

Gulf of Maine Seabird Working Group

Annual Meeting – August 2012

Report summarized by Maine Coastal Islands NWR

The Gulf of Maine Seabird Working Group (GOMSWG) is a collaborative effort among state and federal agencies, national and state Audubon agencies, universities, non-governmental organizations, and private citizens that have been working to monitor, manage, and restore populations of colonial nesting seabirds in the Gulf of Maine for the past 28 years. Despite this combined effort, many of the populations still face significant threats and challenges from predators, declining availability of prey species, climate change and sea level rise, human disturbance, invasive species, and threats during migration. Many of the management agencies are also facing declining budgets that challenge our ability to manage the colonies. It is through our combined effort and sharing of knowledge that seabirds stand the best chance of overcoming the challenges they now face.

The number of common, Arctic, and roseate terns nesting in the Gulf of Maine has decreased in recent years, while least tern numbers are improving. Managers on several colonies in Maine are actively trying to reduce the number of laughing gulls nesting in the managed tern colonies.

Species	Pairs in 2012	Pairs in 2008	% change
Common Tern	17,926	20,905	- 14%
Arctic Tern	2,500	4,286	-42%
Roseate Tern	182	326	-44%
Least Tern	1,566	1,404	+12%
Laughing Gull	4,686	6,293	-26%

Island Reports

Canadian colonies reported at the meeting, but not in the Gulf of Maine:

Country Island, Nova Scotia

Island supervisor: Dan Shervill; staff: Meagan Boucher and Melanie Vezina; summer student: Haley Guest

Census

The 2012 tern census was conducted on the 14th & 15th of June. A total of 1263 tern nests were counted, including 18 Roseate Tern Nests. The remainder of the colony comprised 61% Arctic Tern and 39% Common Tern (ARTE 759 pairs; COTE 486 pairs). Compared to 2011, the 2012 tern population size was smaller (-16%) and fewer Roseate Terns nested (-33%).

Adjusted counts using Lincoln index (i.e., second census) are not yet available.

Number of tern pairs at Country I., Nova Scotia

	Colony size*	Arctic Tern	Common Tern	Roseate Tern
2008	1311			23
2009	1197			25
2010	1300			26
2011	1501	752	722	27
2012	1263	759	486	18

* based on single census conducted in early June, i.e. not applying Lincoln Index to incorporate late nesters

Tern Productivity

Productivity at Arctic, Common and Roseate Tern nests was high in 2012; equal to more than 1 chick fledged per pair for all three tern species.

Productivity[†] at Country I., Nova Scotia - 15 days (N)

	Arctic Tern	Common Tern	Roseate Tern
2008	1.4 (30)	0.9 (18)	1.1 (20)
2009	0.3 (43)	0.5 (30)	0.6 (18)
2010	1.0 (28)	1.2 (38)	0.7 (24)
2011	0.7 (46)	0.6 (31)	0.8 (24)
2012	1.1 (79)	1.8 (79)	1.1 (17)

[†]Fledglings per nest based on survival to 15 days.

Tern Feeding Studies

Data are not yet available.

Predator Activities & Control Efforts

American Crow, Common Raven and gull nests and / or nest contents were destroyed (< 5 nests total). No predators were shot at Country I.

Other island notes: Meadow Voles

2011 was the first year that Meadow Voles (*Microtus pennsylvanicus*) were detected on Country Island since restoration was initiated in 1996, and for a second year in a row voles were abundant. In 2011 adult terns were observed dive bombing voles, adult terns seemed hesitant to settle at times and on one occasion, the field crew witnessed a vole bite a tern chick. At monitored nests (2011), 17% of dead chicks had apparent bite marks, e.g. wounds on legs, wings or back (n = 84 dead chicks). It was suspected that voles may have been responsible for the latter however the crew only observed a single, negative, direct interaction over the course of the entire field season.

In 2012 some basic rodent monitoring was initiated in order to: 1) determine which rodent species were present on the island and 2) establish a population index. Traps (snap and pitfall) were set out over three days / two nights and the only rodent species detected was Meadow Vole. During vole trapping, a vole was seen with a Leach's Storm Petrel egg in its mouth and trail cameras helped confirm that voles on Country Island depredated Leach's Storm Petrel eggs and also revealed that Meadow Voles chewed vole carcasses left in traps. Although voles are considered herbivores, there is evidence that voles will

consume protein (e.g. Sealy 1982, Stanislay 1997) and clearly this is the case on Country Island. In 2012, tern nest monitoring revealed negligible negative effects of voles on tern nestlings with a single dead tern chick with apparent bite marks.

Meadow vole diet and effects of voles on Leach's Storm Petrels and terns will likely be monitored in 2013.

The Brothers Island, Nova Scotia

Island steward: Ted D'Eon and volunteers

Population estimate

Number of tern pairs at the Brothers I., Nova Scotia

	Colony size	Arctic Tern	Common Tern	Roseate Tern
2008	590			55
2009	546			42
2010	714			38
2011	725			38
2012	658			34

Tern Productivity

Detailed productivity work is not conducted on the Brothers; however general sense is that productivity was good in 2012. Twenty-three chicks were banded and an earlier count identified 39 chicks from the 32 nests known at the time. Little chick mortality was observed.

Tern Feeding Studies

Not conducted. Observations suggest that lots of large herring being brought in by adult terns; very few sandlance.

Predator Activities & Control Efforts

One Great Black-backed Gull nest was removed with one egg. The egg was cold and dirty and the nest had been abandoned before it was removed.

Other island notes:

Detailed information is available on Ted D'Eon's website at www.ted.ca.

Grassy Island, Nova Scotia

Island steward: Bluenose Coastal Action Foundation

Population estimate

Number of tern pairs at Grassy I., Nova Scotia

	Colony size	Arctic Tern	Common Tern	Roseate Tern
2011	132			1*
2012	2			0

*Two birds observed together on one occasion. Not believed to have nested.

Tern Productivity

Productivity at Grassy I., Nova Scotia - 15 days (N)

	Arctic Tern	Common Tern	Roseate Tern
2011	-	0	-
2012	-	0	-

Tern Feeding Studies

Not applicable.

Predator Activities & Control Efforts

Data not yet available. Gull nests were destroyed.

Other island notes:

Two nests were observed early in the season but both were abandoned soon after being laid. It is unclear why the colony did not return after such a large number of nesters in 2011. The colony was unsuccessful in 2011 again for unknown reasons but the nesting failure in 2011 may explain the absence of terns in 2012.

This is only the second year of restoration efforts on Grassy Island. Last year's 132 pairs provided some optimism; however this year was disappointing.

Gulf of Maine Colonies:

Machias Seal Island

Kevin Kelly, University of New Brunswick

This season was a good year for food at the island with Herring making up the majority of RAZO diets from chick feeding watched (74.47%) and Hake and Herring being about equal in the majority of ATPU chick feeding watches (41.99% and 34.48%, respectively) with a little more data to be entered. It was also the earliest recorded fledging period for alcids on the island. The calculated peak lay date was the earliest on record (May 2nd) and combined with good weather and good food the chicks grew at a good pace and fledged on schedule given the early lay date. It was also a very warm and dry summer. July had the second lowest rainfall recorded at MSI during UNB's work there and June and July had the second highest average daily temperatures in UNBs time there.

Population estimates

My very rough estimate of tern numbers on the island would be somewhere in the neighbourhood of 600 individuals, give or take a couple hundred, but no formal census was undertaken. Our puffin population

was not censused in any way this summer, but certainly didn't appear to be significantly different than in past years. The Razorbill population was partially censused this year, with 2 meter wide transects done along each of the east-west gridlines of our 30x30 meter grid system. The census was undertaken in the first week of June, mostly before chick hatching. The total number of active nests was 118 (103 eggs, 8 broken eggs, 7 chicks). This was roughly extrapolated to ~1740 total breeding pairs of RAZOs.

Tern Productivity

This year the terns returned again in mid to late May and began laying in early June (first egg June 5th). I estimate the population was the smallest it has been in the three years that I've been present on the island. We had an initial wave of nests appearing in early June, as usual and had what seemed to be a second, small wave of nests began to appear in mid-June, however the terns still abandoned their daytime incubating efforts on June 27th and most nests were depredated within a few days of this event. Following the daytime abandonment there was never a large contingent of terns seen on the island again all summer. There were occasional terns seen landing around the island, maybe even incubating for up to a couple of weeks following the usual daytime abandonment and larger numbers landing on the island after dark and leaving before dawn.

Predators

This season was plagued, as usual by two Peregrine Falcons, likely the same as in past years, and possibly a breeding pair from nearby. PEFAs were seen on the island on 30/84 days, 8 of those days there were two PEFAs confirmed. Gulls had a heavy presence on the island this year, with far more nests on the actual island than have been documented in the past. There were far fewer nests on Gull Rock this year than in past years. The total number of combined nests on the two islands was similar to years past, though their nesting habits appear to have changed. One HERG was killed by pellet gun, while others were merely scared off, occasionally by shooting with a pellet gun, but mostly by researcher presence/disturbance.

Other species

Common Murres, Common Eiders, and Leach's Storm-petrels all nested on the island, though no research work was done on any of the species and population censuses or estimates weren't done.

