

Gulf of Maine Seabird Working Group
18th Annual Summer Meeting
August 12, 2004
Hog Island, Bremen, Maine

Compiled by Scott Hall – National Audubon Seabird Restoration Program

INTRODUCTION

Since the first meeting of the Gulf of Maine Tern Working Group¹ in 1984, ten tern restoration programs have been initiated in the Gulf of Maine and four additional sites are actively managed for terns. In 2004, terns (not including LETE) nested at a minimum of 47 sites; 90% of terns nested at managed sites including 98% of Arctic Terns, 88% of Common Tern and 93% of Roseate Terns. Although managed sites can provide continuously safe nesting opportunities for terns, mammalian and avian predators continue to plague some sites thus forcing terns to redistribute to more suitable predator free sites. Despite continued predator problems at some sites tern numbers remain stable or continue to increase - the success of tern restoration is likely due to a regional rather than local approach to management of terns, where multiple sites are managed for predators and visitations – permitting terns to move to alternate sites when one becomes unsuitable.

The Gulf of Maine now supports 20,829 pairs of Common Terns (↓ 3% from 2003), 5,694 pairs of Arctic Terns (↑ 8% from 2003), and 379 pairs of roseate terns (stable; see data table). In addition, 1,256 pairs of least terns nest along the beaches of Maine and Massachusetts. Laughing Gull numbers decreased 9% from 2003, yet the population has grown to 4,013 pairs (a 26% increase in 5 years). Atlantic puffin and razorbill numbers also continue to increase and the Gulf of Maine (GOM) now supports over 4,000 pairs of puffins and close to 900 pairs of razorbills.

Part 1 – ISLAND SYNOPSIS

Monomoy Islands, Massachusetts – *Monica Williams, USFWS, Monomoy NWR*

North Monomoy Island

Common Tern:

Census: On 20 June, two observers counted 3 Common Tern nests with 3 eggs each and 3 scrapes in the historic nesting area on the island.

Productivity: Productivity was not monitored. However, small numbers of Common Terns were observed throughout the season attempting to nest on the island, but they were unsuccessful due to flooding of the nesting area during spring high tides.

South Monomoy Island

Common Tern:

Census: On June 16, 17, 19, and 20 June a total of 8810 Common Tern nests were counted on the north tip of South Monomoy. The nesting area was delineated into 60 m² grids and nests were tallied

¹ Renamed the Gulf of Maine Seabird Working Group (GOMSWG) in 1997.

by grid. A Lincoln Index adjustment brought the total to 8908 nests. This is a 2.0% increase from the 8727 nests counted in 2003. A second census was not conducted, but an additional 57 nests (13% of the total 448 nests) were initiated in productivity enclosures after the census window, indicating an additional 1299 nests in the colony after 20 June.

Productivity: Productivity was estimated based on 391 A-count nests in 37 fenced productivity enclosures located throughout the colony.

Average clutch size: 2.30 eggs/nest (SD = 0.67, N = 391 nests) 2.50 in 2003
 Hatching success: 1.98 eggs/nest (SD = 0.94, N = 391 nests) 1.88 in 2003
 Reproductive success: 1.37 chicks/nest (SD = 0.94, N = 391 nests) 1.26 in 2003

Number of pairs and Productivity of Common Terns on South Monomoy Island 2000-2004

	2000	2001	2002	2003	2004
Number Pairs	6886	7807	8032	8727	8908
Productivity	1.83	1.20	0.70	1.26	1.59

Feeding Stints: Staff conducted approximately 80 one-hour long feeding stints from June 8-July 31. For each hour-long stint a study area was delineated and species, size and receiver were recorded for every prey item brought to study nests. Sand lance was the most common prey item. Other items delivered in the colony included: Butterfish, Hake, Bluefish, Pollock, and Herring. Data results are still preliminary, but the average prey length was 2.02 inches. Chicks received about 79% of the prey items brought into the colony.

Research: Monomoy NWR participated in a follow-up study investigating the effects of the Bouchard Spill (27 April 2003) in Buzzards Bay, Massachusetts. Hematological data was collected from 20 Common Terns nesting on South Monomoy to determine if there were differences in hematological parameters between birds at Monomoy, an un-oiled site and birds at oiled sites in Buzzards Bay as part of a natural resource damage assessment.

Salmonellosis: This summer an outbreak of Salmonellosis occurred in the tern colony on South Monomoy Island from July 22-September 6. Approximately 1945 Common Tern fledgers (27-60 days in age) were found dead. Birds expressed a variety of symptoms. Generally, the outward appearance was healthy with no visible signs of injury or wounds, but their behavior was strange. Prior to dying, birds were sometimes observed spinning in circles and showed signs of imbalance and lethargy. They appeared droopy, were unable to open their wings and fly, and some had stained vents. Samples of dead birds were collected and sent to the National Wildlife Health Center (NWHC) in Madison, Wisconsin and Tufts University School of Veterinary Medicine in North Grafton, MA for analyses. Results from Tufts University showed terns with enlarged spleens and the presence of *E. coli* and *Salmonella*. The NWHC also found the presence of *Salmonella*, enlarged spleens and livers, and irregular sized thymus and bursa, which were presumed indications of a viral infection. Specimens were tested for avian influenza, Newcastle disease virus, and West Nile virus, but found negative for all three viruses. Tufts University determined the species of *Salmonella* bacteria found in the infected birds at Monomoy was *Salmonella typhimurium*. *Salmonella* is a common finding in colonial nesting birds, but it is uncertain what the source of the *Salmonella* into the colony was. This is the first case of *Salmonellosis* known to occur on the refuge.

Roseate Tern:

Census: One Roseate Tern nest was counted during the census on 16, 17, 19, and 20 June. Observers continued to search for Roseate Tern nests throughout the season, but no additional nests were found.

Productivity: The chick was weighed from day 0-2. The nest was checked every other day throughout the season.

Average clutch size: 1.00 egg/nest (N = 1 nest) 1.33 in 2003

Hatching success: 1.00 egg/nest (N = 1 nest) 1.33 in 2003

Reproductive success: 1.00 chick/nest (N = 1 nest) 1.33 in 2003

Numbers of pairs and Productivity of Roseate Terns on South Monomoy Island 2000-2004

	2000	2001	2002	2003	2004
Number Pairs	3	6	3	3	1
Productivity	1.00	0.83	1.00	1.33	1.00

Least Tern:

Census: On 16 June, 1 Least Tern nest was counted on the south tip of the island. On 1 July, 20 additional nests were found. After an influx of late nesters, 194 nests were found on 10 July. A second census was conducted July 22-23 and a total of 229 nests were counted.

Productivity: Productivity was not quantitatively monitored, but was estimated to be poor. A maximum of 13 Least Tern fledgers were observed at one time however, the colony experienced heavy gull and coyote predation.

Laughing Gull:

Census: On 16, 17, 19, and 20 June 1020 active Laughing Gull nests were counted, a decrease from 1200 nests counted in 2003.

Productivity: Productivity was monitored, but it was estimated to be qualitatively fair to good based on the number of fledgers seen at the end of the season.

Minimoy Island

Common Tern:

Census: On 20 June, 1434 Common Tern nests were counted. No Lincoln Index was conducted to minimize disturbance. In 2003, 1280 nests were estimated based on an adult high count and chicks present after Minimoy was discovered as a new nesting site in early July. This count was done after the Massachusetts State Tern Census Window.

Productivity: Productivity was not monitored. However, based on the number of chicks produced and survival to fledging, productivity was estimated to be qualitatively good.

Roseate Tern:

Census: On 20 June, a total of 24 Roseate Tern nests were counted. Two additional nests were found on July 15. In 2003, at least 15 pairs of Roseate Tern nested on Minimoy. Because nesting on the island was not discovered until early July of 2003, this number represents a minimum.

GOMSWG Minutes 2004

Productivity: Productivity was estimated based on 24 A-count nests.

Average clutch size: 1.50 eggs/nest (SD = 0.51, N = 24) 1.90 in 2003

Hatching success: 1.32 eggs/nest (SD = 0.48, N = 24) 1.70 in 2003

Reproductive success: 1.21 chicks/nest (SD = 0.59, N = 24) 1.70 in 2003

Black Skimmer:

Census: On 20 June, 6 Black Skimmer nests were counted. One new nest, which was a renest, was found on 25 June. A total of 7 Black Skimmer nests were found on Minimoy in 2003 from early July until the season ended. Minimoy was the only nesting site in Massachusetts for Black Skimmers in 2003 and 2004.

Productivity: Productivity estimates were determined based on 6 A-count nests.

Average clutch size: 3.67 eggs/nest (SD = 0.52, N = 6) 3.50 in 2003

Hatching success: 2.50 eggs/nest (SD = 0.55, N = 6) 3.25 in 2003

Reproductive success: 1.50 chicks/nest (SD = 1.22, N = 6) 2.00 in 2003

Least Tern:

Census: On 20 June, 1 Least Tern nest was counted.

Productivity: The nest was later lost to overwash and no additional nests were found the remainder of the season.

Laughing Gull:

Census: During the census on 20 June 1 Laughing Gull nest was found.

Productivity: The nest was unsuccessful and no additional nests were found the remainder of the season.

