Tappen Bay, deep-water levels of phosphorous, nitrogen and chlorophyll have increased over time.

SICAMOUS ARM

Nitrogen, phosphorous and specific conductivity levels have decreased over time in Sicamous Arm. Levels of nutrients and chlorophyll are lower than those at Canoe Point in Salmon Arm. The single shallow-water test site in Sicamous Arm shows more variations and higher levels in all categories than the deep-water sites.

NORTHERN ARMS

Seymour and Anstey arms have retained better water quality than the rest of Shuswap Lake. Nitrogen levels in both arms have increased while phosphorus levels have remained stable. Ammonia levels in Anstey have increased over time compared to Seymour Arm, which are more stable. While conductivity levels have increased slightly, not enough data was available to determine trends in chlorophyll levels.

WEST ARM

The deep-water quality in the West Arm, the final destination for all of Shuswap Lake's water, is less impacted than first anticipated. Though Phosphorous levels are high at times, they don't go above acceptable measures. Deep-water sites at Magna Bay, Blind Bay, Scotch Creek and Sorrento display an increase in levels of nitrogen over time while phosphorus levels do not appear to have increased. Shallow water sites at Scotch Creek show high levels of organic nitrogen, but total phosphorus is the dominant nutrient. Sorrento, Blind Bay and Eagle Bay all show high levels of phosphorus and chlorophyll.

CONCLUSIONS

Generally, deep-water quality is poorest in Salmon Arm, the most impacted area of the Shuswap, and improves - in order - in Sicamous, Anstey, West Arm and then Seymour Arms. Shallow-water sites confirm problems in Salmon Arm but indicate deterioration in the West Arm. Sicamous, Anstey and then Seymour Arms improve in that order.

POSITIVE ACTION SOLUTIONS

Various sectors are already adopting practices to minimize future influences on the water quality at Shuswap Lake.

At the same time, other groups are making strides towards rectifying historical impacts.

Both major Shuswap Lake municipalities, the **Districts of Salmon Arm** and **Sicamous**, have sewage treatment systems.

The Salmon Arm treatment plant was recently upgraded to improve the general effectiveness of the process and remove greater levels of phosphates and nitrates from the effluent before it is discharged into the lake.

Columbia-Shuswap Regional District has a liquid-waste management plan under development to deal with the anticipated effect of dense development and related sewage impacts in Blind Bay and Sorrento areas.

The Regional District's official community plan and zoning regulations directly and indirectly limit the impact of new developments on the South Shuswap area of electoral Area C.

However, similar community planning does not exist in the North Shuswap and Tappen-Sunnybrae areas.

Continuous water quality testing is underway by the Columbia-Shuswap Regional District in Blind Bay and Sorrento and groundwater monitoring is ongoing in Anglemont.

The municipalities of Salmon Arm and Sicamous manage their storm water, while the **Ministry of Transportation and Highways**, which maintains roads and roadside ditches in the area, collects runoff and funnels it into natural drainage channels.

The **agricultural industry**, through close adherence to provincial farm practices, is changing its operations to minimize water quality impacts. Extra care is taken to avoid groundwater contamination by measures such as careful manure management and restricting the access of livestock to streams.

Salmon River Roundtable, a watershed stewardship group, has worked with farmers and property owners along the length of the river to encourage the adoption of practices that will minimize impacts on water quality. Projects and educational initiatives have been undertaken in pursuit of improved water quality in the tributary.

The **houseboat industry**, a prominent user of the Shuswap, has seen blackwater-holding tanks installed on all vessels. Many of these tanks are pumped into the sewage treatment plant at Sicamous. On newer boats, a provision for grey-water storage exists, should that collection become mandatory. Most houseboats have filtration and ultra-violet treatment systems for drinking water.

The Adams Lake Indian Band has held a series of meetings with their tenants to explore concerns by both the Band and cabin owners on water quality.

A joint process, involving all interests, has been developed in which positive solutions to the issues can be explored and recommendations made to the Band council and the Provincial and Federal Governments to implement those solutions.

WHAT CAN I DO?

- Talk to your neighbors. See if they share your concerns.
- Work with other interests. Share ideas.. No one person has all the answers, but together you form a powerful tool for change.
- Encourage your community group to undertake stewardship activities as part of it's program. If no group exists, start one with your neighbours.
- Ask government agencies what they can do to help you to reverse the trend of deteriorating water quality.
- Ask your elected representatives for their help. Your Member of Parliament, your Member of the Legislative Assembly and your Regional District and municipal representatives have the ability to assist and they welcome the opportunity.
- Ask the Fraser Basin Council for assistance. We can help to find information and to organize and facilitate meetings between different interests to seek solutions.

We are here to help!

Now it's your turn to talk to us. We want to hear from you.

1. Do you think Shuswap Lake is worth protecting?
2. Would you like to work with others to help keep your lake as it is today?
3. Do you have the information and resources you need to do so?
4. How can we help you?

Tell us what you think.

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