Common Tern (*Sterna hirundo*) Research and Management Activities at Oneida Lake, New York, 2014

Report to the New York State

Department of Environmental Conservation

Prepared by Ryan Rodriguez, Student intern
Elizabeth Craig and Dr. Paul Curtis, Supervisors
Department of Natural Resources
Cornell University
Ithaca, NY 14853
November 2014

Introduction/Background:

The Common Tern (*Sterna hirundo*) is listed as a threatened species in New York State. This is largely due to the loss of suitable nesting habitat which is strongly correlated with landfill-subsidized increases in gull populations since gulls also compete for similar nesting space (Mattison, 2006). The Common Tern colony at Oneida Lake also faces these issues, and has been reduced to one nesting island on the lake, Little Island, which is reserved annually for the tern colony by Cornell University. Cornell University has monitored and managed the colony since 1976, and continues implementing methods such as chick banding, adult recapture, and habitat enhancement, including chick shelters and providing additional nesting substrate. These management practices continued during the 2014 field season. This was the second year of our geolocator study. We also initiated a pilot project to evaluate hatching success, and determine if egg hatch rates may be impacted by trapping or geolocator banding. The goals of the Cornell University research and management efforts were focused on increasing tern numbers and establishing a stable, self-perpetuating inland tern colony. The NYSDEC management goal for the Oneida Lake population is to reach stability with at least 500 nesting pairs per year. High gull numbers have precluded terns from colonizing additional islands on the lake, and this management goal is sporadically achieved due to Little Island's limited nesting space. 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:

Nest Labeling: We created nest flags using numbered marking tape tied to short metal stakes (Fig. 1). We placed a flag at nests where we recaptured adults, and took particular note of marked nests that had adult terns with newly-attached geolocators. We monitored marked nests so that we did not accidentally recapture the same adult terns.

Chick Banding: We banded all the tern chicks we could find on the nesting island, and used aluminum leg bands provided by the USGS Bird Banding Laboratory. We placed the aluminum band on the right leg of each chick, and we recorded the bird's age. We also recorded the age and number of dead chicks found during each visit to the island, and whether the dead chicks were banded or not.

Geolocators: This was our second year using geolocators, and we placed the geolocator affixed to an orange plastic band on the left leg of 10 different adult terns. Each tern we marked with a geolocator was previously marked with a USFWS aluminum leg band, and was actively nesting at the time of capture. If we recapture terns with geolocators in 2015, we will able to learn about the migration routes and winter destinations for Common Terns nesting at Oneida Lake. We also recorded the USFWS band number, head-bill length, wing length, culmen length and diameter, and the time it took for us to attach the geolocator to each tern. In addition, we recaptured any nesting terns that had a yellow geolocator band (from summer 2013) to determine the return rate for adult terns with geolocators.

Adult Recaptures: We recaptured adult Common Terns with either dip nets, or by using walk-in traps, and recorded their band numbers. Dip nets were used to capture birds in flight. Walk-in traps were used to capture adults incubating eggs. The PVC- frames covered with mesh netting (Fig. 1) were set over nests. The adults enter through a small hole on one side in order to incubate their eggs. We then approached quickly, removed the bird from the trap, and recorded its band number. Recapturing banded adult terns was important for understanding the survivorship, age distribution, and nest-site fidelity for the Oneida Lake colony.

Other colonial waterbird species monitoring: Our research also included monitoring the other colonial waterbird populations on the Oneida 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 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:

Nesting Data for the Common Tern Colony and other waterbirds: During the 2014 field season, the peak count for tern nests on Little Island was 350 on June 23rd (Fig. 2), and we banded a total of 126 Common Tern chicks this summer (Fig. 3). Long Island had peak counts of 27 Herring Gull nests, 165 Ring-billed Gull nests, and three Great Black-backed Gull nests. Wantry Island had peak nest counts of 40 Herring Gull nests, two Great Black-backed Gull nests, and six cormorant nests (the cormorant nests were destroyed). During our four cormorant counts, we counted 72 birds on June 10th, 62 birds on July 3rd, 161 cormorants on July 10th, and 65 birds on July 18th. This summer the DEC staff from Regions 6 and 7 were primarily responsible for cormorant counts, and they conducted weekly hazing activities.