Predators

Great Black-backed Gull (GBBG) and Herring Gull (HERG): Gull harassment in area A was initiated 24 April. Three harassments were conducted in April, 52 in May, 23 in June, and 3 in July. A census was conducted on 13 May; 73 nests (59 GBBG and 14 HERG) were counted in Area B and 1 nest was found in Area A. The nest in Area A was destroyed the day of the census and eggs in Area B were punctured to suppress productivity. GBBG and HERG nests in areas A and B were censused for a second time on 4 June. There were no gull nests in area A, but one GBBG pair attempted to renest several times, and this nest was repeatedly destroyed following the first census. In area B, 46 GBBG nests and 60 HERG nests were counted. Some nests were not new. A total of 42 new GBBG eggs and 114 new HERG eggs were punctured. Gulls were present in the tern colony mid June through August. HERG were seen in the tern colony a minimum of 9 times and GBBG were seen in the colony at least 70 times. Gulls were responsible for taking at least 37 tern eggs and at least 35 Common Tern chicks. Three GBBG were removed from the colony this season.

Northern Harrier: One pair of Northern Harrier nested on the north end of South Monomoy Island this season. The nest was found on 4 June and two successful fledglings were produced from this pair. Northern Harrier were seen in the tern colony a minimum of 21 times during the season. At least 4 adult terns and 7 chicks were found dead in the colony likely killed by Northern Harrier.

Coyote: A total of 20 coyotes (17 adults and 3 pups) were removed this season: 7 in April, 7 in May, 2 in June, and 4 in July. Coyotes were seen in and around nesting areas on 5 nights and 6 times during the day. Evidence of coyote (scat, tracks – often seen in pairs) was found in or around the tern colony a minimum of 34 times 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-Heron were first seen in the colony 28 May, and were present during most nights late June – mid August. There was evidence of heron predation on tern eggs and chicks. A total of 9 Black-crowned Night-Herons (8 adults and 1 juvenile) were removed from the colony this season.

Laughing Gull: Laughing Gull kleptoparasitism on Common Tern stints were continued this year. A total of 81 one-hour-long stints were conducted. Data results are still preliminary, but approximately, 2802 kleptoparasitism attempts were observed and recorded for an average of 34.6 attempts per hour. Laughing Gulls were successful in 55% of the attempts, Common Terns were successful 24% of the time, the outcome was unclear or undetermined 13.5% of the time, and prey items were dropped in about 7.5% of the attempts.

Vegetation Manipulation

A prescribed burn was conducted in two of the 60m² grids in the grid system established on the north tip of South Monomoy Island. The objective of the burn was to decrease the density of American Beachgrass in the tern colony and reduce habitat for Laughing Gulls nesting in an area of the tern colony. The goals were met, but the results appear to be short-lived. Below is a summary table containing the number of nesting pairs of Common Tern (COTE) and Laughing Gull (LAGU) counted in the plots before the burn in 2003 and after the burn in 2004:

	2003		2004	
	<u>COTE</u>	<u>LAGU</u>	<u>COTE</u>	<u>LAGU</u>
Grid15	667	84	956	24
Grid 21	406	185	526	69

White and Seavey Islands, NH – NH Fish and Game Dept and Audubon Society of New Hampshire, Project Supervisor – Steve Fuller; Lead Biologists Diane DeLuca and Dan Hayward; Field Biologists – Melissa Barney and Martin Bean

Introduction: White and Seavey Islands are a 3-hectare island complex located nine miles from the mouth of the Piscataqua River. In 1997, the New Hampshire Fish and Game Department and the Audubon Society of New Hampshire began a tern restoration project at this site using non-lethal gull control techniques.

Census: Six NHFG and ASNH biologists conducted the census. The census began on June 17 and was finished up on June 20 as bad weather made it difficult to get into the colony on June 18 and 19. Roseate and Arctic Tern nests were all marked and confirmed visually either before or after the census. Common Tern numbers continued to climb slightly from 2414 pairs in 2003 to 2582 pairs in 2004. Roseate pairs showed a significant increase as they more than doubled from 42 pairs in 2003 to 107 pairs in 2004. One additional pair of Arctic Terns brought the 2004 total to 5 pairs.

Census (6/17-6/20)

Species	COTE	ROST	ARTE
Date	6/17-20/04	6/17-20/04	6/17-20/04
	2582	107	5
Additional Nests After Census		5	2
Season Total Nests	2582	112	7

*Lincoln’s index not used due to terns removing and/or collecting nest markers. Many were found out on the rocks and there were multiple markers found at a number of individual nests, being used as nest cup material.

Year by Year Comparison (Census)

Species/Year	1998 (pairs)	1999	2000	2001	2002	2003	2004
COTE	18	80	318	460	1273	2414	2582
ROST	0	0	0	1	8	42	107
ARTE	0	0	0	0	1	4	5

Year by Year Comparison (Season Totals)

Species/Year	1998 (pairs)	1999	2000	2001	2002	2003	2004
COTE	45	140	446	809	1687	2414	2582
ROST	0	0	0	1	26	63	112
ARTE	0	0	0	0	1	6	7

Tern Productivity: Productivity was considerably lower for COTE this year than in past years. For the second consecutive year the mean clutch size was low at 1.84. It is unclear why this has dropped but cool weather and rough seas may be having an impact. ROST productivity climbed to 0.95 fledgers per nest and there were only 5 documented roseate nests after the census period. ARTE productivity followed the downward trend of the COTE.

Predation likely had a significant impact on both COTE and ARTE productivity, as gull predation pressures remained high during the field season. A number of “specialist” gulls took a minimum of 68 tern eggs during the period of May 25 – June 5. Sections of the colony re-nested after this initial predation. A total of 36 chicks, mostly fledgers, were also predated. This number is similar to the fledging predation documented in the past couple of years.

Weather may have played a factor in productivity as well. The start of the census on June 16 indicated that hatch was occurring. The next two days of cold and rain had an impact on the colony as many newly hatched chicks were found dead when the census was completed on June 20.

Tern Productivity

COTE [Observed Totals]

Year	1998	1999	2000	2001	2002	2003	2004
Nests Monitored	45	25[140]	43	73	184	163	138
Mean Clutch Size	[?]	2.84	2.60	2.44	2.52	1.96	1.84
Mean Hatch	2.02	2.48	2.33	2.18	2.09	1.61	1.67
Fledglings/Nest	1.6	2.24[1.71]	1.58	1.68	1.63	1.33	0.75
Total Fledglings	72	314[240]	502	773	2075	3212	1936
Total Population	162	520	1394	2669	5449	8040	7100

ROST [Observed Season Totals]

Total Fledges based on Census Productivity applied to Season Total Nests*

Total Fledges based on Season Productivity applied to Season Total Nests**

Year	2000	2001	2002	2003	2003	2004
Nests Monitored	-	1	8	30[47]		55
Mean Clutch Size	-	1	1.38	1.40[1.34]		1.21
Mean Hatch	-	1	1	1.07[1.06]		1.13
Fledglings/Nest	-	1	0.88	0.87[.89]		0.95
Total Fledglings	-	1	7	26[42]	*55, **56	106

ARTE [Season Totals]

Year	2000	2001	2002	2003	2004
Nests Monitored	-	-	1	4[6]	5 [7]
Mean Clutch Size	-	-	2	1.5[1.5]	1.20[1.29]
Mean Hatch	-	-	2	1.5[1.5]	0.50[0.43]
Fledglings/Nest	-	-	0	1[1]	0.60[0.43]
Total Fledglings	-	-	0	4[6]	3[3]

Tern Feeding Study

ROST

# Of Nests	Observer Hours	Feeding Rate
12	115	0.96

Species	Sand Lance	Hake	Unknown Fish	Unknown Item
% of Diet	50.00	27.27	17.27	4.55

Predator Control: Biologists arrived on island on May 6. Three nests were interrupted during the initial gull census during the week of May 6. Two pair of herring gulls persisted through June. Pyrotechnics and regular sweeps of the island continued from May 6 through the field season. Eight HERG and four GBBG were taken as predation continued. A total of 68 tern eggs, 36 chicks and 2 adults were predated by gulls.

Predator Control

Species	Nests Destroyed	Eggs Destroyed	Adults Taken
GBBG	3	4	4(+2 relief kills)
HERG	3(+4 renests)	9	8

Gull Control (Apr29-Aug6)

Control Method	Ave/Day	Control Method	Ave/Day
Human Control	3.30	Problem Gull	0.14
Screamer	1.96	Nest/Egg Destruction	0.12
.22 Cal. Rifle	0.42	Banger	0.02
Cap	0.15	Relief Kill	0.02

Other Nesting Species

Species	COEI	SPSA	MALL	SOSP	CAGO
# Of Nests	~25	~15	2	1	1

Other Tern Sightings, Rare Birds, and Interesting Observations

AMOY-7/17 [1]

ATPU-6/17 [2], 7/15 [2], 7/27 [1]

BLTE-5/28 [1]

COMU-6/6 [2], 6/19 [1]

KIEI-5/16 [1 immature male], 6/27 [1 immature and 1 adult male], 6/28-7/17 [1 immature male]

MASH-7/5 [1]

RAZO-6/9 [2]

Stratton Island – Suzanne Sanborn, Island Supervisor and Robby Lambert, Resident Intern, National Audubon Society SRP

Wading Bird Census

The 2004 wading bird census was conducted May 19-21. Total number of nesting birds has increased, although Black-crowned Night Herons have decreased by thirteen pairs.

