

Lakewatch

*The Alberta Lake Management Society
Volunteer Lake Monitoring Program*

Burnstick Lake

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2004 Report

Completed with support from:



Alberta Lake Management Society's Lakewatch Program

Lakewatch has several important objectives, one of which is to collect and interpret water quality on Alberta Lakes. Equally important is educating lake users about their aquatic environment, encouraging public involvement in lake management, and facilitating cooperation and partnerships between government, industry, the scientific community and lake users. Lakewatch reports are designed to summarize basic lake data in understandable terms for a lay audience and are not meant to be a complete synopsis of information about specific lakes. Additional information is available for many lakes that have been included in Lakewatch and readers requiring more information are encouraged to seek these sources.

ALMS would like to thank all who express interest in Alberta's aquatic environments and particularly those who have participated in the Lakewatch program. These people prove that ecological apathy can be overcome, and give us hope that our water resources will not be the limiting factor in the health of our environment.

Acknowledgments

The Lakewatch program is made possible through the 2004 Lakewatch Chairs, Théo Charette, Ron Zurawell, and Preston MacEachern, and the individual volunteers who dedicate their personal time. It is the local volunteers who make these sampling programs possible. The 2004 summer field technician, Heather Jones, was a valuable and hard-working addition to the program. Numerous Alberta Environment staff also contributed to successful completion of the 2005 program. Shelley Manchur was the Technical Program Coordinator, responsible for planning and organizing the field program. Technologists Mike Bilyk, Brian Jackson and John Willis were involved in the logistics and training aspects; Doreen LeClair was responsible for data management. Théo Charette (ALMS President) was responsible for program administration and planning. ALMS gratefully acknowledges Alberta Environment, the Lakeland Industry and Community Association (LICA) and Lakeland County for their financial support of the Lakewatch program.

Burnstick Lake

Located in the southern half of the province, Burnstick Lake is a moderately small water body tucked into the Boreal Foothills southwest of Caroline. Its primary inflow is West Stony Creek at the southwest end, although other streams may contribute intermittently when conditions are wet enough. Outflow is via East Stony Creek at the lake's easternmost point, which eventually flows into the James River as part of the Red Deer River Basin.

Burnstick Lake is situated in a semi-wilderness area of the lower boreal cordilleran ecoregion (Table 1). The surrounding landscape is primarily native vegetation occurring

Lower Boreal-Cordilleran Characteristics*	
Vegetation	Aspen, Balsam Poplar, Lodgepole Pine succeeding to White and Black Spruce and Balsam Fir
Summer	Average Temp. 12.8 °C
	Average Min. Temp. 6.9 °C
	Average Max. Temp. 18.3 °C
	Month of Max. Precip. July
	Total Summer Precip. (mm) 295 mm
Winter	Average Temp. -7.8 °C
	Average Min. Temp. -14.3 °C
	Average Max. Temp. -2.1 °C
	Total Winter Precip. (mm) 60 mm
Total Annual Precipitation (mm)	464 mm

*precipitation numbers are median values

in a mix of forests and wetlands. The area is also home to the regionally uncommon round-leafed bog-orchid (*Habernaria orbiculata*). The lake supports an active sport fishery for Northern pike, Yellow perch and walleye, the perch having been

introduced in the 1970s (Alberta Environment Report, 1996). Extensive marshy and ponded areas around the lake provide excellent nesting sites for a variety of waterfowl and amphibians. Bald eagles have been known to nest along the lakeshore for multiple years (Mitchell, 1994a, 1994b). Land ownership throughout the watershed is primarily crown with private near-lake properties. Most crown land is under lease as cattle grazing reserves. Private lands consist of a municipal campground at the lake's east end, the Summer Village of Burnstick Lake midway along the north shore, and the Burnstick Lake Resort on the south shore across the lake from the summer village (Alberta Environment Report, 1996).

Table 2. Physical characteristics of Burnstick Lake (Mitchell, 1994).	
Lake surface area	2.93 km ²
Drainage basin	62.6 km ²
Mean depth	5 m
Maximum depth	approx. 18 m

The watershed of Burnstick Lake is quite large relative to lake size (Table 2). Although the lake has fairly deep areas in the middle third, most of the basin consists of shallow regions at either end (Figure 1). Despite the large drainage area and shallow lake bottom, it is a fairly unproductive lake. Burnstick has been sampled previously for water