Geolocators: The 10 new geolocators were successfully placed on adult terns. We continued to monitor the appearance of the terns with geolocators each time we were on the island to make sure that the geolocator didn't alter nesting behavior. There was no significant impact on hatching success associated with the geolocators (p= 0.198), or trapping (p= 0.436), but the sample size was small (n = 10 nests in each group; controls, trapped-only, trapped plus geolocator). Four of 10 geolocators were observed on terns marked during 2013.

Adult Common Tern Recaptures: In total, we recaptured 26 banded adult Common Terns to examine the age distribution of banded adults (Figs. 4 and 5; Appendix B).

Other Oneida Waterbird counts: We conducted counts of Double-crested Cormorants and various gull species throughout the summer. The Oneida Lake cormorants were managed much more heavily by DEC staff during 2014 than in other recent years, and were not allowed to nest successfully on Long Island, as they had in 2013. During 2014, we also banded 16 Ring-billed Gulls, five Herring Gulls, and one Great Black-backed Gull.

Discussion:

This year, the Common Terns at Oneida Lake were less successful in breeding on Little Island. This was likely due to a combination of three factors. The first factor was an injured Ring-billed Gull that was stranded on the island with an injured wing for a few weeks, and likely damaged eggs until we were able to remove it in mid-June. The second factor was summer cormorant harassment by DEC staff on nearby Long and Wantry Islands which likely caused cormorants to flush over to Little Island. Cormorants were seen on the Little Island numerous times this season, and this was the first time in nearly a decade that cormorants were seen on the tern nesting island. The third major impact was severe storms, especially during the first week of July, which had 40+ mph winds and destroyed most of the eggs and nests during the peak hatching point of the season.

We suggest that the historic low in Common Tern hatch rate, despite moderate nest numbers, was due to the phenomenon of nighttime abandonment. This phenomenon is known to cause low hatch rate in other tern colonies despite moderate numbers of active nests. Nighttime abandonment may have occurred due to the first two major disturbances on the island (the injured Ring-billed Gull during the first three weeks of the nesting season, and Double-crested Cormorants using the island as a nighttime roost throughout the summer).

Disturbance events also led to a relatively low peak nest count (n = 350) in comparison to recent years, and the lowest number of hatched chicks (n = 126) during the history of this study. The below average peak nest count was likely due to nest damage caused by the injured gull, and nesting space lost due to the presence of cormorants and storms. The primary ways to manage for storm events is to either lower the lake water level (may not be acceptable to stakeholders), or add rocky substrate to the island to increase its height above mean water level. Another alternative would be to reclaim nesting space for Common Terns on Wantry Island through active management. This island is private, and the owner is supportive of potential management for tern nesting.

Due to the low number of chicks that hatched, and the even smaller number that survived, we will likely notice a gap in future tern recapture and age studies. There will be a notable lack of terns in the 2014 birth-year cohort because of the lower hatching rate. It is interesting to note that in decades of trapping adult terns (Fig. 4) we have never recaptured a banded age-1 bird. As terns do not breed until their second year, they do not return to Little Island to nest until at least age 2, so their behavior during the first two years of life is essentially unknown.

Next year we plan on recapturing terns with geolocators that were attached in 2014. Based on this year's results, we hope to recapture at least 40% of the 2014 geolocator terns during 2015. Once the geolocators are recovered, we will process the data to learn about the migration route and wintering locations of Common Terns from Oneida Lake. We anticipate the terns go to South America, but we don't know their final destination, or how it relates to the migration routes of other tern colonies. Once we idenitfy Common Tern wintering areas, we can potentially find out if there are conservation issues there that may impact populations.

This year's Double-crested Cormorant counts had a much lower range than in previous years. This was likely due to the increased management efforts by the DEC staff, as the cormorants did not nest successfully on Long Island.

Literature Cited:

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.