Species	2000	2001	2002	2003	2004
BCNH	24	24	27	36	23
SNEG	125	129	148	126	122
GREG	1	2	4	11	24
GLIB	86	159	126	110	126
LBHE	*	5*	7*	7*	11*

*- estimate

GOMSWG Census

The Stratton Island annual tern census was conducted on June 17th. Common Tern (*Sterna hirundo*) nesting numbers are up this year by 100 nests at 399 nests. This season Roseate Tern (*S. dougallii*) nest numbers are down from last year probably due to the presence of a mink last year. Arctic Terns are up from last year with 9 nests. Table 1 shows the tern population over the past 5 seasons.

Table 2: GOMSWG Census totals from 2000-2004

Year	COTE	ROST	ARTE
2000	1109	104	9
2001	1881	127	10
2002	1279	98	8
2003	305	40	4
2004	399	15	9

Tern Productivity

A total of 43 Common Tern nests were followed to estimate colony productivity. Four fenced plots and 12 feeding study nests were followed. Last season’s productivity was 0.2 fl./nest this year was 0.3 fl./nest. Low productivity was caused by predation. We also followed 7 Roseate tern nests to fledging. Despite the low nest count, productivity was high at 1.7 fl./nest. Arctic Tern nests numbers were up but productivity was zero due to predation.

Tern Feeding Study

This season there were 12 COTE study nests followed for the feeding study. Night abandonment due to BCNH caused exposure and heavy predation killing all the chicks in our study. There were 67 hours of feeding observations in 2004 with a feeding rate of 4.59 feedings per hour. Hake made up over 50% of the prey items, similar to the 2003 season. Sand Lance was down this season with 17% of the prey items. Table 3 summarizes the total prey for the season.

Table 3: Percent of different species delivered

Prey Item	Percent
White Hake	52%
Sand Lance	17 %
Unknown	14 %
Unknown fish	9 %
Atlantic Herring	7%

Predator Activities

This season’s major predators were Great Black-backed (*Larus marinus*) and Herring (*L. argentatus*) Gull as well as Black-crowned Night Heron. This season we continued to do gull control on the island. We destroyed 68 HERG and 50 GBBG nests this season as well as poked 85 Great Black-backed and 17 Herring gull eggs. This season 5 Herring Gulls and 6 Great Black-backed gulls were killed. Table 4 shows gull control from 2004.

Table 4 Gull control data from 2004

Species	# Shot	# Nests Destroyed
HERG	5	68
GBBG	6	50

Nocturnal abandonment early in the season lead to delayed hatching and nonviable clutches. Black-crowned Night Herons caused night abandonment shortly after the first wave of tern hatching occurred, killing many chicks. This abandonment caused exposure (especially with this seasons’ cool wet weather), opportunistic gulls took chicks, and night herons were observed several times feeding in

groups of 2-7 in the colony. There were 3 night herons shot this season. They frequented the colony between 2000-2300, mostly on foggy nights. There was also a juvenal night heron seen in one of the productivity plots that we were unable to kill due to weather.

Common Eider

There were a total of 1257 nests on the island this season. The predation study conducted by Christina Donehower provided for an exceedingly accurate nest count. Extreme predation by Great Black-backed and Herring Gull on ducklings resulted in very low productivity.

Asiatic Bittersweet

Removal of bittersweet began July 21 and ended August 8th. Weather, logistics, and lack of assistance resulted in 67 hours of total work. 2005 work plan pending. Table 5 indicates 2004 bittersweet removal.

Table 5 Bittersweet removal

PERSONS	HOURS WORKED	ACERAGE TREATED
One	35	.25
Two	20	.50
Three	12	.25
Total	67	1.00acres

Western Casco Bay (survey by Jane Arbuckle & Bob Houston; 14 June 2004)

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

Survey by boat revealed 1 pair of Common Terns; 1 nest probable. Total count of one nest for the ledge the same as last year. No productivity estimate. Nesting common eiders present.

The Nubbin, Yarmouth (55-223)

Survey by boat revealed 1 pair of Common Terns flying about the island with potentially one nest; same as last year. No productivity estimate. Nesting common eiders present.

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. Osprey nest present.

Sister Island Ledge, Freeport (55-237)

Survey by boat revealed 13 pairs of Common Terns with a probable 13 nests. Six nests recorded last year. No productivity estimate.

Grassy Ledge, Harpswell (55-259)

Survey by foot revealed one pair of terns and one tern nest. No reports of terns on this ledge since 1995.

Black Rock, Harpswell (55-252)

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

Outer Green Island – Julie Hart, Island Supervisor, National Audubon Society SRP

Census and Population Estimate

GOMSWG census was conducted on 16 June 2004. The number of Common Tern nests counted was 466. A Lincoln Index of 1.028 (7 unmarked nests out of 250 marked) was applied and 31 productivity and feeding study nests added, giving 510 nesting pairs of Common Terns. Roseate Terns were counted separately and 8 nests were laid by 16 June. The nesting of both Common and Roseate Terns continued after this initial census so a second island-wide census was conducted on 12 July and found 185 additional Common Tern nests and 5 Roseate Tern nests. The total population estimate for Common Terns this year was 695 nesting pairs. This is a dramatic increase from a season total of 160 pairs in 2003 (90 GOMSWG) and 12 pairs in 2002 (1 GOMSWG). This is the first year Roseate Terns have nested on Outer Green with a season total of 13 pairs (8 GOMSWG).

Tern Productivity

Productivity was only determined for Common Terns. The average clutch size was 2.26 eggs (2.64 in 2003). The mean hatch was 1.92 chick/nest (2.45 in 2003). The final productivity was estimated at 1.45 fledged/nest (2.09 in 2003). As the colony has increased in size, the heart of the colony has become very dense. Nests were often located every 2 feet apart, and sometimes within a foot of each other. This high density led to increased competition for food among chicks and increased aggressive behaviors at the chick-chick, chick-adult, and adult-adult levels.

Tern Feeding Studies

A total of 18 Common Tern nests were observed and monitored in three locations on the island. A total of 1073 observation hours yielded 2754 feedings for an average feeding rate of 2.57/hour. The majority of the diet was herring and hake. Almost all of the unknown fish were either herring or hake. The majority of prey items delivered from 29 July until closing (9 August) were bluefish, but are underrepresented in Table 1 because feeding studies were discontinued on 1 August.

Table 1. Major Prey Items for Outer Green Island, 2004.

Prey Item	Number of Deliveries	Percent of Diet
Herring	914	33.19
Hake	843	30.61
Unknown Fish	735	26.69
Butterfish	71	2.58
Lumpfish	51	1.85
Unknown	50	1.82
Stickleback	20	0.73
Unknown Invertebrate	20	0.73
Bluefish	14	0.51

Predation and Predator Control

Both Great Black-backed and Herring Gulls attempted to nest on Outer Green this year. A total of 33 nests were destroyed this season, 3 GBBG and 30 HERG. No gulls were shot this year. GBBG were observed preying on eggs early in the season and on fledgers. It was not clear if they only preyed upon drowned fledgers or if they also caught live fledgers. Predation was also observed by a Peregrine Falcon in May and early June. One adult tern was taken. The recurrence of the falcon and the gull

predation on eggs early in the season caused some early-nesting terns to abandon their nests. Other potential predators observed include Great Blue Heron and Merlin.

Other Island Species

This was the first year that Common Eiders have bred successfully on Outer Green. At least two broods, each with three chicks, were observed brooding around the island. This was the first year a Leach’s Storm-Petrel attraction system was in place. A sound system that broadcast flight and burrowing calls was run 24 hours a day and 21 artificial burrows were installed. A storm-petrel was observed spending the day on 15 July.

Other Island Notes

An Atlantic Puffin was seen flying around the island on two occasions in July. A single Razorbill was observed in the water on one occasion in June and two were seen flying north later in the month. Arctic Terns were observed early in the season, including one with a fish in its mouth.

Jenny Island – Matt Martinkovic, Island Supervisor, National Audubon Society SRP

GOMSWG Census

In the past 5 years the population of terns on the island has fluctuated. Last season there were 468 pairs of Common Terns (*Sterna hirundo*). This season there were 213 pairs. Also this season there were a total of 2 pairs of Roseate and 1 pair of Arctic Terns. Table 1 shows the tern populations over the past 5 years.

Table 1: Tern Populations from 2000-2004

Year	ROST	COTE	ARTE
2000	0	1050	0
2001	0	59	0
2002	0	397	0
2003	1*	468	0
2004	2 / 3*	213	1

*indicates after the GOMSWG census date

Tern Productivity

Over the past five years the productivity of the island has been lowered due to mink predation. In the past 2 seasons there has been no evidence of mink predation on the island. Therefore productivity has been higher. This season the productivity was 1.13 fl/nest. The average clutch size was 2.35 eggs/nest and a hatching rate of 1.13 chicks/nest. Table 2 indicates the productivity over the past 3 seasons.

Table 2: COTE productivity from 2002-2004

Year	N	Avg. Clutch	Avg. Hatch	Avg. Fledging
2002	36	2.53 (.61)	1.44 (1.21)	0.28 (.51)
2003	40	2.30 (.56)	1.92	1.50 (1.04)
2004	31	2.35 (.11)	1.13 (.18)	1.13 (.17)

Predation

This season there was a predatory Peregrine Falcon, Great Horned Owl, and American Crow on the island. The only one that came to the island more than once was the crow. It predated a lot of nests on the Northwest productivity plot. The Great Horned Owl killed one tern adult but did not show signs of returning.

Once again the gull control continued on the island there was only one Herring Gull nest found on the island and was quickly removed.

