Progress Report
Double-crested Cormorants and VHF Telemetry on Lake Ontario, 2002

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In 2000, the New York State Department of Environmental Conservation (NYSDEC) began a telemetry study in the Eastern Basin of Lake Ontario. Its purpose was to determine movements of double-crested cormorants in response to management practices such as egg oiling and pellet collecting. The following is a progress report outlining the 2002 telemetry study design and preliminary results.

Study Area

Little Galloo Island
Little Galloo Island (LGI) is located on Lake Ontario, New York approximately 14 km (9 mi) from Henderson Harbor. This 17 hectare island is owned by New York State and is managed by the NYSDEC. In 2002, the maximum number of cormorant nests counted on this island was 4,780 on 19 June.

Methods

On 7 and 8 May, cormorants were captured on LGI using modified leg hold traps set on or near active nests (King et al. 1998, 2000). Two sub-colonies on the island were chosen to trap birds which represented "treated" and "control" sub-colonies. All nests in the treated sub-colony were included in management activities in which all eggs were treated with vegetable oil during four of the six oiling treatments (Table 1). These nests were also disturbed during pellet collection activities (Farquhar et al. 2003, Johnson et al. 2003). The control sub-colony did not experience any egg oiling or pellet collections throughout the breeding season. Twenty-one and 19 birds in the treated and control sub-colonies, respectively, were fitted with VHF transmitters using a backpack harness design (adapted from Dunstan 1972; King et al., 2000). All transmitters were made by John Kenty (NYSDEC) and were in the 172 MHZ frequency range. Transmitters weighed approximately 27 g. The expected longevity (battery life) of these transmitters was approximately one year. Birds were also marked with United States Fish and Wildlife Service (USFWS) aluminum bands and orange colored plastic leg bands with a black alpha-numeric code.

The following measurements were taken on all tagged bird: mass (0.1 kg precision), rectrice width and culmen, tarsus and wing cord length. These measurements were used to determine the sex of each captured bird in accordance with methods described by Glahn and McCoy (1995).

From 7 May through 18 September LGI was visited at least biweekly via boat to trap and tag cormorants, collect VHF data and conduct management and research activities.

Prior to landing on LGI, all transmitter frequencies were scanned to determine presence or absence of each tagged bird. All birds detected were recorded on data sheets which included: frequency, date, location and time of day. Six of the trips to LGI included egg oiling, but the initial and last treatment (7 May and 24 July, respectively) were only partial treatments and did not include eggs in the treated sub-colony (Table 1). Pellet collections were also conducted on all oiling days and continued every two weeks through 8 October.

A data logger connected to a solar charged 12 volt battery, was set up on LGI on 7 May. The data logger scanned each frequency at 1 min 30 sec intervals 24 hours per day through 14 July. The data logger was also operational on 24 July through 8 October, but only at periodic intervals depending on adequate power supply. For analysis purposes, frequencies detected by the data logger were grouped in one hour increments.

A final trip to LGI for the season was made on 8 October to scan for frequencies, collect pellets and dismantle the data logger/solar panel setup.

Surveys were also conducted throughout the breeding season at other Lake Ontario and St. Lawrence River islands: Gull (both US and Canadian), Bass, Calf, Blanket, Snake, Pigeon, East Brothers, West Brothers, Yorkshire, False Duck, Scotch Bonnet, High Bluffs, Main Duck, Griswold, Strachan, McNair and Stoney Islands to track movements of the VHF tagged birds.

In order to assess bird behavior the following time periods were identified: prior to 31 May was considered pre-chick, chick rearing was 31 May-15 July and post chick was after July 15th. Birds detected on the island throughout the pre-chick (egg laying) and throughout most of the chick rearing time period until 9 July were considered to show nest site fidelity within the current breeding season**.** Difference between control and treated was tested with a χ^2 test (d.f.=1, α=0.05).

Birds for this report will be identified consecutively from 1 to 40: 1-21 were birds from the treated sub-colony and 22-40 were birds from the control sub-colony.

Results

Of the 40 birds tagged with VHF transmitters, 16 (40%) were males, 8 (20%) were females and the sex of 16 (40%) was unknown. Thirty-six (90%) of the tagged birds were detected back on the island within seven days of being trapped.

Data logger information was collected from 34 birds. Six birds (3 treated, 3 control) were never detected by the data logger, but were detected while manual tracking. Bird #3 from the treated sub-colony continually had erratic pulse rates (beats per minute) and will not be used in the data analysis.

As of 19 June, over 50% (n=11) of the treated birds and 15.8% (n=3) of the control birds were no longer being detected on LGI (Figure 1). It was not until 14 July or 25 days later that 50% of the control birds were last detected on LGI.

