<u>2012 Report on the Common Tern (*Sterna hirundo)* at Oneida Lake</u>

Report to the New York State Department of Environmental Conservation

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Introduction/ Background: The Common Tern (*Sterna hirundo*) is listed as a threatened species in New York State. The species predominantly suffers from loss of suitable nesting habitat in association with landfill-subsidized increases in gull populations (Mattison, 2006). This is the case with the Common Tern colony at Oneida Lake. The colony is limited to one nesting island on the lake, Little Island, which is reserved annually for terns by Cornell University. Cornell University has monitored and supported the colony since 1976, implementing methods that include chick banding, adult recapture, and habitat enhancement through the addition of chick shelters, provision of additional nesting substrate and seasonal installment of a gull-exclusion grid. Fieldwork during summer 2012 continued these management practices and also introduced artificial nesting platforms as an experiment. Cornell University's work regarding the Oneida Lake Common Tern colony is focused on increasing tern numbers and aiding the birds in establishing a stable, self-perpetuating inland colony. The NYDEC Management Goal for the Oneida Lake Common Tern colony is to have a stable population with at least 500 nests per year. High gull numbers have precluded terns from colonizing additional islands on the lake, and this management goal is sporadically achieved with Little Island's limited spatial capacity. In light of this colony's and species' limited breeding habitat, the experiment with artificial nesting platforms was performed to assess platform suitability as alternative nesting substrate. Platform height above water level, and position on the island, were the two characteristics tested to determine if these factors affected platform suitability (Figure 1). Restoring the Common Tern to its native habitat enhances biological diversity and allows for the persistence of a species with its own intrinsic value.

Methods:

Artificial Nesting Platform Installation: Four 4-foot (1.22 m) by 8-foot (2.46 m) plywood platforms were installed at the periphery of the island: 2 on the east shore and 2 on the west shore. Each shore had one platform installed at island level (about 0.5 feet or 0.15 m) and one platform installed 2 feet (0.61m) above water level. Thus, our parameters for height and location were established. All 4 platforms included a 4-inch (10.16 cm) lip to prevent chicks from falling off, and were secured to metal stakes. The platforms were covered with a 1-inch-deep (0.25cm) layer of shell substrate.

Enclosure Installation: We installed 4, 4-foot (1.22 m) by 8-foot (2.46 m) enclosures on the island in order to assess chick productivity on the island in comparison to productivity on the platforms. We created the enclosures by wrapping chicken wire and heavy gauge plastic mesh fencing around 6' (1.83 m) stakes installed with a sledgehammer. The chicken wire and plastic fencing were attached to each other and to the stakes using plastic zip ties.

Nest Monitoring: We labeled nests on the platforms and recorded nest contents on a weekly basis. We also banded chicks and recorded numbers of dead chicks. When the shell substrate was depleted, we refilled the platforms with shells. Reproductive success for both platforms and enclosures was evaluated based on hatching rates and the percentage of young to reach 7 days of age (after day 7, surviving chicks jumped off the platforms, while enclosure chicks remained until they fledged).

We labeled nests in the enclosures and recorded nest contents on a weekly basis, as for the platforms. We banded chicks and recorded numbers and band number of dead chicks.

Nest Labeling: We created nest flags using numbered marking tape tied to short metal stakes. We placed one flag next to each nest. In this way we kept track of the progress and fate of these nests. We recorded nest contents by returning to the island several days each week via small motorboat.

Chick Banding: We banded all chicks hatched in the enclosures and platforms, as well as all the catchable chicks on the island. We used bands provided by the USGS Bird Banding Laboratory. We placed the aluminum band on the right leg of each chick. At the time of banding, we recorded the chick's age. We also recorded the age and number of dead chicks during every visit to the island, and whether the dead chicks were banded or not.

Adult Recaptures: We recaptured adult Common Terns on the platforms, in the enclosures, and on the island. Adults were trapped with either dip nets, or by using walk-in traps. We recaptured the birds in order to record their band numbers (Table 1). Dip nets were used to capture birds in flight. Walk-in traps were used to capture adults incubating eggs. The PVC- frame, mesh-sided, walk-in traps were set over nests. The adults enter through a small hole to incubate their eggs. We then approached quickly, removed the bird from the trap, and recorded its band number. Recapturing banded Common Terns is important for understanding the Oneida Lake population's origins, migration dynamics, age distribution, and survivorship.

Gull Exclusion Grid: Traditionally Cornell erects a seasonal 20-lb-test (9. 07 kg) monofilament grid in early April that is intended to reserve the island for the Common Terns. Once the terns return in sufficient numbers to defend the island independently, the grid is disassembled and removed. This was the second year we did not erect the grid due to poor weather near the time of installation, and as a means to test its continued necessity.

Diet: We made visual notes of the fish species the terns were bringing back to the island while foraging.

