
Sulphur Lake Aeration Report 2003 - 2004



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Table of Contents

1.0 Introduction	1
2.0 Study Area	2
3.0 Methods	4
3.1 Oxygen Sampling	4
3.2 Traffic Counter	4
4.0 Results	5
4.1 Oxygen Levels	5
4.2 Traffic Counter Readings	5
5.0 Stocking	5
6.0 Discussion	6
7.0 References	7

List of Figures

Figure 1. Map showing location of Sulphur Lake.	2
Figure 2. Sulphur Lake camping area showing location of aeration site.	3

List of Tables

Table 1. Sulphur Lake monthly oxygen readings for 2003 - 2004.	5
Table 2. Stocking Plan for Sulphur Lake 2001 – 2004.	5

1.0 Introduction

Lake aeration is a fishery enhancement technique used to maintain dissolved oxygen levels in eutrophic lakes prone to winterkill. Ten stocked lakes that are susceptible to winterkill are aerated annually in the Northwest Region. These otherwise seasonal fisheries (May – October) provide year round multi-age class fisheries to anglers in areas that have limited angling opportunities. The objective of lake aeration is to annually sustain dissolved oxygen levels in these lakes at or above 3.0 mg/l. Maintaining the dissolved oxygen at this level or higher ensures the survival of trout throughout the winter (Fast 1994).

The Alberta Forest Service built the campsite in 1971 and Fish and Wildlife Division of Alberta Sustainable Resource Development began stocking fish in 1958 with moderate success. A beaver dam that controlled the lake level, washed out in 1978. By the spring of 1980, the water levels had dropped 1.3 meters. A water control structure was proposed to retain the recreation value of the lake. In the winter of 1983, a sheet pile weir was built at a cost of just under \$ 80,000.

Aeration of Sulphur Lake began in 1989-90 due to occasional winterkill. Several aeration techniques have been used with varying degrees of success. Aqua tubing was used from 1989-90 to 92-93, point release from 1993-94 to 1995-96, and mechanical surface aeration from 1996-97 to present. Mechanical surface aeration has been the most successful aeration technique, that the ACA has used, for over wintering populations of stocked trout. Details on these aeration techniques and results can be acquired from the Alberta Conservation Association, Room 115, Provincial Building, 9621-96 Ave, Peace River, Alberta.

The Lake Enhancement Program (Lake Aeration), of which Sulphur Lake is a part of, continues to be a highly successful project providing year round multi-age class fisheries to anglers in areas that have limited angling opportunities.

2.0 Study Area

Sulphur Lake (NW 07-89-02-W6) is located 110 km northwest of the town of Peace River, 55 km northwest of Dixonville (Figure 1). The lake is 53.4 ha in size and has maximum and mean depths of 7.6 m and 3.3 m, respectively. The area, also includes, an overnight camping area (11 stalls), a group camping area, an over flow area, a day-use area, a parking lot and a boat launch (Figure 2).