Acknowledgements:

Particular thanks go to the New York State DEC for their continued support of Common Tern nesting activity on Oneida Lake. We would like to thank Lars Rudstam, Randy Jackson, Brian Young, and other staff and students at the Cornell Biological Field Station, Shackelton Point, for assistance with procuring equipment, assisting with banding and bird counts, and overall support. We also like to thank Irby Lovette from the Cornell University Lab of Ornithology for supporting the project and continuing to provide geolocators for our study. We also thank the Doris Duke Conservation Scholars program for providing support for the project.

Figure 1. Common Tern nest in foreground marked and numbered with pink flagging on a metal stake, Little Island, Oneida Lake, New York during 2014. Walk-in tern trap is in the background.

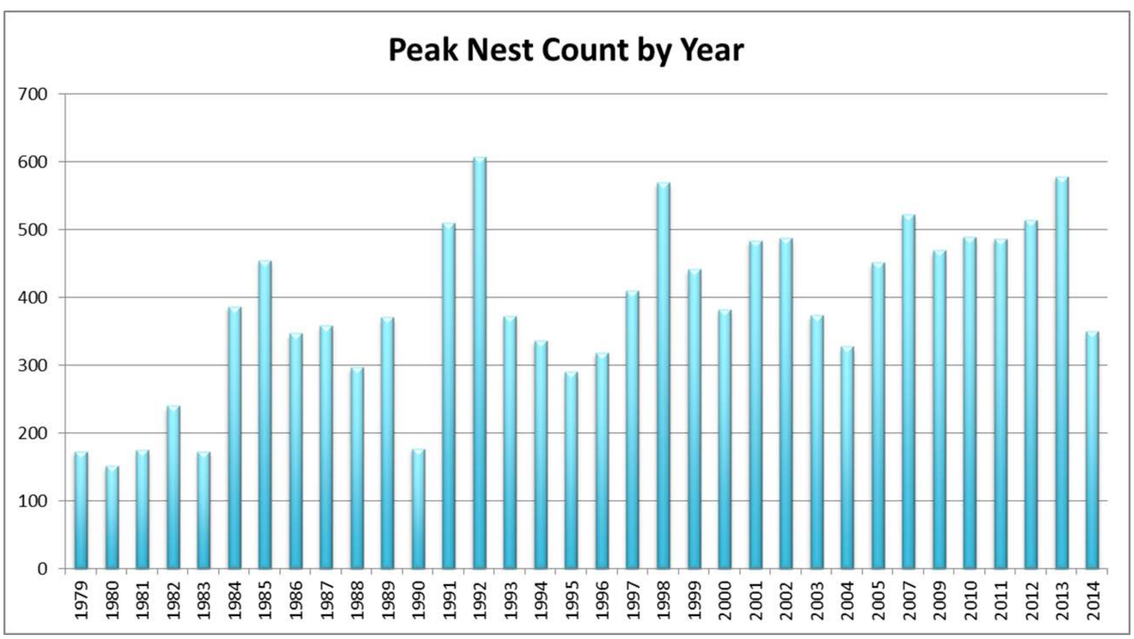

Figure 2: Peak nest counts for Common Terns on Little Island, Oneida Lake, New York from 1979 through 2014 (*n* =350 nests in 2014).