Other notes:

This year marked the first known Gannet nest on MSI ever. It was located at the southern end, on the bedrock shoreline. It was found to have one egg on June 1st, however the egg was missing on June 7th. Gannets were seen around the island for a few days following the disappearance of the egg, but by June they were pretty much gone and further Gannet sightings were limited to offshore fly-bys and feeding flocks sporadically through the summer. Other rare bird highlights of the season included the first recorded Red-bellied Woodpecker and first Nelson's Sharp-tailed Sparrow at MSI.

Kevin Kelly completed his final season of data collection for his Master's research on ATPU condition. Brian Koval collected gull fecal samples in order to analyze them for alcid DNA to get an idea of the prevalence of alcid eggs and chicks in breeding gull diets at the island. Also, 26 geolocators were deployed in late July on breeding puffins in order to track winter movements.

Eastern Brothers Island

Julia Gillis – Island Supervisor, Sarah Keller – Island Technician

This was the 6th year of efforts to establish a new tern and alcid breeding colony on Eastern Brothers Island in Jonesport, Maine. The 17 acre island is currently utilized by black guillemots, common eiders, Leach's storm-petrels, and common terns.

Black Guillemots

We observed a season high count of 340 guillemots adjacent to the island on July 14 with an average of 234 guillemots during our morning counts. Few signs of predation were observed this season, and it is believed that peregrine falcons preyed only a small number of black guillemots. We believe a peregrine falcon killed a total of 4 BLGU adults and that gulls/ravens dispatched 23 BLGU eggs and chicks from 65 regularly checked burrows. Nest contents, eggs of chicks, that were discovered missing were considered preyed. Compared to prior years, the BLGU breeding population on Eastern Brothers is continuing to decline, though with only a 4-7% decline this year compared to last year's 50% decline. For the 28 burrows for which it was measured, BLGU average lay and hatch dates were approximately 10 and 9 days earlier this season, respectively. Of 55 burrows where the number of fledged chicks was known, overall productivity was 0.8 chicks fledged per pair with a mean hatch rate of 56.7% and fledge rate of 48.3%. Mean clutch size was 1.9 eggs per burrow.

Predator control

Refuge staff visited the island on March 21 and observed mink scat on the trails and in front of the cabin. Conibear traps were set on Eastern and Western Brothers Islands, and an adult mink was trapped in the inter-island area on April 18. Additionally, two muskrat were caught prior to the start of the season. Proactive predator control efforts (tube traps and 110 conibear traps) were maintained throughout the season on both islands. No additional signs of mink were observed this season, and no birds or other prey were found cached on either island. In addition to mink, an otter was observed on the island July 4th near a latrine on the west side of Western Brothers Island. In an effort to capture the animal 330 conibear, size 3 foot-hold traps, and snares were deployed in the area. No additional sign of the otter was observed after 3 days. Peregrine falcons and common ravens were the most significant predators this season and were observed on at least 5 and 38 occasions throughout the season. One GBBG was shot on July 13.

Terns

A tern sound system, 53 tern decoys, and an electric fence to protect the tern nesting area from sheep were deployed on May 24, 2012. Sheep grazed Eastern Brothers year-round for the third year since the mid-1990's and vegetation height and density across the island has been considerably reduced. The first common tern was observed on May 25, and on July 9 a new pair of terns laid an egg on the island. Small groups of 2-4 and up to 8 terns were seen regularly throughout the season, especially mid-June to mid-July. One adult COTE remained long-term, and was joined later in the season by the pair who laid the egg. They were frequently seen loafing, foraging, and attempting to feed herring and hake to each other and the decoys.

Alcids

One hundred thirty-seven alcid decoys were placed along cliffs of Eastern Brothers Island on March 21. In May, an alcid sound system was added to one of the decoy areas on the eastern end of Eastern Brothers. Small numbers of RAZO and ATPU were regularly seen foraging near the island and several birds expressed interest in landing on the island. On July 13 a pair landed high on the cliffs and appeared to visually search the rocks. RAZO were observed on 34 occasions while ATPU were observed on 18. One COMU was seen flying close to the south shore of Eastern Brothers on July 13.

Petit Manan Island

Christa DeRaspe – Island Supervisor,

Jordan Chalfant, Brittany Leick and David Bridges – Field Technicians

Census

We conducted the GOMSWG census on 18 and 19 June 2012. We counted 1,779 tern nests, yielding a total of 1,944 nests after applying a Lincoln Index of 1.09. We also hosted two roseate tern pairs this season for a total of 1,946 nests. Our tern census estimate was 14.6% higher than the 2011 season estimate (1,696 nests); however total tern nest numbers remain lower than the seasons of 2006-2009 census estimates. Throughout the summer we identified 21% of all tern nests on the island to species (410 nests). We determined that the tern colony consisted of 61% Common terns (250 marked nests) and 33% Arctic terns (160 marked nests), yielding estimates of 1,186 Common Tern nests and 758 Arctic Tern nests. Roseate Terns returned to Petit Manan and two confirmed nest sites were located on the Eastern side of the island. One ROST chick was banded and fledged during the 2012 season. There were four ROST eggs, all of which hatched, but only one was located after hatching. Finally, 67 Common eider nests were counted during the census.

Petit Manan Island							
	2006	2007	2008	2009	2010	2011	2012
COTE							
# of Nests	1601	1343	1307	1374	912	1138	1186
Mean Clutch Size	2.04	1.70	1.83	1.93	1.7	1.72	1.90
Mean Hatch Success	78.0%	64.8%	85.3%	85%	47.9%	72.3%	78.8%
Mean Fledge Success*	74.4%	76.7%	71.6%	56%	31.0%	40.6% (36.1%)	71.4% (65.1%)
Mean Chicks Fledged/Nest*	1.18	0.76	1.12	0.90	0.43	0.47 (0.40)	1.07 (0.98)

ARTE							
# of Nests	779	1038	1255	1268	688	558	758
Mean Clutch Size	1.99	1.53	1.55	1.68	1.6	1.46	1.73
Mean Hatch Success	83.6%	51.9%	75.3%	78.0%	21.6%	56.8%	73.7%
Mean Fledge Success*	52.9%	62.8%	81.3%	54%	20%	29.5% (24.5%)	80% (70%)
Mean Chicks Fledged/Nest*	0.84	0.45	0.95	0.70	0.21	0.27 (0.22)	1.02(0.89)

ROST							
# of Nests	22	5	4	4	2	0	2
Mean Chicks Fledged/Nest	0.78	0.20	1.00	0.20	0.00	0	0.25

LAGU nests (w/15% correction)	1282	1350	1363	1171	270	735	811
ATPU nests	70	53	93	104	88	46	66
COEI nests	138	49	105	101	56	35	67

* Estimates in parentheses include data from chicks that died after the 15-day GOMSWG fledgling criteria

Tern Productivity

Productivity for both tern species was relatively high this year, especially in comparison to recent years of decline. We observed a mean of 1.07 chicks fledged per nest for Common Terns and 1.02 for Arctic Terns. Food availability and quality seemed diverse and consistent. Peregrine falcons maintained a

presence throughout the breeding season, however, it did not seem to disrupt the overall stability of the tern colony. Chicks followed past the 15-day GOMSWG fledgling criteria showed a slight decrease with actual fledge rates for common terns at 0.98 and arctic terns at 0.89 chicks fledged per nest.

Tern Provisioning

We followed 15 Common Tern nests and 13 Arctic Tern nests over 984 hours. During this time, we observed 975 prey deliveries. Atlantic Herring was the primary prey delivered to both Common Tern (31.4%) and Arctic Tern (30.2%) chicks. On average, tern adults delivered 0.95 prey items per nest per hour.

Diet Item	% COTE diet	% ARTE diet
Atlantic Herring	31.4	30.2
Bluefish	15.7	15.9
Butterfish	10.4	11.0
Insects (moth, dragonfly, etc.)	4.9	7.4
Other	19.3	15.9
Unknown	18.3	19.6

Arctic Tern Metapopulation Project

As part of the Arctic Tern metapopulation project we re-sighted 119 adult Arctic terns. Additionally, we banded 39 adult Arctic Terns and banded 180 Arctic Tern chicks.

Predator Control

Peregrine Falcons were the most frequent visitors to the colony throughout the season. During the month of May we used bird deterrents to discourage Peregrine Falcons and other avian predators from perching on the island. We took a less active role once terns began establishing nests in late May and early June. The terns appeared to adequately deter Peregrine Falcons and other avian predators (e.g., Black-backed gull and Bald Eagle) from perching on the island by grouping together and chasing the predator. During the census, we poked the eggs of 534 Laughing Gull nests and destroyed 171 Laughing Gull nests. Lethal removal of avian predators thought to be specialists also occurred and included: 20 adult Laughing Gulls, 1 Herring Gull and 1 Great Black-backed Gulls.

Alcids

The highest alcid counts for the season were 243 Atlantic Puffins (23 June), 50 Razorbills (13 June), 13 Common Murres (18 June) and 300 Black Guillemots (13 May). We estimated the breeding population of Atlantic Puffins was 66 pairs based on the number of active burrows (i.e. burrows with either an adult, egg or a chick). This estimate is similar to the 2011 estimate of 67 breeding pairs; however, there was evidence of numerous flooded burrows due to a high tide storm surge in early June which may have decreased nest success. We documented four active Razorbill burrows in 2012; one chick successfully fledged. Although Common Murres were observed loafing on the island, there was no evidence of any breeding attempts. Lastly, we estimated that the Black Guillemot breeding population was 76 pairs.

