

**Gulf of Maine Seabird Working Group  
25<sup>th</sup> Annual Summer Meeting**

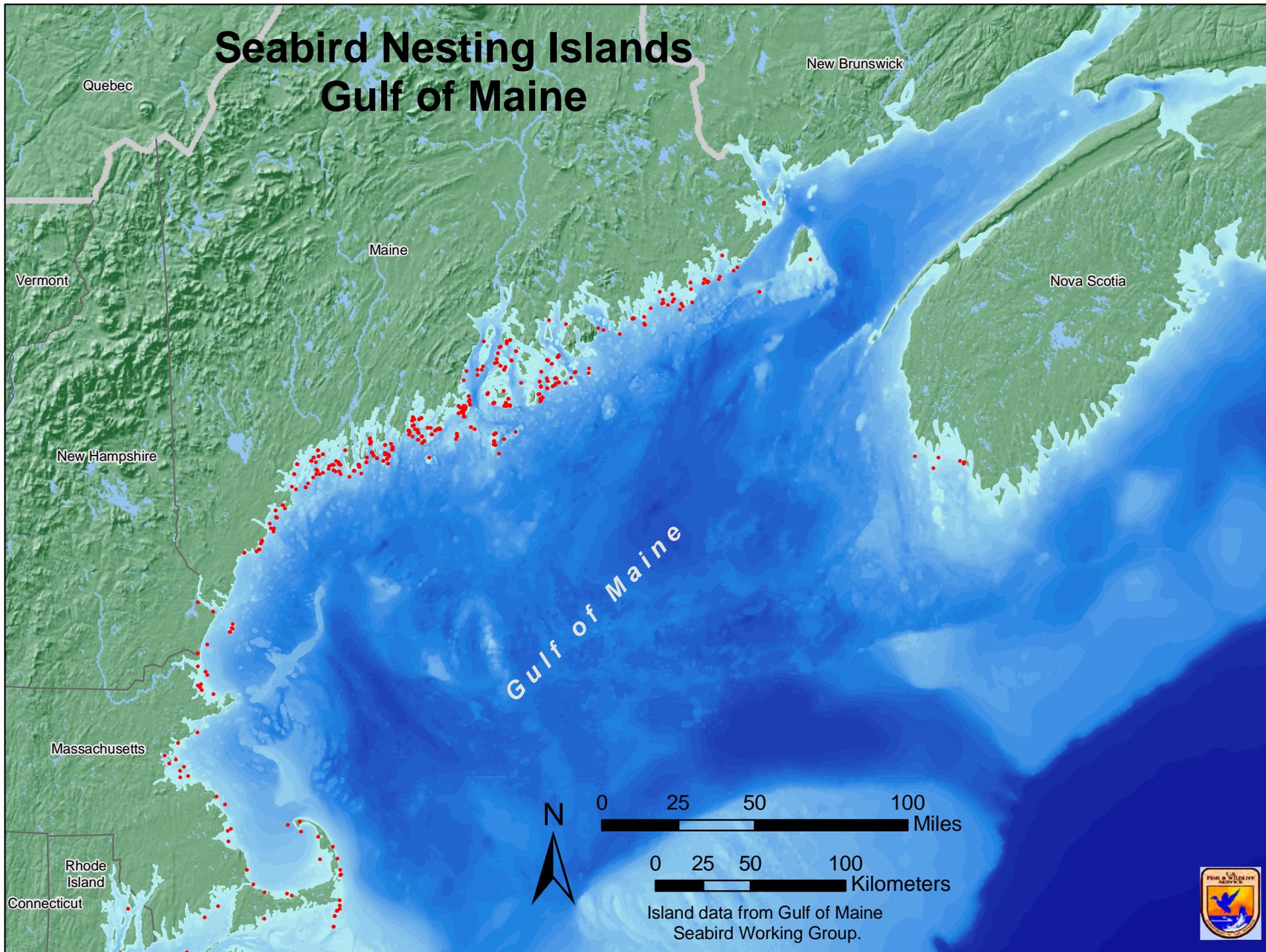


**Hog Island, Bremen, Maine  
August 12, 2009**

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# Seabird Nesting Islands Gulf of Maine



## Introduction

This report highlights the 2009 seabird nesting season in the Gulf of Maine, as reported by seabird biologists at the Gulf of Maine Seabird Working Group (GOMSWG) summer meeting hosted by Maine Audubon on Hog Island. The information in this report is generally organized by island, from outer Cape Cod, Massachusetts northward to Nova Scotia. Seabird biologists reported on productivity monitoring, feeding studies, and predator activity from the colonies that they managed. Abstracts and progress reports from research projects within the Gulf of Maine and surrounding areas are also included (Afternoon Session/Research Abstracts).

Steve Kress of National Audubon Society welcomed everyone to the 2009 meeting and announced that this was the 25<sup>th</sup> anniversary of GOMSWG!

## Summer 2010

The 2010 GOMSWG meeting will be held on Thursday, August 12 on Hog Island. The compiler for next summer's meeting minutes will be the Maine Department of Inland Fisheries and Wildlife, with Brad Allen being the contact. Previous compilers were: *2001*-Atlantic Cooperative Wildlife Ecology Research Network; *2002*- ME Department of Inland Fisheries and Wildlife; *2003*-USFWS Maine Coastal Islands National Wildlife Refuge; *2004*-National Audubon Society--SRP; *2005*-Biodiversity Research Institute; *2006*-Shoals Marine Laboratory; *2007*-Monomoy National Wildlife Refuge; *2008*-Mass Audubon Coastal Waterbird Program; *2009*-USFWS Gulf of Maine Coastal Program.

## Gulf of Maine Seabird Summary

Final **2008** tern numbers became available in late 2009 and indicate that the Gulf of Maine supported approximately 20,905 pairs of Common Terns (an increase of 3% since 2007), 4,286 pairs of Arctic Terns (an increase of 1% since 2007), and 326 pairs of Roseate Terns (a decrease of 17% from 2007). Laughing Gull numbers increased in 2008 to 6,293 pairs (an increase of 11% since 2007) and 1,404 pairs of Least Terns nested last year (a decrease of 27% from 2007).

In **2009**, terns nested at approximately 50 or more sites in the Gulf of Maine from Nova Scotia to outer Cape Cod, Massachusetts. The most common prey items observed during tern feeding studies were herring, hake, butterfish, and sand lance. Predators such as gulls, owls, merlins, and peregrine falcons provided management challenges and made some aspect of predator control necessary for most sites in the Gulf of Maine. However, excessively wet and unusually cool weather for most of the season was likely the major factor limiting productivity this year.

The terns on Machias Seal Island experienced yet another breeding failure - but they did not abandon the island - breaking the trend of nearly 3,000 pairs of Arctic and Common Terns abandoning the island since 2005. This historically important site, especially for Arctic Terns, had another season of poor production and chronic gull predation. Concern continues for the loss of Machias Seal Island as a breeding site.

After four years of steady increases in nesting laughing gulls, 2009 census numbers indicate a slight decrease (approximate 3%) in the nesting population on surveyed islands. This decrease is encouraging given the predatory relationship with terns and the laughing gull control measures implemented in the last few years.

A table with the 2009 GOMSWG census results and gull control efforts will be distributed when it is complete.

## Island and Site Reports

### Massachusetts

#### **Massachusetts Summary**

*Dr. Ian Nisbit*

##### **Massachusetts Tern Census Numbers, 2009**

These numbers were compiled at the Massachusetts tern and plover meeting, held on 4 August. They are preliminary and are subject to minor changes when full reports are submitted. They were presented by Ian Nisbit, on behalf of Carolyn Mostello (MA NATURAL HERITAGE AND ENDANGERED SPECIES PROGRAM).

	COTE	ROST	ARTE	LETE	LAGU	BLSK
TOTAL pairs in MA 2009	15,999.5	1,339	5.5	3,342	1,618	6
% CHANGE from 2008	+1	-3	+22	-7	+2	+20
MASS GOM (includes Monomoy NWR)	8,862	0	4	1,846	1,618	6
% CHANGE from 2008	-17	-100	+100	+49	+2	+20

The “0.5” entries represent a mixed pair of Common Tern x Arctic Tern, which bred on Penikese Island for the third successive year and raised 2 hybrid chicks in 2009.

In Massachusetts as a whole, Common and Arctic Terns, Laughing Gulls and Black Skimmers increased slightly, whereas Roseate and Least Terns decreased slightly. However, these decreases were offset by numbers at a new site on Martha’s Vineyard, where large numbers of terns settled just after the main census period (and hence are not included in the above table). This site was a great conservation success: after terns started to nest there, the entire site was surrounded by skunk-proof fence (>0.5 mile). The terns poured in and by late July there were nearly 1,000 pairs of Least Terns, 500 pairs of Common Terns and 50 pairs of Roseate Terns. All were highly successful and large numbers of chicks were fledging at the time of the meeting.

Changes in numbers in the GOM part of Massachusetts (south to Monomoy NWR) resulted mainly from rearrangements. The most important of these was the partial break-up of the Monomoy colony, where all Roseate Terns, about 4,000 pairs of Common Terns and some Laughing Gulls left between 2008 and 2009 (see the Monomoy NWR report, below). Most of the Laughing Gulls moved to Plymouth Beach; the Common Terns apparently moved to Plymouth Beach (about 2,000 pairs), Ram Island (1,600 pairs) and Martha’s Vineyard (about 500 pairs); the Roseate Terns apparently moved to Martha’s Vineyard. We had hoped that when the Monomoy colony broke up, many would move to our other restoration site at Muskeget Island, but none did so in 2009.

In contrast, Plymouth Beach is another great conservation success: both ORVs and predators have been brought under control in recent years, and numbers of terns have built up to >4,000 pairs of Common Terns, >400 pairs of Least Terns and 4 pairs of Arctic Terns (2 new in 2009). All three of these tern species bred successfully at Plymouth Beach in 2009, but productivity numbers are not yet available. One pair of Black Skimmers nested very late in the season and hatched chicks in early August, but the chicks were taken by predators.

**Buzzards Bay Tern Census Numbers, 2009**

	<b>COTE</b>	<b>ROST</b>	<b>ARTE</b>
BIRD ISLAND	1,805	708	0
% CHANGE from 2008	+15	-5	—
RAM ISLAND	3,961	588	0
% CHANGE from 2008	+68	+4	—
PENIKESE ISLAND	1,139.5	43	1.5
% CHANGE from 2008	+1	-35	-40
BUZZARDS BAY total	6,905	1,339	1.5
% CHANGE from 2008	+36	-2	-40

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). Common Terns have increased in each year since 1976 and continued to increase in 2009. However, Roseate Terns have decreased in each year since 2000, for reasons we do not understand.

The most striking change in 2009 was an increase of more than 1,600 pairs of Common Terns at Ram Island (apparently birds that moved from Monomoy NWR). Complete data on productivity are not yet available, but productivity appears to have been >1 chick raised to fledging per pair for all species/site combinations except ROST/ Penikese. As in other recent years, many pairs of Roseates that laid eggs at Penikese Island in 2009 deserted them before hatching. We are frustrated by our failure to attract Roseate Terns to settle securely at this historically important colony site. We suspect that the continual desertions are caused by the prevalence of Garter Snakes, which are numerous in the vegetated habitats used by Roseate Terns, but infrequently move into the unvegetated areas lower down the beaches that are used by Common Terns.

**Monomoy Islands**

*Kate E. Iaquinto – Biological Technician, USFWS*

*John Thompson – Biological Technician, USFWS*

**North Monomoy Island****Common Tern**

Census: On 16 June, observers counted 275 Common Tern nests in the historic nesting area on the northwest portion of the island.

Productivity: Productivity was not quantitatively estimated, but was estimated to be zero. The nesting area was overwashed shortly after the census period and terns did not return to renest in this area.

**South Monomoy Island****Common Tern**

Census: On June 15-16, a total of 2266 Common Tern nests were counted on the north tip of South Monomoy. The nesting area was delineated into 60 m<sup>2</sup> grids and nests were tallied by grid. A Lincoln Index adjustment brought the total to 2347 nests. This is a 66.0% decrease from the 6834 nests counted in 2008. A second census was not conducted, but an additional 352 nests (62.7% of the total 561 nests) were initiated in productivity enclosures after the census window, indicating an additional 1476 nests in the colony after 20 June.

Productivity: The reproductive success of Common Terns on South Monomoy was poor based on 209 A-count nests in 34 fenced productivity enclosures located throughout the colony. The following calculations are based on A-nests only and reproductive success is measured by nest attempts.

**Table 1. Comparison of Productivity Information for A-Period Nesting Common Terns on South Monomoy Island, 2008 to 2009**

	2009	Standard Deviation	Standard Error	Sample Size	2008
Average Clutch Size	2.17 eggs/nest	0.78	0.05	209	2.18 eggs/nest
Average Eggs Hatched Per Nest	0.62 eggs hatched/nest	0.98	0.07	209	0.76 eggs hatched/nest
Hatching Success	29% of the eggs laid hatched				79%
Fledging Success	57% of the chicks hatched fledged				66%
Reproductive Success	0.35 chicks/nest	0.71	+/- 0.05	209	1.12 chicks/nest

**Table 2. Number of Pairs and Reproductive Success of Common Terns on South Monomoy Island, 2005 to 2009**

	2005	2006	2007	2008	2009
Number of Pairs	8834	9310	7948	6834	2347
Reproductive Success (chicks fledged/nest)	1.41	0.96	0.70	1.12	0.35

**Feeding Stints:** Staff conducted 44 1-hour long Common Tern feeding stints from July 6 - July 29. An area of observation was defined by the observer and prey, prey length and recipient of prey was recorded during each stint. 361 total observations were made during 44 hours of stints. Sand lance was the most common prey item (95%). Other delivered prey items included herring, hake, butterfish, and bluefish. The average prey length was 2.52 inches and 71% of the prey items brought into the colony were delivered to chicks.

**Adult Tern Trapping and Banding:** Forty-nine banded adult Common Terns were recaptured this season using treadle traps. Thirty-nine recaptured terns that were trapped were originally banded at Monomoy NWR. The remaining recaptured terns have been reported to the Bird Banding Lab to obtain information about the origin of their bands. A total of 12 unbanded adult Common Terns were also banded opportunistically during trapping efforts.

**Salmonellosis:** *Salmonella* occurred again this season in the tern colony on South Monomoy Island from June 24-August 7. Approximately 28 Common Tern fledglings (15-23+ days in age) and three Common Tern adults were found dead. Fledglings that were found dead of *Salmonella* generally had a normal outward appearance with no visible signs of injury or wounds. Some birds were observed prior to dying and often showed signs of imbalance and lethargy. They appeared droopy, were unable to open their wings and fly, and some had stained vents. There was significantly less incidence of death from salmonellosis in the colony this year compared to recent years.

### Roseate Tern

**Census:** There were zero Roseate Tern nests counted during the census on June 15-16. Observers continued to search for Roseate Tern nests throughout the season, but no nests were found.

**Productivity:** Since we did not find roseate terns nesting on South Monomoy this year, there was no productivity information collected.

**Table 3. Number of Pairs and Reproductive Success of Roseate Terns on South Monomoy Island, 2005 to 2009**

	2005	2006	2007	2008	2009
Number of Pairs	1	2	2	0	0
Productivity (chicks fledged/nest)	0	0.33	1.00	0	0

**2009 Attraction Project:** In an effort to attract Roseate Terns to South Monomoy Island due to habitat loss on Minimoy Island this year, a Roseate Tern Attraction Project was started this season. Twenty-four nesting structures were set up amongst several areas in the South Monomoy Island colony that refuge staff determined to be desirable nesting habitat for Roseate Terns. Decoys were placed near these colonies and two sound systems played Roseate Tern calls throughout the nesting season. The project was not successful in attracting nesting Roseate Terns to South Monomoy Island this year, but will continued as part of an ongoing effort.