Weather: We recorded weather conditions each time we visited the island. In 2012, there were relatively few severe storms during summer.

Other colonial waterbird species monitoring: Our research also included monitoring the other waterbird populations on the lake. We monitored Ring-billed Gulls (*Larus delawarensis*), Herring Gulls (*Larus argentatus*), Great Black-backed Gulls (*Larus marinus*) and Double-crested Cormorants (*Phalacrocorax auritus*) on Wantry and Long

Islands. We performed dusk and daytime counts of roosting cormorants. We approached the islands via boat near sunset and counted cormorants with binoculars while offshore of the islands, due to the cormorants' tendency to flush easily. We also estimated the number of adult gulls for each gull species during our cormorant counts.

Results:

Gull Exclusion Grid: This was the second year without the gull exclusion grid in place, and we observed the return of Ring-billed Gulls to Little Island. This year gulls began colonizing Little Island prior to tern arrival, and continued nesting into mid-June. We destroyed a total of 35 Ring-billed Gull nests containing 50 eggs during our management this field season (a portion of this figure represents renesting attempts). It is evident that the gull exclusion grid is still very much needed in reserving Little Island for Common Tern nesting.

Adult Common Tern Recaptures: We recaptured 64 banded, adult Common Terns (Figure 2). The age distribution of recaptured adults during the 2012 field season (Figure 3) follows a similar structure to that of past years (Figure 4). We recaptured 2 birds that were not originally banded on Oneida Lake: a 5-year-old bird from Massena, New York, and a 15-year-old tern from Isle la Motte, Vermont. These 2 birds were the first incidence of recaptured adults in recent years that were not hatched and banded at Oneida Lake.

Diet: Predominantly, we observed gizzard shad (*Dorosoma cepedianum)*, smallmouth bass (*Micropterus dolomieu*), yellow perch (*Perca flavescens*) and sunfish in tern diets. To a lesser extent, we observed largemouth bass *(Micropterus salmoides)*, white perch (*Morone americana*), golden shiners *(Notemingonus crysoleucas)* and killifish. In one instance, a tern chick regurgitated a grasshopper (*Schistocerca americana*).

Nesting Data for the Common Tern Colony: The peak count was 515 Tern nests on Little Island during the 2012 field season (Figure 5). Platform nests comprised 9% of total number in 2012. The NYDEC management goal for the Oneida Lake Tern Colony is 500 nests. We also banded 818 Common Tern chicks during 2012. The chicks had a 72% survival rate this year, which was relatively high (Figure 6 and Figure 7).

Other Oneida Waterbird Counts: We conducted counts of Double-crested Cormorants throughout the summer (Figure 8). The Oneida Lake cormorants did not produce successful nests this year, as nest attempts were destroyed by NYSDEC staff. Numbers increased later in the season as the birds began to migrate south.

Artificial Nesting Platforms: The hatch rate was not significantly different between high and low platforms (Figure 9), or between west and east platforms (Figure 10). Additionally, fledge rates (defined as the proportion of chicks to reach 7 days of age) was not significantly different between the enclosures and platforms. Nesting density was also similar between the enclosures and the platforms (4.6 and 3.9 nests/m^2, respectively). The age range of Terns nesting on the platforms, and birds nesting in the enclosures, was similar (4-12 and 4-10 years, respectively) and followed a similar pattern (Figure 11).

Our study concluded that nesting success on the platforms was comparable to the island, and platforms can substitute as suitable, cost-effective, and easily-implemented nesting habitat for this space-limited Common Tern population.

Discussion:

We demonstrated that platforms provided a very similar nesting environment to that available on Little Island. Comparable age distributions indicated that the platforms did not attract any particular age group of nesting terns (e.g., young, inexperienced birds). The results also suggest that height and location of platforms did not affect tern nesting success.

Raised platforms may provide benefits by preventing over wash of nests during severe storms, reducing the need for replacement clutches. Laying a replacement clutch is a significant parental investment and some birds choose not to relay (Wendeln, Becker and Gonzalez-Solis, 2000). The number of eggs per clutch, and egg mass, are usually reduced in replacement clutches (Brown and Morris, 1996). The raised nature of the platforms can prevent the need for replacement clutches by ensuring that first clutches persist and are not destroyed by waves.

Nesting platforms can be used as an easily-implemented, economically-viable conservation tool. The platforms can provide the Oneida Lake Common Tern colony with additional nesting space and facilitate population growth. A long-term management plan for enhancing Common Tern nesting habitat should be developed.