In addition to daily counts and productivity monitoring, a large proportion of our time was spent reading alcid bands and trapping alcids. We re-sighted 146 individual Atlantic Puffins this field season. We banded 40 puffins (13 adults and 27 chicks) and recaptured 8 adults. Puffin hatch success was 62% and reproductive success was 0.56. Finally, we banded 54 Black Guillemots (5 adults and 49 chicks). Guillemots had a 0.55% hatch success and fledged 0.5 chicks per nest.

Other Research

Petit Manan, in conjunction with six other Refuge islands, participated in a pilot study to document the direction of foraging flights. We recorded flight direction for 1,175 tern and alcid flights this summer. In addition, we tagged 18 seabirds (common tern, arctic tern and black guillemot) with coded radio tags to document daily activity patterns and foraging flights. The birds' movements were logged by an automatic receiving station installed at the top of the lighthouse. The data is still being collected on the island, but as of last count over 1.6 million records had been documented.

Stantec also installed two solar-powered anabat detectors on the lighthouse to track migratory movement of bats through the Gulf of Maine.

Ship Island

Amy Beich – Island Supervisor, Jill Tengeres - technician

Census

Ship Island was monitored by a two-person crew from May 9 until July 26. We conducted the GOMSWG census on June 21. We counted 251 active nests, and 39 abandoned nests, all belonging to Common Terns. A Lincoln correction factor was not needed or applied. A high count of 517 adult terns was made using a photograph of the dreading colony.

Ship Island			
	2010	2011	2012
# of Active Nests	41	105	251
Mean Clutch Size	1.83	2.16	2.20
Mean Hatch Success	22.2%	55.6%	57.1%
Mean Fledge Success	56.7%	24.9%	63.9%
Chicks Fledged/Nest	0.33	0.53	0.82

Nesting and Productivity

The first nest was observed on May 21 and terns were continuing to build nests and lay new eggs as of July 26. The island experienced a storm coinciding with the monthly highest tide between June 2 and June 4. Prior to the storm, over 200 nests had been found. We estimate that more than half of those were lost, and a third of the remaining nests abandoned. Nests were also lost and/or abandoned during the high tides on or around July 4. In total, more than 475 nests were found throughout the season, but fewer than 150 were confirmed to have hatched. Three productivity plots were constructed after the June storm. Overall productivity was higher than the past two seasons.

Tern Provisioning

We observed 14 total Common Tern nests for a total of 72 hours and 436 feedings. Average feeding rate was 6.05 feedings per hour. Atlantic Herring composed 79% of observed feedings. Fry of unknown species made up 11%, and larger fish of unknown species composed another 8% of the feedings. Due to the asynchronous laying and hatching in the colony, feedings showed no appreciable trends over time.

Diet Item	Percent of COTE Diet
Atlantic Herring	79.4
Fry (Unknown Species)	10.5
Unknown Species	7.2
Sand Lance	0.9
Invertebrates	1.6
Stickleback	0.2

Predator Control

The most significant predators during the 2012 season were Peregrine Falcons (*Falco peregrinus*) and Merlins (*Falco columbarius*). At least eight adult Common Terns were taken by these predators, and more than NUMBER total visits were made during the season. Attempts were made to deter the falcons through use of pyrotechnics. Mink traps were set early in the season, but no signs of mink were observed during the 2012 season. A Great-horned Owl (*Bubo virginianus*) was observed on Trumpet Island and was shot by Refuge Staff. Owl traps were set on July 12 and maintained until the end of the season. Gulls did not present a significant predation risk this season, so none were shot.

Foraging Directions

Foraging directions were observed from three locations on the island for a total of 35.5 hours. Terns were seen foraging in all directions, but by far the greatest number of foraging terns was recorded either departing to or arriving from the south (151-240°).

Seal Island National Wildlife Refuge

Island Supervisor: Jennifer Howard, Resident Intern: Emily Brownlee

Although the food supply seemed improved from last year—much higher numbers of hake and herring and small amounts of butterfish!—tern productivity did not increase correspondingly. Puffin productivity was the lowest within the past six years, though we still managed to grub 108 pufflings. The new puffin census developed in 2011 showed a decrease in active burrows, however this number is probably greatly underestimated due to poor puffin productivity. The census method will continue to be refined.

Tern Census

Due to safety concerns on the island, a complete tern census was not performed in 2012. Similar to 2009-2011, a partial census was conducted on June 12th, (14 of 30 marked grid squares were counted). The total number of nests in these areas has been determined to consistently represent, on average, 57% of the total nest number of the colony over the last eleven years in which a complete census was performed (1996-2006). Arctic Terns have continued to expand into the southern periphery of the main colony, and the inclusion of an additional grid square in this area should be considered for future census protocols. The total estimated number of nests was 2,796 (after a Lincoln Index of 1.041 was applied), compared with 3,026 nests in 2010 and 3,038 nests in 2011. The tern census was completed earlier than normal on Seal Island due to a staffing shortage during the GOMSWG tern census window and this perhaps contributed to the lower nest number. The storm in early June also likely contributed to abandonment, flooded nests, and increased depredation, further affecting the count. Species ratio was determined by marking a circle with a radius of 16 meters around each of 7 blinds and identifying as many nests to species as possible within that circle, in addition to the known species nests within 5 mixed species productivity plots. The species ratio has changed significantly within the past 5 years, from 45.97% ARTE in 2008 to 34.31% ARTE in 2012.

Table 1. Number of nests per species from 2008-2012.

	2008	2009	2010	2011	2012
Arctic Tern	1,084	991	1,238	1,201	959
Common Tern	1,283	1,580	1,788	1,836	1,837
Roseate Tern	0	0	2	0	1
Laughing Gull	0	0	0	0	0

Tern Productivity

Mean hatch was found to be 1.66 and 1.28 for Common and Arctic Terns respectively, lower values than found in 2010 and 2011. ARTE productivity (0.58) was lower than in 2011—one of the lowest for SINWR history. COTE productivity increased from last year, to 0.83. Additionally, one ROST pair nested this year. The A chick died within 4 days after hatch, but as of August 9th, the parents were still bringing fish for the B chick. Of 289 tern chicks followed for productivity, 144 ARTE and COTE chicks died; 41.67% died of starvation.

Table 2. Number of tern chicks fledged per nest from 2008-2012.

	2008	2009	2010	2011	2012
Arctic Tern	0.93	0.74	0.53	0.74	0.58
Common Tern	1.11	1.07	0.53	0.77	0.83
Roseate Tern	-	-	0.50	-	1.0

Tern Feeding

Twelve nests each of Arctic and Common Terns were watched for a cumulative total of 212 hours. COTE feeding rate was found to be 0.90 feedings/hour, and ARTE feeding rate was 2.05 feedings/hour. COTE chick diet was composed predominantly by hake and herring, while ARTE chick diet was composed of hake, herring, and amphipods. Two amphipod specialist ARTE nests heavily influenced the prey species percentages. Even with a better food source this year—much more hake and herring compared to butterfish—chicks died primarily from starvation. Butterfish was delivered to nests only towards the end of the season in mid-July.

Table 3. Major prey species and percentage of diet for Arctic and Common Terns (2012).

	Euphausiid	Amphipod	Butterfish	Hake	Herring
Arctic Tern	0.90	38.86	3.71	18.79	10.57
Common Tern	3.11	3.94	3.73	13.69	49.59

Predation and Klepto-parasitism

Laughing Gulls klepto-parasitized terns consistently through the season, and terns also klepto-parasitized Atlantic Puffins regularly through mid-July to August. A Peregrine Falcon was observed flying through the colony at least once a day during late June through August. Gull predation increased when chicks started fledging; observing a gull taking one fledgling a day was not uncommon. Two banded adult terns were killed by gulls on the spine; gulls were more frequently observed in 2012 on the spine trying to reach into Black Guillemot burrows. Both gull censuses this season yielded the highest numbers of breeding Herring and Great Black-backed gulls in SINWR history. The high number of breeding gulls might be due to more thorough nest searchers and a larger area censused than in past years. More immature and adult Bald Eagles were observed this year than in 2011, disturbing the cormorants, eiders, terns, and gulls. Several were flushed from Area 2.

Table 4. Gull control measures in 2012 by species.

	# Nests Destroyed	# Shot
Herring Gull	345	9
Great Black-backed Gull	74	2
Laughing Gull	0	2

Atlantic Puffins

28 new burrows were discovered this year for a grand total of 702 known burrows on Seal Island. A new reduced census method for Atlantic Puffins was created in 2011 and continued this season. Burrow status was determined for 89 burrows within 15 plots of 3 m radius spaced 25 m apart throughout the main colony in Area 1, and for 106 additional burrows outside of the main colony. The extrapolated census methods yielded 504 of 702 known burrows as active, which is much lower than the increasing colony trend over the past 20 years. Extrapolation of these plots to the entire colony continues to be under discussion.

Our high count of puffins was 737, which was up from the 2011 high count of 646. Puffin productivity was estimated to be a dismal 0.26 chicks/pair (sample size = 78 active burrows) as compared to 0.77 chicks/pair in 2010 and 0.73 chicks/pair in 2011. Several new burrows were found by starving chicks coming out of their burrows for food. Many chicks, even after growing to a fully feathered size, large enough to fledge, were found dead near burrows. 108 pufflings were banded this season—the 2nd highest for Seal Island.