**Least Tern**

Census: On 6/17, five Least Tern nests were counted on the southern portion of the island. Seven total Least Tern nests were counted on 7/3 and 7/4 between the northern and southern portions of the island.

Productivity: Productivity was not quantitatively monitored, but was estimated to be poor. No chicks were seen on South Monomoy Island and nests were very short lived due to overwash and depredation.

**Laughing Gull**

Census: On 15 and 16 June, 547 active Laughing Gull nests were counted, which is down from the 2008 count of 1317.

Productivity: Productivity was not monitored, but it was estimated to be qualitatively fair to poor based on the number of fledglings seen at the end of the season. Nest destruction efforts were implemented again this season to reduce the increasing Laughing Gull population that is encroaching on the tern colony, but was discontinued due to low levels on nesting gulls on the island. A total of 198 nests were destroyed on June 20.

**Minimoy Island****Common Tern**

Census: On June 17, 1453 Common Tern nests were counted. No Lincoln Index was conducted to minimize disturbance. In 2008, 1258 nests were counted during the census window.

Productivity: Productivity was not monitored, but based on production and survival; productivity was estimated to be qualitatively poor. Overwash, loss of habitat, and some predation by gulls and Black-crowned Night-Herons impacted Common Terns throughout the season.

**Roseate Tern**

Census: No Roseate Tern nests were found during the June 17 or July 11 survey. Roseate Terns were often seen and heard on Minimoy Island, but no nests were found on the island. A total of 30 Roseate Tern nests were counted during the A census window in 2008. Seven B-count nests were found later in the 2008 season. Severe habitat loss during the winter of 2008-2009 was the ultimate cause for the loss of nesting Roseate Terns on Minimoy Island this season.

Productivity: Since we did not find Roseate Terns nesting on Minimoy Island this year, there was no productivity information collected. In 2008, ROST reproductive success was 1.00 chick/ nest.

2008/2009 Habitat Preservation Project: In the fall of 2008, Refuge staff initiated a habitat preservation strategy to help maintain sandy soil and thick dune habitat on Minimoy Island that had begun to wash away. The staff erected several hundred feet of sand-fencing on the island in the hope that it would help to maintain sand on the small dune area of the island. Over the winter the sand fence did collect some sand, however, the main dune that Roseate Terns have nested on in previous years was completely lost. Suitable habitat for Roseate Tern nesting was non-existent on Minimoy Island during this nesting season. This project will most likely not be continued in future years as there is not much dune habitat remaining to be preserved.

**Black Skimmer**

Census: On June 18-19, five Black Skimmer nests were counted. Nests were overwashed continuously throughout the season and several unsuccessful attempts were made.

Productivity: Productivity estimates were determined based on four A-count nests. Average clutch size was four eggs/nest. Black Skimmers did not hatch or fledge any chicks this year. Reproductive success was zero. Reproductive success in 2008 was also zero.

**Laughing Gull**

Productivity was not measured quantitatively, but was estimated to be zero. All Laughing Gull nests found on Minimoy were destroyed to prevent gull establishment on the island. Three nests were found on the island on 6/11/09 before the census and two nests were found on 7/11/09 after the census window.

**Predators (Refuge-wide)**

**Great Black-backed Gull (GBBG) and Herring Gull (HERG):** Gull harassment in area A (gull-free zone) was initiated on 24 April. Gull harassments were conducted weekly throughout June and once in April and July. No Gull census was performed this year. Gulls were present in the tern colony late-May through August. Gulls were seen entering the colony at least 16 times during the day. Gulls were responsible for taking at least 1155 tern eggs. Zero gulls were removed from the island this year. One Great Black-backed Gull empty nest bowl was destroyed on South Monomoy Island to discourage nesting near Piping Plover nesting areas.

**Northern Harrier:** A nest was not found, but based on Northern Harrier presence on South Monomoy Island it is likely that at least one pair nested on the island. Northern Harriers were seen in the tern colony a minimum of 15 times between 28 April and 26 July. At least one adult Common Tern was found dead and likely killed by Northern Harrier.

**Coyote:** A total of 30 coyotes were removed this season: 8 in April, 12 in May, 6 in June, and 4 in July. Evidence of coyote (scat, tracks – often seen in pairs) was found in or around the tern colony on 64 days throughout the season. There was evidence of coyote depredation on tern eggs, as well as eggs and chicks of other nesting birds including Piping Plover, American Oystercatcher, and Laughing Gull.

**Black-crowned Night-Heron:** Black-crowned Night-Herons were censused on 19-20 May during the refuge wading bird census. On South Monomoy Island, one active nest was found. On North Monomoy Island, 107 active nests were counted. Black-crowned Night-Heron activity in the tern colony was first observed 30 May, and was first seen in the tern colony on 16 June. Black-crowned Night-Herons were observed at least eight times in the colony during day and night time observations. At least 87 Common Tern eggs were found dead due to predation by Black-crowned Night-Herons. Three Black-crowned Night-Herons were removed this year during night stint predator control efforts. Night-Herons were only targeted when witnessed within the Common Tern Colony on South Monomoy Island.

**Laughing Gull:** Laughing Gull kleptoparasitism stints were continued this year. A total of 79 one-hour long stints were conducted in the tern colony on South Monomoy Island. Approximately 295 kleptoparasitism attempts were observed and recorded for an average of 17.4 attempts per hour. Laughing Gulls were successful in 38% of the attempts, Common Terns were successful 43.7 % of the time, the outcome was unknown 10.5% of the time, and prey items were dropped in 7.8% of the attempts.

## New Hampshire

### ***White and Seavey Islands***

*Dan Hayward – Project Coordinator, Shoals Marine Lab*

*Melissa Hayward – Assistant Project Coordinator, Shoals Marine Lab*

**Census**

Seventeen people were on hand to conduct the census on June 13<sup>th</sup>, 2009. Staff biologists, volunteers and the Shoals Marine Lab (SML) Field Marine Science Class participated in the census. Two groups of 5 and one group of 6 counted nests and eggs on White and Seavey while one person photographed the census. Common tern (COTE) numbers were down this year from 2011 pairs in 2008 to 1993 pairs in 2009. Roseate (ROST) and Arctic Tern (ARTE) nests were all marked and confirmed visually on or before June 20, 2008. ROST pairs decreased from 37 pairs in 2008 to 34 pairs in 2009. ARTE numbers were the same as in 2008 with 6 pairs. On White Island there was an increase in the number of COTE nests from 187 in 2008 to 262 in 2009. Two pairs of ROST and 1 pair of ARTE nested on White Island in 2008. On July 9, a B-Wave census was “conducted” on White and Seavey Islands. An estimate of 250 new nests on Seavey, based on new nests in productivity plots, and a ground count of 113 nests on White made for a B-Wave total of 384 nests. One ARTE and six ROST nests were initiated after the census period.

**Census (6/12-6/20)**

Species	COTE	ROST	ARTE
Date	6/13/09	6/20/09	6/20/09
A-Wave (ground count)=	1831	34	6
+ Lincoln's Index(131m,2um)=	1859		
+ Plots(134)=Total	1993	After 6/20/08	After 6/20/08
B-Wave (July 9)	384	6	1
Season Total Nests	2377	40	7

**Year-by-Year Comparison (Census)**

Species/Year	2004	2005	2006	2007	2008	2009
COTE (prs)	2582	2033	1736	2121	2011	1993
ROST	107	61	33	52	37	34
ARTE	5	8	6	5	6	6

**Year-by-Year Comparison (Season Totals)**

Species/Year	2004	2005	2006	2007	2008	2009
COTE (prs)	2582	2478	2463	2539	2227	2377
ROST	112	67	38	57	40	40
ARTE	7	9	8	6	8	7

**Tern Productivity**

COTE productivity decreased from 1.28 in 2008 to 1.23 in 2009. The clutch size increased from 2.35 eggs per nest in 2008 to 2.53 in 2009. ROST productivity decreased in 2009 to 1.06 chicks per nest compared to 1.24 in 2008. ARTE productivity decreased in 2009 to 0.33 from 0.60 chicks per nest in 2008.

The weather was mild during May while the majority of nests were initiated. June was mostly cloudy and wet. There were 20 days, during the 35 day period beginning with peak laying to the end of peak hatch, that recorded measurable rainfall. During peak hatch, from June 26 through June 29, we received 1.92 inches of rain, but the chicks seemed to do well despite the bad weather. We did see weather related mortality during the storm on July 24<sup>th</sup>. A number of large chicks were found dead after the storm. The vegetation on Seavey has continued its shift back to more dense grass and leafy vegetation and decreasing the amount of usable nesting habitat. The overall population, at census, was down 0.9% and the nest density in the plots decreased by 5.6%. At the end of the season, the overall population was up 6.7% and the nest density in the plots increased by 7.6%. There was a COTE B-Wave of approximately 384 nests and the productivity was 0.33 chicks per nest. The birds that we were able to follow became less and less attentive to the nests and chicks once the majority of the colony was leaving for the day. Many nests were not able to be followed due to the dense vegetation. Only one chick survived out of the 6 ROST nests initiated after the census period. The very synchronous A-Wave was not significantly impacted by the weather and dense vegetation whereas the B-Wave seems to have been.

The most significant impact to the colony was the presence of a snowy owl. It was first seen on June 3<sup>rd</sup> and on the 5<sup>th</sup> the terns started to abandon at night. While waiting for our depredation permit to be amended, we observed the owl perching on the blinds and dropping into the colony. Based on the number of feather piles, we estimate that it was taking at least 2 adults each night. We found 20 feather piles scattered throughout the colony on Seavey and on White. The owl was trapped on the 14<sup>th</sup> of June using a modified leg-hold trap that was placed on the roof of one of the blinds. The rest of the roof was covered with chicken wire. Once the bird was captured, we transported it to the mainland where NH Fish and Game took the owl to a rehabilitator. It was released 2 weeks later in northern New Hampshire. We have not seen any sign of it since. After the owl was removed, the terns continued with the nocturnal abandonment and we decided to start the sound system up again. After getting all the parts of the sound system back together, we got it up and running on the 20<sup>th</sup>. On the 23<sup>rd</sup>, we were able to hear a large number of terns on the islands and by the 26<sup>th</sup> it sounded "normal" again. The A-wave hatching period was delayed by, on average, 7 days, with a standard deviation of 2.1 days. It also made the hatching more synchronous. Based on egg laying dates, the peak hatch period would have been spread out over 7 days. In actuality, it occurred over 3 days.

Gull predation, on COTE eggs, was observed during storms in late May and early June. Similar to years past, it was not possible to document the number of eggs taken during the storms. The weather did not warrant spending time in and around the colony and in blinds. During the fledging period there was a marked increase in predation. The gulls swooped down over the colony, putting up the terns. When the terns flew off, newly fledged birds would fly out over the water, seem to run out of energy and then fall into the water. Gulls would then take advantage of the waterlogged chicks and pick them out of the water. During high winds, we observed similar situations where the fledglings would become stranded out in the water only to become easy prey for the gulls.

The majority of the COTE A-Wave hatched between June 26 and 29, peaking on the 29<sup>th</sup>. In 2008 peak hatch was between June 23 and 27, peaking on the 23<sup>rd</sup> of June, in 2007 between June 22 and 26, peaking on the 23<sup>rd</sup>, and in 2006, between June 24 and June 27th, peaking on June 24th.

#### COTE A-Wave Totals [Season Totals]

Year	2004	2005	2006	2007	2008	2009
Nests Monitored	138	120	114 [163]	119 [145]	128 [143]	122[140]
Mean Clutch Size	1.84	1.93	2.38 [2.17]	2.27 [2.19]	2.35[2.29]	2.53[2.45]
Mean Hatch	1.67	1.14	1.87 [1.48]	2.13 [2.02]	2.08[1.95]	2.15[2.00]
Fledglings/Nest	0.75	0.76	0.60 [0.47]	1.22 [1.21]	1.28[1.21]	1.23[1.11]
Total Fledglings	1936	1523	1041 [1158]	2588 [3047]	2614[2695]	2541[2638]
Total Population	7100	5585	4513 [6084]	6830 [8125]	6636[7149]	6437[7392]

#### ROST A-Wave Totals [Season Totals]

Year	2004	2005	2006	2007	2008	2009
Nests Monitored	55	56	33 [38]	52 [57]	37[40]	34[40]
Mean Clutch Size	1.21	1.23	1.48 [1.42]	1.62 [1.56]	1.78[1.75]	1.88[1.75]
Mean Hatch	1.13	0.82	1.24 [1.11]	1.42 [1.37]	1.46[1.35]	1.26[1.10]
Fledglings/Nest	0.95	0.70	0.97 [0.87]	1.25 [1.21]	1.24[1.18]	1.06[.93]
Total Fledglings	52 [106]	46	32 [33]	65 [69]	46[47]	36[37]

#### ARTE A-Wave Totals [Season Totals]

Year	2004	2005	2006	2007	2008	2009
Nests Monitored	5	6	6 [8]	5 [6]	6[8]	6[7]
Mean Clutch Size	1.20	1.83	1.67 [1.75]	2 [2]	1.83[1.88]	2.00[2.00]
Mean Hatch	0.50	1.67	0.67 [1.0]	1.20 [1.17]	1.33[1.25]	0.43[0.71]
Fledglings/Nest	0.60	0.83	0.5 [0.75]	0.60 [0.50]	0.67[0.63]	.33[0.29]
Total Fledglings	4	3	5	3 [5]	3 [3]	2[2]

### Tern Feeding Study

Structured feeding study was only done for a short period of time when the Seabird Conservation Interns were on island.

#### COTE

# Of Nests	Nest Hours	Feeding Rate
18	71	1.9

Species	Herring	Hake	Butterfish	Unknown Fish	Mackerel
% of Diet	42.2	24.4	12.6	8.9	7.4

### Predator Control

Biologists arrived on island on May 3. No gulls attempted to nest throughout the season. Pyrotechnics and regular sweeps of the island continued from May 3 through the field season. As a result of predation and non-response to all other control methods, 4 GBBG and 1 HERG were taken. Gull predation on eggs was heaviest during periods of

strong winds in late May and early June. With winds in excess of 20kt, the gulls barely land to depredate a nest. During the end of July, GBBG and HERG were observed eating fledglings out on or over the water. The majority of the chicks taken were those that ended up in the water and could not get back into the air. The gulls took advantage of the wet, flightless chicks and captured them easily. Please see the Productivity section with regards to the snowy owl.

**Predator Control (as of 8/5/2009)**

Species	Nests Destroyed	Eggs Destroyed	Adults Taken
GBBG	0	0	4(+5 relief kills)
HERG	0	0	1(+1 relief kills)

**Gull Control (May 3-Aug5)**

Control Method	Avg/Day
Human Control	0.69
Screamer	0.56
Banger	0.20
Problem Gull	0.05
Relief Kill	0.06

**Other Nesting Species**

Species	COEI	SPSA	SOSP
# Of Nests	~25	~10	~4

**Other Tern Sightings, Rare Birds, and Interesting Observations**

SNOW-June 3-14

LETE-May 31(4); July 19

BLTE-June 12; July 8

COSH- July 12

MASH-June 19, 22, 24

PEFA-May 4, 5, 13, 14, 31; August 1, 2

RBTR- June 23

RAZO-May 22, 23, 29; June 20, 23; July 7

ATPU-May 29; June 6, 9, 10, 21, 29

AMOY- May 4

LAGU-regularly throughout the season

## Maine

### **2009 Maine State Synopsis of Nesting Least Terns**

*Kate O'Brien – Wildlife Biologist, Rachel Carson NWR*

On June 15<sup>th</sup> a coordinated GOMSWG window count survey documented a minimum of 170 least terns within the State of Maine. 98 of those least tern pairs nested on mainland beaches in Maine, while 72 nested on Stratton Island. Two additional coordinated surveys were conducted, one right after the major storm surge washed out a number of nests and after Higgins Beach abandoned due to predation, and another once the birds re-nested. The tern nesting season was extended at Crescent Surf and there were predation problems at Stratton Island, making estimation of production difficult. However, 170 pairs produced a minimum of 78 fledglings (estimated range of 78-99), with the bulk of those 62-69, produced on Crescent Surf Beach and a minimum of 16 (estimated 16-30) from Stratton Island.