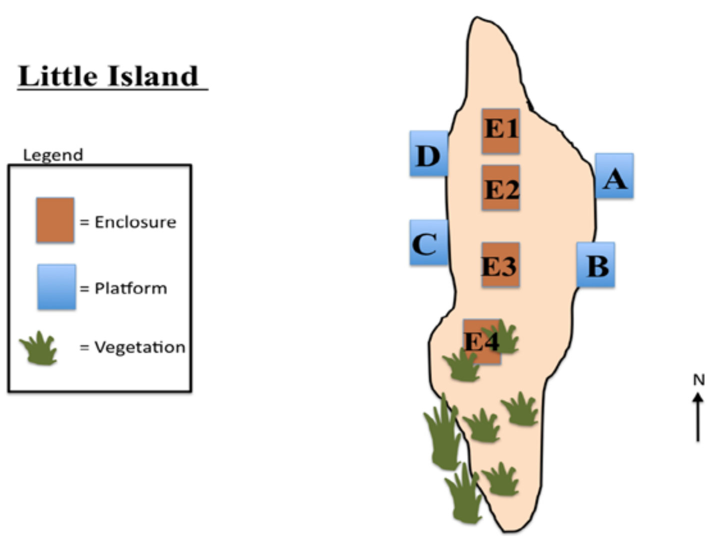

Figure 1: Layout of Platforms and Enclosures. Nesting Platforms were labeled A-D. Platforms D and C were the west shore docks and A and B were the east shore docks testing location on island. Platforms B and D were high docks (2’) and Platforms A and C were low docks (island level). Enclosures were labeled E1-E4.

Table 1: Adult Common Tern recapture data on Little Island, Oneida Lake, 2012.

Dates of Adult Capture	Number of Birds Captured	Notes
June 7, 2012	9	Bird 1262-01588 nesting in Platform D, Bird 1262-01588 nesting in Enclosure 2, Bird 1262-01569 nesting in Enclosure 2
June 14, 2012	8	Bird 1262-01227 nesting in Enclosure 4, Bird 1212-00411 nesting in Enclosure 2
June 22, 2012	8	Bird 1262-01557 nested in Platform B
July 28, 2012	6	
July 10, 2012	7	
July 12, 2013	13	Bird 9822-52617 nesting on island banded in Vermont, Bird 113-29924 nesting in Enclosure 1, Bird 1262-01224 nesting in Platform B
July 19, 2012	6	Bird 1292- 16974 nesting in Platform D
July 25, 2012	4	Bird 1292-16953 nesting in Enclosure 3
July 27, 2012	8	

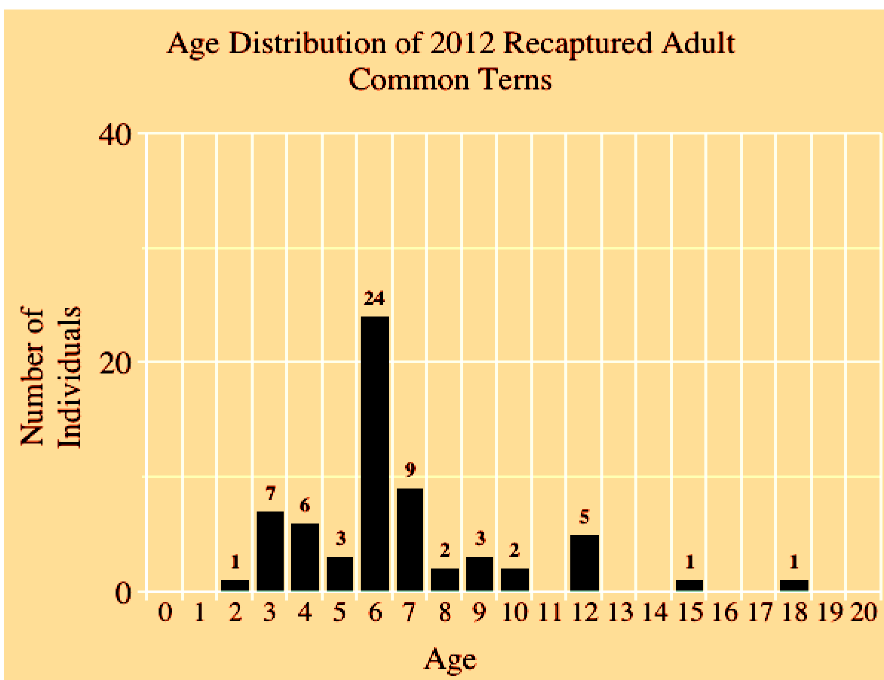

Figure 2: Age distribution of recaptured adult Common Terns at Oneida Lake, 2012.