Puffin chick diet was monitored at two blinds for over 100 observer hours. Chick diet was composed of 57.07% hake, 5.38% bluefish, 8.47% butterfish and 5.38% rough scad. Large butterfish—4.0 bill length—were delivered mid to late July and could have been a factor in the unusually low puffin productivity this year. The high proportion of unknown fish is due to a combination of inexperienced observers and the prevalence of two new, as-of-yet unidentified, fish species that were prevalent in puffin chick diet during the latter half of the season. Observers primarily used DSLR cameras with telephoto lenses to more accurately identify fish species. Observers that used binoculars identified fewer species in bills and had more unknown fish feedings.

Two geolocator units deployed on adult puffins in 2011 were retrieved from burrows in June, and three more adult birds with geolocators deployed in 2011 were seen loafing around the colony in addition to Geovanni, an adult puffin with a geolocator from 2009, that was again seen loafing in the colony this season. His chick from 2009 was resighted during the 2012 season. Three geolocators were deployed on adult puffins this year.

Black Guillemots

This year was the sixth year that Black Guillemot productivity was tracked on the island. 43 active burrows were followed with productivity determined to be 0.46 chicks/pair, a significant increase from last year's 0.09 chicks/pair.

Razorbills

An increased number of Razorbills were seen loafing around the colony this year compared to 2011, particularly at the Western Head. A total of 15 active Razorbill burrows were found on the island this year, which is down from the high of 19 in 2010; more burrows are suspected to be active given the high loafing numbers. Hatch success was 0.87, which was the highest recorded SINWR RAZO productivity.

Common Eiders

A total of 117 COEI nests were counted in early June, a huge leap up from 56 in 2011. However, a large portion of their main nesting area (Area 4) was not counted to minimize disturbance to the birds. Creches of 40+ ducklings were seen regularly during mid-June.

Great and Double-crested Cormorants

Great and Double-crested Cormorants were again nesting on Seal. Boat counts performed in May, June, and July, reported 25 GRCO nests.

Bird Sightings

A Red-billed Tropicbird was seen on the island for the eighth year in a row. It was first sighted on May 12 and was last sighted on August 7. It was seen on 70 days throughout the summer – up from 56 days last year – and was again seen loafing under a boulder in Area II.

Matinicus Rock NWR

Caroline Poli, Supervisor, Anne Rohn, Resident Intern

During the 2012 season Matinicus Rock received 6.4 inches of rain. Our average temperature was 61.5 degrees F and our average sea surface 54.5 degrees F. The food quality this year was average early season with many Razorbill chicks fledging normally. Food quality turned poor mid to late season, with tern and puffin chicks fledging slowly and at low weights. Predation from Herring, Great Black-backed, and Laughing Gulls was a problem throughout the season.

Tern Census. 910 tern nests were counted during census (June 14-16). 693 of these were Arctic Terns and 268 were Common Terns for a species ratio of 72% ARTE and 28% COTE. Our Lincoln Index correction factor was 1.021.

Laughing Gull Census. This is the third year since 2004 that we observed a decrease in Laughing Gull nests. Heavy culling seems to be having an effect on the LAGU population, but the birds may be immigrating elsewhere. The 557 nests counted this year represent a 28% drop from last year but 136 adults were culled and 49 nests were destroyed prior to census.

Productivity

Arctic Terns fledged 0.44 young per nest. Mean clutch was 1.65 for 50 nests. This is similar to recent years. Common Terns fledged 0.63 young per nest. Mean clutch was 2.01 for 35 nests. Productivity is low compared to recent years. Predation by gulls was a major factor in this year's low productivity, with Laughing Gulls preying opportunistically on tern eggs and chicks throughout the season. We found that productivity was lowest in plots where LAGUs and terns nested in close proximity (0.11) and highest where terns nested among other terns or in LAGU-free areas (0.88). Predation by Herring and Great Black-backed Gulls was not as prevalent as in 2010. Poor quality food was the significant factor in overall low productivity.

Atlantic Puffin: hatch success for control/geolocator birds was 0.63/0.75 (n = 65/8) and productivity was 0.43/0.57 (n = 65/8). This is unusually low compared to previous seasons. Hatch success for geolocator birds was improved from 2011 in part because we successfully protected all eggs from damage during recapture. We banded 164 chicks this year and resighted 275 adults. A minimum of 355 nest sites were identified as active. This represents an increase since the last complete census in 2006, when 310 active sites were identified.

Razorbill: hatch success was 0.32 (n = 60), and productivity was 0.23 (n = 60). In early June, storm events lead to widespread predation (presumably by large gulls and Common Ravens) and egg failure. Fledge success was good at 0.74 chicks fledged/chicks hatched.

Leach's Storm Petrel hatch success was 0.73 (n = 90). This is low compared to the 5 year average of 0.9.

Black Guillemot productivity was 0.43, which is average compared to 2010 and 2011. Fledge success for B chicks was very low at 0.09.

Manx Shearwaters were seen on the water in groups of as many as 10 regularly throughout the season and heard calling from the northwest, west-central, and southwest areas of the island. We banded four new adults, bringing the total number of adults banded to 16. On August 8th, we found two large partly feathered chicks in burrows known to be active.

Feeding Studies

Arctic Tern feedings were primarily hake (37%), butterfish (12%), unknown prey (8%), and invertebrate (38%). The average feeding rate was 1.63 deliveries/hour. Common Tern feedings were hake (27%), butterfish (24%), unknown (16%), and invertebrate (13%). The average feeding rate was 0.94 deliveries/hour. Puffin bill-loads consisted of hake (57%), haddock (15%), rough scad (8%), butterfish (7%), bluefish (7%). This is the third season in which haddock and rough scad were a major part of chick diet. Razorbill feedings were hake (46%), and herring (40%).

Laughing Gull Control

During census, all eggs in 557 nests were poked to prevent hatching. An additional 49 nests were destroyed outside the census period. 136 adult Laughing Gulls were shot prior to census, with effort concentrated on parts of the island where LAGUs and terns nested in close proximity to each other.

Herring and Great Black-Backed Gull Control

One Herring Gull nest was found this year. Adults killed included 12 Herring Gulls and 7 Great Black-backed Gulls.

Unusual Birds

A Snow Bunting was observed 10 times from July 14 until August 8.

Our high count for Common Murres was 106. The decoys and sound system were washed away during a heavy storm in early June. No eggs were observed this year.

Metinic Island

Kathryn Chenard – Island Supervisor, Chelsea Vosburgh - Island Technician

Census

The Gulf of Maine Seabird Working Group (GOMSWG) census was not conducted this year, due to the abandonment of the tern colony on the North End of Metinic Island on June 4, 2012. However before the abandonment of the colony, we had started marking nests for the species ratio nests. We identified 138 nests (87 COTE and 51 ARTE), and estimated that the colony was composed of 63% Common Terns and 37% Arctic Terns.

Metinic Island						
	2007	2008	2009	2010	2011	2012
COTE						
# of Nests	338	303	387	406	300	n/a
Mean Clutch Size	2	2.17	2.37	2.32	2.19	-
Mean Hatch Success*	75%	85%	87%	84%	83%	0
Mean Fledge Success*	56%	81% (71)	47% (41)	44% (35)	63%(61)	0
Chicks fledged/Pair	0.8	1.49 (1.09)	1 (0.8)	0.85 (0.70)	1.23(1.08)	0

ARTE						
# of Nests	321	409	393	352	198	n/a
Mean Clutch Size	1.7	1.61	1.75	2.32	1.45	-
Mean Hatch Success*	67%	83%	81%	84%	41%	0
Mean Fledge Success*	38%	80% (59)	50% (41)	37% (35)	36% (36)	0
Chicks fledged/Pair	0.4	1.11 (0.97)	0.81 (0.64)	0.32 (0.29)	.17 (.17)	0

ROST						
# of Nests	0	0	0	1	0	0
Chicks fledged/Pair	-	-	-	0	-	0

South End						
ARTE and COTE nests	2	9	1	2	2	0
*when available, data in parenthesis includes fledglings found dead after the GOMSWG fledge age of 15 days						

Productivity

No terns successfully nested on Metinic Island in 2012. The entire colony abandoned the island on June 4th due to a combination of factors including a significant storm (rain and fog), excessive gull predation, snake predation, and shooting by the crew (in an attempt to stop the gull predation). We made efforts to encourage the terns to re-nest on Metinic (further controlling for predators, and placing decoys and playing tern calls through speakers to attract the birds).