Other Species

This season there were a total of 5 Roseate Tern nests found on the island. Also 1 pair of Arctic Terns found on the west side of the island.

Pond Island National Wildlife Refuge – Matt Martinkovic, Island Supervisor, National Audubon Society SRP

GOMSWG Census

Over the past 5 years the Common Tern (*Sterna hirundo*) populations has been increasing. This season there was 429 pairs of Common Terns (*S. hirundo*). This was an increase of 119 pairs from last season. Also there was an increase in Roseate Terns (*Sterna dougallii*) nesting on the island this season. There were 9 active nests at the time of the census. In 2003 there were only two pairs nesting. Table 1 shows the tern population over the past 5 seasons.

Table 1: GOMSWG Census totals from 2000-2004

Year	COTE	ROST
2000	33	0
2001	135	0
2002	109	0
2003	310	2
2004	429	9

Tern Productivity

A total of 49 nests were followed to estimate colony productivity. Both fenced and unfenced plots were followed. There was an average clutch size of 2.04 eggs/nest with a rate of 1.20 chicks/nest. In 2003 there was an average clutch size of 2.20 eggs/nest with a hatching rate of 1.67 chicks/nest. The productivity of the island this season was 0.71 fledgers/nest. Last season’s productivity was 1.10 fl/nest. Table 2 summarizes the productivity over the past five years.

Once again this season’s productivity was affected by predation. There were 3 GHOW removed from the island this season. Also there was a mink and a predatory Great Blue Heron. The mink was never caught and the heron continued coming till the close of the island. The funk was another major reason for low productivity. Approximately 30% of chicks hatched had symptoms of funk. Approximately 83 % died from the symptoms.

Table 2: COTE productivity from 2000-2004 (Standard Deviation)

Year	Avg. Clutch Size	Hatching Success	Productivity
2000	2.40 (.67)	0.91 (1.22)	0.24 (.72)
2001	2.80 (.63)	1.74 (1.24)	0.44 (.91)
2002	2.80 (.41)	2.43 (.85)	1.55 (1.80)
2003	2.20 (.56)	1.67 (.97)	1.10 (1.10)
2004	2.04 (.22)	1.20 (.16)	0.71 (.14)

Tern Feeding Study

This season there were 18 study nests followed for the feeding study. There were 473 hours of feeding observations in 2004 with a feeding rate of 5.21 feedings per hour. In past seasons Sand Lance has been the primary food source. This season Atlantic Herring was the primary food source. Herring made up 40 % of the terns diet, while Sand Lance made up 30 % of the diet. Table 3 summarizes the total prey for the season.

Table 3: Percent of different species delivered

Prey Item	Percent
Atlantic Herring	40 %
Sand Lance	30 %
Unknown	15 %
White Hake	15 %

Predator Activities

Once again this season’s major predator was Great Horned Owls (*Bubo virginianus*). This season we removed 3 GHOW adults from the island. This season we had a trapping effort 143 hours with 120 hours of night effort. Two of the owls were trapped using padded leg hold traps. The third owl was found on the island and removed with a .22 caliber rifle. This makes 7 owls in the past two seasons. This season we continued to do gull control on the island. We destroyed 3 HERG and 3 GBBG nests this season. Also we shot 2 Herring Gulls throughout the season. Table 4 shows gull control from 2004.

Table 4 Gull control data from 2004

Species	# Shot	# Nests Destroyed
HERG	2	3
GBBG	0	3

Also this season we had a mink that killed 10 known fledgers. There was 777 hours of trapping effort. Staff could remove this predator even though the extensive amount of trapping. Finally, there was a predatory Great Blue Heron on the island for most of July. The heron was seen eating fledgers on the north end of the island. The heron would arrive on the island at dusk and would leave the island at dawn. The behavior indicates that the heron was specialized and would only feed on the terns.

Common Eider

There were a total of 98 nests on the island this season. Approximately 51% hatched, 34% were depredated, 7% abandoned and 7% unknown. Most predation came from American Crows and Great Black-Backed Gulls.

Eastern Egg Rock - Ellen Peterson, Island Supervisor, and Gillian Brooks, Resident Intern, National Audubon Society SRP

Introduction:

Eastern Egg Rock is a seven-acre island six miles offshore of New Harbor, Maine in the outer waters of Muscongus Bay. Eastern Egg Rock is owned by the Maine Department of Inland Fisheries and Wildlife, and managed by the National Audubon Society.

Census:

All Arctic Tern *Sterna paradisaea* and Roseate Tern (*Sterna dougallii*) nests were located and flagged on the island by direct observation, so that species differentiation during census was unnecessary. The nest count census was conducted on the 17th, 18th and 20th of June. We censused Common Tern (*Sterna hirundo*) Laughing Gull (*Larus atricilla*) and Common Eider (*Somateria mollissima*) nests. Eight hundred and seventy-three COTE pairs nested on Eastern Egg Rock (Lincoln adjustment =1.0648), down 119 nests from last year. There were 84 ARTE nests, up slightly from last season. One hundred and ten ROST nests were found, a large decrease of 50 nests since last season. Fourteen hundred and twenty Laughing Gulls nests were tallied during the census, a decrease of 46 pairs.

Table 1: Census Numbers, Nesting Pairs 2001-2004

Year	COTE	ARTE	ROST	LAGU
2004	873	84	110	1420
2003	992	77	163	1466
2002	1003	81	160	1176
2001	1514	92	145	1252
2000	1443	85	165	955

Tern Productivity:

Seventy-two COTE nests, 26 ARTE nests and 46 ROST nests were monitored for productivity this year. Common Tern productivity was low at 0.67. ARTE productivity was 0.58. ROST productivity was 0.76. The extremely wet weather and the high gull predation pressures are most likely the reason for the overall low productivity on EER.

Table 2: Tern Productivity 2000-2004

Year	COTE	ARTE	ROST
2004	0.67	0.58	0.76
2003	0.97	0.64	0.92
2002	0.9	1.2	1.1
2001	0.4	0.3	0.4
2000	1.08	0.76	1.28

Tern Provisioning Study:

Twelve COTE nests, 6 ARTE nests and 6 ROST nests were monitored for the chick provisioning study. The prey delivery percentages for each species are summarized in Table 3. Common Tern feeding rate was the highest, 2.98 items per hour. The ARTE feeding rate was 1.26 items per hour and ROST was 1.19.

Table 3: Prey Item Percentages observed in Tern Feeding Study

Species	Hake	Herring	Invertebrate	Butterfish	Unknown		Stickleback
					Fish	Sandlance	
COTE	44.61	10.49	2.36	8.86	23.34	1.92	2.22
ARTE	43.54	5.34	18.54	5.06	19.38	3.37	0.28
ROST	36.05	20.93	0	2.71	34.88	1.94	0.39

Laughing Gulls:

We began the process of creating a buffer zone between the tern colony and the LAGU colony this season. A 9m ring around the tern habitat was staked. We removed all LAGU nests within this area.. We broke the eggs and dispersed the nest cups of 809 nests. Three removal treatments were tested: early and late removal, late removal and constant removal (a nest sweep every 5 days through hatch). Next season we will continue the process of establishing the buffer zone using one of the tested treatments or a combination. Hopefully separating the terns and the LAGU will eliminate any predation and site selection pressure on the terns.

Herring and Great Black-backed Gulls:

All GBBG and HERG nests were removed from EER as in the past. A total of 4 GBBG and 6 HERG nests were found. There was intense egg predation early in the season followed by significant chick and fledging predation all the way through the breeding season. We shot 7 GBBG and 7 HERG specialists. Using the color marking technique developed by C. Donehower we were able to identify predatory individuals, track them and shoot them more efficiently. Many hours were spent stalking these very alert gulls. Being confident that the problem birds were definitely being killed made our efforts more worthwhile and effective.

Puffins:

The puffin population increased from 58 to 71 active burrows this season. Twelve of the thirteen adopt-a-puffins returned to the island this season to breed, some of them 27 years old and still able to produce chicks. The colony is expanding towards the north end of the island and possibly even to the northeast side. Soon the puffins will have encompassed the whole island. We were able to grub and band only one chick and trapped 44 adults. Ten of these adults had very worn bands and therefore were re-banded. This season we made a great deal of progress in our ability to trap adults using our box traps. Last season we trapped for 277 hours and trapped 15 birds. This season we trapped for 306 hours and banded more than double that of the 2003 record. We moved the box traps often this season, sometimes even in the middle of a stint. This technique kept the puffins curious about the traps and helped us in trapping specific individuals based on the loafing or traveling patterns.

Other Notes:

Common Murre and Razorbill sightings this season were very common. And although Manx were not heard on the island this season up to three individuals were seen quite often flying offshore.

Metinic Island- Chris Riley, Island Supervisor, USFWS

Census

We conducted the Gulf of Maine Seabird Working Group (GOMSWG) Census on June 18 and documented 731 tern nests with a Lincoln Index corrected total of 743 nests. This represents 403 pairs

of Arctic Terns, 340 pairs of Common Terns and 1 pair of Roseate Terns. The species ratio of the colony was 54.2% Arctic to 45.8% Common.

Figure 1. Total number of tern nests on Metinic Island 2000-2004.