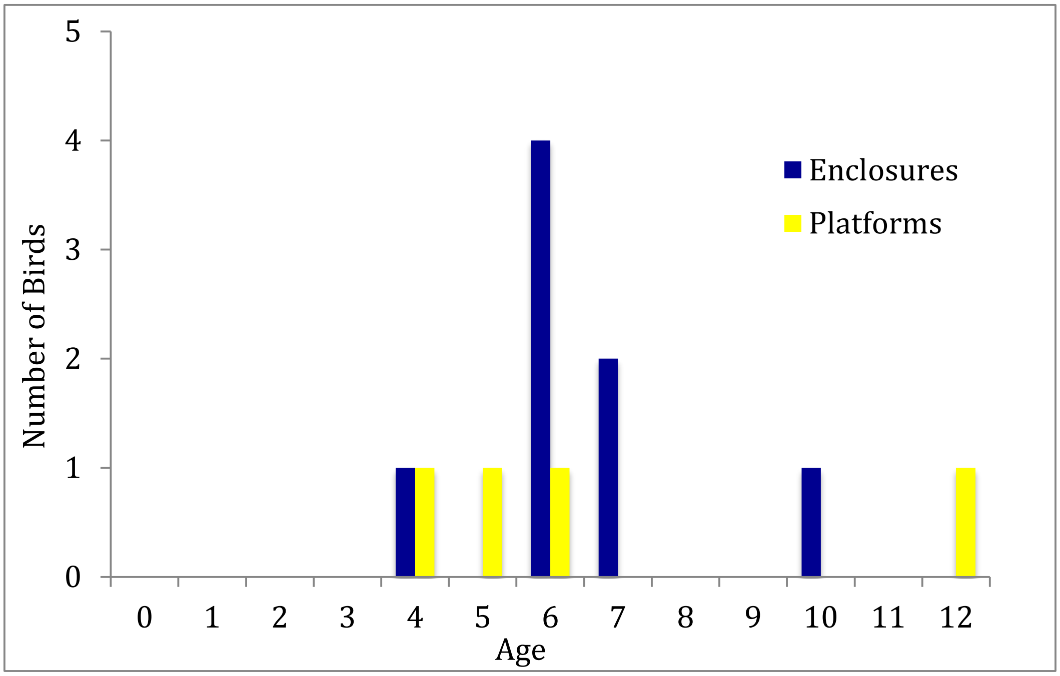

Figure 3: Age distribution for adult Common Terns nesting in the enclosures and platforms on Little Island, Oneida Lake, summer 2012.

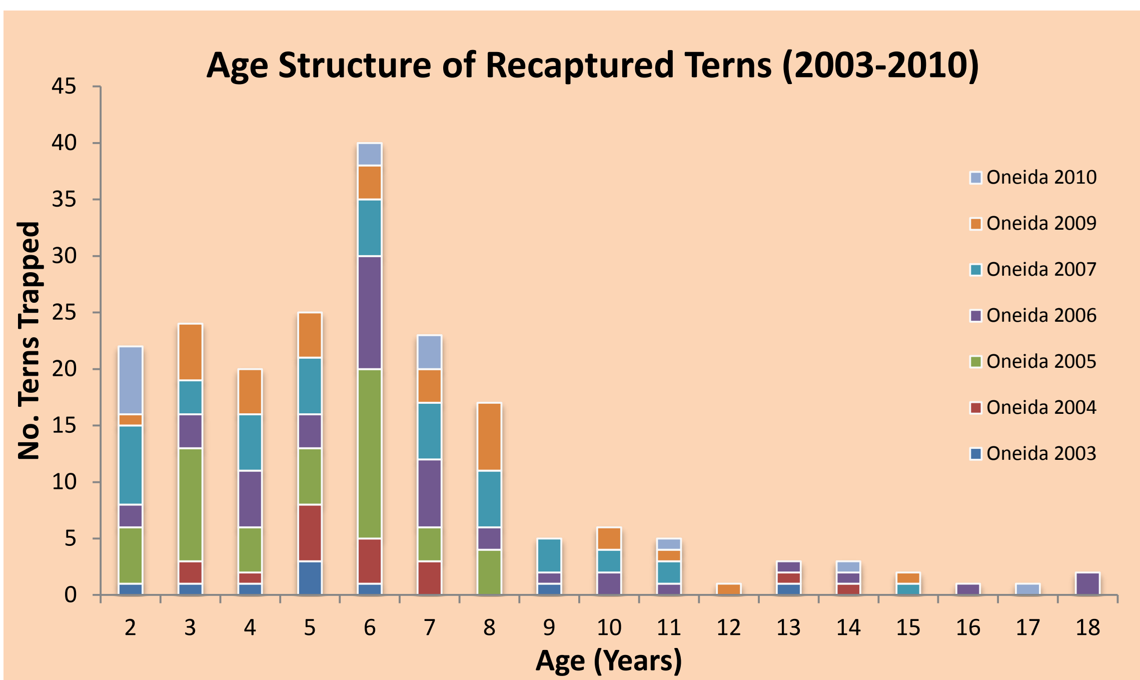

Figure 4: Age structure of recaptured Common Terns at Oneida Lake (2003-2010).