Visual Estimates Throughout the Season

The figure below gives a visual estimate of tern numbers observed during our morning counts. This represents the best estimate of tern numbers available for Metinic Island this year. The highest count we obtained in 2012 was 416 terns. After the colony abandoned, the highest number of terns observed was 59 terns, with an average of 12 terns. These terns would usually circle the island for 10-30 minutes before flying off. The highest number we counted

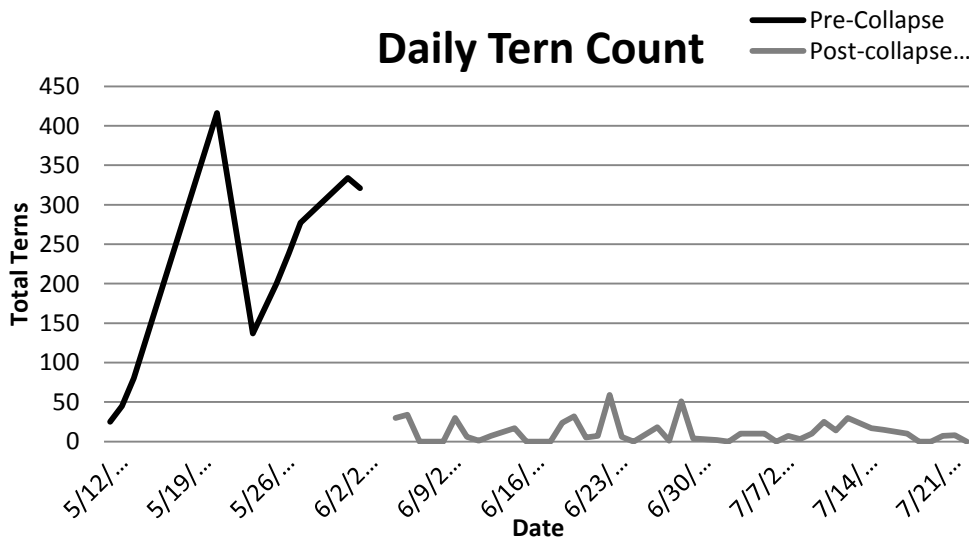


Figure 1. Daily morning count of individual terns on the North End of Metinic Island, 2012.

Predators

- In 2011, the crew on Metinic documented garter snakes preying on tern eggs and chicks. This year we began capture and removal of snakes from the island. Refuge staff caught 16 snakes prior to the nesting season, and the seabird crew caught an additional 43 snakes (total of 59 snakes).
- Gulls: We destroyed nests or punctured eggs in more than 202 Herring Gull nests and 34 Great Black-backed Gull nests.

Guillemots

We located 52 active Guillemot nests and documented a hatching rate of 58%. We confirmed 45 chicks in the burrows, but some pairs were still incubating when we left the island in late July.

Petrels

We identified 55 Leach's Storm-petrel burrows. We grubbed and used a burrow camera at night to confirm adults in 51 burrows, as well as 15 eggs and 2 chicks.

Common Eider

We had a high count of 159 common eiders this season, with an average of 82 birds observed during morning counts. Our high count for ducklings was 46, which was also observed during a morning count.

Eastern Egg Rock

Maggie Lee Post, Supervisor

Summary: *Census numbers for nesting Roseate and Arctic Terns decreased on Egg Rock in 2012, while Laughing Gulls and Common Terns were similar. This year's tern success seemed to depend mostly on predation. Common Tern productivity remained close to the historic island average, while Roseates were the highest since 2002 and Arctics were the lowest ever.*

Census

Arctic and Roseate Tern nests were identified between June 15 and June 20, with Roseates decreasing from the 2011 count of 90 to 71 nests and Arctic Terns decreasing from 77 to 57 nests. An island-wide Common Tern and Laughing Gull nest count was conducted from June 12 to June 14. Common Tern numbers were similar to 2011, with a raw total of 727 nests that was corrected with a Lincoln index of 1.03, to 817 nests, including the productivity plots and feeding studies. Laughing Gull nesting was very similar to 2011, increasing from 2051 to 2065 nests, approaching the all-time high from 2009 of 2127 nests. Seventy-six Common Eider nests were identified opportunistically during the census.

Productivity

Tern productivity was conducted using both fenced and unfenced plots. The Common Tern plots comprised 80 total nests which hatched at a rate of 1.65 chicks per nest and fledged at a rate of 1.01 chicks per nest. Roseate Terns hatched 1.52 chicks per nest and fledged at a rate of 1.31 chicks per nest for the 69 nests followed. Similar to most seasons, Arctic Terns were hit hardest by predatory gulls. The 58 study nests fledged only 0.26 chicks per nest of the 1.07 chicks hatched/nest. For the fifth season productivity was conducted on Laughing Gulls in a fenced plot which hatched 1.45 chicks per nest and fledged 1.09 chicks per nest. Diet and post-hatch weather were good in 2012, so the highest cause of chick mortality in Arctic and Common Terns appeared to be predation.

	2008	2009	2010	2011	2012
Common Tern					
census count	1129	1036	714	829	817
Clutch	2.31	2.3	2.36	2.32	2.58
Hatch	1.95	1.97	2.08	1.85	1.65
Productivity	0.87	0.70	1.09	1.14	1.01
Roseate Tern					
census count	129	101	82	90	71
Clutch	1.9	1.93	1.89	1.83	1.80
Hatch	1.5	1.34	1.72	1.33	1.52
Productivity	1.03	0.69	0.72	0.72	1.31
Arctic Tern					
census count	111	100	83	77	57
Clutch	1.79	1.8	1.83	1.89	1.69
Hatch	1.39	1.1	1.69	1.15	1.07
Productivity	0.71	0.37	0.64	0.40	0.26
Laughing Gull					
census count	1972	2127	1553	2051	2065
Clutch	2.57	2.26	2.30	2.54	2.23
Hatch	2.1	1.74	1.91	2.18	1.45
Productivity	1.2	0.74	0.87	1.5	1.09
Atlantic Puffin					
# of nests	101	107	71	106	91
Fledge Success	0.95	0.79	0.86	0.92	0.74

Diet

Twelve Common Tern nests were observed for a total of 549 hours. Hake and herring were the two most frequently fed items, comprising 31% and 30% of feedings, with butterfish at 7% and smelt/silverside at 3%. Five Arctic Tern nests were observed for a total of 93 hours; unknown invertebrates were the most frequently fed item comprising 25% of diet followed by hake at 24%, amphipods at 15%, herring at 8%, and crustaceans at 7%. Five Roseate Tern nests were observed over 191 hours; herring was the most frequently fed item at 39%, hake at 25% and sand lance at 6%.

Atlantic Puffins

This year there were 91 active puffin burrows on the island, not including large complexes. The fledging success rate of 0.74 chicks per nest was the lowest for the island. Hake comprised the largest proportion of puffin diet at 69% followed by butterfish and herring each at 8%. Hake averaged 1.33 bill lengths with many small hake being delivered late in the season, while butterfish averaged 1.37 bill lengths.

Predation

Herring and Great Black-backed Gulls were the predominant tern predators. One Great Black-backed and eight Herring Gulls were shot over the course of the season. No nests were found on the island. As part of an effort to reduce Laughing Gull numbers in the Gulf of Maine eggs all Laughing Gull nests were poked during census and 183 adults were shot. Laughing Gulls appeared to be a source of predation on Common and Arctic Tern eggs and chicks.

Gulls Shot					
	2008	2009	2010	2011	2012
GBBG	2	1	2	3	1
HERG	6	6	12	4	8
LAGU	93	89	156	109	183
Gull Nests Destroyed					
GBBG	0	0	0	0	0
HERG	5	1	1	0	0
LAGU	1982	2127	1553	2061	2046

Other

Two otters were observed on the island this year. The first, a recently pregnant female was first sighted on June 12 and removed on June 20. The second, a pup, was confirmed on June 23 and removed on July 5. Both appeared to be living in the boulder berm on the south end and the pup had adult puffin feathers in its stomach.

This summer, Egg Rock welcomed 57 visitors, primarily donors, teen campers, and media personnel. None of the 7 remaining Arctic Tern geolocators were seen.

Pond Island NWR

Adam DiNuovo - supervisor

Census

The tern census was conducted on June 15. The unadjusted nest count for COTE was 523 (including study nests). The count was adjusted using a Lincoln Index of 1.14 (79 marked nests and 11 unmarked nests), with the adjusted count being 596. This is the highest COTE count in the last 5 years. (see table 1)

There was one confirmed ROST nest by the large tent platform. The pair abandoned the nest soon after camp was opened. No further ROST breeding activity was observed during 2012.

Table 1. Pond Island Tern Census Counts, 2008-2012

Year	COTE	ROST	ARTE	TOTAL
2008	434	0	3	437
2009	438	0	4	442
2010	590	0	3	594
2011	586	2	0	588
2012	596	0	0	597

Tern Productivity

COTE productivity was measured by following 52 nests in both fenced and feeding plots. All nests were monitored from hatch until fail/fledge. Mean clutch size was 2.88 with 2.31 chicks produced per pair. (see table 2)

The high productivity seems to be related to the abundance of high quality forage within close proximity to the island. Feeding study chicks received a diet consisting of 65% herring. The ability to produce a fat reserve most likely helped chicks survive night abandonment by adults during times of owl harassment.

Table 2. Estimates of COTE Reproductive Performance on Pond Island 2008-2012

Year	# Nests	Avg. Clutch/Pair	Avg. Hatch/Pair	Avg. Fledge/Pair
2008	45	2.69	2.33	1.07
2009	39	2.74	2.21	0.79
2010	48	2.71	2.35	2.08
2011	16	2.06	1.0	0.69
2012	52	2.88	2.38	2.31

Tern Provisioning

A COTE provisioning study was conducted by observing 20 nests with a total of 697 nest hours of observation. There were a total of 1731 feedings observed with the primary prey items being herring (64.64%) and sand lance (30.56%), with an average feeding rate per nest of 2.48 feedings per hour (see table 3).

