

## **Alberta Conservation Association 2015/16 Project Summary Report**

**Project Name:** Stocked Trout Survival – Avian Predation at Selected Enhanced Fish Stocking Ponds

**Fisheries Program Manager:** Peter Aku

**Project Leader:** Kevin Fitzsimmons

**Primary ACA staff on project:**

Cale Babey, Andrew Clough, Kevin Fitzsimmons, John Hallett, Jacob Rovere and Diana Rung

### **Partnerships**

Government of Canada – Canada Summer Jobs

### **Key Findings**

- Cormorant activity at Mirror Reservoir was 14.9- and 39.7-fold greater after first and second trout stockings than before stocking.
- Extremely low abundance of rainbow trout at Mirror Reservoir two weeks after stocking is attributed to cormorant predation.
- Avian deterrents failed to prevent cormorants from visiting Mirror Reservoir.
- Abundance of cormorants was low at Windsor Lake and Bashaw Pond compared with Mirror Reservoir; however, their presence may indicate a potential fish predation issue at these sites.
- No cormorants were documented at Vegreville Pond.

### **Introduction**

The Enhanced Fish Stocking (EFS) project creates recreational fisheries in areas of the province where such opportunities do not otherwise exist. Through EFS, we stock approximately 120,000 catchable-sized (i.e., 20 cm) trout into 60 ponds each year, creating “put-and-take fisheries” that allow anglers to harvest up to five fish per day. Most waterbodies are situated close to small municipalities, making them popular family destinations. However, recent evidence suggests some of these waterbodies may not be capable of supporting trout survival beyond mid-summer. Results from our study of seven stocked waterbodies indicated that only 4% of trout mortality was attributable to anglers and that over 90% of stocked trout died of natural causes over the fishing season (Patterson and Sullivan 2013). A variety of factors, including avian predation, likely contributed to the high mortality of stocked trout in EFS waterbodies. During field surveys at Mirror Reservoir in the summer of 2014, we observed a substantial increase in the number of cormorants coincident with trout stocking dates. Anecdotal evidence suggests avian predation of trout at EFS ponds may be widespread and may also occur at Bashaw and Vegreville ponds and Windsor Lake. In this project, we examined the extent of avian predation at Mirror Reservoir,

Bashaw and Vegreville ponds, and Windsor Lake, and assessed the effectiveness of various avian deterrent methods.

## Methods

We collected data on cormorant abundance and activity at Mirror Reservoir, Bashaw and Vegreville ponds, and Windsor Lake using digital trail cameras programmed to take a photograph every 15 minutes throughout the summer from 0500 to 2200 hours. One camera was deployed on each lake and mounted on a tree or sign post. Cameras were deployed approximately 30 days before fish stocking. Trail camera photos were analyzed using the Timelapse2 software program (Greenberg and Godin 2015), and cormorant abundance and activity estimates were generated using the R software program (R Core Team 2014).

On April 15, 2015, we set up three different types of avian deterrents at Mirror Reservoir to dissuade birds from landing on the water and subsequently foraging on stocked rainbow trout. Deterrents consisted of 15 scare balloons (40.5 cm diameter), 4 oversized bald eagle replicas (91 cm in height) placed on the surface of the pond, and 6 raptor-patterned kites (112 cm wing span) tethered and flown from 8.5 m poles around the perimeter of the lake.

In 2015, Mirror Reservoir was stocked twice with a total of 3,000 rainbow trout, 1,500 fish each on May 12 and June 25. We used short-set gill nets on three occasions (May 22, June 1 and July 8) to monitor temporal trends in fish abundance. Nets were set across the reservoir for approximately 20 minutes; we used overnight sets if the 20-minute sets did not capture fish.

## Results

Estimated cormorant abundance and activity was highest at Mirror Reservoir, followed by Windsor Lake and Bashaw Pond (Table 1). No cormorants were documented at Vegreville Pond. Relative to the surface area of the waterbody, there was an increase in cormorant activity of 35.6, 36.1, 3.3, and 1.3 h/ha at Mirror Reservoir (first stocking), Mirror Reservoir (second stocking), Windsor Lake, and Bashaw Pond, respectively, after stocking. For Mirror Reservoir, this translates to a 14.9- and 39.7-fold increase in activity after first and second stockings, respectively. At Mirror Reservoir, large groups of cormorants, which were not present before stocking, were observed shortly after each stocking date and typically persisted for up to 10 days (Table 1). Estimated cormorant activity for 2015/16 did not vary greatly from 2014/15 estimates when no deterrents were used, suggesting we were not effective at preventing birds from foraging at the reservoir. Despite relatively intensive netting of Mirror Reservoir, very few fish were captured (Table 2). We attribute this extremely low abundance of rainbow trout two weeks after stocking to cormorant predation.

Table 1. Cormorant counts and estimated activity at three waterbodies stocked with rainbow trout by Alberta Conservation Association in 2015.