Ten (50%) of the treated birds and 15 (78.9%) of the control birds were considered to show nest site fidelity on LGI within the breeding season. Preliminary results indicate a significant difference (χ^2 d.f.=1,α=0.05) in nest site fidelity between treated and untreated (control) sub-colonies.

Of the birds that did not show nest site fidelity, eight treated and three control birds abandoned the island within the pre-chick time period. Two treated and one control bird were believed to have abandoned LGI during the chick-rearing time period. Hatch and Weseloh (1999) indicated that cormorants need a minimum of three months to successfully nest and raise young to independence from parental care. It is assumed that these 14 birds had the potential to fledge young at alternative nest sites.

Two of these birds (1 treated, 1 control) were detected on Bass and Gull (U.S.) islands throughout the pre-chick and chick rearing time periods and are believed to have attempted to renest on these islands. These two islands are included in the NYSDEC nest removal program (Farquhar et al. 2003). It is also believed that these two birds were not successful in reproducing due to the management activities.

Four (3 treated, 1 control) of these birds were never detected again after they were last heard on LGI. Five birds (4 treated, 1 control) were also detected on four Canadian islands (Scotch Bonnet, False Duck, High Bluff and Snake) on Lake Ontario. One of the birds detected on False Duck Island was also confirmed to be nesting during a routine color band observation survey by the Canadian Wildlife Service (CWS).

One treated bird was detected back on LGI on 8 October and was probably loafing on the island during migration. It is unclear whether the remaining two birds (1 treated, 1 control) that did not show nest site fidelity were successful in renesting and producing young old enough to fledge since they each were detected in the eastern basin, but only once or twice after their departure from LGI.
The ten birds in the treated sub-colony that exhibited site fidelity to that island were determined to be unsuccessful in reproducing young in 2002.

Movement of two birds (1 treated, 1 control) that did exhibit nest site fidelity was also documented. One bird was detected on the St. Lawrence River near Lac St. Louis, Montreal and the other bird was detected on False Duck Island, but after the chick rearing time period.

Data logger hits from two treated sub-colony birds (#6 and #7) and two control sub-colony birds (#25 and #28), all showing nest site fidelity, were further analyzed for this report. The data collected on the remaining 36 birds is in need of further analysis.

Birds #6, #7 and #25 were identified as males and #28 as a female. The amount of time each bird spent on the island was analyzed by looking at the presence of the bird on the island by the hour from 14 May -9 July (Figure 2). Three of the birds (one treated and two control) exhibited similar behavior in terms of total hours that they were present on the island (Figure 2). All four birds exhibited a decline in the number of hits between 0600 and 0800 thus showing a departure from the breeding colony and a maximum increase in hits or return to the colony around 20:00.

Discussion

As discussed in previous reports, one of the initial concerns is whether capturing techniques (leg hold traps) and handling of the birds causes them to abandon their breeding colony. Seven days after being trapped 90% (n=36) of the tagged birds were detected back on the island. In 2001, 100% (n=25) of the tagged birds were detected back on LGI on or within 11 days of being trapped (Mazzocchi 2002). This capture method is not without risk, but it is an effective and efficient means of capturing nesting birds.

Although egg oiling as a management tool is very effective in reducing cormorant productivity (Farquhar et al 2003) there is evidence that continual disturbance on the nesting colony may increase the chance of abandonment. This study showed a significant difference in nest site fidelity between the treated and control birds, but one must consider when the abandonment occurred in order to assess whether the management action should be considered successful or not.

Of the 14 birds that did not exhibit nest site fidelity within the breeding season, 12 (9 treated, 3 control) had the potential to renest and produce young that could successfully fledge. Of those nine treated birds one was detected within the eastern basin of Lake Ontario on 9 July and was perhaps still searching for a new nesting site. This bird was also probably not successful in reproducing.

This suggests that eight (40%) of the treated birds may have relocated to another nesting site and produced young. The chances of all of those birds being successful is slim, but should be considered when making management decisions. Movements associated with management activities such as egg oiling may require increased harassment of cormorants on nesting colonies on both Lake Ontario and the St. Lawrence River, in both U.S. and Canadian waters, to minimize chances of successful renesting.

Behavioral differences between birds from treated and control sub-colonies that exhibited site fidelity is in need of further investigation. Data from all 40 birds will be analyzed to determine all behavioral differences.

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Table 1. Movements of Double-crested Cormorants on Little Galloo Island in response to egg oiling, 2001.