Year	Common	Arctic	Roseate
2000	41	33	0
2001	32	79	0
2002	126	104	0
2003	317	229	3
2004	320	403	1

Productivity

The productivity for the 2004 season was lower than any year since the restoration project began. Both Common and Arctic Terns had low reproductive success this season with Common Terns producing .30 chicks/pair, Arctic Terns producing .15 chicks/pair, and Roseate tern at 1 chick/pair. There was an increase of approximately 200 nests on Metinic Island this season. Figure 1 summarizes the numbers of nesting pairs on Metinic Island from 2000-2004 and Figure 2 summarizes the 2004 productivity.

Productivity Measure	Common Tern	Arctic Tern
Mean Clutch Size	2.15± 0.37	1.68± 0.48
Mean Hatch Success	77.27%	78.13%
Mean Fledging Success- GOMSWG	32.35%	15.78%
Mean Fledging Success (chicks surviving to end of season)	11.76%	5.26%
Mean reproductive Success- GOMSWG	25%	9.38%
Mean Reproductive Success (chicks surviving to end of season)	9.09%	3.13%
# Chicks Fledged/Nest – GOMSWG	0.30± 0.27	0.15± 0.05
# Chicks Fledged/Nest (chicks surviving to end of season)	0.2± 0.41	0.05± 0.22

Provisioning

A total of 19 nests were observed regularly and followed for most of the season to collect provisioning data, 12 being Arctic Tern nests and 7 being Common Tern nests. The total amount of provisioning hours for the 2004 season was 120 in which a total 622 feedings were witnessed. On average Arctic Terns fed their chicks 1.79 times/hr, and Common Terns fed their chicks 2.35 times/hr. The primary prey items delivered to Common and Arctic chicks were Atlantic Herring and Butterfish. The diet of Arctic Terns consisted of 63.8% Herring, 12.30% Butterfish and 6.36% Hake. The Common Tern diet consisted of 68.47% Herring, 24.10% Butterfish and 2.17% Hake. “A” chicks (1st hatch) received 65.83%, “B” chicks (second hatch) 15.51%, and “C” chicks (third hatch) received 0.46% of all prey

deliveries. One speculation concerning decreased productivity may have been caused by the high percentage of butterfish delivered to chicks, which chicks have difficulty swallowing.

Predators

High levels of predation were recorded during 2004 season. Great Black-backed Gulls were seen predating 29 tern nests and 25 tern chicks throughout the season. Herring Gulls were seen predating 1 tern nest and 10 tern chicks throughout the season. An injured Herring Gull removed from the hillside colony was examined and found to be eating garter snakes. Weather is thought to be the major cause for the amount of predation on Metinic Island. There was twenty days of rain and fog this summer. The Merlin was seen taking 7 tern chicks and 3 adult terns this season. Ravens were seen predating Black Guillemot nests on two separate occasions. There was a lamb seen eating a Common Tern nest in the hillside colony this season and it was the first record for Metinic Island. Sheep were a big disturbance for the North end colony this season because they were constantly getting into the fenced area. Sheep were seen stepping on 9 tern nests throughout the 2004 season. The above were predations seen by observers, there were most likely unobserved predations.

Unique Species

A total of 104 different species were seen on Metinic Island this season. To name just a few seen: Green Heron, Harlequin duck (fem), Atlantic Puffin, Razorbill, breeding Roseate Tern, Manx Shearwater, Peregrine Falcon, Great Cormorant, Black-legged Kittiwake, Bald Eagles, breeding Merlins, breeding Ospreys, breeding Ravens and many more.

Matinicus Rock - Paula Shannon, Island Supervisor and Frank Mayer, Resident Intern, National Audubon Society SRP

Census. We conducted the tern and Laughing Gull nest census on 18 and 20 June. The total (unadjusted) tern nest count was 906. To determine species ratio, a direct count of Common Tern nests was conducted, yielding 116 COTE nests. COTE nests were subtracted from the nests counted, and the Lincoln Index was applied to ARTE nests only, yielding an adjusted total of 830 ARTE nests. Thus the species ratio was 116 COTE/830ARTE. The total adjusted nest count was 946, which is a decrease of 264 nests from last year's estimate of 1,210.

We counted 524 Laughing Gull nests during the census, which is a decrease of 73 nests from last year's count of 597 nests. The decrease in both tern and Laughing Gull nests is partly due to the fact that nesting began about two weeks later than usual, and eggs were still being laid during the census period. Hence each count is lower than the actual number of birds nesting on the island this season. Population estimates for Arctic Terns, Common Terns, and Laughing Gulls from the past five years are shown in Table 1.

Table 1. Estimated number of breeding pairs of Arctic Terns, Common Terns, and Laughing Gulls at Matinicus Rock from 1999 to 2004.

Year	Arctic Terns	Common Terns	Laughing Gulls
1999	968	102	367
2000	1030	176	355
2001	1014	147	417
2002	999	198	624
2003	1022	188	597
2004	830	116	524

Tern Productivity. We followed 56 Arctic Tern nests and calculated productivity at 0.38 chicks/nest, and we followed 29 Common Tern nests and calculated productivity at 0.31 chicks per nest (Table 2). Several factors influenced the low productivity this year. A Peregrine Falcon was present from mid-May to early June, preventing terns from nesting until 6 June, about two weeks later than usual. A poor food year and predatory Herring Gulls also combined to reduce productivity this year.

Table 2. Productivity (chicks/nest) of Arctic and Common Terns at MR from 2002 to 2004.

Year	Arctic Terns	Common Terns
2002	1.31	1.22
2003	0.85	0.88
2004	0.38	0.31

Predator Observations and Control. In mid-July at least two Herring Gulls were observed repeatedly flying through the tern colony, preying on tern chicks. We also observed Laughing Gulls taking tern chicks on several occasions. Large gull control efforts this year included the destruction of 21 Herring Gull nests and two adult Herring Gulls. We also destroyed 180 Laughing Gull nests this year in an effort to decrease Laughing Gull productivity.

Tern Feeding Studies. We observed feedings at 18 Arctic Tern nests this year, with 981 feedings in 576 hours of nest observation, and at 12 Common Tern nests, with 307 feedings in 201 hours of nest observation. There was a marked increase in the number of Euphasids fed to chicks this year, and a decrease in the number and variety of fish.

Table 2. Prey items fed to Arctic Tern chicks (a), and Common Tern chicks (b) at Matinicus Rock, 2004.

a. Arctic Terns

Prey item	Total Items	Percent of Diet
Hake	379	38.6
Euphasid	268	27.3
Unknown Fish	131	13.4
Amphipod	41	4.2
Butterfish	29	3.0
Other fish	41	4.2
Other inverts	21	2.1
Unknown	71	7.2

b. Common Terns

Prey Item	Total Items	Percent of Diet
Hake	111	36.2
Euphasid	94	30.6
Unknown Fish	42	13.7
Butterfish	9	2.9
Stickleback	10	3.3
Other fish	6	2.0
Other Inverts	2	0.7
Unknown	33	10.7

Atlantic Puffins. We compared two methods of determining productivity this year: the 21-day feeding method and the burrow check method. These data are yet to be analyzed. We also banded 93 puffin chicks for the continuing juvenile survival study.

Razorbills. We counted 237 active razorbill nests this year, which is an increase of 26 nests over last year's 211 nests. We also estimated Razorbill hatching success by following 60 nests. Fifty of the 60 eggs hatched, yielding a hatch rate of 83%.

Common Murres. We continued the Common Murre Attraction Project this year by setting up murre decoys and continuously broadcasting murre colony sounds. Murres visited the decoys throughout the season, although most murres were usually observed in an area adjacent to the decoys. A high count of 50 murres were observed on the island this year.

Leach's Storm-petrels. We estimated hatching success for Leach's Storm-petrels by following 37 burrows this year. Twenty-eight of the 37 eggs hatched, yielding a hatch rate of 76%.

Manx Shearwaters. One Manx Shearwater was heard calling at night throughout the season, and was occasionally seen flying over the island during the day. Up to seven manx shearwaters were observed near the island in May, and two were heard calling on the island occasionally throughout the summer.

Other Notes. A pair of Common Ravens built a nest on the island this year. The pair was present in May and early June.

Seal Island National Wildlife Refuge – Carlos Zavalaga, Island Supervisor and Anala Miller Resident Intern, National Audubon Society SRP

Tern census

The ARTE (Arctic Tern, *Sterna paradisaea*) and COTE (Common Tern, *Sterna hirundo*) census was conducted on 17 June by seven persons and completed in 2.75 hours. The unadjusted count was 2,161 nests. For the estimation of the Lincoln Index a sample of 204 nests were identified. The correction factor [(marked + unmarked)/ marked] was 1.0408. After adding 90 nests from the productivity plots and 30 nests from the feeding plots, the adjusted total became 2,339 tern nests. The species ratio was undertaken by observations and counts of 870 incubating terns from five permanent blind locations and four enclosures. The proportion of ARTE and COTE nests was 0.5011 and 0.4989, respectively. The total number of ARTE nests was higher in 2004 than in 2003, whereas the numbers of COTE decreased (Table 1).

Table 1. Total number of tern nests on SINWR 2000 to 2004.

Year	ARTE	COTE
2000	890	1205
2001	860	1197
2002	1057	1582
2003	1066	1283
2004	1172	1167

Tern Productivity

Productivity was assessed in 57 ARTE and 68 COTE nests distributed in four enclosures and five feeding plots (3 for ARTE and 2 for COTE). All productivity indicators for ARTE and COTE in 2004 were lower than in previous years (Table 2 and 3), but the differences were larger in COTE than in ARTE. Main causes of mortality in a sample of 60 dead chicks in the enclosures were: starvation (66%), injured by other adults (10%), predation (7%) and unknown (17%).