Table 3. COTE Prey Item Summary

Prey Item	Count of Prey Item	Percent of Diet
Herring	1119	64.64
Sand Lance	529	30.56
Silverside/Smelt	25	1.44
Pollock	25	1.44

Predator Activities and Control

Great Black-backed Gulls were a serious problem for Common Eiders, observed on several occasions taking chicks. Four GBBG were observed targeting COEI; two of these birds were shot and the other two never presented an opportunity for removal.

There were two HERG nests destroyed on the south ridge and two HERG shot that were observed in the colony on several occasions.

Crows were another problem for COEI. Crows were seen daily on the south end of the island taking eggs. Many COEI failed due to crow predation.

Great Horned Owls were once again an issue on Pond. Signs of GHOW predation were observed on May 30 when the island was opened. Four padded leg hold traps were set and an owl was trapped on the first night. A second GHOW killed four adult COTE on July 2 and 3. Ten leg hold traps were set nightly from July 4 – July 15. It was determined the owl was not present during this time. No further evidence of predation was observed until July 19. Eight COTE fledglings were found dead (headless) on the morning of July 19. Ten leg hold traps were set nightly and a GHOW was caught the night of July 21.

Other Island Notes

There were very few disturbances from island visitors in 2012. On three occasions kayakers landed on the beach and quickly departed with minimal disturbance to the colony.

There were three bird sightings this season that were first records for PINWR. A Forsters Tern was sighted in early June, a Royal Tern in early July and five Western Sandpipers stopped to feed on the beach on July 10.

Jenny Island 2012

Island Supervisor: Halley Walsh

Census

The annual Gulf of Maine Seabird Working Group (GOMSWG) census was conducted on June 14th. A total of 725 COTE nests were counted, with clutches ranging between 1 and 5 eggs. A Lincoln index mark/recapture correction of 1.24 was applied to the uncorrected count. The addition of 49 productivity plot and feeding study nests brought the total to 948 nests. This number is higher than the past 10 years.

11 Roseate Tern nests were found. This is much lower than the 2010 count of 33 nests but higher than last year's count of eight nests.

On June 14th, we visited historic tern nesting site Hen Island to conduct a census, however, we found no signs of tern activity in the area. (In 2008 and 2009, 121 and 109 pairs of COTE, respectively, were nesting on Hen Island. No terns nested there in 2010 or 2011.)

A note about phenology: the first COTE hatch in 2012 was on June 13th; this is earlier than last year's hatch which began on June 22nd. The first ROST chick hatched on June 16th this year compared to June 21st last year.

Productivity

For Common Terns, three productivity plots containing 23 nests and three feeding study plots with 23 nests were used to determine productivity, a summary of which follows:

Location	# of Nests	# of Eggs	# Hatch	# Fledge	Clutch Size (SD)	# Fledge/ Nest (SD)	Hatch Success ¹ (%)	Fledge Success ² (%)	Nest Success ³ (%)
Overall	46	124	107	94	2.70 (0.47)	2.04 (0.92)	86.3	87.9	75.8
<i>Productivity Plots</i>	23	61	46	40	2.65 (0.49)	1.74 (1.05)	75.4	87.0	65.6
<i>Feeding Studies</i>	23	63	61	54	2.74 (0.45)	2.35 (0.65)	96.8	88.5	85.7

For ROST, mean clutch size was 2, with an average hatch of 1.4, and 1.4 fledglings were produced per nest based on the ROST Recovery Team algorithm, which assumes that 95% of A chicks fledge and B chicks weighing more than 16.8g on day 2 fledge.

Mortality Events

The level of Common Tern chick mortality in 2012 is hard to determine due to late season predation by a Black-crowned Night Heron. Mortality within productivity nests was less than last year. 16 chicks were found dead in 2012 compared with 21 in 2011. The vast majority of chicks that died were C chicks. The cause of death was not always clear, but as far as could be determined, exposure and starvation were the primary causes of mortality. At least 100 chicks around the perimeter of the island were found to be predated by the BCNH. It is unknown how many other chicks were eaten. Very little BCNH predation was found in the inner vegetated area of the island; Thus the BCNH did not affect productivity nest numbers making productivity difficult to extrapolate for 2012.

Feeding Study

Three feeding plots with 23 COTE nests were monitored in 2012. A total of 1,236 feedings were observed during 824 chick-observation hours, producing an average feeding rate of 1.50 deliveries per hour (compared with 1.00 deliveries per hour in 2011). Average prey size was 67.33 mm. Atlantic herring (*Clupea harengus*) constituted about one half of observed feedings. Hake (including white hake, *Urophycis tenuis*, and four-bearded rockling, *Enchelyopus cimbrius*) and Sand Lance (*Ammodytes hexapterus*) made up another 25% of the feedings. Butterfish (*Peprilus triacanthus*) were not seen in abundance this season contributing only 3% to the total feedings. More than 96% of prey deliveries were fin fish.

Prey Species	Number of items	% of Diet (Frequency)	Average Size (bill length)
Atlantic Herring	596	48	2.09
Hake	162	13	1.48
Sand Lance	147	12	2.06
Unknown Fish	96	8	0.79
Alewife/ Blueback	55	4	2.80
Silverside/ Smelt	40	3	2.19
Butterfish	38	3	1.50
Pollock	36	3	2.52
Unknown	26	2	0.69
Killifish	14	1	1.30
Insect	9	0.7	0.25
Hake or Herring	4	0.3	1.25
Amphipod	4	0.3	0.25
Crustacean	3	0.2	1.00
Euphausid	2	0.2	0.75
Moth	1	0.1	0.25
Polychaete	1	0.1	2.50
Snipefish	1	0.1	1.75
Squid	1	0.1	3.00

Management Strategies

Although Laughing gulls (*Larus atricilla*, LAGU) have generally posed little direct predation threat to terns on Jenny Island thus far, they do actively kleptoparasitize adult terns. There were no nests on Jenny Island this season, which is strikingly less than 2010 (38 nests plus two re-nests). One LAGU nest was found in 2011 and destroyed. Large gulls did not present a problem for terns this season on Jenny. One GBBG was removed. In 2012, vegetation in productivity plots (especially Camp and Meadow) was uprooted and cut extensively early as well as mid-season in order to open habitat and facilitate finding chicks.

Outer Green Island

Michael Whalen, Island Supervisor

Census

The GOMSWG census for 2012 was conducted on June 14th, 2 days earlier than in 2011. A total of 964 Common Tern (COTE) nests were counted with a Lincoln Index Correction factor of 1. Adding Feeding Study and Productivity Plot nests resulted in an island wide total of 1,034 nests. This count represents a 4.1% decrease from 2011. The vast majority of the nests were located on the island's periphery, especially the southern end. No Roseate Terns (ROST) nested on Outer Green Island (OGI) this year or in 2011. In both cases this phenomena is likely due to a faulty ROST attraction sound system. One or two pairs of ROST were seen around the colony consistently throughout the season, but made no attempt to nest. No Arctic Terns (ARTE) were seen on OGI this year.

GOMSWG Census totals for Outer Green Island, ME:

Year	2008	2009	2010	2011	2012
COTE	828	837	1151	1067	1034
ROST	0	0	15	0	0
ARTE	1	2	0	0	0

Productivity

COTE egg laying in 2012 began before May 15th which is considered “early,” though no exact data is available. Average clutch size (n = 77) was 2.81 eggs per nest, similar to 2010 and 2009, those three years being higher than all others. The first COTE hatched on June 12th, with peak hatch occurring between the 18th and 22nd of June. This timing is also congruent with an early hatch as 2011 peak started on the same day that 2012 peak ended. Hatching success was 2.2 chicks per nest, as many C eggs failed to hatch. Productivity, however, was 1.42 chicks per pair. This relatively low productivity was likely due to a storm in early June that left many nests dead. Another thunderstorm later in the summer also caused relatively high mortality. Food availability was good throughout the summer, though a higher percentage of insects were seen than in most other years.

Yearly OGI Common Tern Reproductive Performance:

Year	2008	2009	2010	2011	2012
Census Count	828	837	1151	1067	1034
Avg. Clutch Size	2.32	2.87	2.81	2.43	2.81
Hatching Success	2.08	2.7	2.63	1.98	2.19
Productivity	0.61	1.68	2.09	1.77	1.42

Provisioning

Chick provisioning was recorded at 20 COTE nests on the island, with 1356 feedings observed over 991 chick-hours of observation, for an average feeding rate of 1.37 items per hour. Average prey size was 1.54 bill lengths (55.55 mm). This average is likely reduced by the relative prevalence of amphipods, insects, and moths in COTE diet. Herring was the most common prey species observed making up 43.73 % of COTE chick diet. Hake made up 12.54% with unknown fish and other items taking up 9.66% and 5.97% respectively, followed by Amphipods at 5.38%, Sand Lance at 5.16%, Moths at 5.01 %, and insects and Butterfish tied at 2.43%.

Predation

Predation was a relatively minor problem on OGI in 2012 as in 2011. One HERG nest was found on OGI in late season, but this was the lone nest on the island. Two pairs of GBBG attempted to nest on the neighboring island, Junk of Pork, and a total of 5 nests were destroyed, three of which were re-nests. There was little gull predation throughout the season, with evidence of peaked activity during the early June storm and increased aggression at the end of the season when colony defenses relaxed. Two Herring Gulls were culled in 2012 in response to loafing on the periphery of the colony. This was the first year on OGI that the COTE colony was predated by a Bald Eagle. Between July 5th and 9th a fourth year Bald Eagle dispatched no fewer than 8 fledglings, but was promptly chased from the island. Throughout the season adults in the colony were targeted by Peregrine Falcons, though only 3 birds were known to have been killed, these predators caused many disturbances in excess of 30 minutes.

