Alberta Conservation Association
2007/08 Project Summary Report

Project name: *Lake Aeration Program*

Project leader: Trevor Council

Primary ACA staff on this project: Nathan Carruthers, Trevor Council, David Jackson, Mike Jokinen, Corey Rasmussen, Diana Rung, and Brad Taylor

Partnerships

Alberta Fish & Game Association
Alberta Sustainable Resource Development, Fish & Wildlife Division
Alberta Tourism, Parks and Recreation
Canadian Forest Products Ltd.
County of Stettler
Daishowa Marubeni International Ltd.
Moonshine Lake Provincial Park
Northern Sunrise County
Shell Canada
TAQA North (formerly PrimeWest Energy)
Tay River Environmental Enhancement Fund (TREE Fund)
Town of Fairview
Volunteer Stewards
Weyerhaeuser Canada Ltd.

Key findings

- All aerated water bodies successfully overwintered trout.
- A new aeration project was initiated and operated at Fiesta Lake in 2007/2008.
- Summer aeration occurred at Beaver Lake and Boehlke's Pond.
- The Lake Aeration Program creates angling opportunities that would otherwise not exist.

Introduction

The Alberta Conservation Association (ACA) currently aerates 16 lakes and ponds stocked with trout by Alberta Sustainable Resource Development (Table 1). The aerated lakes are typically, shallow, eutrophic, experience prolonged ice and snow cover, and are prone to fish kills. Shallow depths, coupled with low hypolimnetic dissolved oxygen (DO) during winter, resulting from an interplay of low photosynthetic oxygen production and high biological oxygen demand led to winterkills (Miller and Mackay 1996). Similarly, an interplay of high surface temperatures and low hypolimnetic DO during the summer results in summerkills (Aku et al. 1997). ACA

uses aeration as a fishery enhancement technique to maintain hypolimnetic DO concentrations in these lakes at or above 3.0 mg/L. The primary objective of the program was to develop and maintain lake habitats that promote year-round survival of sport fish, thereby creating or enhancing recreational angling opportunities. Maintaining DO concentrations at 3.0 mg/L or higher should ensure year-round survival of trout in these lakes (see Fast 1994), allow fish to live longer, grow larger, and provide new and better recreational opportunities for Alberta anglers.

Table 1.....Location and size of ACA-aerated water bodies.

Region	Aerated Waterbody	Location	Size (ha)	Winter Angling
Northwest	Moonshine Lake	SW 32-79-08 W6	30.8	yes
	Cummings Lake	SE 10-82-03 W6	26.9	yes
	Figure Eight Lake	NE 20-84-25 W5	38.6	yes
	Swan Lake	13-70-26 W5, 18-70-25 W5	139.9	yes
	Sulphur Lake	NW 07-89-02 W6	53.4	yes
	East Dollar Lake	NW 08-73-21 W5	5.6	yes
	Spring Lake	SE 23-75-11 W6	32.1	yes
	Cecil Thompson Pond	SW 23-83-21 W5	0.8	yes
Southern	Boehlke's Pond	31-35-15 W4	9.2	yes
	Hansen's Reservoir	29-38-3 W5	5.7	yes
	Coleman Fish & Game Pond	SW 24-08-05 W5	3.4	yes
East Slopes	Beaver Lake	E 16-35-06 W5	31.0	no
	Mitchell Lake	NE 25-37-08 W5	18.0	yes
	Ironside Pond	SW 07-38-07 W5	3.3	no
	Fiesta Lake	NE 12-35-6 W5	7.1	TBD[1]
	Millers Lake	SW 08-53-19 W5	35.6	yes

[1]TBD = to be determined.

Methods

Currently, we use two methods of aeration: mechanical surface aeration for winter aeration, and point-release system for fall destratification and summer aeration. Mechanical surface aerators are used during periods of prolonged ice and snow cover (October to April). These aerators produce tiny droplets of water in a fountain-like spray adding oxygen to the water body via the open water created and maintained by the aerator. The point-release systems use a subsurface bubble diffuser connected to an onshore compressor or a windmill to circulate or de-stratify the water column, thereby enhancing oxygen levels and creating a uniform thermal and oxygen gradient throughout the affected area. The number of aerators per water body varied from 1 to 10 units. We visited each lake monthly to ensure proper aerator function and to measure temperature and dissolved oxygen levels.

Results

All winter-aerated water bodies successfully overwintered trout with no observed or reported winterkill. Lake aeration was first conducted on Fiesta Lake during 2007-08. Summer aeration was conducted at Beaver Lake and Boehlke's Pond.

Conclusion

Lake aeration continues to create, maintain, and enhance recreational angling opportunities for Albertans by ensuring the year-round survival of trout in several stocked waterbodies throughout the province. The Aeration Program creates angling opportunities that would otherwise not exist. Several of the aeration projects would not be possible without partnership contributions.

Communications

- Public notices were placed in local newspapers to notify the public of aeration activities and hazards related to these activities. These notices were sent out in November (ice-on period) and April (ice-off period).
- Informative articles were posted in several newspapers.

Literature cited

Aku, P.M.K., L.G. Rudstam, and W.M. Tonn. 1997. Impact of hypolimnetic oxygen injection on the vertical distributions of cisco (*Coregonus artedi*) in Amisk Lake, Alberta. Canadian Journal of Fisheries and Aquatic Sciences 54: 2182-2195.

Fast, A.W. 1994. Winterkill prevention in lakes and ponds using artificial aeration. Reviews in Fisheries Science 2: 23-77.

Miller, T.G., and W.C. Mackay. 1996. A comparison of mechanical surface aeration and point release air injection used to prevent winterkill in Alberta. Second annual progress report on winter lake aeration, Department of Biological Sciences, University of Alberta, Edmonton, Alberta. 64 pp.

East Dollar Lake, 2007-08. (Photo: David Jackson)

Swan Lake, November 2007. (Photo: David Jackson)

Figure Eight Lake, 2007. (Photo: David Jackson)

Local angler displaying 50-cm rainbow trout from Sulphur Lake. (Photo: David Jackson)