	WELLS	LAUDHOLM FARM	CRESCENT SURF	GOOSE ROCKS	WESTERN BEACH	STRATTON ISLAND	HIGGINS	RAM ISLAND	SEAWALL	POPHAM	REID STATE PARK	TOTAL
2003	0	20 (0)	57(8)	8(0)	0	-	38 (53)	0	0	0	33(5)	156 (66)
2004	15 (10)	1(0)	[50 (3)]	0	0	-	45 (54)	0	0	0	50(2)	146 (69)
2005	0	4(1)	[52 (7)]	0	[40 (3)]	18(9)	[22 (0)]	0	[17 (0)]	0	0	114 (20)
2006	[1(0)]	0	30 -10	[25 (1)]	0	103 (15)		0	0	0	[1(0)]	134 (26)
2007	1(1)	0	[37 (1)]	[45 (2)]	0	113 (10)8	0	0	0	0	0	150 (112)*
2008	0	0	92(52)	2(0)	[2]	72 (33)	0	0	0	0	0	166 (89)*
2009	0	0	102** (62)	[6** (0)]	0	72(16)	[16 (0)]	0	0	0	0	170 (78)

[ ] colony deserted

\* simultaneous count at all occupied nesting sites, not a site specific high nest count

\*\* high nest count

### **Wells Beach, Wells, Maine**

*Julia McGuire, Laura Minich, and David Mallard – Maine Audubon*

**Population Estimate:** No terns attempted to nest at this site. 82 Least Terns were observed loafing on the marina docks at Wells Harbor on May 23.

**Comparison:** One pair produced one fledgling in 2007. There were no nesting pairs of Least Terns in 2006 or 2008. In 2005 no nests were located despite ten pairs of least terns scraping. 15 nesting pairs produced 10 fledglings in 2004.

**Predator Control:** None.

### **Laudholm Beach, Wells, Maine**

*Shonee Strickland, Andy McEvoy and Kate O'Brien – Rachel Carson NWR*

**Population Estimate:** Zero nesting pairs.

**Comparison:** Least terns have not nested on site since 2005, when four nests were reported, one nest hatched to produce a single fledgling. Laudholm Beach has yet to recover from storms, which stripped away sand to reveal a cobble beach. Several years of deposition have yet to create suitable habitat.

**Predator Control:** None at Laudholm, however across the Little River at Crescent Surf there was predator control. The beach remains in poor condition here, with minimal sand.

### **Crescent Surf Beach, Kennebunk, Maine**

*Shonee Strickland, Andy McEvoy and Kate O'Brien – Rachel Carson NWR*

**Population Estimate:** There were 82 active nests during the statewide least tern census on June 15<sup>th</sup>, however the high count of nests was 102, on July 8<sup>th</sup>. It is likely the number of pairs nesting on Crescent Surf was even higher, as an additional 15 chicks were counted during the survey on July 8<sup>th</sup>. Approximately half of all nests were lost to a late summer storm during astronomical high tides, on June 24<sup>th</sup>. Nests which survived summer storms hatched, only to

face extremely difficult weather conditions marked by cold rains and high chick mortality. Birds which re-nested had better success, and are thought to have produced the bulk of the fledglings at this site.

A high fledgling count of 62 fledgers and 7 large chicks was recorded on August 6 during a daytime, high-tide count. There were two previous dusk fledgling counts coordinated throughout the state on July 15<sup>th</sup> and July 29<sup>th</sup>. There were not many fledged birds on July 15<sup>th</sup> (n=13 fledgers, n=15 chicks) and during the survey on the 29<sup>th</sup> it was noted that a large flock of least terns was missed during the count. Nest counts on June 15, and fledgling counts from August 6 were used to calculate approximate productivity values of 0.756 fledgers per a pair, or a total of 62 fledglings produced. Mean clutch size was 1.76, SD +/- 0.43.

Although our fledgling count was performed outside of a coordinated state-wide effort and occurred during the day, we are confident of our August 6<sup>th</sup> fledgling count. Stratton banded all of their least tern fledglings, and we saw no banded fledglings on Crescent Surf. Furthermore, there were reports of the Stratton birds being on Western Beach at about the same time that we conducted our daytime count.

Comparison: In 2008, the high count of nests was 97 on July 13<sup>th</sup>. The high fledgling count was 54, yielding a productivity of 0.609. Productivity was poor from 2003-2007. In 2002, 81 pairs of least terns produced 145 fledglings.

Predator Control: USDA Wildlife Services removed predators from the Crescent Surf beach area from April 8<sup>th</sup> to August 14<sup>th</sup>. During this time, key predators were taken including twenty-three raccoons, two skunks, five crows, nine great black-backed gulls, two opossum, and two weasels. The predator control program in 2009 was very successful, and an integral part of restoring a productive tern colony at Crescent Surf. Interesting observations include two crows attacking a killing a large chick/fledgling late in the season after most terns had left the area.

A solar powered electric net fence was installed at Crescent Surf Beach to further dissuade predators. Storm tides in June passed over the fence, knocking it down, and causing us to move the fence back on the beach and enclose a smaller portion of the colony. The fence was moved throughout the season in response to tides, and to include as many least tern nests as possible within the fenced section of the beach.

### **Goose Rocks Beach, Kennebunk**

*Julia McGuire, Laura Minich, and David Mallard – Maine Audubon*

Population Estimate: A high of 12 adults was observed around the Baton River Spit on June 3. A total of six nests were found on June 3 and June 5, although all nests were predated by June 8. One nest with two eggs was seen from July 3 to July 22, and it was predated by July 30. The predator is unknown, although fox tracks were regularly seen in the area.

Comparison: Last season four pairs of Least Terns nested at Goose Rocks Beach at the Batson River Sand Spit. The first four nests were predated and three new nests were found on July 7<sup>th</sup>, one chick was seen on July 28 but not observed again. In 2008 there was a colony of at least 45 nesting Least Terns on Goose Rocks Beach until a fox predated many nests on June 23. The colony was largely abandoned. Three fledglings were observed, though only one was believed to survive until migration.

Predator control: USDA Wildlife Services removed numerous predators using a variety of methods from Goose Rocks Beach area.

### **Western/Ferry Beach – Scarborough**

*Dave Mallard, Julia McGuire, Laura Minich – Maine Audubon*

Population Estimate: No Least Terns attempted to nest at Western Beach in 2009.

Comparison: There were 2 nesting pairs in 2008, however they abandoned after a skunk predated their nests. In 2006 and 2007, although a few pairs were exhibiting nesting behavior, no nests were located. In 2005 there were a

total of 40 active nests. Crow predated chicks and eggs and reduced productivity. Prior to 2005 Least Terns had not nested here since 1981.

Predator Control: None.

### **Stratton Island**

*Pam Loring and Scott Hall – National Audubon Society*

Population Estimate: Least Terns initiated 95 nests on Stratton Island in 2009, but the number of pairs associated with the colony is certainly lower as several pairs likely re-nested. 72 nests were present during the GOMSWG census window. The first chick was found hatched on June 23<sup>rd</sup>; the first fledgling was observed on July 15<sup>th</sup>, dusks counts started immediately. On July 19<sup>th</sup> and 23<sup>rd</sup> 16 fledglings were observed. However, between the 17<sup>th</sup> and 19<sup>th</sup> 24-30 fledging and near fledging chicks were counted. Thus the estimate of total production is between 16-30 chicks in 2009. Estimated productivity for the island for peak nesting LETE only was 0.22-0.42 chicks/pair; the overall estimate for the island was 0.17-.033 chicks per pair in 2009 (a further decrease from the nearly 1.0 chicks fledged per pair in 2007). By July 29<sup>th</sup> only 1 LETE adult was observed in the colony.

It appears that the first nesting wave was the only productive group on Stratton again this year, late nests appear to have failed at higher rates as evidenced by declining numbers of fledglings seen on the island after July 23. Flooding and predation were the limiting factors in 2009. On June 22<sup>nd</sup> 14 nests were lost to high tides (20% of the colony). A Peregrine Falcon was seen from 7/13 to 7/28 and was observed several times in the LETE colony – we also suspect that a resident problem Great-Black backed Gull was responsible for the disappearance of near fledging chicks. On July 27<sup>th</sup> 10 LETE adults and 6 fledglings were seen on Western Beach in Scarborough, dogs were observed disturbing LETE on more than one occasion.

A total of 120 chicks were banded (92% of hatched chicks) with USGS metal bands. 59 banded chicks were recovered dead (49% of banded chicks) and another 11 unbanded chicks were also found dead in the colony (total =70 dead chicks out of 131 hatched or 53.4%). Most deaths were attributed to exposure. This means 61 chicks were not found dead; beach checks occurred twice daily (am and pm). If we assume that the max number produced from the colony was 30 (based on max high count) then ~ 31 chicks disappeared. Because the beach used by LETE is not also used by Arctic, Common and Roseate Terns, staff generally spend less time on this portion of the island than in the main tern colony. That combined with the long stretches of poor weather in 2009 (which prevents staff from disturbing loafing and actively hunting gulls) suggest that predation may be a major factor limiting LETE on Stratton. Future management should focus on gull removal and preventing access to nesting LETE through exclosures.

Diet studies were conducted on Stratton for the third year in a row. 309 prey deliveries were recorded; principal prey types were Sand lance (36%), herring (21%), mummichog (7%) and hake (6%).

Comparison: In 2008 an estimated 77 pairs produced 33 fledglings and in 2007, an estimated 113 pairs of least terns produced approximately 108 fledglings, for a productivity of 0.96 fledglings per pair. In 2006, 103 pairs produced 15 fledglings. 2005 was the first year least terns had nested on Stratton Island; with 18 pairs producing 9 fledglings.

Predator Control: 6 Great Black-backed gulls were removed.

### **Higgins Beach – Scarborough**

*Dave Mallard, Julia McGuire, Laura Minich – Maine Audubon*

Population Estimate: As many as 40 adult least terns were observed on the Spurwink Sand Spit in 2009. On June 2 at least 6 nests and 14 terns were on the spit. These nests were lost by June 8 to an undetermined predator, although several fox tracks were identified on the spit. During the June 15 tern census, 16 nests were counted with a mean number of 2.06 eggs per nest. On June 18 all nests were gone, with no eggs, shells, or evidence of predators in the former colony. A motion-detecting camera was erected to identify predators roaming the spit on June 18, however no terns attempted to re-nest and no footage of predators was obtained as the camera was not set up properly.

Comparison: In 2008 and 2007, there were no nesting pairs, although there was scraping seen in 2007. In 2006, a single nest was abandoned by June 27<sup>th</sup>.

Predator Control: None

Other Notes: Least terns fed in and loafed near the Spurwink River throughout the season. Several fledglings were spotted staging in the area in late July.

### **Seawall Beach, Morse Mountain – Phippsburg**

*Dave Mallard, Julia McGuire, Laura Minich – Maine Audubon*

Population Estimate: No Least Terns nested at this site.

Comparison: No birds have attempted to nest here from 2006-2009. In 2005, an early colony was established with 17 nests, but later was decimated from fox or coyote predation. From 2002-2004 there were no Least Tern nests recorded.

Predator Control: None.

Other notes: The Morse River Sand Spit offered extensive amount of suitable nesting habitat for Least Terns in 2009, and 2007 and 2008 it was also noted that Seawall provided potential habitat. Heavy fox and probably coyote presence at Seawall (which caused the failure of two plover nests this year) likely deters terns from nesting on the beach.

### **Reid State Park – Georgetown**

*Dave Mallard, Julia McGuire, Laura Minich – Maine Audubon*

Population estimate: There were no nesting Least Terns at either Mile or Half-mile Beach in 2009.

Comparison: There were no nesting terns in 2007 or 2008. A single nesting pair was documented in 2006, but no fledglings were produced.

Predator Control: None.

## ***Stratton Island***

*Pam Loring – Island Supervisor*

### **Census**

Complete nest counts were conducted for Common, Roseate, Arctic, and Least Terns. A total of 948 Common Tern nests were counted during the census; this was corrected for observer error (Lincoln Index = 1.05) and 42 feeding study and productivity plot nests were added to yield an adjusted total of 1037 Common Tern nests. This is a 9% increase from 2008's adjusted total of 951 Common Tern nests. Prior to the Common Tern census, Roseate and Arctic nests were numbered and flagged. This year's count of 76 Roseate nests was higher than 2008's count by 16%. Arctic Tern nest numbers also increased from nine in 2008 to 12 in 2009.

Least Terns have nested on Stratton Island since 2005. Three colony wide censuses were conducted in 2009. During the first census on June 15, 72 active nests were found. Census counts on June 25 and July 9 revealed ten new nests each, however these numbers likely include a few re-nests. An extremely high tide (11.1 ft) combined with storm surge overwashed 12 nests on June 22. The 72 active nests encountered in 2009 mark a 22% increase from 2008's 59 active nests.

**Table 1. Number of tern nests found on Stratton Island from 2004-2009**

Year	COTE	ROST	ARTE	LETE
2004	231	11	9	0
2005	156	2	3	19
2006	672	84	9	58
2007	752	80	9	113
2008	951	67	9	59
2009	1037	76	12	72

### **Productivity**

Common Tern productivity (fledglings/nest) was estimated from a sample of 42 nests in four fenced enclosures and two unfenced feeding studies. Sixty-one Roseate and twelve Arctic nests were monitored in unfenced productivity plots. Common and Arctic chicks surviving to 15 days old were considered fledged. Roseate Tern productivity was calculated using methods developed by the Roseate Tern Recovery Team.

Compared to 2008, clutch sizes and hatching success were similar or equal for Common, Roseate, and Arctic terns. Fledgling success was higher for both Common and Roseate Terns this season, at 1.74 and 1.31, respectively. Arctic Tern productivity was unable to be estimated this season due to complications resighting chicks. Five nests containing eggs were overwashed by extreme high tides during June 21 and June 22. A chick hatched from an additional nest on June 20 was not seen since the tide event. Eleven chicks hatched from the six remaining nests, but just three chicks were resighted as fledglings. Resighting was not attempted in the vicinity of four nests due to the proximity of an American Oystercatcher nest.

Chick survival in 2009 was likely influenced by a combination of weather events, food availability and predation pressure throughout the season. Total rainfall in 2009 was extremely high at 23.7 inches, compared to 13.71 inches in 2008. Twenty Common Tern chicks within our productivity sample died of exposure in 2009, however a constant availability of quality food such as herring likely contributed to high chick survival. Gull predation also contributed to fledgling loss with increasing frequency in late July. In addition, a Peregrine Falcon was present from mid July through early August and was observed preying several tern fledglings. Breeding parameters for Common, Arctic, and Roseate terns are summarized in Table 2.

