Sulphur Lake Aeration Report 2004 - 2005

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Acknowledgements

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1.0 Introduction

Lake aeration is a fishery enhancement technique used to maintain dissolved oxygen levels in eutrophic lakes prone to winterkill. Eight stocked lakes that are susceptible to winterkill are aerated annually in the Northwest Region. The aerated lakes are Swan, Spring, Moonshine, Cummings, Figure Eight, Cecil Thompson Park Pond, East Dollar and Sulphur. 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).

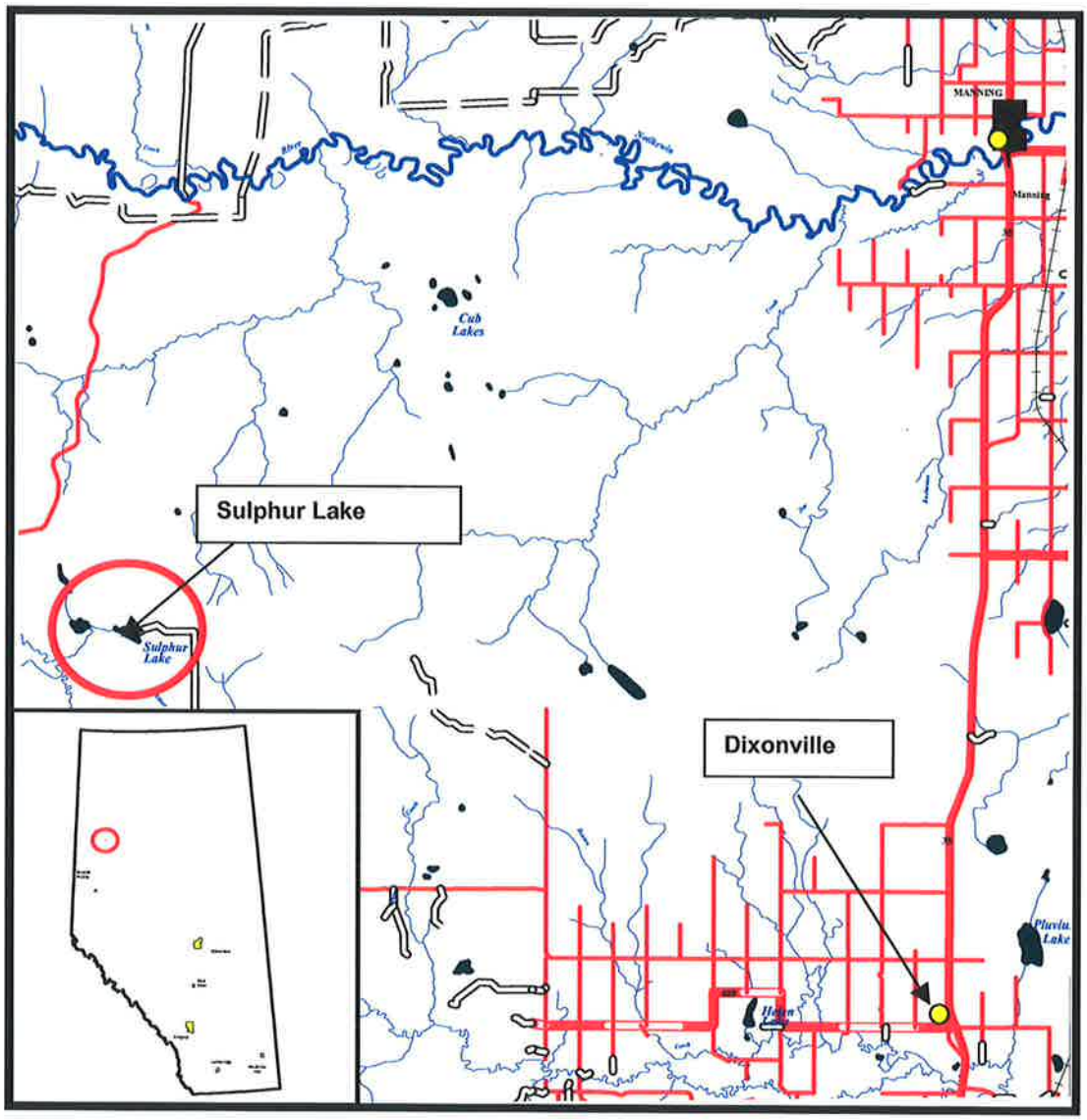

Figure 1. Map showing location of Sulphur Lake.