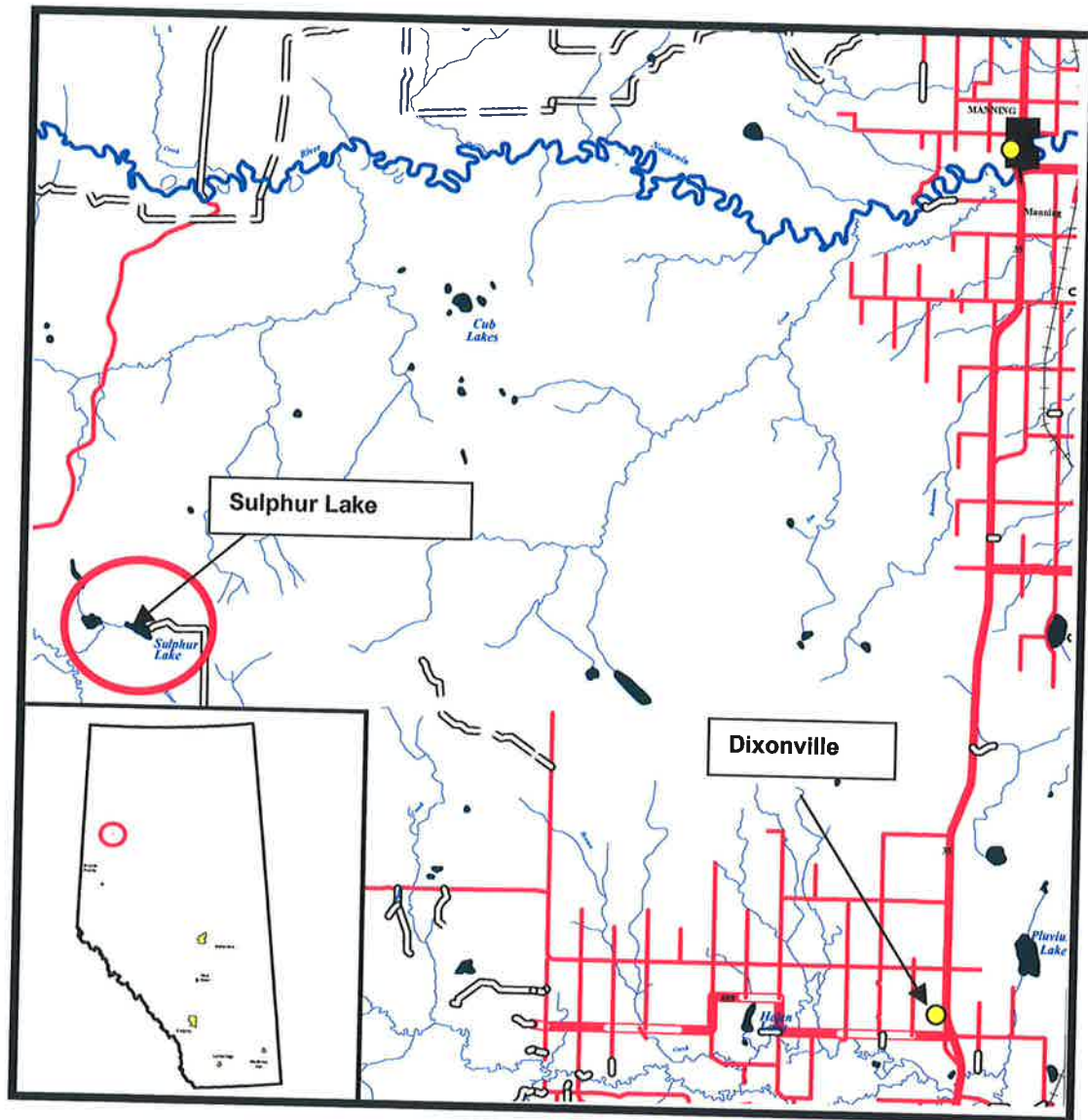


Figure 1. Map showing location of Sulphur Lake.