**Table 2. Breeding parameters for Common, Arctic, and Roseate terns on Stratton Island in 2009. Data for 2008 shown in parentheses.**

Species	Clutch size	Hatching success	Fledging success	Nests monitored
COTE	2.76 (2.58)	2.60 (2.22)	1.74 (1.00)	42 (64)
ARTE	----- (2.00)	----- (1.57)	----- (1.00)	12 (9)
ROST	1.98 (1.98)	1.46 (1.63)	1.31 (1.25)	61 (52)

Dusk counts were conducted nightly from July 15-26 and used to assess Least Tern productivity. A high count of 16 fledglings and nine chicks was generated on July 19. Using this count of 16-25 fledglings and near fledglings, productivity is estimated at 0.22 to 0.35 chicks produced per pair. All Least Tern chicks were banded at hatch and the colony was searched for dead banded chicks twice per day, weather permitting. Of 120 chicks banded, 59 were found dead. Nearly all chicks recovered had died of exposure or starvation. Twenty five chicks between 4 and 11 days old were found dead on July third after a storm producing over an inch of rain in 24 hours. Subtracting the totals of banded chick mortalities (59 chicks) and dusk high counts (25 fledglings and near fledglings) from the total of 120 chicks banded leaves 36 chicks unaccounted for. It is suspected that predation by gulls contributed largely to the missing chicks.

### **Tern Provisioning**

Fourteen Common, 12 Roseate, and a subset of Least Tern nests were included in chick provisioning studies. Observers spent 366 nest hours watching Common Terns, 332 nest hours watching Roseate Terns, and 68 nest hours watching Least Terns. Feeding rate (items delivered/hour) for Common Terns was 2.00 in 2009, slightly higher than 1.86 in 2008. Conversely, feeding rate for Roseate Terns marked a slight decrease from 1.42 in 2008 to 1.06 in 2009. Average prey size (measured in tern bill lengths) was 1.33 for Common Terns, 1.51 for Roseate Terns, and 1.62 for Least Terns.

Common terns fed a variety of herring, hake, and sand lance to their chicks in 2009. Roseate Terns fed predominately sand lance with lesser numbers of herring and hake. Least terns also fed a large proportion of sand lance, among lesser numbers herring, killifish, and hake. Kleptoparasitism of Least Terns by Common Terns was frequently observed throughout the season. However, kleptoparasitism among Common and Roseate Terns remained low throughout 2009 and finfish availability was steady. In 2008, kleptoparasitism and invertebrate feedings increased in July suggesting decreased food availability towards the end of the season.

**Table 3. Principal prey items (percent) in tern chick diet on Stratton Island in 2009.**  
*n* is the total number of prey items observed.

Prey item	COTE	ROST	LETE
Herring	41.51	23.30	21.04
Hake	9.81	5.40	6.47
Sand Lance	8.36	45.74	36.25
Butterfish	5.17	0.28	0.00
Pollock	1.46	0.28	0.00
Stickleback	0.80	0.00	0.00
n	754	352	309

### **Predator Activities and Control Efforts**

Herring and Great Black-backed gull control measures included nest destruction, egg-poking, displacement walks, and shooting of predatory individuals. Gulls were displaced and all nests destroyed in Gull Meadow during daily walks between May 7 and July 15. Gull eggs were poked on Little Stratton during censuses on May 22 and June 26. On Bluff Island, gull eggs were also poked during censuses on May 17 and June 13. Overall, 52 Herring Gull nests (91 eggs) and 104 Great Black-backed Gull nests (147 eggs) were poked or destroyed on Stratton, and 58 Herring Gull nests (118 eggs) and 83 Great Black-backed Gull nests (200 eggs) were poked on Bluff. Six predatory Great Black-backed Gulls were shot in 2009.

### **Common Eiders**

A partial Common Eider nest census was conducted in 2009. A count restricted to the south side of the pond revealed 131 nests in 2009, a considerable decrease from 206 nests in that area in 2008. It is possible that a later wave of nesting occurred after our census period. A second census was attempted in late May but called off due to disturbance of ducklings within the nesting habitat. Of 33 nests followed for fate, 87% hatched successfully. The majority of ducklings produced were consumed by Great Black-backed Gulls soon after hatching. Twenty older (class II) ducklings were observed in mid June, an increase from 13 class II ducklings in 2008.

### **Wading Birds**

A wading bird census was conducted on May 19 – 21 in 26 person hours. Numbers for Snowy Egret (132 nests), Glossy Ibis (100 nests), and Black-crowned Night-Heron (21 nests) marked a slight increase from 2008's totals. The number of Great Egret nests decreased slightly from 25 nests in 2008 to 19 in 2009. Just three Little Blue Heron adults were observed during the 2009 census, versus 12 in 2008.

### **Black Guillemot**

There was at least one active Black Guillemot burrow located in the South Rocks area of Gull Meadow. It is likely that another burrow was active on Bluff Island, as adults were frequently observed in that area. Up to six adult guillemots were observed in early May.

### **American Oystercatcher**

An American Oystercatcher nest was confirmed on Little Stratton Island in 2009. Two nesting attempts on Stratton Island occurred on east beach. The first was depredated and the second was overwashed. A third nest was suspected on Bluff Island due to the presence of a highly vocal pair. Up to six adults and three hatch year birds were observed in 2009.

### **Other Notes**

1) Stratton Island welcomed approximately 175 visitors, including members of the general public and scheduled tour groups.

2) Sightings of rare or unusual species included: A dark morph Snow Goose regularly occurring from late June through early August, and a Royal Tern on July 15.

## **Western Casco Bay**

Bob Houston – USFWS, Gulf of Maine Coastal Program  
Survey date: June 16, 2009

### **Clapboard Island Ledge, south, Falmouth (55-330)**

Survey by boat revealed no terns present. Last year's was the same.

### **The Nubbin, Yarmouth (55-223)**

Survey by boat revealed no terns present. Last year's was the same.

### **French Island Ledges, Freeport (55-268, 55-269, 55-270)**

Survey by boat, no terns seen. No terns on these ledges for the past 20+ years. Active osprey nest on northeast ledge again this year.

### **Sister Island Ledge, Freeport (55-237)**

Survey by boat – no terns seen. No terns seen last year.

### **Grassy Ledge, Harpswell (55-259)**

Survey by boat– no terns seen. No terns seen last year.

### **Black Rock, Harpswell (55-252)**

Survey by boat - no terns seen. No terns on this ledge for 20+ years.

## **Outer Green Island**

Alison Kocek – Island Supervisor

### **Census**

The GOMSWG census was conducted on 15 June 2009. The count produced a total of 759 Common Tern (COTE) nests and 2 Arctic Tern (ARTE) nests. A Lincoln Index Correction factor of 1.019 was applied to the COTE count and all research nests were added to bring the total to 837 COTE nests. This is a very slight increase of only 1.1% over 2008's nesting numbers. Despite only a marginal increase in COTE nests, the terns spread out significantly over the island, occupying 20 of the 21 grid squares on the island which is up from only 17 grid squares occupied last year and is the most grid squares occupied on Outer Green Island (OGI). The vast majority of the nests were located on the island's periphery and on the island's backbone; a high, rocky section running N-S down the center of the island. Although ARTE increased slightly from last year's single nest, Roseate Terns (ROST) did not return to nest on the island although non-nesting individuals were sighted daily which increases the chance that future nesting attempts may occur.

**GOMSWG Census totals for Outer Green Island, ME**

	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>
COTE	1	94	510	971	732	937	828	837
ROST	0	0	8	36	6	7	0	0
ARTE	0	0	0	0	0	0	1	2

**Productivity**

Terns began laying early compared to the previous year with the first eggs seen on 22 May 2009. The average clutch size (n=63) was extremely high at 2.87 eggs per nest which is the highest recorded for OGI and may have corresponded with an abundance of fish around the island. The early egg laying then lead to a general early hatch on the island that started on 14 June 2009 and proceeded into peak hatch between 20 June 2009 and 24 June 2009. Hatching began on the east and north sides of the island with the south and west sides generally a day or two behind. The hatching success was also very high at 2.7 chicks hatching per nest which is also a peak record for the island. Fledging success was greatly decreased due to excessively wet weather (26.5 inches of rain for the season) and large thunderstorms which occurred at stages when chicks were too young to thermoregulate, but too large to all be brooded by a parent. Despite these obstacles, a continuous food supply kept many chicks alive and lead to an average productivity of 1.68 chicks per nest which is the second highest productivity seen on the island.

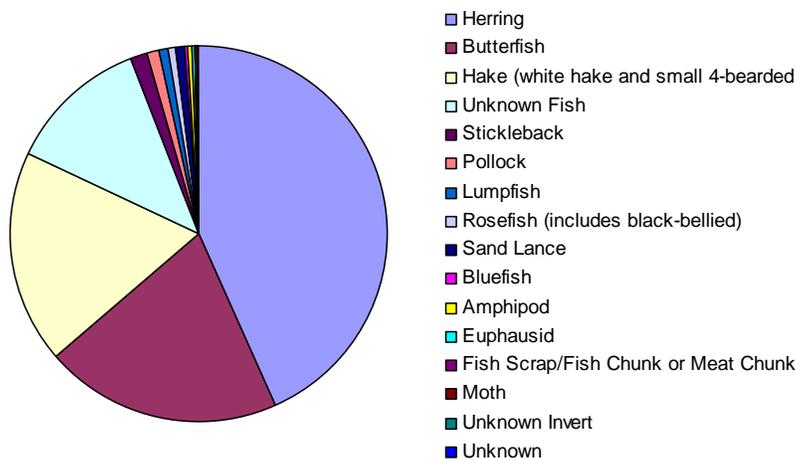
**Yearly OGI Common Tern Reproductive Performance**

	2004	2005	2006	2007	2008	2009
Census Count	497	971	732	936	828	837
Avg. Clutch Size	2.26	2.22	2.35	2.48	2.32	2.87
Hatching Success	1.92	1.69	1.92	2.24	2.08	2.70
Fledging Success	1.45	0.67	1.13	1.71	0.61	1.68

**Provisioning**

Food was very abundant on Outer Green Island this year which likely helped many chicks to maintain a high enough body temperature to survive the excessively wet and cold weather. Herring (43.3%) dominated the food supply with Butterfish (20.2%) and Hake (18.4%) as the next most abundant fish to be delivered although small amounts of various other fish and invertebrates were delivered as well. Despite the high Butterfish numbers, most of the deliveries occurred at a time when chicks were able to consume them and starvation was a rare occurrence on the island. Feeding was observed in 27 nests on the island and an average prey bill length of 1.45 was noted which is normal for the island. This season, 1627 feedings were noted in 1107 hours of observation which is a rate of 1.46 feedings/hour. Although this rate is lower than normal, it may not accurately depict the total season of feedings as many more hours were spent during the later stages of the chick’s lives when they were beginning to fly and be absent from the nest than the beginning and middle stages due to inclement weather.

**Prey Species’ Percent of Diet on Outer Green Island in 2009**



**Predation**

Predation did not pose a significant problem on Outer Green Island this year. This was the first year that gulls did not attempt nesting on the island although 11 gull nests were destroyed on the neighboring Junk of Pork. These nests consisted of 9 Great Black-backed Gull (GBBG) and 2 Herring Gull (HERG) nests and no nests were allowed to hatch which likely aided in keeping gull predation on the gull colony low. Predation did increase during the fledging

stages of the tern chicks when they are most vulnerable due to their poor flight abilities and 6 gulls (2 GBBG and 4 HERG) were culled in an attempt to reduce take on the fledgling terns.

Number of Nests Destroyed (OGI & Junk of Pork)	2004	2005	2006	2007	2008	2009
Great Black-backed Gull	30	48	28	16	10	9
Herring Gull	3	33	8	9	5	2
Total	33	81	32	25	15	11

### Weather

The weather for the 2009 field season was exceptionally wet and cold. OGI received a total of 26.5 inches of rain between 01 May 2009 and 27 July 2009. This precipitation spanned 58 of the 88 days surveyed and varied from small showers bringing only 0.01 inches of rain to long lasting thunder storms bringing over 3 inches of rain. The average temperature for the season was also much lower than normal consisting of: 53°F for May, 60°F for June and 64°F for July.

### Other Species/Projects

The 2009 field season was the third year of monitoring Black Guillemot (BLGU) productivity. This year, 9 of the 12 known BLGU burrows were occupied although only 6 burrows had eggs hatch (1 burrow was flooded out and 2 were abandoned/failed). The average clutch size was 2 eggs per burrow although the average hatch was only 1 egg per burrow. Of the 9 chicks that hatched, only one was found deceased bringing the fledging success to 0.89 for the season.

Common Eiders continued to nest on the island. Although no full scale surveys were made, 16 nests were found of which 11 were successful. The remaining nests seem to have been abandoned, possibly due to the excessive amount of rain making it difficult for females in the higher vegetation.

Although Leach's Storm-Petrel social attraction was begun early in the season, due to its lack of success in the previous 5 years, it was discontinued in hopes of converting the sound system to attract Roseate Terns instead. Once converted, ROST were seen daily near the system and on the island and although none nested, several were seen landing on the island in various spots and this may increase the chance they will nest on OGI in future seasons.

A migration banding station was operated from 02 May 2009 to 08 June 2009. Nets were open for a total of 527.5 hours, capturing 766 birds of 54 species. Noteworthy species captured on the island include: Bobolink, Orchard Oriole, Nelson's Sharp-tailed Sparrow, Northern Flicker (Yellow Shafted), White-crowned Sparrow, and a Cooper's Hawk. Other rarities seen on the island include: Red-necked Grebe, Northern Rough-winged Swallow, Chimney Swift, Black-billed Cuckoo, Least Tern, Hudsonian Godwit, Razorbill, Atlantic Puffin, Field Sparrow, and Great Cormorant.

## **Jenny Island**

*Jeff Kimmons – Island Supervisor*

Jenny Island was occupied for only a short season from June 16<sup>th</sup> to July 15<sup>th</sup>. Research plots, blinds, feeding studies, and canvas tent was set up prior to June 16<sup>th</sup>. Although most birds had passed the 15 day fledging date, COTE productivity is probably inflated as additional plot checks to find dead chicks did not occur. 2009 was an exceptionally wet season as rainfall totals on neighboring Outer Green and Pond Islands reached over 20 inches. Although Jenny Island rain was not monitored for the entire season, it should be assumed that Jenny received this large volume of rain as well. Overall tern chicks did well on Jenny which probably can be attributed to the high food quality in the area. Tern adults were observed feeding high amounts of Herring (50%). Other abundant fish species observed were Butterfish (9%), Hake (8%), and Pollock (6%). The poor weather may also have deterred predators from visiting the island. Only one gull was removed from the colony. An owl was suspected for leaving a decapitated adult COTE on the beach however an owl was never trapped nor was there any additional sign of owl

predation. Early season disturbances prior to June 16<sup>th</sup> led SRP research coordinator Scott Hall to believe a mink was present on the island. Mink traps were set until June 16<sup>th</sup> with no success.

### **GOMSWG Census:**

A direct nest count was conducted on June 16<sup>th</sup>. 533 Common Tern nests were counted. The adjusted count was 578 nests. This number represents a small increase (5%) from the 2008 season. 3 Roseate Tern nests were found which is very similar to the 2008 census. 8 Laughing Gull nests were also counted during the census representing a slight decrease from 2008; no relayed LAGU nests were found after the GOMSWG census period.

**Table 1. GOMSWG Census Results 2004-2009**

Year	COTE	ROST	ARTE	LAGU
2004	213	2	1	1
2005	532	11	0	1
2006	589	15	1	5
2007	680	16	0	15
2008	556	2	0	10
2009	578	3	0	8

### **Tern Productivity:**

A sample of 39 Common Tern nests was monitored to determine productivity. The mean clutch size was 2.51, the mean hatch was 2.31, and the mean number of chicks fledged (reaching 15 days) per pair was 1.72. Common Tern productivity doubled from the 2008 field season. Roseate Tern productivity was 1.5 chicks per pair.