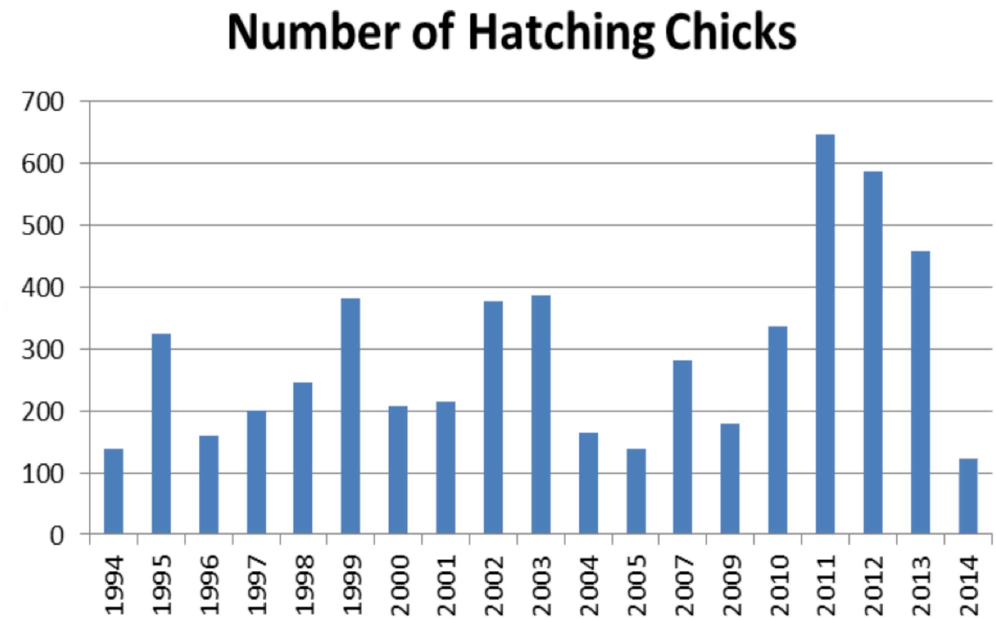

Figure 3: Long-term records of the annual number of chicks hatched and banded on Little Island, Oneida Lake, New York during 1994-2014 (n = 126 chicks in 2014).

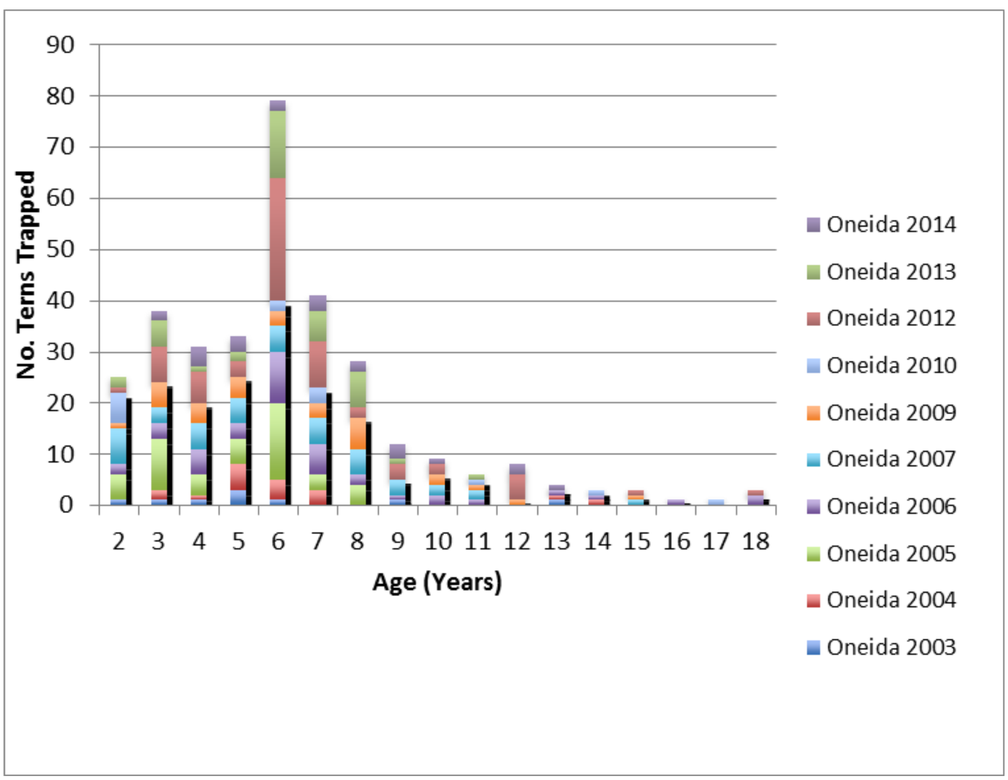

Figure 4: Age structure of recaptured adult Common Terns at Oneida Lake, New York, for the years 2003-2014.