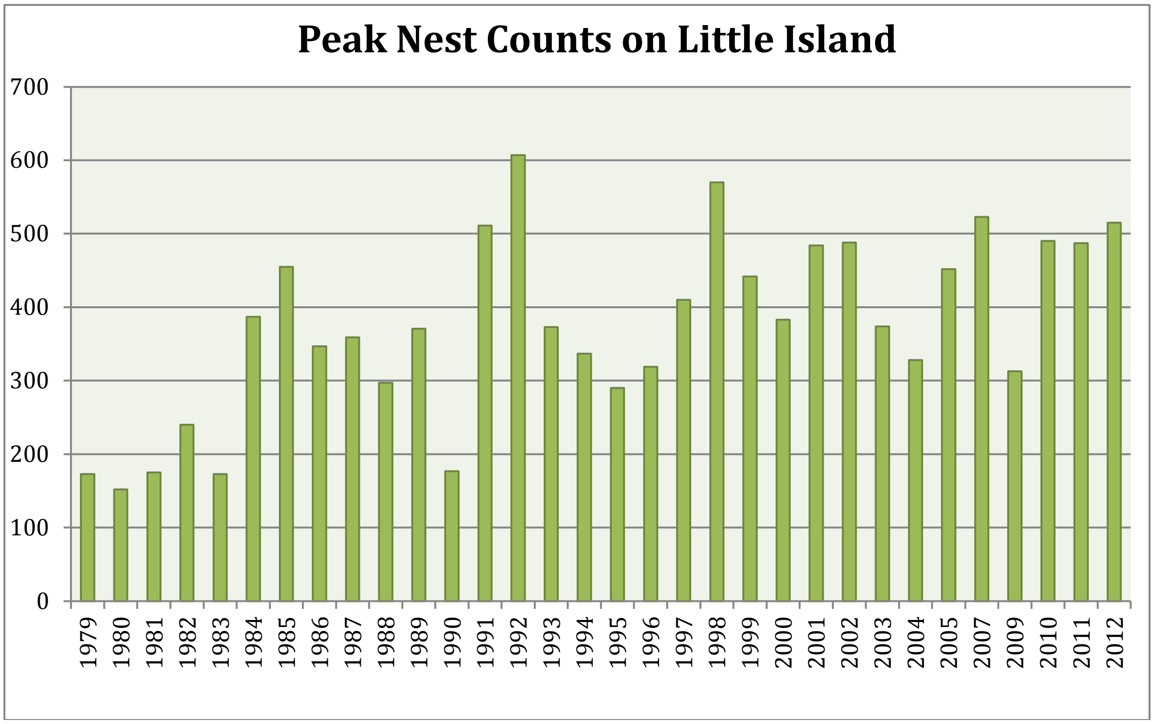

Figure 5: Peak Tern nest counts on Little Island, Oneida Lake (*n*= 515 nests in 2012).