**Table 2. COTE Productivity 2004-2009**

Year	N	Avg. Clutch (SD)	Avg. Hatch (SD)	Avg. Fledging (SD)
2004	31	2.35 (0.11)	2.13 (0.10)	1.13 (0.17)
2005	25	2.20 (0.58)	1.88 (0.93)	1.00 (0.65)
2006	43	2.47 (0.50)	2.20 (0.89)	1.05 (0.82)
2007	51	2.35 (0.49)	2.08 (0.79)	1.67 (0.58)
2008	45	2.24 (0.57)	2.02 (0.78)	0.89 (0.53)
2009	39	2.51 (0.51)	2.31 (0.66)	1.72 (0.51)

**Table 3. ROST Productivity 2005-2009**

Year	N	Avg. Clutch	Avg. Hatch	Avg. Fledging
2005	11	1.64	1.27	1.18
2006	11	1.45	1.36	1
2007	16	1.82	1.75	1.72
2008	2	1.5	1.0	0.0
2009	3	2	1.33	1.5

### **Predator Control:**

During the short season, predators were minimal in the tern colony. One decapitated COTE was discovered on arrival in which an owl was suspected. Trapping effort to catch the owl resulted in 72 trap hours from June 17<sup>th</sup> to July 10<sup>th</sup>. No other sign of an owl was detected for the remainder of the season. 1 HERG was removed that had landed in the tern colony.

### **Feeding Studies:**

Common Tern feeding studies were continued this season, while Roseate Tern feeding studies were not conducted. 21 COTE nests were monitored. Approximately 889 hours of observation produced 1699 feedings, resulting in an average rate of 1.87 feedings/hour. The mean prey length was 1.67 bill lengths. A majority of the fish delivered was Herring (50.44%) which was double the herring from 2008. Other fish delivered to the colony was Butterfish (9.36%), Hake (7.77%), Pollock (5.65%), and Cunner (2.41%).

Table 4. COTE Diet 2009

Prey Item	% of Diet
Herring	50.44
Unknown Fish	17.78
Butterfish	9.36
Hake	7.77
Pollock	5.65
Cunner	2.41
Unknown	2.06

## **Hen Island (Unmanaged)**

*Monitored by Jeff Kimmons – Supervisor of Jenny Island*

### **GOMSWG Census:**

On the 17<sup>th</sup> of June, a nest count was conducted; 109 Common Tern nests were found; 65% were three egg clutches. The mean clutch size was 2.65 (SD=0.61). 121 pairs of Common Terns nested on Hen Island in 2008.

## **Pond Island**

*Kevin Kelly – Island Supervisor*

This year on Pond Island we received a total of 18.4 inches of rain and had an average wind speed of 8.3 miles an hour. Our high temperature for the season was 79° F and a low of 42° F for an average of 59.8° F. Our sea surface temperature high was 68° F and the low was 48° F, for an average of 57° F. This year the Common Tern colony was healthy and had the third highest number of nests in its project history. A few Arctic Tern nests were present on the peripheries of the island for the fourth consecutive year but Roseate Terns were not found to be nesting on Pond for the third consecutive year. Roseates were present in small numbers until early June and were seen again through most of July until closing. Predation pressure by gulls on the terns was not seen this year, though two Great-horned Owls were confirmed on the island this year. The first did not kill any terns that we know of before it was caught and relocated. The second is known to have killed two tern chicks but it moved on of its own accord shortly after that. A female Merlin was a problem all year as she preyed upon tern chicks throughout the season and efforts to scare her off were unsuccessful.

### **Census**

Census for Common Tern nests was conducted on June 18<sup>th</sup>. The number of Common Tern nests this year was steady with last year's number. The crew found 383 nests and this was corrected to 399 nests with a Lincoln Index Factor of 1.04. When nests from the plots were added in a total of 438 Common Tern nests were counted, which was the third highest total since beginning recovery efforts on Pond. Two Arctic Tern nests were identified on the spine during the census window and two late nests were found on the landing beach. Common Eider nests were not censused this year as they are largely in areas with poison ivy coverage and we did not have protective gear to go into the area until later in the season.

### **Productivity**

Common Tern clutch size this year was the largest in five years at 2.74 eggs per nest though hatchings were down to 2.21 chicks per nest and the fledging rate was down to 0.79 chicks per nest. Most of the chick mortality occurred over one 24 hour period during which 18.4 inches of rain fell and an owl was suspected to be on the island at night, preventing the parents from settling in at night and exposing the wet chicks to a cold night.

This year marked the first time Arctic Tern chicks have fledged. The two early nests both had two eggs and hatched two chicks. In one nest both chicks fledged, while in the other both chicks died of exposure shortly after the second owl began frequenting the island. The two late nests found on the beach were each one egg clutches and neither hatched.

**Tern Chick Diet**

This year 20 Common Tern nests were studied for a total of 393 observation hours observing 782 feedings. Sandlance again comprised the largest portion of chick diets this year accounting for 46% of deliveries up from 38% of feedings last year. Herring was the second most common prey again making up 17% of diet, and it also increased in its proportion of chick diet this year from 14% last year. Shore or Sand Shrimp were the third most common prey last year, making up 12% of feedings, but this year dropped to only 2% of feedings, behind Butterfish which rose to 7% of feedings from less than 1% last year.

**Predation**

For the first time in Pond Island's restoration period Great Black-backed and Herring Gulls were not found nesting on the island all year. This may have been due to the presence of a Great-horned Owl on the island early in the season, thus discouraging the gulls to settle on the island. Only one Great Black-backed Gull was shot this season, one of a pair that had an established territory on the island. Gull predation on terns was not seen this year though gull predation on eider crèches was seen on at least two occasions early in the season.

A female Merlin frequented the island for much of the season, first appearing on the 20<sup>th</sup> of June and was seen on eighteen days through closing of the island on July 29<sup>th</sup>. The Merlin is confirmed to have killed three adult Common Terns and 15 tern chicks, and unseen predation is also likely to have occurred.

As is custom on Pond we had two Great-horned Owls visit the island this year. The first was caught on June 3<sup>rd</sup> and relocated to northern Maine. The second was believed to have visited first around the 25<sup>th</sup> of June. It was never observed during subsequent night stints, but two tern chick kills and one yellowlegs spp. kill were attributed to it. Though the owl is not believed to have caught many chicks, the owl's presence and subsequent parental abandonment of the nests at night and led to deaths from exposure which accounted for a large portion of out tern chick mortality. This was particularly the case on the night of July 8<sup>th</sup> when a storm during the day combined with parental abandonment at night led to a loss of over half of all remaining chicks. No sign of the owl was seen after July 16<sup>th</sup> and it is hoped that it moved on.

	2005	2006	2007	2008	2009
<b>COTE</b>					
Nmbr. Nests	32	36	30	45	39
Avg. Clutch	2.4668	2.2778	2.5	2.6889	2.7436
Avg. Hatch	2.2813	1.1667	2.3667	2.3333	2.2051
Avg. Fledge	1.0938	0.4	2.0333	1.0667	0.7949
<b>ARTE</b>					
Nmbr. Nests	0	5	0	4	4
Avg. Clutch	-	1.6	-	1.75	1.5
Avg. Hatch	-	0.4	-	0.5	1.0
Avg. Fledge	-	0.0	-	0.0	0.5
<b>Gulls Shot</b>					
Great Black-backed				3	1
Herring				3	0
<b>Gull Nests Destroyed</b>					
Great Black-backed				2	0
Herring				2	0

***Muscle Ridge to Mouth of Kennebec River***

*Conducted by Brian Benedict – USFWS, Maine Coastal Islands NWR*

Survey Date: June 15, 2009

Start Time: 6:30 a.m. End time: 5:30 p.m.

### **Muscle Ridge**

The following islands were circled by boat with no terns observed: Cutters Nubble, Marblehead, Fisherman, Crescent, Birch, Nettle, Bar, Hurricane, Oak, Mink, High Clam Ledge, Little Green, Yellow Ridge, Tommy, Two Bush, Little Two Bush, and all other unnamed ledges and treeless islands within the Muscle Ridge.

### **Port Clyde**

The following islands were circled by boat with no terns observed: Hay Ledge, The Brothers, Gunning Rocks, Hart, Shag Ledges

### **Muscongus Bay**

The following islands were circled by boat with no terns observed: Little Egg Rock, Shark, Two Bush, Old Hump Ledge, Killeck Stone, Thief, Combs Ledge, Gull Rock, Crotch, Jims, Bar, Ram

### **Johns Bay, Linekin Bay**

The following islands were circled by boat with no terns observed: Thrumcap, Thread of Life (large feeding flock of terns offshore, 120 terns), The Hypocrites, Outer White, Outer Heron, Pumpkin, Damariscove, Fisherman, Ram, Holbrook Ledge, The Cuckolds

### **Sheepscot Bay**

The following islands were circled by boat with no terns observed: Lower Mark, The Black Rocks, Outer Head, Middle Mark, Powderhorn, Dry Ledge, Upper Mark

## ***Eastern Egg Rock***

*Juliet Lamb – Island Supervisor*

### **Summary**

This season on Eastern Egg Rock (EER) was far cooler and wetter than average, with a cumulative rainfall of over 27" and subnormal temperatures averaging 60 degrees. These climatological conditions are reflected in the productivity of all species breeding on the island, despite the generally good quality of the fish delivered by adults to their nestlings. Gull predation and competitive pressure from Laughing gulls also contributed to reduced nesting and low fledging success for terns on EER this season.

### **Census**

Island staff identified Arctic and Roseate tern nests between 7 and 20 June, with both species decreasing over 2008 levels: Arctic terns to 100 total nests (from 111), and Roseate's from 129 to 101 nests. The decrease in Roseate nesting is particularly significant given that most other colonies in the region saw an increase in nesting this year. From 15 to 17 June, researchers conducted an island-wide Common tern and Laughing gull nest count. Common terns also decreased from 2008, with a raw total of 912 nests that was then corrected, via a Lincoln index of 1.056, to 1036 nests. Laughing gulls continued to increase dramatically, with a total of 2127 nests found. 116 Common eider nests were identified opportunistically during the census.

### **Larid Productivity**

Researchers studied tern productivity using both fenced and unfenced plots. The 73 nests in the common tern plots hatched at a high rate of 1.97 chicks per nest, although the fledging rate fell to 0.70. Roseates, generally less exposed, hatched 1.34 chicks/nest and fledged at a rate of 0.69 chicks/nest for the 71 nests we followed. Arctic terns were hit hardest by predatory gulls, as well as by late-season storms, and our 30 study nests fledged only 0.37 of the 1.1 chicks hatched per nest. For the second season in a row, a group of 23 Laughing gull nests was fenced and monitored throughout the season; this group hatched 1.74 chicks/nets and fledged 0.74. For all species, productivity dropped from 2008 levels, probably due to the unusually cold temperatures and constant rain that persisted throughout mid and late June. During this time, researchers observed heavy mortality across all measured species due to exposure and, during periods of poor visibility, predation by Herring and Great-black-backed Gulls.

**Diet**

Researchers observed 13 Common tern nests for a total of 549 hours. Hake and butterfish were the most frequently-fed items, each comprising 27% of feedings. Herring was close behind at 20%. Arctic tern diets, determined from 124 hours spent observing five successful nests, were more heavily weighted toward hake, at 48%, followed closely by herring (20%) and butterfish (11.9%). Roseate terns, observed over 201 hours for seven nests, were the only species that did not exhibit an unusual fondness for butterfish this season—herring was the most frequent species at 29%, followed by hake at 20% and butterfish and pollock at 14% and 13% respectively. Boluses collected opportunistically from laughing gull chicks were predominantly fish, shrimp, and scarab beetles.

**Atlantic Puffins**

Puffins had their most abundant year in Egg Rock history, with 107 active burrows on the island. The fledge rate of 0.79 chicks/nest was unusually low, and many burrows appeared to stop feeding during periods of heavy rainfall in late June and late July. The majority of their feedings (53%) were hake, but herring (13.9%) and butterfish (13.2%) were also significant components.

**Predation**

Most predation events observed during this season on Egg Rock occurred during peak hatch, which coincided with a period of poor weather and reduced visibility. During this period we were unable to shoot. Several herring gulls were observed taking newly-hatched chicks during this time, with Common and Arctic tern chicks the most frequent victims. Researchers shot 6 Herring and 1 Great Black-backed gulls over the course of the season, as well as destroying 1 HERG nest. Egg Rock also participated in efforts to reduce Laughing gull numbers in the Gulf of Maine, both by poking all LAGU nests during census and by shooting 89 adults. Although only one predatory individual was identified and removed, researchers frequently observed Laughing gull predation on Common and Arctic tern eggs and chicks.

**Other events**

A single black tern nested on Egg Rock this year, laying two eggs that it incubated for a few weeks. The bird disappeared in mid-June, and the eggs were subsequently found cold. A single Manx shearwater called in the vicinity of the cabin nearly every night although it demonstrated no evidence of breeding. Razorbills landed on the island on several occasions. Few rarities were seen this season. This was the first field season for a graduate student project to improve vegetation for tern nesting habitat, which involved experimentally burning and laying fabric barriers in treatment plots and measuring re-growth during the season.

	2005	2006	2007	2008	2009
<b>COTE</b>					
census count	758	763	1206	1129	1036
Clutch	2.01	2.11	2.04	2.31	2.3
Hatch	1.32	1.33	1.75	1.95	1.97
Productivity	0.59	0.64	1.19	0.87	0.70
<b>ROST</b>					
census count	136	113	118	129	101
Clutch	1.69	1.6	1.51	1.9	1.93
Hatch	1.32	1.15	1.15	1.5	1.34
Productivity	0.90	0.95	1.06	1.03	0.69
<b>ARTE</b>					
census count	81	80	101	111	100
Clutch	1.77	1.57	2	1.79	1.8
Hatch	1.08	1.23	1.48	1.39	1.1
Productivity	0.58	0.62	0.97	0.71	0.37

	2005	2006	2007	2008	2009
<b>LAGU</b>					
census count	1638	1486	1705	1972	2127
Clutch	--	--	--	2.57	2.26
Hatch	--	--	--	2.1	1.74
Productivity	--	--	--	1.2	0.74

	2005	2006	2007	2008	2009
<b>ATPU</b>					
number of nests	71	82	90	101	107
Productivity	0.86	0.89	0.93	0.95	0.79

<b>GULLS SHOT</b>	2005	2006	2007	2008	2009
GBBG	3	2	5	2	1
HERG	3	5	4	6	6
LAGU	1	0	0	93	89

<b>GULL NESTS DESTROYED</b>	2005	2006	2007	2008	2009
GBBG	3	1	0	0	0
HERG	0	1	2	5	1
LAGU	0	0	811	1982	2127

## Metinic Island

Anna MacDonald – Island Supervisor, Kristi Kennedy, and Ben Dudek

### North End

#### Census

On June 17<sup>th</sup>, 2009 there were 780 nests on the north end of the island during the GOMSWG census (730 in unadjusted count; 205 of 220 nests were marked when we walked through the northeast point colony to determine a Lincoln Index of 1.07).

Our species ratio was determined by identifying 293 nests to species on the northeast point; the species ratio for the north end of Metinic was 49.6% common tern and 50.4% Arctic tern. No roseate terns nested on Metinic this year.

**Table 1. Numbers of tern and laughing gull nests on the north end of Metinic Island, 2005-2009**

Year	Common Terns	Arctic Terns	Roseate Terns	Laughing Gulls
2005	331	392	0	
2006	88	134	2	
2007	321	338	0	
2008	409	303	0	0
2009	387	393	0	0

#### Tern Productivity

Mean hatch success was 81% for Arctic terns and 87% for common terns. About 18.5% of fledged chicks died following the 15 day fledgling date, as a result of weather events and parents having difficulty finding fish. Common terns dropped from 1.0 to 0.8 fledglings per nest (n = 35), and Arctic terns dropped from 0.81 to 0.64 fledglings per nest (n = 25). Productivity dropped from 2008, but is still higher than in 2005 and 2007 (Table 2).