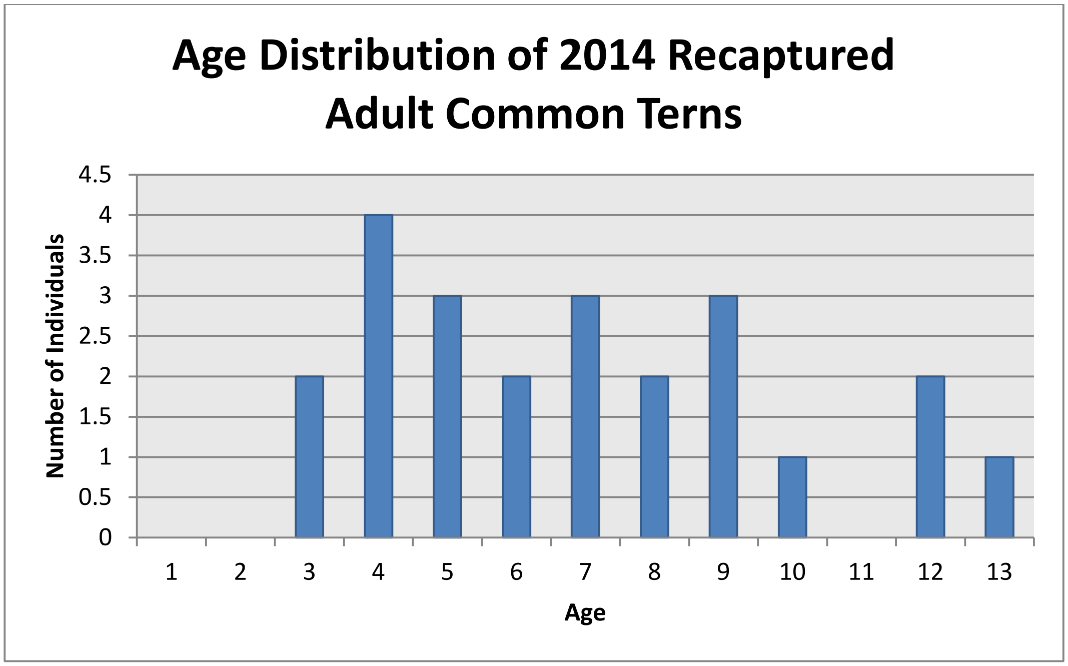

Figure 5: Age distribution of adult Common Terns recaptured at Oneida Lake, New York, during 2014.