Table 2. Productivity indexes for ARTE on SINWR between 2000 and 2004.

Productivity Index	2000	2001	2002	2003	2004
Mean clutch size	1.87	1.86	1.84	1.69	1.59
Mean hatching success	1.67	1.64	1.57	1.38	1.44
Mean fledging success*	0.95	0.95	1.11	1.00	0.82

Table 3. Productivity indexes for COTE on SINWR between 2000 and 2004

Productivity Index	2000	2001	2002	2003	2004
Mean clutch size	2.2	2.06	2.11	1.97	1.70
Mean hatching success	1.94	1.94	1.78	1.69	1.39
Mean fledging success*	0.77	1.00	1.09	1.01	0.72

* A chick was considered successful if it fledged.

ARTE and COTE feeding studies

Between 27 June and 27 July 2004, a total of 18 ARTE and 11 COTE nests were observed in 5 feeding plots (3 for ARTE and 2 for COTE) for a total of 1,044 hours x nests. The feeding rate was 2.88 and 3.67 prey delivered per hour for ARTE and COTE, respectively. The provisioning rate for ARTE and COTE in 2004 was higher than that recorded in 2003 (ARTE = 1.54; COTE = 1.52) and was associated to the frequent occurrence of euphausiid swarms close to the island. The diet composition (expressed as percentage by number) is shown in Table 4.

Table 4. Principal prey items in the diet of ARTE and COTE in Seal Island, 2004

	ARTE			COTE		
	Freq.	% diet	Mean size (mm)	Freq.	% diet	Mean size (mm)
Euphausids	1022	57.90	27.5	1110	69.94	33.1
Hake (white hake and small 4-beard rockling)	400	22.66	41.9	142	8.95	48.2
Other prey	343	19.44		335	21.11	

Atlantic Puffins

A total of 290 active burrows were identified in 2004, which represents an increase of 31% over last year. Productivity was estimated for a sample of 144 burrows located in areas where the observation effort was the highest. Eighty percent of the nests were considered successful (chick fed at least for 21 consecutive days). This index of reproductive success was slightly higher than in 2002 (77%).

Predator Control/ Gull Census/Predators

A total of 73 Great Black-Backed, 139 Herring gull and 5 Laughing Gull nests were counted and destroyed on 25-26 May and 14-16 June 2004. Tern chick predation by gulls was uncommon and only two sightings of Peregrine Falcon were reported. This was the first breeding attempt by Laughing Gulls on the island in known time. The nests were removed to prevent the establishment of a core population that would attract additional nests in subsequent years.

Other Breeders

Two breeding pairs of Razorbills and two pairs of Roseate terns bred successfully. Great and Double-crested Cormorants nested (19 and 32 nests, respectively) on the south-east edge of SINWR, while a minimum of 122 Common Eider and several hundred breeding Black Guillemots were also observed.

Visitors/ Rare Birds/ Student Research

A banded black tern (BBL 9722-25068 + yellow plastic band on the right leg). A black tern was sighted on 25 July.

East Penobscot Bay - Brad Allen, Maine Department of Inland Fisheries and Wildlife

Only one island in East Penobscot Bay had nesting Common Terns in 2004: Buck Island in Brooksville. 109 nests were counted on June 16th. Approximately 40 adult terns were present on July 21st and they appeared to still be sitting on nests (renests). No other islands in East Penobscot Bay had nesting terns this year.

Penobscot and Jericho Bay - John Drury - Working with a grant from the Maine Department of Inland Fisheries and Wildlife.

Terns:

Wooden ball, June 17, 8 adult Arctic Terns east of the landing.

10 adult terns near the old nesting area mid NW shore.

NW shore, 3 nests with one egg, 2 nests with two eggs,

There was one nest found with one egg above the SW end of the beach.

east of the landing, 100 meters, 2 nests with one egg and 4 nests with 2 eggs,

total 12 nests found.

July 18, 2 Arctic Terns on shore below nest area, none from the nest area, 8 Arctic Tern loafing intertidal, 8 more out of the nest area NE of the landing,

There were, 9 nests in '03, 7 nests found on Wooden ball in '02, some success.

2 nests found in '00.

Little green, June 16, 5 adult Arctic Terns N end of the eastern beach

1 Arctic Tern nest west of the landing beach. Total 221 DC nests 0 GC.

July 27, 4 adult terns, 0 fledglings, seen, common and arctic, no fledglings here. Many cormorant chicks west side, 0 GC seen, 0 terns west of the landing.

There were 4 Arctic Tern nests found in '03, There were 22 Arctic nests found in '02.

Southern end of Metinic **June 16**, @ 35 adult Arctic Terns, a couple of Common Terns on the Hog island facing beach, 4 nests with one egg, 18 with two eggs, 2 with three eggs, one chick. Total 25 nests. @23 Arctic, @2 pairs of common. one adult up off Hog island,
July 27, 0 terns N end, 2 puffin ½ mile NE of the island.
South end Hog island facing beach 0 terns., 0 terns Hog island.

there were 21 mostly arctic nests found in '03, There were 15 tern nests found on the southern end of Metinic in '02 and 11 on hog island

Little two bush, **June 16**, a few adult Common Terns in the area, no terns come up from the island during all gull flush.
July 27, Little two bush, , 0 terns.

Eastern cowpen, **June 4** , terns present,
June 18, no flush after I land @50 adult Common Terns come up.
5 nests w/ 1 egg, 20 nests w/ 2 eggs, 11 nests with 3 eggs.
Total, 36 nests found.
July 17, 20 ad Common Tern dread off all?, Jumpy.
July 25, 75 adult Common Terns, 4 fledglings, 2 large chicks seen.
herring and butter fish seen incoming, this colony is doing well.

Brimstone (burnt coat harbor), **June 4**, terns present,
June 18, @70 Common Terns up out of the nesting area, very tight reluctant to flush. Estimate from the boat @60 nests.
July 25, 75 adult terns, 1 fledgling, one large chick seen form the boat, it looks well here.
There were 45 Common Tern nests in '03. There were no terns nesting on Brimstone in '02 but 60 Common Terns were seen roosting there on July 13 '02

Southern Poplestone Ledge. **June 4**, no terns seen,
June 18, 7 adult Common Terns, Visual estimate from the boat, 5 nests, ashore 2 nests with 2 eggs and two nest with 3 eggs. Total 4 tern nests found.
July 17, 2 adult terns below high water 0 from nest area,
July 25, 0 terns.

Great spoon **June 4**, @25 terns over the western end of the SE beach, @12 came up from the nesting area., 0 terns on the spit.
one pair of Arctic Tern on the SE beach, 6 adult Common Terns guess @4 nests, many scrapes at the western end of the beach, hillside, 2 nests with one egg, 4 nests with 2 eggs, one nest with 3 eggs.
Total 7 Common Tern nests found, one arctic nest suspected not found.
July 25, 0 terns on the SE beach,

There were 65 Common Tern nests found on the SE beach in '03,
There were no Terns nesting on Great Spoon in '02. There have been no terns nesting on this south east beach for @15 years, and those were Arctic Terns.

Mason ledge, June 4 no terns seen.

June 18, 1 Common Tern acting nesty, estimate from the boat 1 nest.

July 25, 4 adult GC, 4 adult tern defensive, they have something to defend

Dry money ledge June 4, 80 Common Tern flush

June 18, @80 adult Common Terns flush, estimate @80 nests.

13 nests with one egg, 42 nests with 2 eggs, 21 nests with 3 eggs, 2 nests with 4 eggs.

Total 78 nests found.

July 25, 14:30, 200 adult Common Tern, 8 fledglings seen from the boat. Late nesting? There has been considerable increase in this flock

There were 24 Common Tern nests in 03, there were 59 nests found in '02.

Three bush, June 18, 3 adult Common Tern

one nest with one egg, 1 nest with 2 eggs. Total 2 nests found

July 25, Three bush, 1 large chick seen, and a feeding at another site, 22 adult Common Tern, This flock has been augmented over the course of the season.

Islands where there were no terns seen: Robert's, Little Roberts, Otter, Saddleback ledge (Pen Bay), Brimstone, Little Brimstone, Carvers, lanes' Nubble, Dead man's ledge, little Hurricane, Medic Rock, Green Ledge(Leadbetters), Green Island (Leadbetters), Tobacco Juice, Green ledge (Criehaven), Pudding, Ten pound, no Man's land, Two Bush (Matinicus), Western cowpen, White ledge, Saddleback ledge (Jericho Bay), Southern Mark, Green ledge (Fog Island), Little Spoon, Heron island, John's Island, Gooseberry island, High Sheriff,

Great Cormorants:

Seal Island NWR: May 30, 29 GC. Nests. 26 DC cormorant nests.

June 13, 29 GC nests and 26 DC corm nests, 10 GC nests in SW cove

July 12, 19 large GC chicks, South west cove Seal island,
@2 chicks per nest.

Aug 26, 25 GC fledglings SW tip.

White horse, June 4, 27 great cormorant nests from the NW, 4 on the ridge, 2 adult displaying without nests, 9 double-crested nests, 60 adult and 1 imm. GC, East side: 10 more GC nests 10 adult, total : 70 adult and 37 nests,

July 25, total, 56 adult, 82 chicks at 33 nest sites.

Aug 25, 20 fledglings and 5 adult GC. 4 DC.