**Table 2. Number of fledglings produced per nest for tern species on Metinic Island, 2005-2009**

Year	Common Terns	Arctic Terns	Roseate Terns
2005	0.30	0.50	No nesting
2006	1.73	1.0	1.0
2007	0.80	0.40	No nesting
2008*	1.49*	1.11	No nesting
2009*	1.0*	0.81	No nesting

\* Significant weather events and poor food supply decreased estimated productivity ~22% in 2008 and ~18% in 2009.

### Tern Provisioning Study

We included 7 Arctic and 14 common tern nests in the provisioning study on Metinic this season. The study was conducted for a total of 488.5 nest-hours. Common tern chicks were fed .96 times per hour on average, and Arctic tern chicks were fed 1.1 times/hour. Herring was the most common prey item for both Arctic and common terns. Sand lance made up a large part of common tern chick diets, but a small part of Arctic tern chick diets. Butterfish made up 12-15% of prey items brought back for chicks, which were often difficult for even large chicks to swallow.

**Table 3. Most common prey types (>5% of total feedings) for common and Arctic tern chick provisioning, Metinic Island 2009.**

Prey Species	Common Tern	Arctic Tern
Herring	34%	29%
Sand Lance	21%	4%
Unknown	18%	22%
Butterfish	15%	12%
Invertebrate	2%	12%
Larval Fish	1%	12%
Euphausid	3%	6%

### Predation and Predator Control Efforts

Major predators this year included a merlin, herring gulls and great black-backed gulls. We also observed bald eagles preying on common eider ducklings on several occasions. Two peregrine falcons were observed for one day early in the season feeding on an adult black guillemot.

Herring and great black-backed gulls nest across Metinic Island with the exception of a gull-free zone in and near the tern colony. Gull nesting has been discouraged in this zone through a combination of human presence, nest destruction, pyrotechnics, and a Bird Guard Pro Plus audio system that broadcast gull distress calls at irregular several-minute intervals during the weeks leading up to nesting. Gull nests found in the northeastern quadrant of the refuge (closest to the tern colony) were destroyed, and farther nests were poked to discourage productivity and nesting in future seasons. Refuge staff destroyed 21 and poked 38 herring gull nests, and destroyed 2 and poked 9 great black-backed gull nests. One herring gull and 1 great black-backed gull were found in or near the tern colony with broken wings and were euthanized. Two great black-backed gulls were lethally removed this season.

### Other Monitoring Activities

We located 46 active black guillemot burrows on the north end of Metinic Island and banded 28 chicks. We located 27 Leach's storm-petrel burrows, mostly located in stone walls. Common eider hens were captured and banded in cooperation with MDIFW and USGS on June 3<sup>rd</sup>. Herring and great black-backed gulls continue to nest in large numbers on the south half of the island, as well as the western side of the north end. We recorded all birds seen on Metinic Island, especially shorebird use. We observed 21 species of shorebird stopping over on Metinic, including large flocks of black-bellied plovers, purple sandpipers, short-billed dowitchers, ruddy turnstones and semipalmated and least sandpipers.

### Other Island Notes

No visitors other than refuge staff, neighbors, researchers and volunteers came onto the north end of Metinic this year. This year we began an intertidal monitoring project which aims to document plant and animal species composition and monitor change resulting from invasive species and climate change. Interesting bird sightings

include an Atlantic puffin flying past the northeast point on June 30th, a parasitic jaeger, a pair of American oystercatchers, northern gannets and Wilson's storm-petrels.

### **South End**

#### **Census**

The south end of Metinic is privately owned. The Metinic (North End) crew conducted a census on June 23<sup>rd</sup>. We found 1 Arctic tern nest with one chick, and observed 6-7 adult terns flying overhead, but only the adults of the single nest were aggressive. The south end was not revisited, so productivity was not calculated, however, there are large numbers of gulls nesting in the area which would decrease productivity.

## ***Outreach and Boat Tours***

*Pete Salmansohn and Rose Borzik*

Nearly 10,000 people visited the Project Puffin Visitor Center located at 311 Main St; Rockland, Maine in 2009.

Nearly 5,000 people were aboard 88 puffin-watching cruises around Eastern Egg Rock aboard either the Hardy Boat departing from New Harbor and Cap'n Fish cruises departing from Boothbay Harbor.

Seabird Sue Schubel visited 23 Maine schools presenting seabird and marine education programs to 1,205 students during the 2008-2009 school year.

## ***Penobscot Bay***

*Brad Allen – Bird Group Leader, MDIFW*

No report; see data table for survey data.

## ***2009 Colonial Wading Bird Surveys***

*Danielle D'Auria – MDIFW*

There are at least 53 historic sites on Maine's coastal islands where colonial wading birds have been known to nest. Nesting has been documented in the past for the following colonial wading bird species: great blue heron, little blue heron, tricolored heron, black-crowned night-heron, glossy ibis, snowy egret, great egret, and cattle egret. In spring 2009, MDIFW made an effort to survey all historic locations from fixed-wing aircraft. The focus was on great blue herons, but other colonial wading bird species were noted when seen. On-the-ground surveys were conducted on Ram Island and Damariscove Island, documenting significant colonies of black-crowned night-herons, a state Threatened species. Flights over these islands after ground counts were performed and proved it very difficult to detect smaller species that often nest below a deciduous canopy such as black-crowned night-herons, glossy ibis, and snowy egrets.

Of the 47 coastal sites surveyed by air, ten hosted colonial nesting wading birds:

Colony #	Island Name	Town	Species	# Pairs	# Adults	Notes
4	Eagle	Harpswell	GBHE	1		
7	Wreck	Bristol	GBHE	90		
8	Graffam	Muscle Ridge Shoals Twp	GBHE	65		
22	Ram	Portland	BCNH	68		
			GLIB	16		
			SNEG	2		
23	Outer Mark	Harpswell	GBHE	120		
			SNEG		20+	
608	Eastern Mark	Stonington	GBHE	40		
618	Berry	Wiscasset	GBHE	25		Occupied late, then abandoned
630	Lower Coombs	Brunswick	GBHE	60		
650	Damariscove	Boothbay	BCNH	19+		
705	Seven Hundred Acre	Islesboro	GBHE	25		New location at sw end of island

Islands that were not surveyed by air include: Appledore Island, Stratton Island, Outer Ram Island (Beals), Black Island (Bar Harbor), Little Duck Island (Frenchboro), and Iron Island (Brunswick). A researcher on Appledore Island indicated there are no colonial wading birds currently nesting there. Nesting numbers from Stratton Island (National Audubon) will be included in MDIFW's database after the GOMSWG meeting.

MDIFW has also started an adopt-a-colony program called the Heron Observation Network (HERON). This network of volunteers will collect occupancy data for colonies over time. Maine Coast Heritage Trust has already "signed up" to monitor their islands.

If you know of a wading bird colony, MDIFW would like to know about it, too! Please don't hesitate to contact Danielle D'Auria ([danielle.dauria@maine.gov](mailto:danielle.dauria@maine.gov), 941-4478) with information about wading bird colonies, or if you or your organization would like to sign up to monitor a site in the future.

## **Matinicus Rock**

*Maria Cunha – Island Co-Supervisor*

*Katie Kauffman – Island Co-Supervisor*

During the 2009 season Matinicus Rock received 10 inches of rain. Our average temperature was 57 degrees and our average sea surface 51 degrees. The food quality this year was high and plentiful. All tern and alcid species brought in large herring from May through August. Predation from Herring, Great Black-Back, and Laughing Gulls was a problem throughout the entire season.

### **Tern and Laughing Gull Census**

#### **Tern Census**

1479 tern nests counted during census (June 14-17) were multiplied by a Lincoln Index correction factor of 1.042, yielding a corrected census total of 1541 tern nests. 323 of these were Common Tern nests (determined by direct count immediately following census), 1218 were Arctic Tern nests. Adding nests from study plots (not counted in census) yields overall totals of 1278 Arctic Tern nests and 359 Common Tern nests. The species ratio was 78% Arctic Tern to 22% Common Tern. No Roseate Tern nests were found this year.

**Laughing Gull Census**

Breeding Laughing Gulls continue to increase in number on Matinicus Rock. The 1161 nests counted this year are a 2% increase from last year.

**Productivity**

**Arctic Terns** fledged 0.37 young per nest. Hatch success was 0.71 and mean clutch was 1.82 for 60 nests. Eighteen percent of clutches had one egg and 82% had 2 eggs.

**Common Terns** fledged 0.73 young per nest. Hatch success was 0.90 and mean clutch was 2.57 for 37 nests. No clutches had one egg. Forty-three percent of clutches had two eggs, and 57% had three eggs.

**Atlantic Puffins**

Hatch success was 0.79 (n = 77), fledge success was 0.92 (n = 53), and productivity was 0.71 (n = 69).

**Razorbills**

Hatch success was 0.64 (n = 81), fledge success was 0.61 (n=46), and productivity was 0.37 (n = 75). This is the third year that fledging success has been studied, and this year's rate was much lower than last year's 0.86.

**Leach's Storm Petrels**

Hatch success was 0.81 (n = 48). We banded 38 chicks and 41 adults. Thirty-three previously banded adults were recaptured in burrows.

**Mortality****Weather**

A series of rain storms throughout June resulted in the death of many tern chicks due to exposure of wet and cold weather. Many chicks died on June 26 and June 29.

**Starvation** was not as large of a factor as weather was in tern chick mortality this year.

**Gull Predation**

Predation by Laughing Gulls, Herring Gulls and Great Black-backed Gulls caused significant tern chick mortality. Gulls also were likely responsible for the disappearance of numerous tern eggs, especially in certain portions of the island. Several Laughing Gulls were observed flying away with small tern chicks. One adult Laughing Gull was observed eating a medium sized tern chick. Many Herring Gulls were seen peering around the Razorbill colony and may have been a significant source of mortality for Razorbill chicks as well. A gull pellet found on the island contained a pair of bands put on an arctic tern chick earlier in the season.

**Feeding Studies****Terns**

**Arctic Tern** feedings were primarily fish. Twenty percent of which were unknown. Of the identified fish 16% were herring, 14% hake, and 9% butterfish. Twenty-six percent of feedings were unknown invertebrates, 4% Euphausiid, and 3% Amphipod. Average feeding rate was 0.82 deliveries/hour for 278 nest-hours of observation at 13 nests.

**Common Tern** feedings included mostly fish and almost no invertebrates. Last year Common Terns brought in a large amount of sandlance, this year no sandlance were seen during feeding studies. Feedings contained 34% Herring, 12% Butterfish, 11% Hake, 5% Stickleback, and 4% Pollock. Average feeding rate was 0.85 deliveries/hour for 337 nest hours of observation at 14 nests.

**Alcids**

**Puffin** bill-loads consisted of 59% Herring, 8% Sand lance, 7% butterfish, and 5% hake. Last year the season ended with puffins bringing in bill-loads of euphausiid, this year herring were prevalent and large throughout the entire season.

Razorbill prey items were primarily large herring (63%), butterfish (16%), and hake (12%). This season very few sandlance (2%) were brought in compared to last season when sandlance constituted 70% of their diet.

### Gull Control

#### **Laughing Gulls**

During census, all eggs in all nests (1161) within the marked tern census areas were poked to prevent hatching. Many pairs continued to incubate poked eggs through late July, but others rolled eggs out of nest cups in the week after poking. Due to a significant amount of relaying, eggs were destroyed for a second time in sector 1 on July 18-20 by crushing all eggs found. On June 16 in sector 1, the original census date, 1017 eggs were poked in 385 nests. On July 18-20, 238 eggs were destroyed in 144 nests. An additional two nests were destroyed outside the census period. 148 adult Laughing Gulls were shot on July 1, with effort concentrated on parts of the island where LAGU nest numbers have significantly increased. A second culling occurred on July 9 when 117 adult Laughing Gulls were shot. Four more adults were shot later in the season making the total number shot this year 269.

#### **Herring Gulls and Great Black-Backed Gulls**

No Herring Gull or Great Black-backed Gull nests were found this year. We observed no chicks or fledglings. Adults killed include eight Herring Gulls and three Great Black-backed Gulls.

#### Unusual Birds

A **Red-billed Tropicbird** was observed on 2 days this season flying by the island. The first sighting at the end of May and the second at the end of July, however it was observed regularly at Seal Island.

**Manx Shearwaters** were observed on 44 days, and a maximum of 100 individuals were seen from the island at one time. They were heard during 6 of 10 night-time listening periods, and a maximum of three distinct individuals could be distinguished. While placing a remote camera outside of five suspected Manx burrows, images taken documented 1-2 individuals coming and going from each of the five burrows.

Our high count for **Common Murres** was 116. On June 26, one Common Murre egg was found among the decoys where the Murres loaf regularly. On July 2 the egg was found predated.

## **Seal Island**

*Matt Klostermann – Island Supervisor*

*Lauren Scopel – Resident Intern*

The birds on SINWR benefited from an abundance of large Herring in 2009, but were hurt by an unusually high amount of rainfall (17.35 in.), much of which came during the time when chicks were small and could not thermoregulate well and when many eggs had not yet hatched.

#### Tern Census

Due to safety concerns on the island, a complete tern census was not performed in 2009. However, a partial census was conducted (14 of 30 marked grid squares were counted) and 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 past eleven years in which a complete census was performed (1996-2006). The total estimated number of nests was 2,571. Species ratio was determined by marking a circle with a radius of 16 meters around 8 blinds and identifying as many nests to species as possible within that radius.

**Table 1. Number of nests per species from 2005-2009. 2007 numbers are from the second census, conducted just before hatch.**

	2005	2006	2007	2008	2009
Arctic Tern	1064	1015	823	1084	991
Common Tern	1219	1726	1005	1283	1580
Roseate Tern	0	1	0	0	0
Laughing Gull	0	0	0	0	0*

\*Two pairs of Laughing Gulls nested in July after the census period (only the second nesting attempt of LAGU on SINWR since 1984).

**Tern Productivity**

Common Tern productivity in 2009 was near their long-term average, while Arctic Tern productivity was slightly below their long-term average. Arctic Tern chicks hatched slightly earlier than Common Tern chicks during a long period of cold, rainy weather, resulting in lower relative productivity.

**Table 2. Number of chicks fledged per nest for Arctic and Common Terns from 2005-2009.**

	2005	2006	2007	2008	2009
Arctic Tern	0.67	0.72	0.67	0.93	0.74
Common Tern	0.58	0.94	0.66	1.11	1.07

**Tern Feeding**

Tern chick diet was composed mostly of Herring, which was plentiful throughout the season except for a very short period in the third week of July. During this period, terns continued to bring in some Herring, but the number of Butterfish brought in increased sharply.

**Table 3. Major prey species and percentage of diet for Arctic and Common Terns.**

	Herring	Hake	Butterfish
Arctic Tern	40.92	10.89	7.99
Common Tern	66.57	1.51	6.53

**Predation**

Gull predation in 2009 was constant, but not severe. Gulls were seen in the colony predated tern chicks and eggs nearly every day in June, when it was difficult to shoot because of low visibility.

**Table 4. Gull control measures in 2009 by species.**

	# Nests Destroyed	# Shot
Herring Gull	164	13
Great Black-backed Gull	70	4
Laughing Gull	2	5

**Atlantic Puffins**

The estimated minimum number of active puffin burrows was 425. Our high count of puffins was 651, which was up from 492 in 2008. Puffin productivity was estimated to be 0.72 chicks/pair (sample size = 55 active burrows) as compared to 0.80 chicks/pair in 2008. Puffin chick diet was composed of 47.59% Herring, 13.87% Hake, and 7.32% Butterfish.