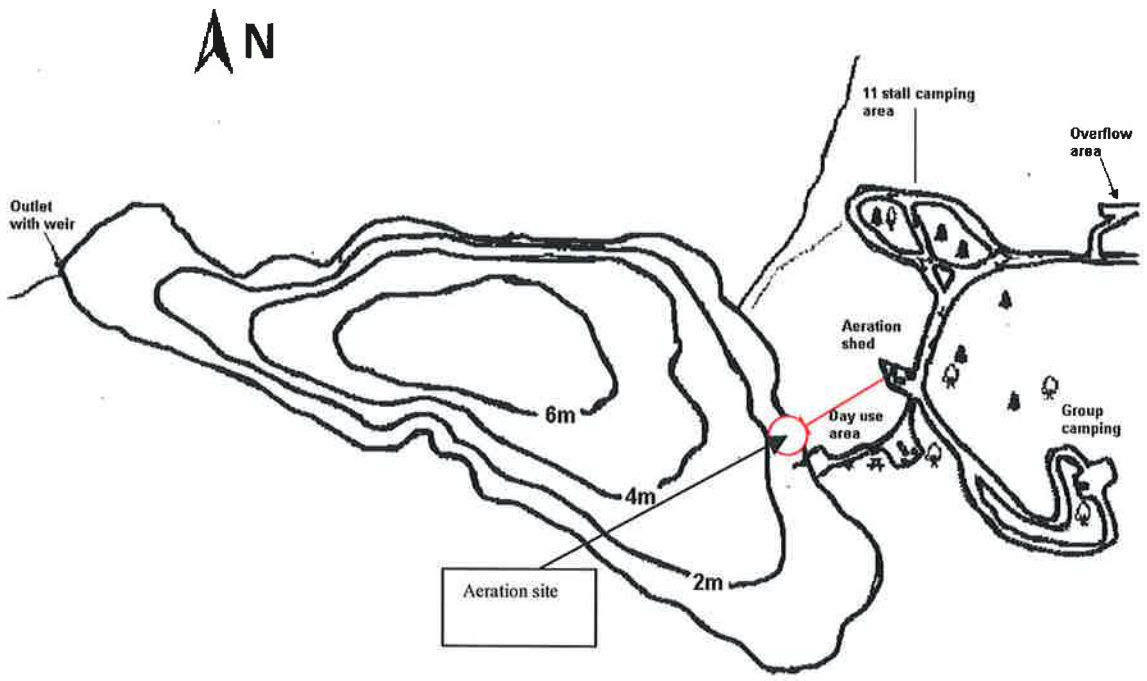

Figure 2. Sulphur Lake camping area showing location of aeration site.

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 Dissolved Oxygen Kit. 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 an Excel database.

3.2 Traffic Counter

Traffic counter readings were recorded monthly from a StreeterAmet JR Traficounter. 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 will again over winter (Table 1). Oxygen levels in February were 5.8 mg/L at 1 meter, 5.2 mg/L at 4 meters and 1.4 mg/l at 7 meters.

Table 1. Sulphur Lake monthly oxygen readings for 2004 - 2005.

	Sulphur			
Month	1m	4m	7m	Critical
Oct	n/c	n/c	n/c	2.0
Nov	n/c	n/c	n/c	2.0
Dec	6.6	5.4	3.4	2.0
Jan	5.9	5.0	n/c	2.0
Feb	5.8	5.2	1.4	2.0
Mar	n/c	n/c	n/c	2.0
Apr	n/c	n/c	n/c	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). 2004 Sept – March 2005 readings are incomplete.

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 2004 – 2007.

Year	2004	2005	2006	2007
Rainbow trout	10,000		10,000	
Brook trout		6,000		6,000

6.0 Discussion

The aeration systems were installed in early November. In mid-December aeration was interrupted for a few days by genset shutdown due to lack of adequate ventilation in the shed. The doors were opened more and secured by lock and chain. Minimal maintenance required this season with only one aerator and one breaker malfunctioning.

Sulphur Lake will over winter with slightly higher oxygen values (>1mg/L) than last year.

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.