Waterbody	Cormorant counts (two-week period)		Cormorant activity (h) two weeks			
	Before stocking	After stocking	before stocking		after stocking	
			Mean	95% CI	Mean	95% CI
Mirror Reservoir 1st stocking	18	253	11	2–24	164	85–257
Mirror Reservoir 2nd stocking	6	217	4	0–10	159	115–209
Windsor Lake	0	77	0	0	56	25–94
Bashaw Pond	0	3	0	0	2	0–4

Table 2. Summary of gill netting results at Mirror Reservoir in 2015.

Date	Fishing time (min)	Total fish caught	CPUE (fish/100 m <sup>2</sup> 24 h <sup>-1</sup> )
May 22, 2015	276	1	0.82
June 1, 2015	2,518	2	0.23
July 8, 2015	2,838	2	0.24

## Conclusions

At Mirror Reservoir, very high cormorant abundance and activity is likely responsible for extremely low trout abundance shortly after stocking. Estimated cormorant abundance and activity suggest our scare tactics were ineffective at reducing cormorant visitation at Mirror Reservoir. Relative to waterbody surface area, cormorant abundance at Bashaw Pond and Windsor Lake was low; however, their presence may indicate a potential fish predation issue.

## Literature Cited

- Greenberg, S., and T. Godin. 2015. A tool supporting the extraction of angling effort data from remote camera image (feature article). *Fisheries* 40(6): 276–287.
- Patterson, W.F., and M.G. Sullivan. 2013. Testing and refining the assumptions of put-and-take rainbow trout fisheries in Alberta. *Human Dimensions of Wildlife* 18(5): 340–354.
- R Core Team. 2014. R: a language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. Available online at <http://www.R-project.org/>.

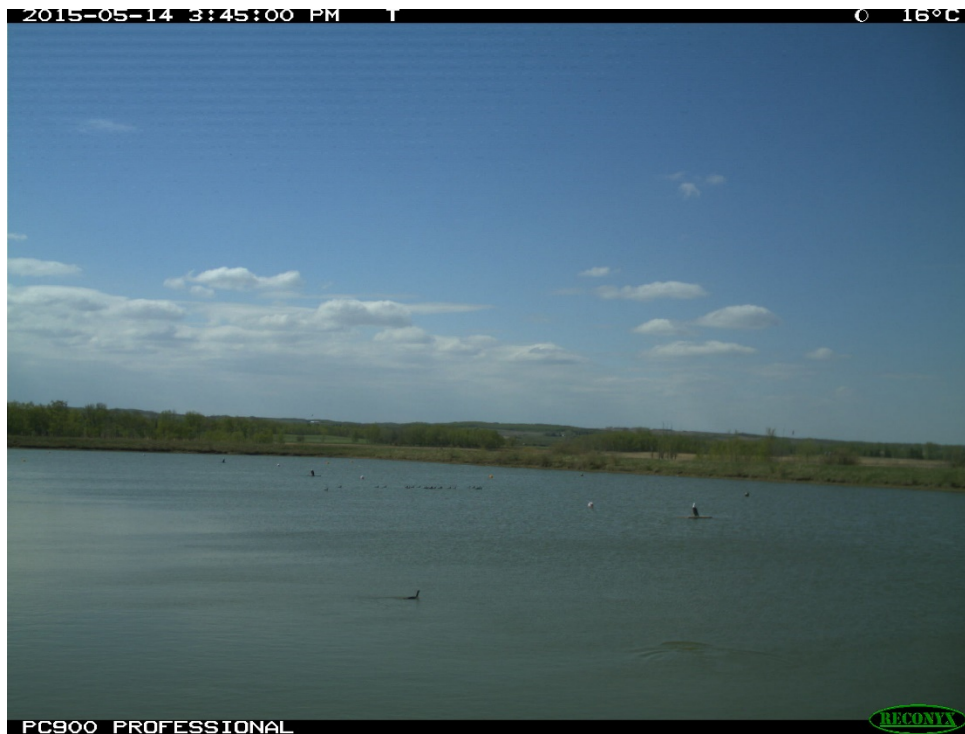


Photo from a trail camera showing cormorants at Mirror Reservoir on May 14, 2015. Photo: Alberta Conservation Association.