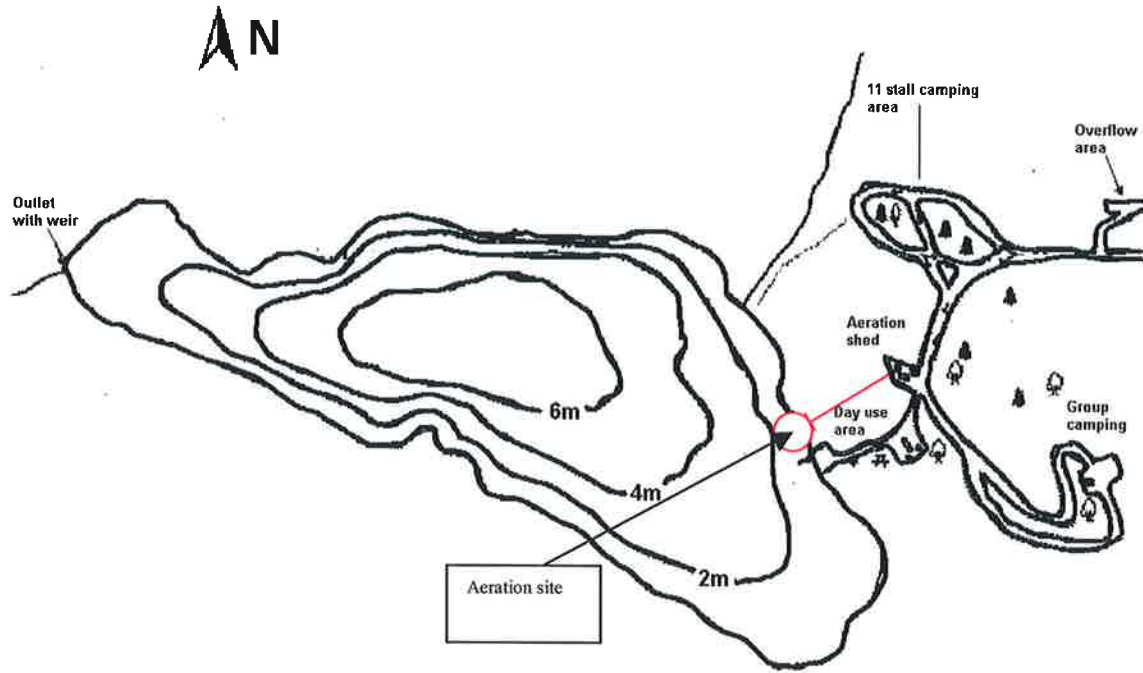


Figure 2. Sulphur Lake camping area showing location of aeration site.

3.0 Methods

3.1 Oxygen Sampling

Oxygen sampling was conducted monthly from mid-October until mid-April. Oxygen samples were performed using a HACH Kit and a multi-parameter unit. Results from HACH Kit and multi-parameter were compared to ensure proper calibration. If the readings between the two sampling methods were within 1mg/l of each other, the multi-parameter was used at the other sample sites for faster data collection. At Sulphur Lake there are two sample sites, site 1 located at mid lake (56 42' 29" N, 106 19' 12" W) and site 2 located in the west end (56 42' 36" N, 106 19' 48" W). Site 1 was sampled monthly while site 2 was sampled on three occasions throughout the aeration year (October, January, March). Site 2 sampling was completed to record oxygen data furthest away from the aeration site. Oxygen samples were taken at each meter and recorded in a database.

3.2 Traffic Counter

Traffic counter readings were recorded monthly from a StreeterAmet JR Trafficcounter. An inductive loop installed in the roadbed detects vehicle axles, which were recorded on a counter operated by two 6-volt batteries. These monthly figures were entered into a modified formula from the 1998 stocked lake angler survey (D. Jackson 1998. Stocked Aerated Lake Angler Survey, Alberta Conservation Association, Peace River, Alberta.). This formula estimates numbers of vehicles for each year.

4.0 Results

4.1 Oxygen Levels

Sulphur Lake should over winter in 2003 – 2004 (Table 1). Oxygen levels in February were 4.6 mg/l at 1 meter and 1.0 mg/l at 7 meters.

Table 1. Sulphur Lake monthly oxygen readings for 2003 - 2004.

	Sulphur			
Month	1m	4m	7m	Critical
Oct	7.4	8.0	8.0	2.0
Nov				2.0
Dec	7.2	5.8	5.2	2.0
Jan	5.4	3.6	1.4	2.0
Feb	4.6	2.4	1.0	2.0
Mar				2.0
Apr				2.0

4.2 Traffic Counter Readings

Traffic counter data have been collected since 1998. The average number of vehicles per year at Sulphur Lake is 1991 (1998 – 2003 Traffic counter readings).

5.0 Stocking

The stocking plans are outlined in Table 2. Rainbow trout and Eastern Brook trout will continue to be stocked in alternate years.

Table 2. Stocking Plan for Sulphur Lake 2001 – 2004.

Year	2001	2002	2003	2004
Species				
rainbow		10,000		10,000
brook	6,000		6,000	

6.0 Discussion

In December, the genset was installed and lake aeration operation began. However, aeration was interrupted (Dec – Jan) by genset shutdown due to lack of adequate ventilation in the shed. Vents were added to the shed, to improve ventilation and the doors were left locked and slightly opened.

Oxygen levels are lower than in past years due to late start-up and overheating of genset. Sulphur Lake is expected to over winter but with lower oxygen values than in past years.

Traffic counter readings will need to be taken with more regularity if a true representation of the number of vehicles is to be documented. A creel survey along with the traffic counter information will allow us to calibrate angler use using traffic counter information. At present ACA funds have not been identified or approved.

Changes in the aeration system are not required as the lake is over wintering annually. Monitoring activities, communications and maintenance are satisfactory.

7.0 References

Fast, 1994. Winterkill Prevention in Lakes and Ponds Using Artificial Aeration. Reviews in Fisheries Science. 2 (1): pg 23-77.