**Black Guillemots**

This year was the third year that Black Guillemot productivity and growth were tracked on the island. Productivity was determined to be 0.62 chicks/pair, which was down from 1.13 chicks/pair in 2008. Guillemot eggs and young chicks suffered from cold, rainy weather in June and from gull predation.

**Razorbills**

A total of 14 active Razorbill burrows were found on the island this year, which is up from 11 last year. Hatch success was 0.43%.

**Common Eiders**

A total of 120 nests were counted in late May, although their main nesting area (Area 4) was not counted to minimize disturbance to the birds.

**Great and Double-crested Cormorants**

The cormorant colony on the western end of the island was counted by boat to minimize disturbance to the birds (see John Drury's GOMSWG report).

### **Bird Sightings**

A Red-billed Tropicbird was seen on the island for the fifth year in a row. It was first sighted on May 20 and was last sighted on August 10. It was seen on 36 days throughout the summer – up from 20 days last year – and was seen loafing under a boulder in Area II.

### ***Notes on Some Seabirds***

Between Metinic and Frenchboro Long Island  
*John Drury, Po. Box 102 Vinalhaven Maine, 04863*  
Spring/Summer 2009

#### **Terns**

##### **Hog island - Metinic (63-588)**

**June 16:** 5 arctic tern nests found, 4 with two eggs, one with one egg. 2 adult oystercatchers.

**July 23:** 0 terns, they may have fledged and moved from here, 3 adult oystercatchers no young seen.

##### **Wooden Ball (63-917)**

**June 29:** 0 terns seen, fog.

**July 11:** 2 groups of about 12 adult arctic tern on the northwest shore, one 250 meters northeast of the cabin, the other east of the cobble mertensia beach, guess between 10-20 nests total.

**July 31:** 25 mostly arctic adult terns roosting 0 fledgling, a couple of common terns in the group

##### **Fisherman's Island**

**June 16:** there were 2-3 snowy egret nests in spruce trees.

##### **Eastern Cow Pen (63-284)**

**May 31:** 25 adult common Terns.

**June 19:** 75 adult common terns, 55 nests found, 6 with one egg, 17 with 2 eggs, 32 with 3 eggs.

**July 16:** 30 adult common terns, 0 chicks seen.

**August 7:** 3 adult terns.

##### **Great Spoon Island (63-287)**

**June 18:** 2 adult common tern over the spit, they act as if they have a nest.

**July 16:** a pair of terns present.

**August 7:** 100 terns roosting at the north end of the spit, many of them fledglings, the gulls have abandoned the island and the spit and maybe this will make these sites more attractive to terns.

##### **Green Island - Burnt Coat Harbor (59-478)**

**May 31:** terns in the area, north of Brimstone.

**June 19:** about 150 adult common terns. There were 153 nests found, 28 with one egg, 54 with 2 eggs, 70 with 3 eggs, and 1 with 4 eggs. 2 Harlequin ducks. The nests were widely spread around the south western shore and in a band along the highest part of the island, most in grassy to tussock areas lacking in access to ledge. Also found during nest search, 7 eaten petrels, 13 eaten tern egg, (Crows?) 4 eaten adult tern, a great horned owl feather. There were few gulls on the island, about 6 nests, those were on the eastern shore. This is the first year terns have tried to nest at this site since about 1984.

**July 16:** the colony had abandoned.

##### **Dry Money ledge (59-449)**

**June 19:** 0 terns

**July 16:** 40 total adult common terns, about 25 from nesting area in beach pea.

**Three Bush Island (59-980)**

**May 31:** 0 terns.

**June 19:** about 110 adult common terns, 37 nests found: 20 with one egg, 13 with 2 eggs, 4 with 3 eggs.

**July 16:** about 250 adult common terns, this colony apparently augmented some by the Green Island gang.

**August 7:** terns present, small chicks seen, some adults seen brooding.

**No terns seen on** the Black Horse, The White Horse, Little Spoon, Western Cow Pen, Spirit Ledge, Mason Ledge, The High Sheriff, Brimstone ledge, John's Island, heron Island, Southern Mark Southern Popplestone ledge, Little Green, Little Two Bush, No Man's Land, Ten Pound, Two Bush Island, Roberts, Hay, Otter, Brimstone, Carvers, Dead Man's ledge, Robinson Rock, Green Ledge, Green Ledge, Green Ledge, or Green Ledge.

**Great Cormorants****Summary**

There were a total of 77 great cormorant nests counted at 7 sites in Maine. All but 2 nests were at 5 sites. One nest was at Pulpit Rock in Washington County the others were in Jericho and Penobscot bays. The colonies at Southern Mark Island and Brimstone ledge and the two single nests at western head cove Isle au Haut were abandoned by mid July. That is 27 nests about 2 fifths of the population. Those at the Black Horse were still very vulnerable and it is probable that the gang of eagles that drove the gulls from Great Spoon did not overlook them. There were 5 eagles on Little Roberts August 18 during chick rearing for the cormorants, despite this there were 8 this year's great cormorant at Little Roberts Sept 4. There were 23 great cormorant chicks of the year counted at Seal Island August 8.

Clearly this is the only critically threatened population of breeding seabirds in Maine. The cormorants lay eggs in late April and early May it is crucial that eagle repellent observers occupy Seal Island by the first of May in an effort to protect that one colony. If the cormorant abandon Seal Island it would be much more difficult to do anything for them. Maintaining Observers on Roberts Island at the end of July through August to drive eagles away from Little Roberts is another action that could be taken in an effort to protect this population.

**Southern Mark Island**

**May 31:** 10 great cormorant nests, below 60 double-crested cormorant nests on the eastern shore, also two clumps of About 90 nests each of double-crested cormorant on the west side.

**July 16:** 2 Great Cormorant nests with chicks, 15-20 double-crest nests with chicks, 10 eagles around the eastern colony, as yet the other two clumps of double-crested nests have been unmolested.

**August 7:** 3 eagle, 0 great cormorant, two small clumps of double-crested cormorant and young on the western shore, dwindling.

**Brimstone Ledge - Burnt Coat harbor**

**May 31:** 16 great cormorant nests, 2 double-crested cormorant nests from the south.

**July 16:** 2 adult great cormorant, **abandoned nests**, there is an immature eagle on the ledge in the low part stooped on by black-backed gull.

**The Black Horse**

**May 31:** 16 great cormorant nests, 17 double-crested cormorant nests.

**July 16:** 13 great cormorant nests, eagle on the White Horse, 8 eagles on Great Spoon.

**August 7:** about 20 great cormorant chicks, they are still vulnerable, some of them small an downy, the eagles have driven the gulls from Great Spoon, there were no gulls on Great Spoon.

**Little Roberts Island**

**May 6:** 15 great cormorant nests, about 35 double-crested cormorant nests.

**May 31:** 14 great cormorant nests.

**August 3:** eagle at Little Roberts, 15 great cormorant chicks that had been driven to the shoreline.

**August 17:** 4 eagles.

**August 18:** 5 eagles.

**Aug 19:** one adult eagle.

**August 27:** 11 this years fledgling great cormorant.

**Sept 4:** 8 of this years great cormorant, there was also a great cormorant of the year at eastern ledge, southeast of Brimstone Island, with 10 adult great cormorant and 4 double-crested cormorant.

### Seal Island

**May 6:** 16 great cormorant nests, 4 double-crested cormorant nests, adult and immature eagle on the western head.

**May 12:** 19 great cormorant nests western side of the western head. Immature eagle.

**August 3:** a single fledged great cormorant of the year seen.

**August 8:** 23 great cormorant chicks.

**Sept 4:** immature eagle.

**Sept 6:** adult eagle on the western head, the cormorants have moved out of there to the eastern end of Murre head and the roost at the middle of the island. Apparently the observers have been taken off the island without replacement.

### Western Head Cove On Isle au Haut

Dave Hiltz reported great cormorant nest there. The nest was abandoned by the middle of July.

A great cormorant nest on **Pulpit Rock** in eastern Maine reportedly failed due to eagles.

## Petit Manan Island

*Brian Guzzetti – Island Supervisor*

The 2009 season on Petit Manan Island, in Downeast Maine, was marked by continued growth in the number of breeding terns and Atlantic Puffins and the first decrease in Laughing Gull nests in five years. Long periods of heavy fog and rain caused many chick mortalities while decreases in gull activity provided some relief, leading to an overall average year for tern productivity.

### GOMSWG Census

The GOMSWG census was conducted on the 16<sup>th</sup> and 17<sup>th</sup> of June by nine US Fish & Wildlife staff and contractors. We counted all tern, Laughing Gull (LAGU), and Common Eider (COEI) nests on the island. We applied a Lincoln Correction Factor of 1.04 to Arctic (ARTE) and Common Tern (COTE) nests counted outside of productivity plots. Consistent with previous years we applied a correction of 1.15 to the number of Laughing Gull nests. No correction was applied to eider or Roseate Tern nests. We calculated a total of 2643 tern nests, a 3% increase from 2008, and 65% increase from 2005. Laughing Gull numbers dropped for the first time in 5 years by 14%, nearly to 2005 levels, due in large part to increased lethal control of adults and destruction of nests in designated tern breeding areas. Roseate Tern (ROST) and Common Eider numbers changed little from the previous year and high variability in these numbers over the last five years makes any short-term trend difficult to assess.

**Table 1. GOMSWG Census Results for Petit Manan Island from 2005 to 2009**

Year	ARTE	COTE	ROST	LAGU	COEI
2005	595	1007	9	1151	61
2006	779	1602	23	1282	138
2007	1038	1343	5	1350	49
2008	1255	1307	4	1363	105
<b>2009</b>	<b>1269</b>	<b>1375</b>	<b>4</b>	<b>1171</b>	<b>101</b>

### Tern Productivity

Petit Manan's largest tern population in recent history had overall average productivity compared to previous years. We tracked productivity for 63 Arctic Tern nests, 62 Common Tern nests, and all four Roseate Tern nets. Despite decreased disturbance from Herring and Great Black-backed Gulls, and increased management activities to limit Laughing Gull disturbance, long periods of heavy fog and rain likely caused many chicks to succumb to hypothermia and starvation.

**Table 2. Summary of tern productivity on Petit Manan Island from 2005 to 2009**

Measure	Species	2005	2006	2007	2008	2009
Hatching Success	ARTE	81	84	52	75	<b>78</b>
	COTE	92	78	65	85	<b>86</b>
	ROST	89	82	50	81	<b>80</b>
Fledged chicks/nest	ARTE	0.5	0.8	0.5	1.0	<b>0.7</b>
	COTE	0.5	1.2	0.8	1.1	<b>0.9</b>
	ROST	0.2	0.8	0.2	1.0	<b>0.2</b>

### **Tern Provisioning**

Between July 1<sup>st</sup> and July 20<sup>th</sup> we monitored chick provisioning for 34 stints, or 563 nest hours (hours spent/stint\*nests/stint). Dense fog and rain between the 18<sup>th</sup> of June and the 1<sup>st</sup> of July prevented us from gathering provisioning data immediately following hatching. Atlantic Herring was the primary dietary component of both Arctic and Common Tern chicks, although more variation was observed in the prey items delivered to Arctic Tern chicks. Common Terns fed their chicks at a significantly higher rate than Arctic Terns ( $P < 0.001$ ,  $\chi^2 = \infty$ ,  $df = 1$ ), but did not result in higher reproductive success ( $P = 0.15$ ,  $t = -1.03$ ,  $df = 222$ ).

**Table 3. Summary of provisioning data for Arctic and Common Tern on Petit Manan Island in 2009**

	ARTE	COTE	Pooled
Total Feedings	196	247	443
avg. nests/stint	6.4	4.5	5.5
avg. feeds/nest	15.4	27.3	20.0
avg. feeds/nest hour	0.5	1.2	0.8

**Table 4. Summary of Arctic and Common Tern chick diet composition on Petit Manan Island in 2009**

Diet item	ARTE	COTE
Herring	78%	91%
Butterfish	9	2
Bluefish	3	1
Other*	3	2
Unknown	8	4

\*includes Sandlance, Rockfish, Stickleback, Pollock, and invertebrates

### **Predators and Gull Control**

No Great Black-backed Gulls or Herring Gulls attempted to nest on Petit Manan Island in 2009. These large gulls did prey on fledglings offshore and in the intertidal zone and occasionally took advantage of the cover of fog to enter tern colonies. In the fourth year of lethal methods to reduce the Laughing Gull population, the island saw its first decrease in nesting pairs to 2005 levels. Refuge staff and contractors removed 115 adult laughing gulls, destroyed 228 nests and poked eggs of 850 nests.

Other predators to visit the island included Parasitic Jaeger, Peregrine Falcon, Bald Eagle, and Merlin. Peregrine Falcons were a consistent visitor on non-fog days, entering the colony up to eight times a day and taking four terns in a single day. Despite efforts to install pigeon wire on the lighthouse in 2008 to prevent predators from perching on man-made structures, Peregrine Falcons began perching on the Lighthouse tower by the end of July. Bald Eagles were a consistent presence on neighboring Green Island, but visited Petit Manan only 10 times this season, concentrating their efforts on Gulls and Eiders.

### **Alcids and other Seabirds**

Petit Manan saw its greatest number of breeding Atlantic Puffins in history at 104 nesting pairs. We monitored productivity for 60 Black Guillemot burrows, a minimum estimate for the island's breeding population, and four pairs of Razorbills on the island. High counts of alcids around the island included 213 Atlantic Puffins, 501 Black Guillemots, 79 Razorbills, and 38 Common Murres.

### **Other Island Breeders and Visitors**

As in previous years, a pair of Willets, 2-3 pairs of Spotted Sandpipers, a pair of Barn Swallows, and numerous Savannah Sparrows bred on Petit Manan. A pair of American Oystercatchers bred on neighboring Green Island but appear to have failed in their breeding effort. Migrants of note that passed through between May 13<sup>th</sup> and August 4<sup>th</sup> include Orchard Oriole, Ring-billed Gull, Black-legged Kittiwake, Greater Shearwater, and Sooty Shearwater.

## ***Eastern Brothers Island***

*Sara Williams, USFWS, MCINWR*

2009 was the third 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, and Leach's storm-petrels. Gull nesting was deterred by using a sound system (by BirdGard) from April 15-May 4, destroying 5 empty nest bowls, and harassing loafing birds.

A sound system and 50 tern decoys attracted a single common tern to the island for the season, possibly the same resident individual as in 2008. A group of 4 terns flew over the island (but did not land) on 10 days in June and early July. Small groups of razorbills and puffins foraged offshore in June and July with a peak of 325 razorbills in mid-June. One hundred alcid decoys were placed along cliffs on April 9. A razorbill was observed vocalizing and walking amongst alcid decoys on two occasions.

Sheep grazed the islands seasonally in 2008 after a 25 year absence. Twenty sheep were brought to the island on June 16, 2009 and will remain year-round to enhance tern habitat. In 2009, we completed the second year of a three year Adaptive Management Study to study the efficacy of sheep grazing, prescribed fire, and mowing to maintain tern habitat on Eastern Brothers, Petit Manan, and Metinic Islands. Permanent vegetation plots on E. Brothers were sampled three times during the growing season to document the effect of sheep grazing on raspberry and high meadows.

Mink traps were deployed February 25 and for the entire season although evidence of mink activity this summer was scarce and no mink were caught. Mink likely visited the island on a few occasions but did not reside on the island. A pair of common ravens and American crows attempted to nest on the island and depredated a total of 63 black guillemot eggs. Eggs were found along cliffs near burrows rather than the typical mink caching behavior.

