

## **Alberta Conservation Association 2013/14 Project Summary Report**

**Project Name:** Trout Stocking Evaluation

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**Project Leader:** Kevin Fitzsimmons

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### **Partnerships**

TD Friends of the Environment Foundation

### **Key Findings**

- Stocked waterbodies vary considerably in size (0.4 to 4.0 ha, mean = 1.6 ha), shape and depth.
- Water quality parameters varied widely between our 10 study waterbodies, with pH varying the least and nitrates varying the most.
- Estimated angler effort ranged from 57 to 811 angler-hours.
- Water temperatures ranged from 9.3°C to 25.1°C and reached the upper threshold for rainbow trout to survive (25°C) on only one four-hour occasion at Airdrie Pond.
- Dissolved oxygen ranged from 0.0 to 16.8 mg/L and reached the lower threshold for rainbow trout to survive (3 mg/L) at all waterbodies, except Nugent Pond.

### **Introduction**

Stocking trout to create put-and-take fisheries is a popular management tool for providing recreational fisheries. In Alberta, both Alberta Environment and Sustainable Resource Development and Alberta Conservation Association (ACA) annually stock over three million harvestable-sized rainbow trout (*Oncorhynchus mykiss*) into approximately 242 put-and-take waterbodies. Of these, ACA stocks 57 with approximately 121,000 rainbow trout as part of our Enhanced Fish Stocking project. Initial results from our studies (Patterson 2011) suggest that put-and-take sport fisheries are composed of populations of many fewer fish than previously assumed. Most stocked waterbodies are situated close to small municipalities, making them popular destinations. In spite of the importance of the program, very little information exists on the suitability of the waterbodies to support viable populations of stocked fish and the related sport fishery. To assess the suitability of these waterbodies for stocking and to improve ACA's Enhanced Fish Stocking project, water quality and bathymetry data were collected from 47 of the 57 ACA stocked waterbodies in 2011/12 and 2012/13. In 2013/14, we collected water quality and bathymetry data from the remaining 10 waterbodies. Additionally, data on angler effort, hourly temperature and hourly dissolved oxygen (DO) were collected from six waterbodies to

determine their benefit to anglers. These six waterbodies were chosen because they are small, shallow and are suspected to have high water temperatures, low DO levels and low angler use.

## **Methods**

We collected bathymetry data using a boat-mounted Garmin Chartplotter that recorded geographic coordinates and depth every 5 seconds along a series of 5 m wide transects; we mapped the shoreline with a Garmin 60CSx Global Positioning System (GPS) handheld unit. Bathymetric maps for each waterbody were produced using geostatistical tools in Esri® ArcMap 10.0 software.

To assess water quality, we measured temperature, conductivity, pH and DO in situ using a YSI Professional Plus™ multi-parameter and collected grab samples from each waterbody for analysis by Maxxam Analytics for ammonia, conductivity, nitrate, nitrite, nitrogen, pH, total phosphorous and turbidity.

At six waterbodies, angler effort was estimated from photographs taken at hourly intervals by a trail camera. Photographs provided instantaneous counts of anglers, which were used to estimate angling effort during the summer period. Water temperature and DO data were also collected hourly by a HoboTemp U26 data logger suspended mid-column near the centre of each waterbody.

## **Results**

In 2013/14, water quality parameters varied widely among our 10 study waterbodies, with pH varying the least and nitrates the most (coefficient of variations of 5.2% and 227.8%, respectively). Waterbodies varied considerably in size (0.4 to 4.0 ha, mean = 1.6 ha), shape and depth (Table 1). Estimated angler effort ranged from 57 angler-hours at ProAlta Pond (95% CI = 29 – 91) to 811 angler-hours at Nuggent Pond (95% CI = 700 – 924) (Table 2). Water temperatures ranged from 9.3°C to 25.1°C at Airdrie Pond and reached the upper threshold for rainbow trout to survive (25°C) on only one four-hour occasion (Table 2). DO ranged from 0.0 mg/L (Oyen Concrete Plant Pond, Oyen Reservoir, Tees Reservoir and ProAlta Pond) to 16.8 mg/L (Tees Reservoir). At all waterbodies except Nuggent Pond, DO levels reached the lower threshold for rainbow trout to survive (3 mg/L; Table 2). These low oxygen events ranged from 4% of the recording period at Airdrie Pond to 99% of the recording period at Oyen Concrete Plant Pond. Analysis of bathymetry data is in progress.