APPENDIX A: History of Common Tern banding on Oneida Lake, NY

Prepared by Jeremy Coleman and Elizabeth Craig

Date	No. banded	Bander	Band Nos.
1975	152	G. R. Maxwell	722-32411/-32500, 822-90601/-90664, 922-10243, 952-53228
1977		G. R. Maxwell	812-78XXX/-79XXX
1978		G. R. Maxwell	692-787XX, 822-908XX, 952-53264
1979	425	L. L. Severinghaus	653-41914/-42000, 763-41105/-41400, 963-39901/-39989,
1980	365	L. L. Severinghaus	862-52101/-52456, 883-75005/-75014, 833-75100/- ?, 963-39991/-40000
1981	594	L. L. Severinghaus	862-51457/-52024, 902-69929, 952-53286
1982	453	R. A Charif	722-03751/-03800, 902-84701/-85112**
1983	198	P. B. Bollinger	912-43501/-43840
1984	417	P. B. Bollinger	822-47201/-47429, 912-43666/-43900
1985	291	P. B. Bollinger	762-01223/-01300, 822-47430/-47500, 902-60529/-60600, 922-10401/-10500
1987	241	Kim Claypoole	842-48966/-49000, 902-14002/-14007, 902-78601/-78800
1988	629	Hsiao-Wei Yuan	922-10201/-10300**, 942-14008/-14100, 942-70601/-70800, 952-53201/-53698**
1989	637	Hsiao-Wei Yuan	902-69901/-69988**, 942-70680/-70700**, 952-75401/-75700, 962-21501/-21825
1990	550	Hsiao-Wei Yuan	902-69989/-70000**, 942-70179/-70600**, 952-53699/-53700** 952-75301/-75400, 962-21826/-21972
1991	606	Hsiao-Wei Yuan	942-70247/-70276**, 962-21973/-22000** 962-52001/-86527
1992	554	Sarah Klinowski	972-?
1993	490	Melissa Lewin	972-?
1994	300	Dawn Chavez & Connie Adams	912-32101/-32400
1995	200	Carl Kochersberger & C. Adams	912-32401/-32600
1996		Jennifer Wang & C. Adams	1152-33101/- ?
1997	500	Gretchen Anderson & C. Adams	1162-31901/-32400
1998	400	Jeremy Coleman & C. Adams	1162-80401/-80800
1999	400	Peter Mattison & J. Coleman	812-53501/-53600?, 852-38701/-38800?, 872-94401/-94600?
2000	364	Jake Walker & J. Coleman	1152-99601/-99964
2001	436	Matt Perkins & J. Coleman	1152-99965/-00000 922-59601/-60000
2002	400	Janet Ma & J. Coleman	1212-00201/-00600
2003	475	J. Coleman & P. Mattison	1212-88401/-88875**
2004	350	Markus Wait & J. Coleman	1212-88876/-88900 1222-36401/-36725
2005	575	Claire Horan & J. Coleman	1222-36726/-36800, 1222-78401/-78900
2006	563	Jake FitzRoy & J. Coleman	1262-00701/-01262** (incoloy bands)
2007	736	M. Richmond	1262-01263/-01800, 1252-08601/-

			08800
2008	403	M. Richmond	1252-09101/-09118, 1292-16601/-17000
2009	176	M. Richmond, E. Craig	1292-87401/-87577
2010	349	E. Craig, P. Curtis, C. Schwartz	1232-30709/-30800, 1292-87578/-87800, 1342-48801/-48834
2011	700	E. Craig, P. Curtis, L, Mortelliti	1342-48701/-48800, 1352-00701/-01000, 1352-07401/-07700
2012	873	E. Craig, P. Curtis, L, Mortelliti	1152-56701/-57200, 1192-05501/-05600, 1352-28301/-28375, 1352-28401/-28600
2013	544	E. Craig, P. Curtis, R. Rodriguez	1352-28376/-28400, 1352-28601/-28800, 1352-53901/-54000, 1352-56001/-56100, 1352-58001/-58048, 1352-58101/-58200
2014	126	E. Craig, P. Curtis, R. Rodriguez	1352-58049/-58067, 1352-58083/-58100, 1352-58201/-58228, 1352-58241/-58300, 0962-51701/-51702

Total: **15,472**

** indicates some banded as breeding adults
A range of numbers does not mean that all bands in that range were deployed

APPENDIX B. Adult Common Terns recaptured at Oneida Lake during summer 2014.

Band ID	Banding location	Year banded	Notes
922-59905	Oneida	2001	Geolocator attached, underlined numbers were unclear
1212-00336	Oneida	2002	Geolocator attached
1212-00370	Oneida	2002	
1222-36612	Oneida	2004	Geolocator attached
1222-36781	Oneida	2005	
1222-78418	Oneida	2005	
1222-78507	Oneida	2005	Geolocator attached
1222-78780	Oneida	2005	Geolocator attached
1222-78795	Oneida	2005	
1262-00950	Oneida	2006	Geolocator attached
1262-01103	Oneida	2006	
1252-08717	Oneida	2007	Geolocator attached
1262-01283	Oneida	2007	Geolocator attached
1262-01588	Oneida	2007	
1262-01768	Oneida	2007	Geolocator attached
1252-08634	Oneida	2007	
1292-16820	Oneida	2008	
1292-16834	Oneida	2008	
1292-87466	Oneida	2009	
1232-30736	Oneida	2010	Geolocator attached
1232-30770	Oneida	2010	
1292-87763	Oneida	2010	Geolocator attached
1342-48819	Oneida	2010	
1342-48794	Oneida	2011	
1352-00706	Oneida	2011	
1352-58147	Oneida	2013	Found dead on Long Island