Great Spoon, June 4 33 individual Great Cormorant 16 GC nests, plus 5 displaying, on the highest part of the spit, 10 GC nests on the northern end of the spit and 20 adult, 1 GC nests seen from the west of the spit. Total, 27 nests 51 adult GC.

July 25, High part of the spit, 6 nests GC, 2 empty, 8 adult GC, 2 small chicks visible. N end of the spit, 16 GC chicks, 7 nests, 8 adult.

No terns on the spit, **10 eagles**, 2 adult.

Aug 25, 4 GC great spoon spit. 1 adult 3 imm.

Little spoon. June 4,

0 GC nests South eastern shore,
NW corner, @65 Double-crest nests. 0 GC nests.

Green ledge, (fog island), **June 4** 0 GC nests.

Southern Mark Is. June 4 70 DC nests 2 adult GC western end.

18 GC nests east side, 24 adult GC. No count of Double crests on the east side.

July 25, Southern Mark, 37 chicks, 12-13 nests.

Aug 26, 3 adult 1 imm. GC., 15 DC.

Spirit Ledge, June 4, 4 adult GC., 0 nests 1 imm. GC.

Mason ledge, June 4, 10 DC nests 25 adult DC, 0 GC.

Brimstone, June 4, (Burnt Coat Harbor) 57 adult GC, 26 GC nests, 3 adult displaying with out nests not counted.

July 25, 69 GC chicks, 22 nests, 15 adult,

John's island. June 4, 12 DC corm nests, NE corner.

0 Cormorant nest 0 GC

Western green island, June 4, 0 cormorant nest, GC imm. last years.

Eastern green, June 4, @75 DC nests 3 imm GC. 0 GC nests.

Little Duck, June 4, 2 adult one imm. 0 GC nests. 0 DC nests on the shore.

Little Roberts, May 27, 13 GC nests.

June 13, 12 GC nests.

July 26, 30 GC chicks,

Aug 26, 15 fledglings

Shabby island, June 6, 0 GC nests, 55 DC nests

Saddleback, (Jericho bay), **June 4**, 1 imm GC. 10 DC. 0 nests.

June 18, 1 GC nest.

July 25, 5 adult GC, 0 nests

June 4,

White Horse, 37 Great cormorant nests.

Great Spoon, 27 GC nests.

Little Spoon, 0 GC nests.

Green ledge (Fog Island) 0 GC nests.

Southern Mark, 18 GC nests.
Spirit Ledge, 0 GC nests
Saddleback, 0 GC nests June 4, 1 GC nest June 18.
Mason ledge, 0 GC nests
Brimstone (burnt coat) 26 GC nests
John's island, 0 Gc nests.
Western Green, 0 GC nests
Little Duck, 0 GC nests
MAY 27 Little Roberts, 13 GC nests.
May 30 Seal island, 29 GC nests.
June 6 Shabby island, 0 GC nests

total 150 GC nests. 141 in '03, 192 in '02.

The drastic drop in attendance at great Cormorant colonies between late July and late August is due to eagles. At some point after the Eagles have been feeding on Fledgling gulls in late July and early August the fledgling Cormorants become the easiest things to catch.

The high percentage of this population that chooses to relocate their nest sites between years indicates a high level of unease.

The interaction between these Great Cormorants and Eagles May cause the Extirpation of the only Great Cormorant population breeding in the United States. The situation deserves considerable observational effort.

Razorbills:

Freeman Rock, June 4, 17:30. 12 Razorbill seen on arrival. @20 Razorbill, come up out of the crack on the west side after the gulls raise the alarm.

June 5, 06:00, 50 DC nests from the east, 25 DC nests from the NW,
@20 Razorbill, roosting, 35 Razorbill flush out of the deep crack on the western side,
55 total Razorbill.

June 5, 15:25,
10-15 Razorbill come out of crack on the southern shore.
@50 total Razorbill, est. 35-50 pair.

Pulpit Rock, June 5, 06:55, 20 Razorbill emerge from cracks on the NW corner,
Total 35 Razorbill, guess 20-40 pair. One Puffin flies by. 4 imm GC.

Western Libby Is., 07:35, 1 Murre, west side, 19 guillemot, east side 7 guillemot, total, 26
Guillemot,

Eastern Libby island, 3 imm. Eagle 14 geese,
west side, 69 guillemot, 55 guillemot east side, total, 124

Old Man, June 5, 08:40 40 Razorbill ashore, viewed from the SW cove, 4 in the water, 65
DC corm nests from the north, +30 from SE.
5 Razorbill from a crack on the north side, 30 total north side.
35 Razorbill east shore,

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@115 total Razorbill, estimate, 80-100 pairs, 40 roosting below high water, 2 geese

Yellow Murre ledge, 11:30 count of 105 Murre on the water with 50 Razorbill after they flushed. 300-400 Alcids total, @2.5-1 Murre.

Estimate 100-150 pair of Murre, 50-80 pair of Razorbill.

The rate of growth in this Murre Population suggests immigration, where are these Murre coming from? And why, is something changing there or is this the result of productive saturated colonies.

July 25 adult and chick 3 miles S of Brimstone island Penobscot Bay,

Seal Island, September 2, Puffin feeding Murre cove

Manx Shearwater - Matinicus Rock, a late may high count of 7 Manx shearwaters, down from 9 in '03: 4 or five seen several days.

May 21, 3 manx

May 23, 7 manx

May 27, 6 manx,

Two individuals heard calling at night.

Petit Manan Island – Stephen Agius, Island Supervisor

The GOMSWG census was conducted on June 14th -15th. During the census we counted tern, Laughing Gull, and common eider nests across the entire island. The unadjusted count for terns was 2,105 nests. We applied a Lincoln Correction factor of 7%, with and adjusted total of 2,252 nests. Our species ratio was determined by observing incubating terns on 800 nests, across the entire island. We determined that the colony consisted of 41% ARTE (911 nests) and 59% COTE (1,312 nests). The island also supported 29 pairs of ROST this season.

Year	Common	Arctic	Roseate	Puffin	Laughing Gull
2000	962	474	16	17	794
2001	859	622	16	17	961
2002	990	671	27	20	838
2003	1213	799	31	28	1123
2004	1312	911	29	35	1042

Tern Productivity:

As compared to the prior five years, COTE and ARTE experienced significantly reduced reproductive rates during the 2004 season. Although a combination of weather and food availability both contributed to this decline a particularly cold rain storm (temps in upper 30's) between June 23-26th resulted in the death of over 50% of the tern chicks.

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Common , Arctic, and Roseate Tern Productivity

Productivity Measure	2000	2001	2002	2003	2004
Mean Hatching Success	86.2 (COTE)	85.2	73.0	100	87.0
	61.7 (ARTE)	60.3	86.0	95.2	79.0
	73.1 (ROST)	92.6	67.0	73.0	82.0
#chicks fledged / nest (GOMSWG)	1.17(COTE)	1.07	1.57	1.84	0.62
	0.62 (ARTE)	0.70	1.41	1.21	0.77
	1.00 (ROST)	1.10	0.68	0.55	0.62

*GOMSWG fledge=chicks surviving to 15 days

Diet Composition

The primary prey items delivered to both Arctic and Common Tern chicks were Atlantic Herring (*Clupea harengus*) and Sand Lance (*Ammodytes americanus*). A chicks (first hatch) received 93% of the food deliveries, B chicks (second hatch) 2.5%. We followed 25 nests for a total of 972 hours, including 945 prey deliveries. In late June and July we observed that butterfish were “fed” to tern chicks in large numbers. The average number of food items delivered per hour for Arctic Terns was 0.91(N=6) and 1.15 for Common Terns (N=19).

Diet Item	% of COTE diet	% of ARTE diet
Herring	56.2	40.0
Hake	0.02	0.0
Butterfish	9.9	5.3
Sand lance	20.2	7.3
Invertebrates	0.03	6.6

ARTE Metapopulation Study

We continued to participate in the ARTE metapopulation study in 2004. We read 180 tern bands this season, including 139 ARTE, 29 COTE, and 12 ROST bands. We utilized the modified bownet to trap nesting ARTE on PMI. We trapped 123 ARTE and 2 COTE during our nine days of trapping. We also placed BBL and field readable bands on 109 ARTE chicks.

Alcids:

Alcid use of Petit Manan Island continues to increase and this season we documented 35 pairs of puffins and over 150 pairs of black guillemot. Two of the six artificial nest burrows (15 gallon Rubbermaid totes) placed on the island in early May were used by nesting puffins, unfortunately neither nest was successful. The alcid high counts from the season were: 192 puffins (7/27), 84 razorbills (6/14), 31 common murre (6/20), and 551 black guillemot (6/05). We were able to document the first successful nesting of razorbill on PMI. The pair utilized the same burrow as in 2003, and one of the adults was a banded bird (#17-058). We banded 27 puffins (23 chicks and 4 adults) and read 51 different puffin bands this summer.

Predator Control

In an effort to minimize LAGU nesting distribution and predation on terns, we removed all LAGU nests from the north and east sides of the island during the GOMSWG census. Our permit allowed for the removal of 600 LAGU nests this season. Despite our efforts to minimize interactions between the

LAGU and nesting terns, we documented at least 81 predated tern nests and chicks. In addition, we observed at least 100 kleptoparasitism events per week in July! Three herring gulls and two great black backed gulls were also removed from the island.

Bald eagles visited PMI and Green Island 49 times during the nesting season, but focused their predation efforts on common eiders and Laughing Gulls. Peregrine falcons visited PMI 79 times, and we occasionally observed more than one falcon in the colony at a time. A merlin also was observed taking a small number of terns.