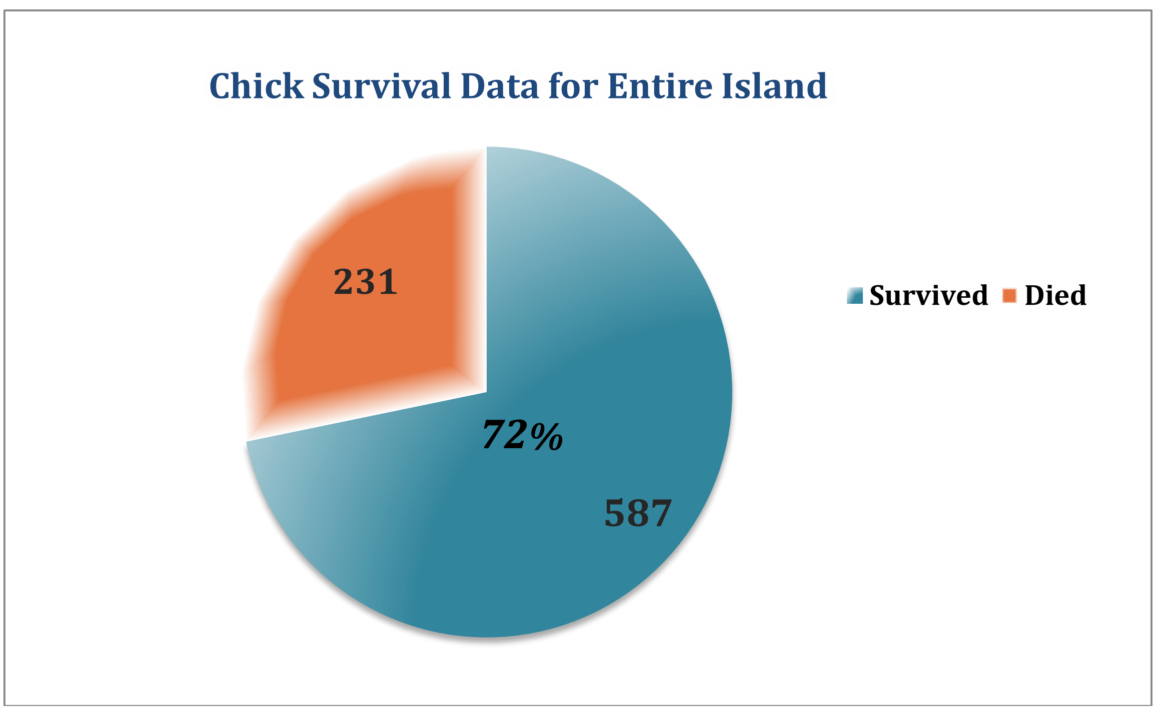

Figure 6: Common Tern chick survival data for Little Island, Oneida Lake, 2012.

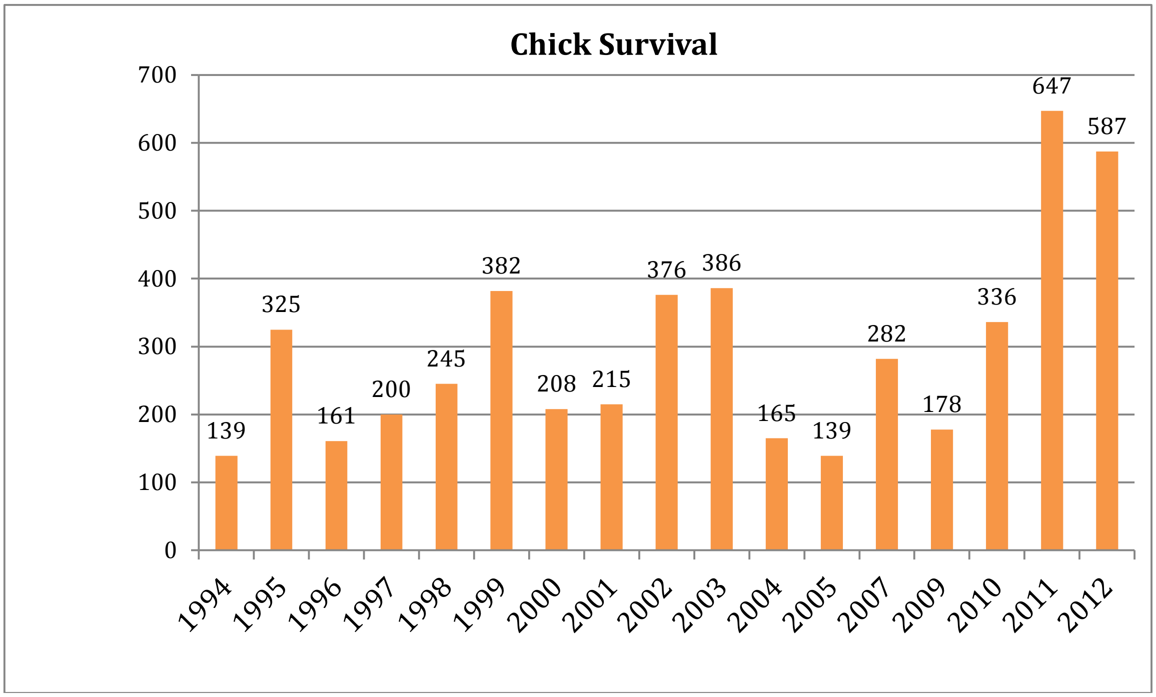

Figure 7: Past chick survival data for Common Terns at Oneida Lake.

