

## **Alberta Conservation Association 2011/12 Project Summary Report**

**Project Name:** *Lake Aeration*

**Fisheries Program Manager:** Peter Aku

**Project Leaders:** Kevin Fitzsimmons, Troy Furukawa, Brad Hurkett, Dave Jackson and Corey Rasmussen

**Primary ACA staff on project:**

Kevin Fitzsimmons, Troy Furukawa, Ryan Hermanutz, Kelly Hooey, Brad Hurkett, Dave Jackson, Mike Jokinen, Chad Judd, Corey Rasmussen, Diana Rung, Brad Taylor and Ken Wright

### **Partnerships**

Alberta Sustainable Resource Development, Fish and Wildlife Division  
Alberta Tourism, Parks and Recreation  
Canadian Forest Products Ltd.  
Clearwater County  
Daishowa-Marubeni International Ltd.  
Devon Energy  
Fisheries Enhancement Society of Alberta  
Northern Sunrise County  
Sundance Forest Industries Ltd.  
TransAlta  
Trout Unlimited Canada, Yellowhead Chapter  
Village of Spring Lake  
Weyerhaeuser Canada Ltd.

### **Key Findings**

- Aeration helped maintain year-round dissolved oxygen levels suitable for survival of stocked fish, thereby creating angling opportunities that would not otherwise exist.
- All surface-aerated waterbodies successfully overwintered trout in 2011/12.
- No reports of summerkill events at any of our surface-aerated waterbodies.

### **Introduction**

Alberta Conservation Association (ACA) uses aeration as a management technique to provide Albertans with recreational angling in areas of the province where such fishing opportunities are otherwise limited. Aerated waterbodies are typically shallow, eutrophic, experience prolonged ice cover, and are prone to both summer and winter fish kills. Low winter hypolimnetic dissolved oxygen (DO) resulting from the interplay of shallow depths, low photosynthetic oxygen production and high biological oxygen demand lead to winterkills (Miller and Mackay

1996). Similarly, the interplay of high surface temperatures and low hypolimnetic DO during the summer results in summerkills (Aku et al. 1997). Our primary objective is to develop and maintain lake habitats that promote year-round survival of sport fish by maintaining DO concentrations at or above 3.0 mg/L all year.

## **Methods**

We use two methods of aeration: mechanical surface aeration in the winter and point-release system for summer circulation and fall de-stratification. Mechanical surface aerators are used during periods of prolonged ice and snow cover (October to April). These aerators oxygenate by producing a fountain of water and through the open water created and maintained by the aerator. Point-release systems use a subsurface bubble diffuser connected to an onshore compressor or windmill to circulate and de-stratify the water column, thereby increasing DO levels and creating uniform thermal and oxygen gradients throughout the water column. We visited each waterbody monthly during the winter to ensure proper aerator function and to measure water temperature and DO profiles. In addition, we monitored temperature, DO, total phosphorus, total nitrogen, ammonia and chlorophyll-a throughout the summer at five waterbodies that may be prone to summerkill (Beaver, Fiesta, Swan, Figure Eight and Dipping Vat lakes).

## **Results**

In 2011/12, we aerated 17 waterbodies throughout Alberta (Table 1) and continued to explore opportunities for new aeration sites. Overall, DO levels remained above 3 mg/L throughout most of the water column in surface-aerated waterbodies. Boehlke's Pond and Hansen's Reservoir (windmill-operated subsurface aerators) experienced very low DO levels at all depths in January 2012. It is suspected that Boehlke's Pond and Hansen's Reservoir experienced winterkill conditions in the late winter of 2010/11. Summer water quality analysis conducted on samples from five waterbodies did not identify any water quality concerns. In June 2011, vandalism to two of three windmill aerators at Boehlke's Pond damaged these aerators beyond repair.

Throughout the year, we continued with the development of aeration projects at West Dollar Lake and continued to identify other future lake aerations projects. Proposed aeration activities at Dipping Vat Lake have been suspended due to low water levels and unresolved adjacent land owner issues. We established and maintained partnerships to assist with costs associated with the development and maintenance of all aeration projects.

Table 1. Location and size of waterbodies aerated by Alberta Conservation Association in 2011/12.

<b>Waterbody</b>	<b>Legal Location</b>	<b>Size (ha)</b>	<b>Winter Angling</b>
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
Muir Lake	30, 31-53-27-W4	29.0	no
Spring Lake (Stony Plain)	30-52-01-W5	69.2	yes
Coleman Fish & Game Pond	SW 24-08-05-W5	3.4	yes
Boehlke's Pond	31-35-15-W4	9.2	yes
Hansen's Reservoir	29-38-03-W5	5.7	yes
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 12-35-06-W5	7.1	no
Millers Lake	SW 08-53-19-W5	35.6	yes
Birch Lake	18-35-06-W5	28.8	yes

## **Conclusions**

We continue to use aeration to create, maintain and enhance recreational angling opportunities for Albertans by ensuring year-round survival of trout in several stocked waterbodies. Several of our aeration projects would not have been possible without partnership contributions. We continue to investigate and develop new aeration opportunities.

## **Communications**

- Posted public service advertisements in local newspapers in November (ice-on period) and April (ice-off period) to notify the public of aeration activities and hazards related to these activities.
- Installed 'Thin Ice' signage at winter-aerated waterbodies to warn the public about the dangers of thin ice conditions and open water associated with lake aeration.
- Presentation to Peace Country Flyfishers Association Meeting.
- Article on Cummings Lake in *The Fairview Post*.
- Aeration article in *Conservation Magazine*, Spring/Summer issue.

## 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 artedii*) in Amisk Lake, Alberta. Canadian Journal of Fisheries and Aquatic Sciences 54: 2182–2195.
- 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.





Alberta Conservation Association staff member, Diana Rung, preparing to collect data at Hansen's Reservoir. (Photo: Chad Judd)



Alberta Conservation Association staff member, Corey Rasmussen, repairing an aerator at Mitchell Lake. (Photo: Chad Judd)





Measuring photic depth with a Secchi Disk at Swan Lake, August 2011. (Photo: Dave Jackson)



Satellite phone used in 2011. (Photo: Ryan Hermanutz)





Installation of access sign at Figure Eight Lake. (Photo: Dave Jackson)