## **Canada**

### ***Machias Seal Island***

*Kirsten Bowser and Tony Diamond*  
University of New Brunswick

It has been a great year. Although the terns experienced yet another breeding failure, they did not abandon the island. Additionally, the high availability of fish around MSI made for happy and fat alcid chicks. Many feeding flocks were seen around the island (events that have been essentially absent in the last several years), drawing large numbers of gulls, alcids and shearwaters.

Becky Holberton visited on three occasions this year to take blood from the alcids. Becky and Tony are collaborating on an auk condition project which will look at indicators of bird condition (hormones and immune activity) at different times of the breeding cycle, and in relation to diet and other external variables.

Kirsten Bowser collected data for her Master's project on the Seabird Food Web.

A more detailed account of the 2009 research season on MSI can be found in the yearly progress report (once completed). Please contact us for details at akbowser@gmail.com.

### **Terns**

The terns arrived on MSI in early May and began courtship feedings almost immediately. Like last year, the terns started leaving the island every afternoon. With a few exceptions, terns were roosting on MSI at night and leaving around dawn the following day. We found our first egg on 2 June, which, like most of the other subsequent eggs in nests, was not incubated. There were a total of 35 nests in our monitored areas which was less than half of last year's total (74). Most eggs were lost to depredation. The terns stopped laying eggs and landing in the first week of July, and were essentially absent during the day (they continued to roost on MSI at night) until 22 July when large numbers (average 1000 birds) landed on the island. The birds were in full courtship display mode from then until early August (when this summary was produced).

### **Predator Control**

Gull scaring was conducted with pyrotechnics and a slingshot by the Canadian Wildlife Service caretaker. Both methods were largely ineffective. Gulls were seen hunting and loafing in the colony on a continual basis. Both HER and GBB gulls continued to nest on adjacent Gull Rock (0.25 km away). This season a total of 28 nests and 62 eggs were destroyed on Gull Rock and 2 nests with 6 eggs were found on MSI. Some nests were treated with mineral oil and dye which allowed researchers to identify some of the gulls hunting on MSI as Gull Rock breeders.

### **Alcids**

Details of alcid productivity, growth and (identified) diet are described in the tables below.

	Monitored Burrows	Mean Lay	Mean Hatch	Burrow Occupancy	Hatching Success (total hatch / total active nests)	Fledging Success (total fledge / total active nests)	Growth Rate (mass)
Puffin Linear growth (day 10-30)	119	9 May	19 June	0.84	0.82	0.67	10.7 grams/day
Razorbill Linear growth (day 5-15)	86	16 May	21 June	0.73	0.76	0.54	8.2 grams/day

	N	Herring	Hake	Krill	Butterfish	Sandlance	Larval Fish	Other
Puffin	1445	88.5	2.3	3.4	0.6	0.8	3.3	1.2
Razorbill	1023	91.9	2.9	1.2	0.1	1.1	2.7	0.1

## ***North Brothers Island***

*Ted D'Eon – Volunteer Steward*

For a detailed report on North Brothers Island, please visit: <http://www.teddeon.com/tern09.html>.

## Afternoon Session/Research Abstracts

### Wind power

*Wing Goodale*

BioDiversity Research Institute

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Wing summarized the issue of constructing off-shore wind farms on the coast of Maine. He asked the GOMSWG participants to send him any suggestions they might have for a monitoring protocol to record impacts of the proposed wind farms.

For more information and updates about the Ocean Energy Task Force, visit the Maine State Planning Office website: <http://www.maine.gov/spo/specialprojects/OETF/>.

BRI also has information on their website, as well as the report *BIRDS, BATS AND COASTAL WIND FARM DEVELOPMENT IN MAINE: A new report by BioDiversity Research Institute*.  
<http://briloon.org/windpower/>

### Seabird food web dynamics in the Bay of Fundy

*Anne Kirsten Bowser*

University of New Brunswick

Atlantic Cooperative Wildlife Ecology Research Network

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Ecosystem-based fisheries management is an increasingly supported concept that incorporates biological interactions within ecosystems into management plans. The Bay of Fundy is an ideal candidate for ecosystem-based management as it is an important habitat for many animal species and is subject to overfishing, pollution and climate change. Seabirds on Machias Seal Island within the Bay of Fundy have, until recently, fed heavily on 1-group Atlantic herring (*Clupea harengus*), an economically and ecologically important fish species. Little is known about 1-group herring diet. It is also unclear why herring have decreased in seabird diet. The purpose of this research is to identify the major pathways in the Machias Seal Island seabird food web. Predatory-prey relationships will be determined by a combination of feeding observation, stomach content analysis, and fecal DNA barcoding. Trophic position and major diet items will be established with stable isotope analysis. Fulfilling these objectives will provide a framework from which to investigate the cause of herring decline in seabird diet and will contribute significantly to a much-needed ecosystem-based approach to fisheries management in the Bay of Fundy.

### Cormorants

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The U.S. Great Cormorant population has been less than 100 pairs for five years, has been declining for 17 years, is concentrated geographically and they are easy prey for a large cohort of long-lived predators who have been broken in eating birds. This is the most critically threatened seabird species breeding on the east coast.

To protect one Great Cormorants colony it is crucial to establish observers on Seal Island on the first of May. If these Cormorants abandon of Seal Island protecting this population would be much more difficult.

We could forego the tern census in '10, and use some of that time to conduct a region wide cormorant survey from the water. Documenting the effect of the burgeoning Eagle population on Gulls, Eiders and Double-crested Cormorants should also be a priority.

As eagles clear gulls from areas more geography is opening up for terns and less human intervention will be required to ensure their populations persistence.

The puffin transplantation program contributed no more than 5% to the Gulf of Maine's growing puffin population. The Razorbill and Murre populations in our area have similarly expanded enormously during the last 40 years. We have here a diverse wave of Alcids swelling in our direction quite on their own. Yet what the public hears is that the National Audubon Society brought back puffins and now they're bringing back the Murre. With the exception of clearing gulls from a few Islands what people have done has been largely irrelevant to these populations.

Stressing the use of social attractions relevance to the establishment of Tern colonies in Maine in recent years ignores the reality that there have been far more tern colonies established in the absence of gull clearing and social attraction than with.

The failure to emphasize these realities shows little respect for the public, financial supporters or those many of us who have worked on the project over the years.

The idea that populations are regulated is not supported by reality. Populations are endlessly dynamic.

## **Managing vegetation to restore tern nesting habitat in the Gulf of Maine**

*Juliet Lamb*

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As seabirds become increasingly concentrated on a small number of protected nesting islands, rampant vegetation growth, fertilized by nitrogen-rich guano, has begun to threaten the limited habitat available. Traditional control methods, such as frequent mowing or herbicide application, are generally impossible to apply in areas with dense aggregations of tern nests. Moreover, the growth of rank vegetation increases habitat for Laughing gulls, already a problem species on several seabird islands. My project studies the application of several novel techniques, including burning, fabric barriers, soil removal, and the planting of low-growing fescues, on Eastern Egg Rock and Outer Green Island. These plots were paired with untreated controls and monitored during the nesting season, both to measure vegetation growth and composition and to assess use by nesting terns. Preliminary results from my first research season indicate that burn plots provided suitable habitat only through hatch, after which they became densely overgrown with annuals and were unsuitable for continued chick-rearing. Both the fescue and soil plots also overgrew, primarily with quackgrass and other persistent perennial pasture grasses. Only the barrier plots remained open throughout the season and provided usable habitat. I will conduct a second season of research during Summer 2010, following the same protocols, and will base my thesis on both seasons of work.

## **Foraging & reproductive ecology of Razorbills (*Alca torda*) on Matinicus Rock, Maine**

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Razorbills (*Alca torda*) are alcids that breed on rocky islands and coastal cliffs in boreal and sub-arctic latitudes of the North Atlantic. They are listed as threatened in the state of Maine, but little is known about their foraging and reproductive ecology at the southern edge of the species range in the Gulf of Maine. On Matinicus Rock, Maine (part of the Maine Coastal Islands NWR), the Razorbill colony is growing rapidly, yet initial observations suggested that reproductive rates might be low. This two-year thesis research project investigates reproductive success at Matinicus Rock, as well as foraging and diving behaviors of chick-rearing adults, and the diet and growth rate of chicks. To study diving behavior, adults were captured at their burrow sites using noose-carpets and fitted with time-depth recorders (TDRs) on plastic leg bands. Chick diet data were collected through direct observation of prey items brought to burrows by adults. Chicks were regularly measured at a sample of burrows to estimate growth rate, and reproductive success estimated by monitoring a sample of burrows. Additionally, 20 nest boxes were deployed in the colony to facilitate access to nest chambers. Reorientation of nest boxes in 2009 resulted in increased use by Razorbills, from two in 2008 to nine in 2009. The results of this study will help inform management decisions by National Audubon Society Seabird Restoration Program and the USFWS Maine Coastal Islands NWR.

## **Spatial distribution and key habitat characteristics of the seabirds in the Gulf of Maine**

*Laura Kennedy*

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Understanding the habitat preferences and needs of the Gulf of Maine's foraging seabirds is necessary for managers when analyzing and preparing for anthropogenic and environmental change upon the ocean. This study is a repeat from a 2005 & 2006 study by Busco et al. to gather two more years of at-sea survey data with which comparisons will be made to determine the key habitat characteristics of foraging locations and analyze if there is seasonality or any other predictability to the locations utilized by Maine's pelagic species. Surveys are performed upon the Bar Harbor Whale Watching cruises and data will later be analyzed using GIS to compare sea surface temperatures, salinity, chlorophyll concentrations, sea depth, and any other significant factor involved. Potential for additional survey platforms are currently undetermined, however, the additional data outside of the whale grounds will provide unbiased data with which predictability patterns can be tested against. This would be conducted by means of supplementary at-sea transects and aerial surveys. The purpose of this project is to provide a foundation for conservation managers and potential developers to better recognize habitat preference by the migrating and reproducing seabird species within the Gulf of Maine, and to prevent unnecessary habitat destruction or alteration by offshore wind development, oil platforms or accidental spills, and climate change. Only a handful of broad-scale pelagic seabird surveys have been performed in the northwestern Atlantic and this project is one step towards a better understanding of the seabirds' foraging in the Gulf of Maine.

## **Life history variation in common terns: foraging inputs and thermal expenditures**

*Jeff Kimmons*

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Life history variation between Common Tern (*Sterna hirundo*) colonies includes clutch size, juvenile growth rate, and asymptotic mass. Tern life history characteristics vary among colonies as they increase in latitude, but also with longitude as colonies are located farther from the coast. Shortcomings in energy budgets create these differences are commonly attributed to foraging success thus an energy input problem. To determine if energy inputs are driving this life history phenomenon on National Audubon Society Seabird Restoration Program islands Common Tern foraging success was monitored from 2005 to 2007. Foraging success was compared between islands using observations of adult prey deliveries to chicks and carbon and nitrogen stable isotope analyses of chick feathers. Feathers selected for analyses were obtained from chicks during days 0 to 2 and 16 to 18 for an individual chick. Isotopic signatures and observational results in 2005 indicate that islands farther from the mainland were receiving a lower quality food source. However 2006 and 2007 isotopic values indicate that there was no relationship between food quality and colony distance from the mainland. Isotope results disagree with observational data during this period which indicate that lower quality prey items were still being delivered to islands farther from the mainland. To better understand the life history relationship between colonies, stable isotope models will be made to address specific changes that occur in isotope signatures between down and juvenile feathers. Energy outputs were also addressed in 2009 using copper thermal models to quantify differences in chick and adult energy expenditure for thermoregulation between Seal Island National Wildlife Refuge and Stratton Island. Additional energy expenditure could help drive the life history phenomenon between colonies as seen with Arctic Tern (*Sterna paradisaea*) colonies.

## **Monitoring seabird behavior on a coastal Maine island: An update**

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Little is known of the effects of establishing finfish aquaculture pens adjacent to seabird breeding colonies. In order to better understand possible seabird-aquaculture interactions we documented behaviors of Black Guillemots, Common Eiders, Herring Gulls and Great Black-backed Gulls nesting on Jordan's Delight Island in 2008 and 2009. We used a combination of temperature loggers, time-lapse cameras, and motion activated cameras to measure nest attendance. Hobo temperature loggers with external probes were placed in Great Black-backed Gull, Herring Gull and Common Eider nests to determine nest attendance. ThermoChron iButtons were also placed in Common Eider nests to assess their utility in detecting nest hatch and abandonment date. Time lapse cameras set to take a picture once per minute were placed overlooking gull and guillemot nesting areas to measure colony attendance and compare it to boat and eagle activity. Additional cameras were placed to record boat activity around the island. The data gathered will also be used to determine the interaction among species during a disturbance event. We will also make recommendations of methods to be used to measure disturbance in the event an aquaculture facility is placed near a breeding island.

## **Trapping and TDRs: Techniques from Petit Manan Island**

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As advances in technologies are made which allow us to record movements and collect data from seabirds, refinement of techniques used to capture, handle and deploy these devices should follow. A pilot study was started in 2007, followed by deployment of temperature depth recorders (TDRs) in 2008 and 2009 to collect foraging data from Atlantic Puffins breeding on Petit Manan Island, Maine. Plastic cradles which held the TDRs had to be modified to fit puffin bands and gorilla tape was used to attach the cradle and TDR to the BBL band. Birds were handled for 20-25 minutes. We experienced difficulty re-trapping birds in many cases and suggest having multiple trapping methods available when re-trapping is required. We recovered 13 of 18 TDRs deployed between 2008 and 2009 using hand grubbing, box traps, noose carpets or a combination of the three. TDRs not recovered in 2008 were seen on birds throughout the 2009 season, with one falling off and one being recovered during the 2009 season. Chick success varied among study birds during and between seasons. All TDRs worked properly during the study period and we were able to retrieve data from a TDR that had been deployed for one year.

## **2009 Update for the 2008 Maine coast gull and cormorant census**

*Linda Welch, Sara Williams (Maine Coastal Islands NWR) and Rick Schauffler (USFWS)*

Although significant tern islands are censused annually, gulls and cormorants have not comprehensively been surveyed in Maine since 1996. Recent ground surveys have documented a substantial shift in the breeding distribution and species of gulls and cormorants on Maine islands. Ground surveys, however, are labor intensive and do not capture the scale of this pattern along the coast. In order to successfully continue to restore tern and alcid populations on Maine islands, it is important to understand the population dynamics and ecology of species like cormorants that nest in association with terns and alcids, but also of species like black-backed and herring gulls that may nest nearby and prey upon "restored" colonies.

MCINWR obtained funding in 2008 from USFWS to aerially photograph 225 gull and cormorant islands in Maine. Aerial photos were taken using a Cessna 172 flying at 1,200 feet during the peak of the gull breeding, from the last

week of May and first week of June. The Refuge repeated the 1996 aerial photo counting methods pioneered by Rick Schauffler but utilized more advance digital technology including a 21 megapixel camera and GIS software.

During the same time interval as aerial photos, we conducted ground surveys on 58 islands. Ground survey data are being used to calculate correction factors for photo-counts. Egg Rings, developed by MCINWR, were used to differentiate between herring and black-backed gull nests. These ground surveys also allowed us to detect the presence of nesting great cormorants, which are known to nest among double-crested cormorants.

This project was facilitated by the MCINWR but could not have been accomplished without Rick Schauffler (USFWS, Region 5 Cartographer) and the assistance of the Maine Department of Inland Fisheries and Wildlife, Maine Natural History Observatory, US Geological Survey, National Audubon, College of the Atlantic, Acadia National Park, and John Drury. Photo-counting was completed in August 2009 and the data will be made available after the data is corrected and synthesized. These data will facilitate management of offshore seabird islands, help justify the acquisition of significant seabird nesting islands, and provide a reference for future disease response actions.

## Appendix A. 2009 GOMSWG Attendees

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