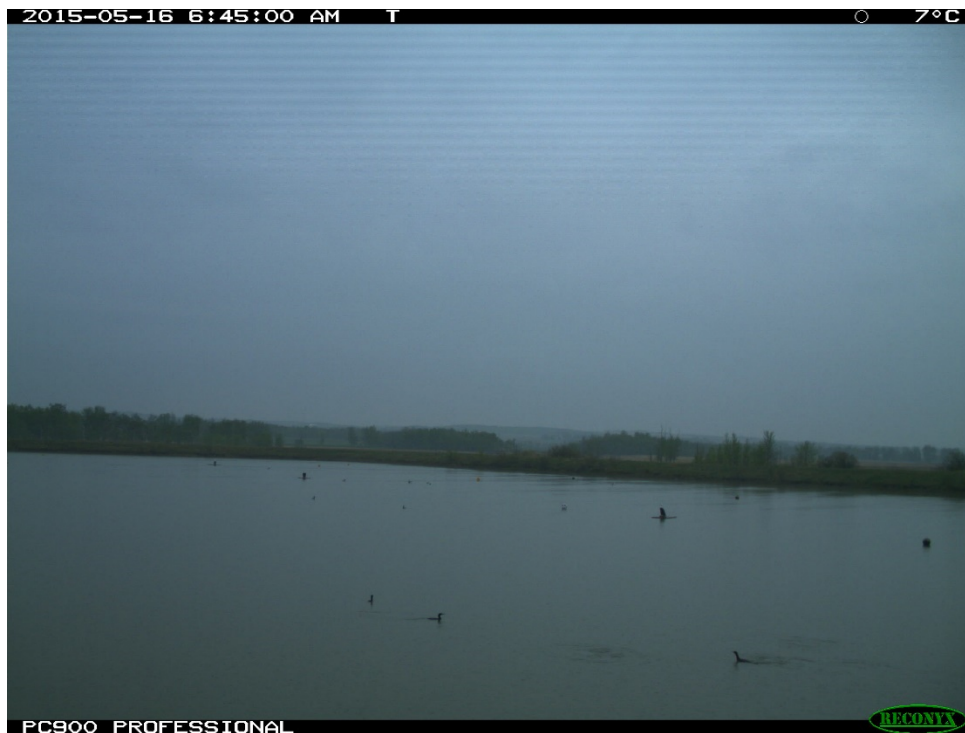
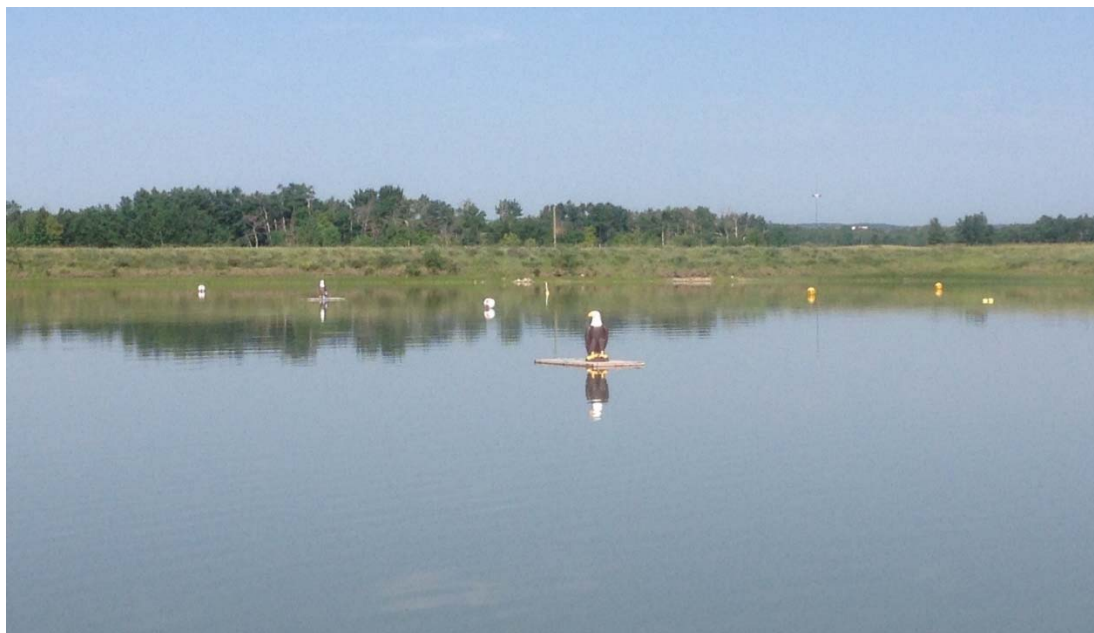


Photo from a trail camera showing cormorants at Mirror Reservoir on May 16, 2015. Photo: Alberta Conservation Association



Alberta Conservation Association staff member Cale Babey holding a rainbow trout netted at Mirror Reservoir. Photo: Kevin Fitzsimmons



Scare devices used at Mirror Reservoir: eagles (near-field and mid-field), balloons (mid-field), and raptor kites (far-field). Photo: Kevin Fitzsimmons



Coverage of scare devices used at Mirror Reservoir. Photo: Kevin Fitzsimmons



Raptor kites flying from poles at Mirror Reservoir. Photo: Kevin Fitzsimmons





Close-up of a raptor kite. Photo: Kevin Fitzsimmons