Yearly Number of Gull Nests Destroyed on Outer Green and Junk of Pork Islands:

Number of Nests Destroyed (OGI & Junk of Pork)	2008	2009	2010	2011	2012
Great Black-backed Gull	10	9	7	4	5
Herring Gull	5	2	0	0	0
Total	15	11	7	4	5

Weather

2012 was a year of relatively extreme weather most readily consisting of significant precipitation. The island received a total of 14.8 inches of precipitation between May 25th and July 28th. Temperatures ranged between a low of 47°F and a high of 91°F, with average temperatures of 61°F for May, 63°F for June and 71°F for July. A four day storm in early June resulted in 22 dead eggs found in Productivity Plots on June 5th. Later, on June 26th, a thunderstorm killed 10 chicks in Productivity Plots.

Other Species/Projects

The 2012 field season was the sixth year of monitoring Black Guillemot (BLGU) productivity on OGI. This year, 11 of the 13 known BLGU burrows were occupied and 6 burrows hatched eggs. The average clutch size was 1.63 eggs per burrow and the average hatch was 0.909 eggs per burrow. Due to the major storm in early June the entire original wave of eggs was wiped out and not replaced until late June. Due to this delay, fledging could not be determined for any chicks.

Stratton Island, Maine

Emily Pollom and John Gorey, Supervisors

Summary

Census numbers for nesting Common and Roseate Terns in 2012 increased on Stratton Island. Like in 2011, this year's tern success seemed to depend mostly on food quality. In late-July, unfledged tern chicks began to lose weight and eventually starved to death, however, productivity remained close to the historic average.

Census

Arctic and Roseate Tern nests were identified between 1 June and 30 Jul, with Roseates increasing from 2011 levels from 58 to 71 nests and Arctic Terns decreasing from 11 to 0 nests. An island-wide Common Tern nest count was conducted from 12 to 13 June. Common Terns increased from 960 in 2011, with a raw total of 947 nests that was corrected with a Lincoln index of 1.04, to 1033 nests.

A census of the wading bird colony on Stratton Island was conducted on May 17-18. A total of 79 Glossy Ibis, 21 Black-crowned Night Heron, 33 Great Egret, 96 Snowy Egret, and one Little Blue Heron nests were found. A Common Eider census was conducted on May 17- 21 and May 23. Bluff Island was also included in the survey and a total of 649 nests were found.

Productivity

Tern productivity was conducted using both fenced and unfenced plots. The 48 nests in the Common Tern plots hatched at a rate of 2.4 chicks per nest and fledged at a rate of 2.02 chicks per nest. Roseate Terns hatched 1.4 chicks per nest and fledged at a rate of 1.31 chicks per nest for the 69 nests followed. Predation events were somewhat rare in 2012, and weather was good and therefore did not

have a significant impact on fledging success; instead, the highest cause of mortality in all larid species appeared to be starvation.

Diet

Eleven Common tern nests were observed for a total of 354 nest hours. As in 2011, herring the fish species most offered to chicks comprising 59% of the diet, with sandlance making up 18%, and hake 10%. Twelve Roseate tern nests were observed for 573 nest hours. Sandlance made up 69% of their diet, with herring being the second most common item at 10% and hake at 5%. The remainder was made of up unknown fish, euphasids, and butterfish. A subset of Least tern nests were observed. Sandlance were the most commonly fed item at 37%, herring at 22%, killifish 22%, and hake at 12%.

Predation

Herring and Great Black-backed Gulls were the predominant tern predators and also continue to have a devastating impact of Common Eider chick success. Three Herring and eleven Great Black-backed Gulls were shot over the course of the season. Eleven Herring Gull nests and 23 Great Black-backed nests were found on Stratton and destroyed. As part of an effort to reduce Herring and Great Black-backed Gull populations on Stratton and Bluff Islands, eggs in all gull nests found on nearby Bluff Island were poked. Forty-nine Herring Gull and 75 Great Black-backed Gull nests were poked on Bluff Island.

Other

A severe storm hit Stratton Island at the beginning of June, washing away many nests. It is estimated that 80% of Least Tern nests were lost and between 50-60% of Common Tern nests. Most pairs relayed and there was even recruitment from the mainland when colonies there were washed out by the same storm, especially for Least Terns.

When Least Terns relayed after the storm on Stratton, many laid fairly close to the tide line. The full moon tide was threatening to wash these nests away so they were slowly moved by research staff during the week before the tide was going to be highest. Twenty four out of thirty-two nests were saved, with the remaining eight either washing away or abandoning. We found that all LETE pairs except for two returned to the nests after they were moved, even after being moved distances of a few meters over several days.

	2008	2009	2010	2011	2012
Common Tern					
census count	951	1037	854	960	1033
Clutch	2.6	2.8	2.6	2.5	2.6
Hatch	2.25	2.6	1.9	2.2	2.4
Productivity	1.0	1.7	1.7	1.7	2.0
Roseate Tern					
census count	64	76	35	51	71
Clutch	2.0	2.0	2.1	1.9	1.8
Hatch	1.6	1.5	0.9	1.5	1.4
Productivity	1.3	1.3	1.0	1.0	1.3
Least Tern					
census count	59	72	76	59	112
Clutch	2	2	2	1.9	2
Hatch	--	--	--	1.5	1.5
Productivity	--	--	--	0.38	0.76

White and Seavey Islands, NH

Dan and Melissa Hayward, TERNS LCC

Census: On June 12th, 2012, staff biologists and volunteers from Shoals Marine Lab (SML) and the Star Island Corporation conducted the Common Tern census on White and Seavey Islands. Common Tern (COTE) numbers were down this year to 2044 pairs from 2447 pairs in 2011. Roseate (ROST) and Arctic Tern (ARTE) nests were all marked and confirmed visually. The ROST and ARTE nested in a few new areas and were not confirmed before the close of the census period. In the nests that had eggs that hatched, we estimated the laid dates based on an incubation period of 23 days, and for the ARTE we used 21 days, like the COTE. Nests that were identified after the census period and ultimately abandoned were considered initiated after the census period. ROST pairs increased from 42 pairs in 2011 to 51 pairs in 2012. ARTE numbers increased from 3 pairs in 2011 to 4 pairs in 2012. On White Island, there was a large increase in the number of COTE nests from 90 in 2011 to 166 in 2012. The presence of a dog on White throughout the breeding season discouraged the terns from nesting in the area around the house. An electric dog fence was set up upon arrival and the dog was encouraged to roam within the boundaries. There were a few nests initiated within the fenced in area and they seemed to be successful. The nests visible from the house both had 2 fledglings. There were 2 ROST and 3 ARTE nests on White Island in 2012. On July 7, a B-Wave census was “conducted” on White and Seavey Islands. An estimate of 421 new nests on Seavey, based on new nests in productivity plots, and a ground count of 112 nests on White made for a B-Wave total of 533 nests. Twelve ROST nests and one ARTE nest were initiated after the census period.

Census (6/12-6/20) (pop #'s based on plots with predation*)

	COTE	ROST	ARTE
	6/12/2012	6/20/2012	6/20/2012
A-Wave (ground count)=	1643	51	4
Corrected with Lincoln's Index(257m, 1lum)=	1713		
+ Plots(165)+White Is(166)=Total	2044	After 6/20/12	After 6/20/12
B-Wave (July 7)	533 (852)*	12	1
Season Total Nests	2577 (2896)*	63	5

Five Year Population Comparison (at Census)

Species/Year	2006	2007	2008	2009	2010	2011	2012
COTE (prs)	1736	2121	2011	1993	2251	2447	2044
ROST	33	52	37	34	48	42	51
ARTE	6	5	6	6	6	3	4

Five Year Population Comparison (Season Totals)

Species/Year	2006	2007	2008	2009	2010	2011	2012a	2012b*
COTE (prs)	2463	2539	2227	2377	2615	2811	2577	2896
ROST	38	57	40	40	53	50	63	
ARTE	8	6	8	7	6	5	5	

Tern Productivity (A-Wave): COTE productivity decreased from 1.36 chicks per nest in 2011 to 0.94 in 2012. The clutch size increased from 2.29 eggs per nest in 2011 to 2.70 in 2012. ROST productivity decreased in 2012 to 0.98 chicks per nest compared to 1.21 in 2010. ARTE productivity increased in 2012 to 0.50 from 0.33 chicks per nest in 2011.