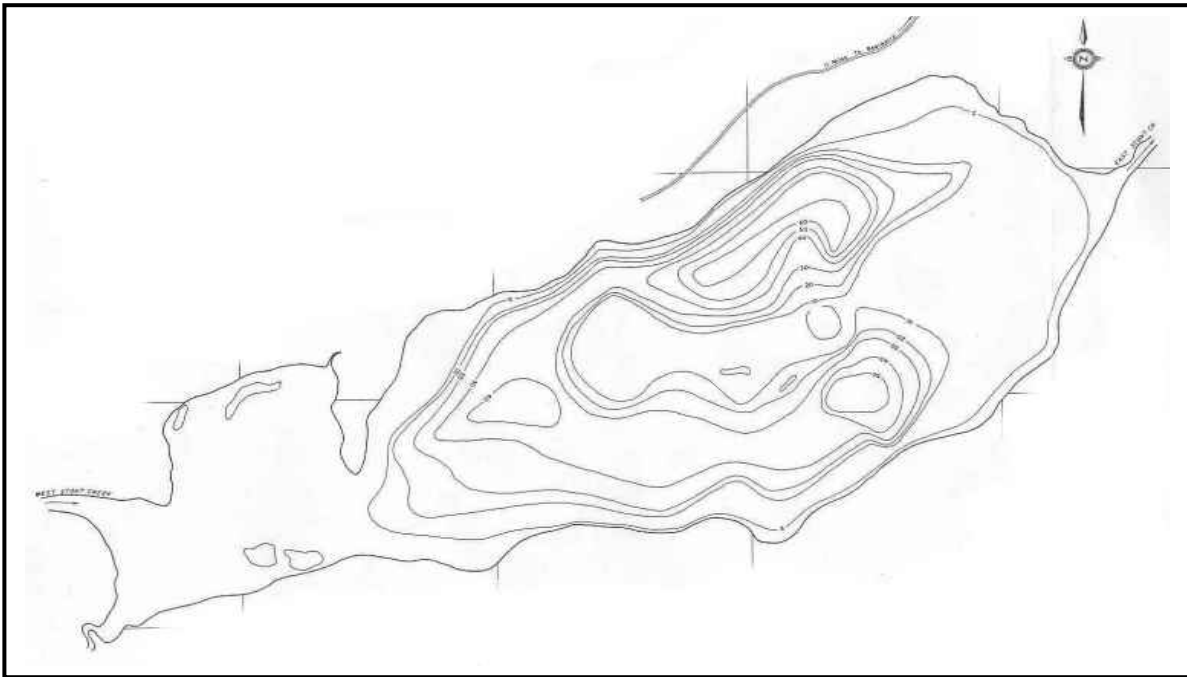


Figure 1. Bathymetric map of Burnstick Lake. Alberta Environment Historical Library.

quality as part of the Volunteer Citizens' Lake Monitoring Program, the precursor to the ALMS' Lakewatch Program. Phosphorus loading rates have also been estimated for the lake and implicated effects from cattle as having a greater potential impact on the lake's productivity level than near-shore developments (Mitchell, 1995). The results from the phosphorus calculations were included in a 1996 report from Alberta Environment detailing the Burnstick Lake Management Plan. This plan sought to '...provide guidelines for the protection, management and orderly development of lands and resources around the lake'. It was created through the efforts of Alberta Environment staff and local citizens who expressed an interest in maintaining the attributes that make Burnstick Lake attractive to all those who enjoy it.

Methods

Lakes monitored under the Alberta Lake Management Society's Lakewatch program are all monitored using standard Alberta Environment procedures: composite samples are collected from numerous sites around the lake and water is profiled at the deep water

spot in each lake once per month through the warmer months. This usually results in 4 sampling trips per open-water season. On each trip, the deep-water profiles include measurements for temperature and dissolved oxygen recorded from lake surface to lake bottom, as well as maximum depth. A Secchi depth is also measured, from which the range of the euphotic zone is estimated. Once the euphotic zone depth is known, the composite samples are collected for lab analyses. After the water has been analyzed, results are examined for trends and summarized.

Water Levels

Water levels on Burnstick Lake have been monitored regularly since 1971 (Figure 2). A weir was installed on the lake in 1977. Prior to this, water levels fluctuated widely year-to-year but have remained relatively stable since. Over the monitoring period, the lake's

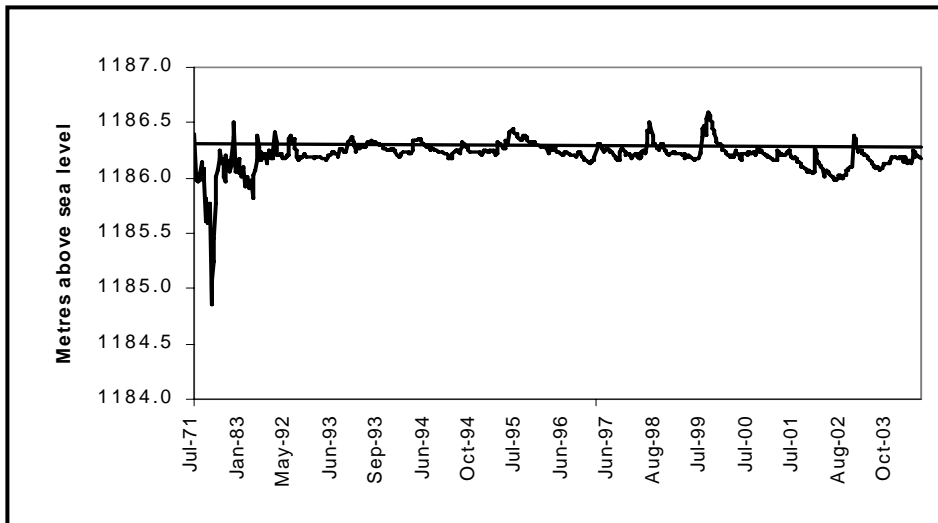


Figure 2. Historical water levels of Burnstick Lake. The horizontal line represents mean distance above sea level. Alberta Environment data.

surface has ranged from a high of 1186.589 m above sea level (asl) on July 16, 1999, to a low of 1184.849 m asl on January 22, 1976. The average water level during this time was 1186.206 m asl. At the lake's deepest point, this translates into a depth of approximately 18 m.

Temperature and Dissolved Oxygen Profiles

The temperature profiles for summer 2004 suggest that Burnstick Lake stratifies at the deep water sampling point (Figure 3). This is indicated by the thermocline, represented on the graphs by the sharp drop of the temperature line in the summer months. By September 19th, the water column has started its fall turnover and the temperature is