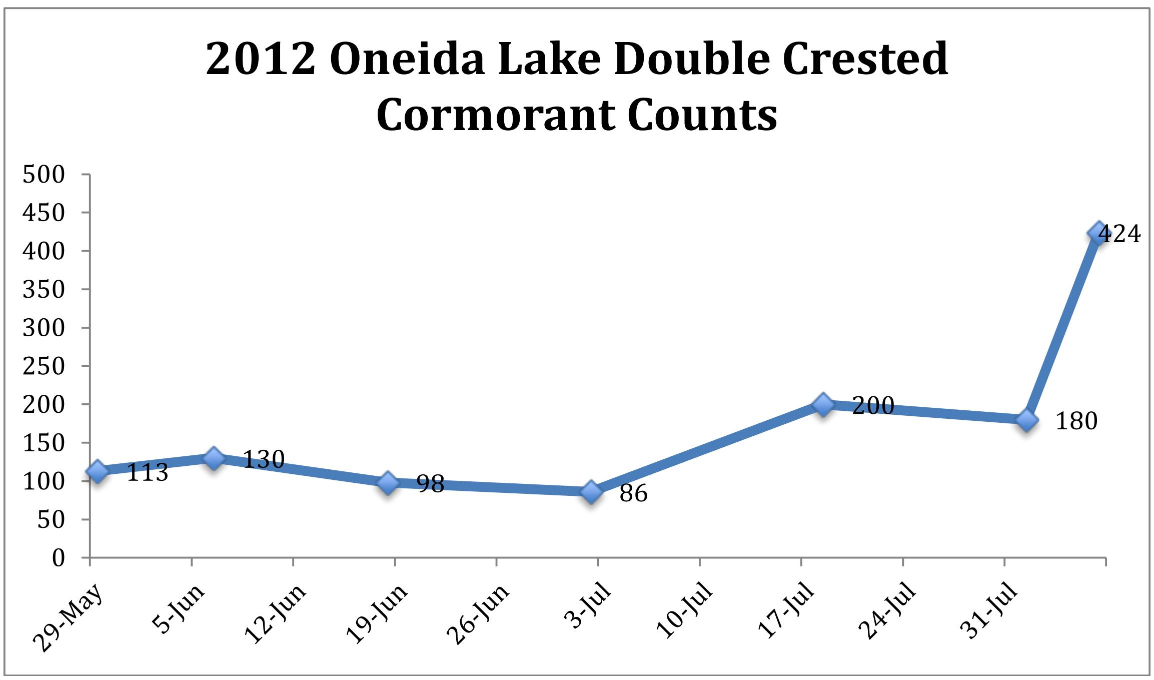

Figure 8: Double-crested cormorant counts for Oneida Lake, NY, during summer 2012.

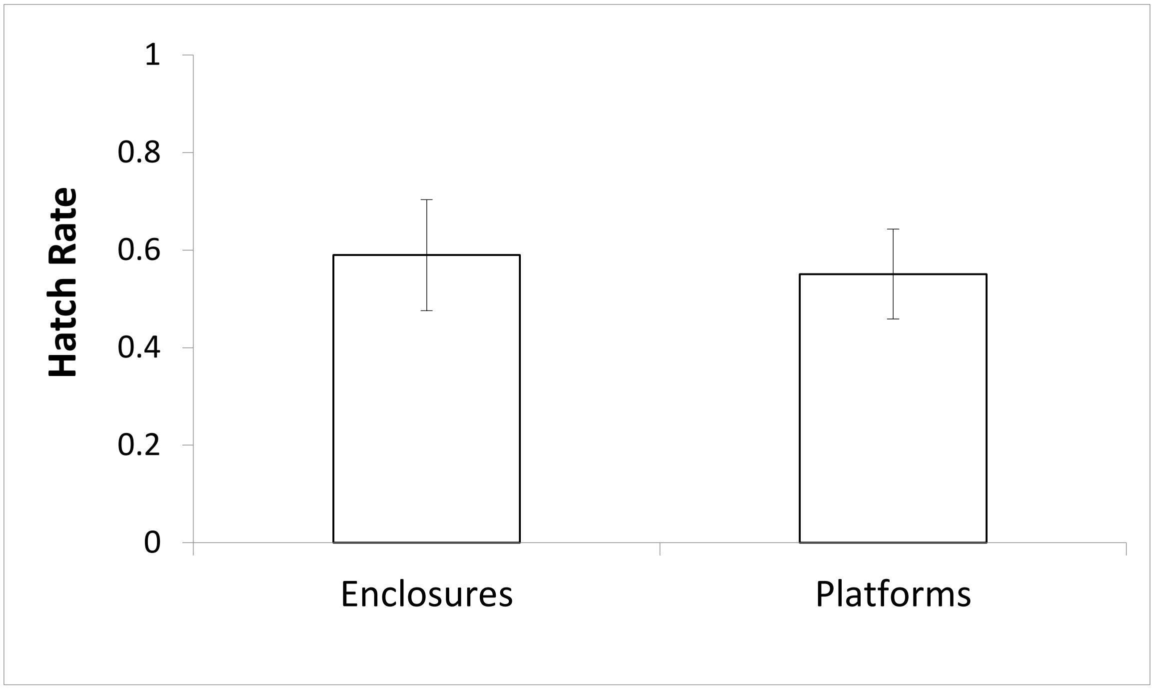

Figure 9: Average egg hatch rate for enclosures and platforms on Little Island, 2012.