Table1. Morphometric and water quality variables for selected Alberta Conservation Association stocked waterbodies in 2013/14.

Pond	Mean depth (m)	Max depth (m)	Area (ha)	DO (mg/L)	Temp (°C)	NH <sub>3</sub> (mg/L)	Nitrates (mg/L)	TDS (mg/L)	pH	TKN (mg/L)	TP (mg/L)	Turbidity (NTU)
Anderson	3.0	8.2	2.0	10.4	15.1	0.050	0.00	240	8.7	1.5	0.08	7
Cipperley's Reservoir	3.0	5.6	0.93	8.6	13.4	0.064	0.19	360	7.9	2.2	0.48	3.8
Daysland Pond	2.7	5.7	2.1	12.3	17.7	0.050	0.00	570	8.4	1.9	0.10	5.4
Echo Dale Park	2.0	3.8	2.37	8.6	18.3	0.050	0.01	190	8.5	0.57	0.02	6
Fort Lions	5.0	8.6	4.9	10.2	16	0.050	0.00	360	8.7	0.76	0.02	2.0
Lacombe Park Pond	1.6	2.5	1.45	10.6	14.4	0.050	0.00	1,100	9.4	0.64	0.03	9.4
McVinnie Reservoir	3.5	6.1	4.0	12.5	15.3	0.050	0.00	230	8.8	0.55	0.01	0.9
Radway Pond	3.2	6.8	1.7	10.5	17.3	0.050	0.00	250	8.8	1.2	0.03	2.9
Two Hills Pond	2.7	4.2	1.	9.9	18.2	0.19	0.00	2,400	9.4	2.6	0.05	2.1
Vegreville Children's Pond	2.5	4.4	1.3	6.7	17.3	0.43	0.06	380	8.4	2.1	0.19	1.8

Table2. Morphometric data, temperature, dissolved oxygen and angling effort for selected Alberta Conservation Association stocked waterbodies in 2013/14.

Pond	Mean depth (m)	Max depth (m)	Area (ha)	DO (mg/L)	Temp (°C)	Fishing effort (angler-h)	Fishing pressure (h/ha)
Airdrie Pond	1.53	2.33	0.40	0.1 – 9.5	9.3 – 25.1	633	511
Nuggent Pond	1.53	2.33	0.40	4.8 – 9.3	13.0 – 23.5	811	1,376
Oyen Concrete Plant Pond	2.56	3.70	0.50	0.0 – 3.7	17.8 – 22.1	121	307
Oyen Reservoir	2.41	4.90	0.40	0.0 – 15.4	17.9 – 23.7	134	253
ProAlta Pond	2.48	4.86	1.9	0.0 – 15.2	18.2 – 22.2	57	29
Tees Reservoir	2.03	3.62	0.7	0.0 – 16.8	12.1 – 23.9	413	854

## Conclusions

The bathymetric, water quality and angler effort data will help us assess the suitability of the waterbodies for stocking.

## Communications

N/A

## Literature Cited

Patterson, W.F. 2011. Do hatchery trucks make happy anglers? Evaluating entrenched assumptions of put-and-take fisheries. Unpublished Master's thesis, Royal Roads University, Victoria, British Columbia, Canada.

## Photo Captions



Alberta Conservation Association staff member Troy Furukawa angling at Oyen Concrete Plant Pond. Photo: Alberta Conservation Association  
[filename: Photo1\_TSE\_2013-14\_Alberta Conservation Association.jpg]





Alberta Conservation Association staff member Troy Furukawa collecting water quality data at Viking Lake. Photo: Bill Patterson  
[filename: Photo2\_TSE\_2013-14\_Bill Patterson.jpg]