Date	Oiling Trip #	# Birds last heard on LGI this day (treated/control)	Comments:
5/07/02	1	2/0	Twenty-one birds tagged in "treated" sub-colony. This sub-colony not oiled today.
5/08/02		1/1	Nineteen birds tagged in "control" sub-colony.
5/15/02		0/1	
5/20/02	2	2/1	Treated sub-colony oiled this day.
5/22/02		1/0	
5/26/02		1/0	
5/27/02		1/0	
6/06/02	3	0/0	Treated sub-colony oiled this day.
6/19/02	4	2/0	Treated sub-colony oiled this day.
6/28/02		0/1	
7/03/02	5	0/0	Treated sub-colony oiled this day.
7/09/02		1/0	
7/11/02		0/1	
7/12/02		0/2	
7/13/02		1/1	
7/14/02		0/1	
7/24/02	6	2/3	Spot oiling today. Did not include "treated" sub-colony.

Figure 1. Percent of Double-crested Cormorants last detected on Little Galloo Island by date, 2002.

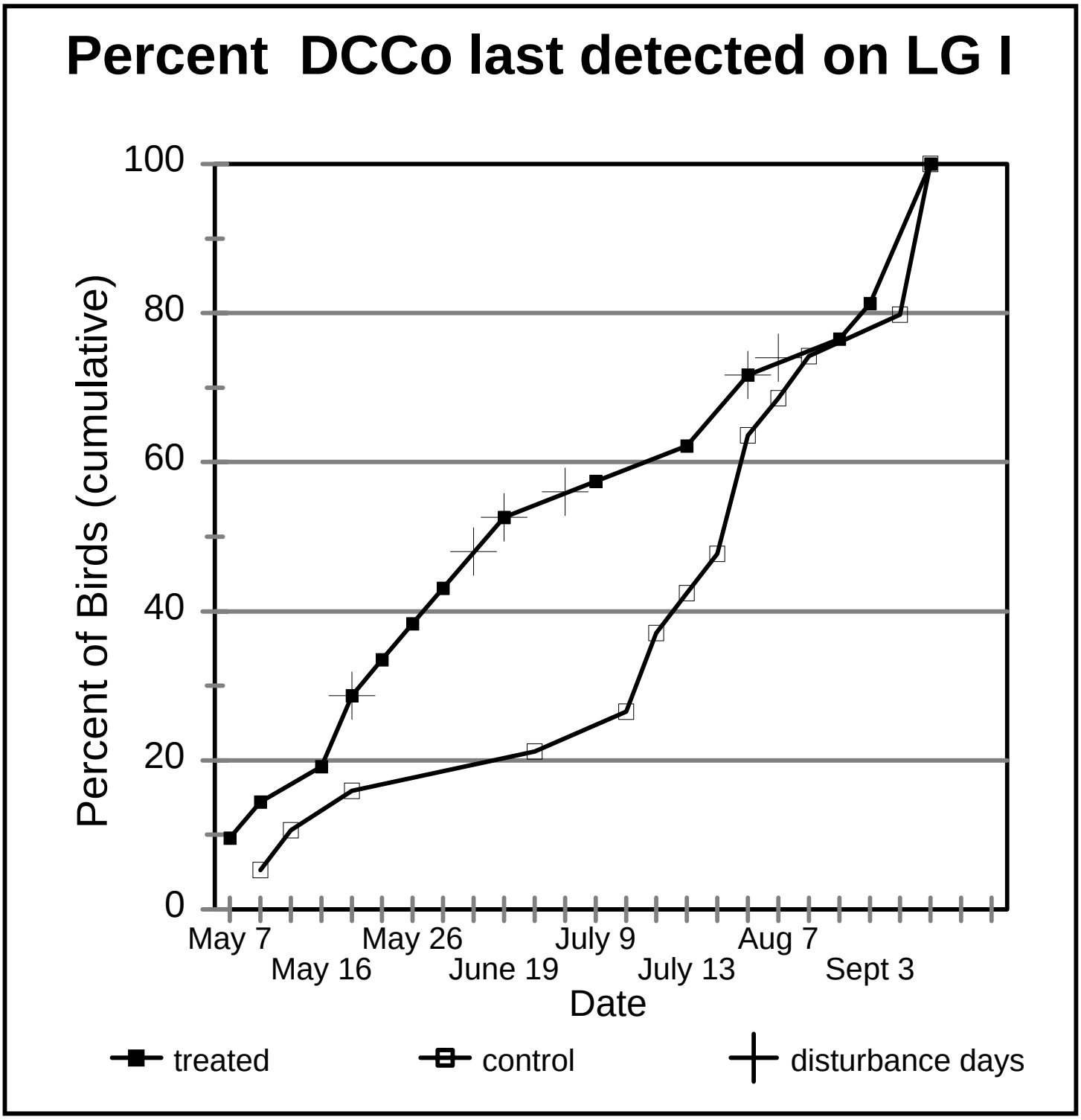

Figure 2. Presence of Double-crested Cormorants on Little Galloo Island by the hour from 14 May through 9 July, 2002. Maximum number of hits is 57.