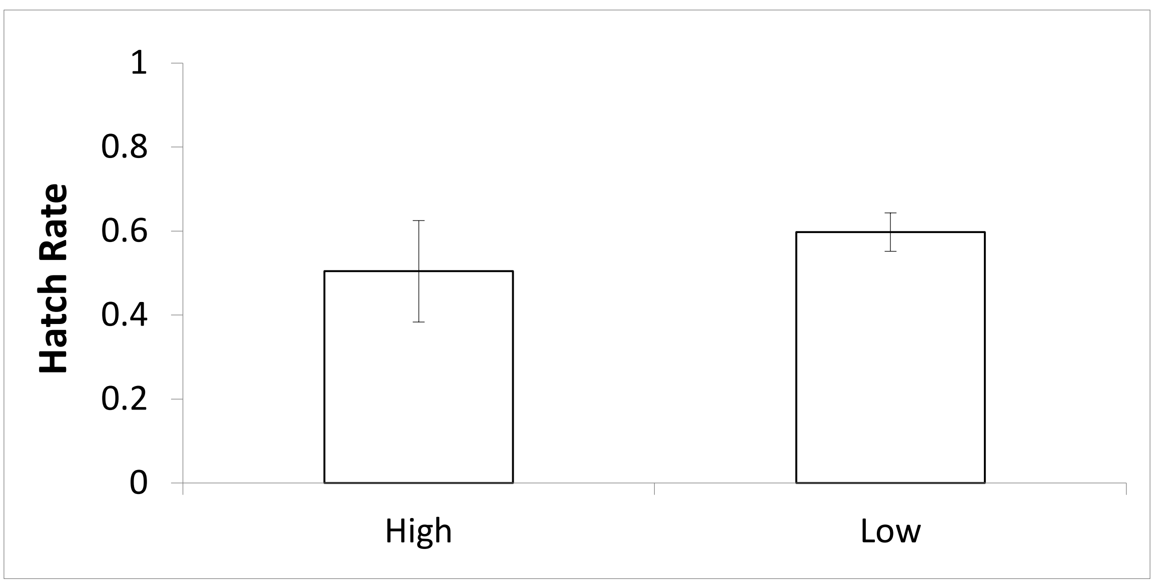

Figure 10: Average egg hatch rate for high and low platforms on Little Island, 2012.

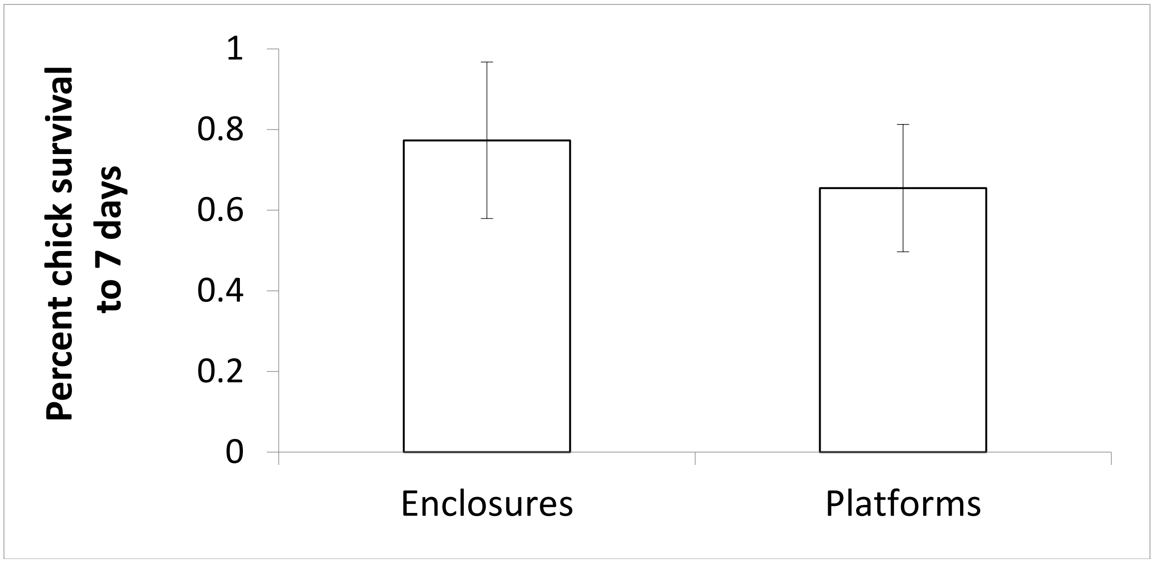

Figure 11: Percent chick survival to 7 days for enclosures and platforms on Little Island, 2012.

Literature Cited

Brown, K., and R. Morris. 1996. From tragedy to triumph: renesting in ring-billed gulls. *Auk* 113(1): 23-31.

Mattison, P. M. 2006. Quantifying disturbance factors and effects in common terns (*Sterna hirundo*) using visual, audio, and reproductive data. M. S. Thesis, Cornell University, Ithaca, NY.

Wendeln, H., P. H. Becker, and J. Gonzalez-Solis. 2000. Parental care of replacement clutches in common terns (*Sterna hirundo*). *Behavioral Ecology and Sociobiology* 47(6): 382-392.

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