The weather was fairly mild throughout the season with the exception of two significant weather related events. A storm rolled through from 2 JUN through 5 JUN with almost 4" of rain recorded in Portsmouth and another from 22 JUN through 26 JUN with over 2.5" of rain. During the first storm there were instances of gulls landing in the colony and stealing eggs. This seemed fairly wide spread with no area of the colony heavily targeted. One area of the colony was being hit hard and we attributed it to the gulls but were not seeing the normal reaction from the terns. It was an area clearly visible from the house and was watched frequently. Multiple clutches were disappearing daily and we did not see anything out of the ordinary. It took us a little while but we identified the predator as a Muskrat. Looking through some of the tall vegetation we discovered piles of eggshells. As we continued to look we found more piles of shells and a cache of eggs at the entrance to a Muskrat den. We set out a number of conibear traps but the muskrat would reroute its path to avoid them. We got a few Have-a-heart traps from Shoals Marine Lab and set them out. We set out 3 traps and in one we placed one of the COTE eggs that was cached. The next morning there was a muskrat in the trap and the egg had been eaten. After removing the muskrat, a few pairs of terns renested but later abandoned. The area was basically abandoned. We had 2 productivity plots in that area with 59 nests initiated and a productivity of 0.16 chicks per nest for the A-Wave and 0.09 for the season. The productivity for the rest of the colony was 1.13 for the A-Wave and 1.07 for the season. This area is isolated from the larger part of the colony by a small ravine and the muskrats tend not to cross back and forth. We had a B-Wave on White Island of 112 pairs and we are assuming that many of them came from the area of muskrat predation.

The second storm came at the end of the month and we saw a number of chicks that succumbed to exposure. The vegetation on Seavey grew quickly early on due to the mild weather. A large percentage of the island is not being used by the terns due to the dense vegetation and accumulating dead vegetation. We will need to look at opening up habitat and reducing the litter later in the fall or in the spring.

At census, the COTE numbers were down 16.5% and the nest density in the plots decreased by 11.9%, over 2011. At the end of the season, the overall population was down 8.3% and the nest density in the plots increased by 13.2%. There was a COTE B-Wave of approximately 533 nests and the productivity was 0.37 chicks per nest. The adults in the nests that we were able to follow became less and less attentive towards the eggs and chicks once the majority of the colony started leaving for the day.

Gull predation, on COTE eggs, was sporadic in late May and early June, heaviest during the previously mentioned storm. There were gulls present throughout the breeding season putting constant pressure on the colony but it was not enough to cause any significant damage. We did not observe increased gull pressure during the fledging period as in years past.

The following table represents the Peak COTE hatch information for the A-Wave.

Year	2007	2008	2009	2010	2011	2012
Peak Hatch Period	6/22-6/26	6/23-6/27	6/26-6/29	6/19-6/23	6/23-6/28	6/15-6/21
Peak Day	6/23	6/23	6/29	6/20	6/25	6/18
Standard Deviation	3.53	3.95	3.64	4.10	3.25	3.83

Tern Productivity

COTE A-Wave Totals [Season Totals]{minus area of Muskrat depredation in A-Wave}

Year	2007	2008	2009	2010	2011	2012
Nests Monitored	119 [145]	128 [143]	122[140]	184[189]	184[212]	163(235){132}
Mean Clutch	2.27 [2.19]	2.35[2.29]	2.53[2.45]	2.68[2.62]	2.29[2.22]	2.70(2.43){2.70}
Mean Hatch	2.13 [2.02]	2.08[1.95]	2.15[2.00]	2.37[2.26]	2.05[1.91]	2.02(1.40){1.69}
Fledglings/Nest	1.22 [1.21]	1.28[1.21]	1.23[1.11]	1.81[1.67]	1.36[1.22]	0.94(0.80){1.13}
Total Fledglings	2588 [3047]	2614[2695]	2541[2638]	4074[4393]	3328[3429]	1921(1649){2310}

ROST A-Wave Totals [Season Totals]

Year	2007	2008	2009	2010	2011	2012
Nests Monitored	52 [57]	37[40]	34[40]	48[53]	42[50]	51[63]
Mean Clutch Size	1.62 [1.56]	1.78[1.75]	1.88[1.75]	1.90[1.87]	1.98[1.86]	2.0[1.89]
Mean Hatch	1.42 [1.37]	1.46[1.35]	1.26[1.10]	1.44[1.38]	1.38[1.22]	1.25[1.06]
Fledglings/Nest	1.25 [1.21]	1.24[1.18]	1.06[.93]	1.31[1.27]	1.21[1.16]	0.98[0.86]
Total Fledglings	65 [69]	46[47]	36[37]	64[66]	51[58]	50[54]

ARTE A-Wave Totals [Season Totals]

Year	2007	2008	2009	2010	2011	2012
Nests Monitored	5 [6]	6[8]	6[7]	6	3[5]	4[5]
Mean Clutch Size	2 [2]	1.83[1.88]	2.00[2.00]	2.00	2.00[2.00]	2.00[1.80]
Mean Hatch	1.20 [1.17]	1.33[1.25]	0.43[0.71]	1.83	1.00[0.60]	1.5[1.20]
Fledglings/Nest	0.60 [0.50]	0.67[0.63]	.33[0.29]	1.5	0.33[0.20]	0.50[0.44]
Total Fledglings	3 [5]	3 [3]	2[2]	9	1[1]	2[2]

Tern Feeding Study

COTE

Nest Hours	Feeding Rate
75	1.32

Species	Herring	Sand Lance	Mackerel	Butterfish
% of Diet	56	18	16	9

Predator Control: Biologists arrived on island on May 13 and found evidence of gull nesting. Three GBBG nests were found and destroyed, two with 2 eggs and one with 3 eggs. Pyrotechnics and regular sweeps of the island continued from May 13 through the end of the field season. As a result of predation and non-response to all other control methods, 3 GBBG and 1 HERG were taken. There were instances of depredation throughout the breeding season.

Predator Control (as of 8/12/2012)

Species	Nests Destroyed	Eggs Destroyed	Adults Taken
GBBG	3	7	3(+0 relief kills)
HERG	0	0	1(+2 relief kills)

Gull Control (May 13-Aug 12)

Control Method	Avg/Day
Screamer	1.47
Banger	1.29
Starter cap	0.11
Problem Gull	0.04
Nest Dest.	0.03
Relief Kill	0.02

Other Nesting Species

On July 19 we discovered the failed nest of a Black Guillemot on White Island. We had been seeing a pair of BLGU near the island for a couple of weeks and then finally up on the rocks. When we investigated the area we found one broken egg with a partially developed fetus down between some rocks. To our knowledge, this is the first record of Black Guillemots breeding in New Hampshire.

Species	COEI	SPSA	SOSP
# Of Nests	~30	~10	~6

Other Tern Sightings, Rare Birds, and Interesting Observations

- KIEI-Adult Male 5/26
- AMOY-3 on 6/25, 1 on 7/26
- Very few seabirds observed from the islands

Funding for this project comes from the USFWS State Wildlife Grants, New Hampshire Fish and Game Nongame and Endangered Wildlife Program, NH Moose Conservation License Plate Program, the 908 Group, and private donors.

Massachusetts Tern Census Numbers, 2012

Dr. Ian Nisbet

Massachusetts

These numbers were compiled at the Massachusetts tern and plover meeting, held on 7 August. They are preliminary and are subject to minor changes when full reports are submitted. They were compiled by Ian Nisbet on behalf of Carolyn Mostello (MA NATURAL HERITAGE AND ENDANGERED SPECIES PROGRAM)

	ROST	COTE	ARTE	LETE	BLSK	LAGU
TOTAL pairs in MA 2012	1,271	14,506.5	0.5	2,612	4	1,253
% CHANGE from 2011	-6	-13	++	-39	-20	-21
MASS GOM (includes Monomoy NWR)	8	9,187	0	1,374	1	1,253
% CHANGE from 2011	-33	-9	—	-47	-80	-21

Notes on total pairs:

ROST: Decreased slightly following four years of relative stability.

COTE: First substantial decline since the mid-1970s. Numbers had been stable at about 16,000 pairs since 2003, following steady increase from low of <4,000 pairs about 1976.

ARTE: The lone surviving male at Penikese Island interbred with a Common Tern in 2012, after being present but not breeding in 2011. Some of the hybrid young raised at Penikese Island since 2007 are expected to return to breed.

LETE: Sharp decline from all-time high of 4,309 pairs in 2011. A major storm in early June wiped out many nests at the beginning of the census period; apparently many pairs did not re-nest so were not counted in 2012.

BLSK: Three pairs moved from just inside the GOM to another site outside the GOM.

LAGU: Irregular decline since 2008 high of 1,816 pairs.

Buzzards Bay Tern Census Numbers, 2012 (Outside Gulf of Maine)

	COTE	ROST	ARTE
BIRD ISLAND	1,902	814	0
% CHANGE from 2011	+2	-13	—
RAM ISLAND	2,511	439	0
% CHANGE from 2011	-25	+16	—
PENIKESE ISLAND	585.5	9	0.5
% CHANGE from 2011	-51	-74	++
BUZZARDS BAY total	4,998.5	1,262	0.5
% CHANGE from 2011	-22	-6	++

Buzzards Bay is outside the GOM, but is traditionally reported on at GOMSWG meetings because it is the site of intensive management and monitoring programs by MNHESP, and is the core breeding area for Roseate Terns, from which some birds emigrate to the GOM (and to which a few birds return from the GOM).

COTE: sharp decline at Ram and Penikese Islands. Numbers at Bird Island have been stable at ~1,800 pairs since 1988, despite shrinkage of available habitat.

ROST: Decreased slightly following four years of relative stability. Many birds move back and forth from year to year between Bird and Ram Islands; there was net movement from Bird to Ram in 2012.

ARTE: The lone surviving male at Penikese Island interbred with a Common Tern in 2012, after being present but not breeding in 2011.

Complete data on productivity are not yet available, but productivity appears to have been >1 chick raised to fledging per pair for both species at Ram and Bird Islands, but low at Penikese because of predation.