Machias Seal Island – Amie Black ACWERN - UNB

Tern Census

The CWS biannual tern census was conducted from the 17-18th of June. The uncorrected total nest count was 2494, with a total corrected number calculated at 2770 nests (this includes 276 nests which are an average count of a section of the colony not censused in 2004). The Lincoln Index was 1.1, based on a count of 286 marked nests and 27 unmarked nests. 734 Arctic Tern nests and 340 Common Tern nests were identified in 77 grid squares, giving a species ratio of 32% Common Terns and 68% Arctic Terns. This gives a total of 970 Common Tern nests and 2062 Arctic Tern nests (table 1). The average clutch size was 1.59, the lowest since 1996 (1.45). The 2004 count of Common Eider nests was the highest ever (139 nests), compared to 132 nests in 1998. The average clutch size was 4.3.

Arctic Tern

Peak lay was on the 6th of June, and peak hatch was on July 1st. Productivity was .38, compared to .70 in 2003. See table 3. The dominant food item for Arctic Terns was euphausiid shrimp followed by fish larvae. See table 2. Thirty-five Arctic Tern nests were followed for a total of 345.6 nest hours of observation with a feeding rate of 2.58 feedings per hour. Poor diet and foul weather may have contributed to low productivity for both species of terns.

Common Tern

Peak lay was on the 11th of June, and peak hatch was on July 3rd. Productivity was 0.18 compared to 0.76 in 2003. See table. 3. Common Terns mainly brought in euphausiid shrimp, as well as a high proportion of Butterfish. See table 2. Twenty-eight Common Tern nests were observed for a total of 171 nest hours, with a feeding rate of 1.08 feedings per hour.

Atlantic Puffin

Peak laying for Atlantic Puffins was on the 22nd of May, 10 days later than last year. Peak hatch was the 1st of July. The first Puffin fledging was collected on the 5th of August, 11 days later than last year. See table 3 for productivity details. Diet was predominantly unidentified fish (30%), followed by a large proportion of larva (24.8%).

Razorbills

Peak laying for Razorbills was on the 23rd of May and peak hatch was on the 27th of June. See table 3 for productivity details. Herring (60.5%) was the most abundant prey item, followed by fish larva (23%).

Predator Activity

There were a high number of Great Black-backed Gulls and Herring Gulls loafing on the island this season. It was difficult to detect an increase in predation due to the large amount of fog. No gull nests were destroyed or gulls shot this season. Two Peregrine Falcons were seen hunting regularly in the early part of the season, and occasionally mid-season. Their presence increased again during August.

Other Island Notes

Up to 600 adult Common Murres were observed loafing on the rocks among Razorbill burrows and around the periphery of the island. The first Murre egg was found on the 23rd of May and the first chicks hatched on the 28th of June. A total of 148 eggs were easily counted but we kept our presence around breeding areas to a minimum so we are unsure of how many eggs were laid. Seventeen out of approximately 25 of the easily accessed COMU chicks were banded- the rest were taken by gulls. Two Black Tern nests were found on the island with 2 and 3 eggs, but both nests were unsuccessful. We continued to try to attract Roseate Terns to the island in two different areas using sound systems, decoys, and stand-up mirrors. At least one Roseate Tern was seen often in June, and was incubating a nest. We have no evidence of the success of the nest as it was not near any blinds and was difficult to approach. A white puffin was seen twice in late June.

Table 1. Tern census counts and species ratio for Machias Seal Island 1998, 2000, 2002, 2003 and 2004 (data from Newell and Mackinnon 1998, Boyne et al. 2000, Mackinnon et al. 2002).

Year	Corrected Total	Species Ratio % COTE	% ARTE
1998	3354	30 % (1006)	70 % (2348)
2000	2662	31 % (825)	69 % (1837)
2002	3551	38 % (1349)	62 % (2202)
2003	3323	40 % (1329)	60 % (1994)
2004	2770	38% (970)	68% (2062)

Table 2. Tern diet summary of percentage of identified prey for Machias Seal Island 2004.

Species	Euphausiid	Fish Larvae	Butterfish	Hake	Moths	Herring
ARTE	34.24	7.99	3.42	2.0	0.57	0.43
COTE	18.75	11.93	14.2	5.68	5.11	5.11

Table 3. A summary of the breeding success of Common and Arctic Terns, Puffins and Razorbills nesting on Machias Seal Island between 1995 and 2003. Mean (SD) clutch size, number of hatchlings and fledgling per nest are listed.

	Year	n	Clutch Size	Hatching Success	Chicks/nest Alive at Day 15	Chicks/nest Alive at Day 20	Fledglings/ nest*
Common Tern	2000	34	1.74 (0.618)	1.24 (0.923)	0.74 (0.618)	0.53 (0.507)	0.53 (0.507)
	2001	74	1.77 (0.562)	0.92 (0.933)	0.65 (0.730)	0.50 (0.603)	0.50 (0.603)
	2002	72	1.85 (0.522)	1.11 (0.881)	0.64 (0.612)	0.54 (0.625)	0.54 (0.625)
	2003	62	1.71 (0.457)	0.93 (0.778)	0.74 (0.737)	0.56 (0.687)	0.53 (0.671)
	2004	68	1.66 (0.64)	0.69 (0.758)	0.18(0.391)	0.07 (0.250)	0.05(0.218)

Arctic Tern	2000	87	1.57 (0.520)	0.86 (0.864)	0.41 (0.518)	0.38 (0.488)	0.38 (0.488)
	2001	125	1.53 (0.501)	0.91 (0.803)	0.74 (0.706)	0.63 (0.690)	0.58 (0.637)
	2002	285	1.54 (0.506)	0.91 (0.803)	0.57 (0.599)	0.50 (0.602)	0.50 (0.602)
	2003	100	1.51 (0.535)	0.94 (0.823)	0.70 (0.688)	0.56 (0.653)	0.50 (0.594)
	2004	170	1.42 (0.494)	0.84 (0.76)	0.38 (0.487)	0.30 (0.461)	0.05 (0.226)
Atlantic Puffin	2000	73	1	0.78 (0.417)	-	-	0.48 (0.503)
	2001	78	1	0.81 (0.397)	-	-	0.71 (0.458)
	2002	76	1	0.91 (0.291)	-	-	0.59 (0.495)
	2003	70	1	0.97 (0.168)	-	-	0.77 (0.423)
	2004	56	1	0.96 (0.187)	-	-	0.78 (0.420)
Razorbill	2000	71	1	0.74 (0.444)	-	-	0.62 (0.490)
	2001	62	1	0.82 (0.385)	-	-	0.65 (0.482)
	2002	57	1	0.89 (0.317)	-	-	0.63 (0.490)
	2003	55	1	0.75 (0.440)	-	-	0.60 (0.494)
	2004	58	1	0.87 (0.336)	-	-	0.68(0.471)

* Fledglings/nest - Tern chicks found dead after day 20 were subtracted from the number of chicks fledged. Not including late nesters at time of calculation for ATPU.

Sheep Island, NB - Brian Dalzell, Fundy Bird Observatory

This was the third year of Common Tern management on this 14-acre island at the mouth of the Bay of Fundy. Data for the 2004 season was provided by our summer intern, Carlotta Stoddart of Edmonton, Alberta. The colony was apparently formed in the mid 1980s, and probably never exceeded ~10 pairs, until intensive management efforts began in 2002, resulting in 18 pairs that year, ~40 pairs in 2003, and ~60 pairs this year. Egg-laying began June 6th, and peaked at 58 nests on June 28th, the same day the first chick was found. A total of 108 eggs were laid, for an average of 1.86 per nest. Hatch rate was determined to be approximately 72%. However, most of the adults abandoned the colony about July 22nd, before any young had flown. This due to an almost total lack of small herring, exacerbated by continuous fog in July, and gull harassment.

Lobster Bay, NS – Ted D’eon (see Ted’s website for more information on the 2004 season <http://pages.ca.inter.net/~deonted/tern04.html>)

The following is a synopsis of the tern status in southwest Nova Scotia for the 2004 nesting season. My "tern" work and observations deal primarily with the tern colony on The Brothers. These two tiny islands are located about 1 km offshore from Lower West Pubnico in Yarmouth County.

• The first terns arrived in Lobster Bay on May 1, 2004.

• One cripple Great Black-backed Gull and 3 Great Black-backed Gull nests were removed from South Brother. One Great Black-backed Gull nest was removed from North Brother. On June 12, 2004 there was one Great Black-backed Gull nest with two 7-day old chicks in the center of the tern colony

on Île-aux-fraises (a.k.a. Green Island). These gull chicks were unfortunately left there unharmed. Perhaps I should have requested permission from CWS to remove them.

• Census on Île-aux-fraises - June 12 - 459 Common and Arctic Tern nests (up from 362 in 2003), 90 to 95% Common Terns.

• Another decrease in tern nest numbers on The Brothers - 526 on N. Brother and none on S. Brother on June 12, 2004. (2003 numbers - 648 on N. Brother and 102 on S. Brother)

• The number of Roseate Tern nests, at 76 on The Brothers, was slightly down from the 86 of the 2003 season. Fledgling success during the last two seasons, though, has been pretty close to zero, due to predation by mink. Before the mink attacks I had counted as many as 58 Roseate Tern chicks (June 28). The mink attacked the colony between July 4 and July 11 (most likely closer to July 11). It was captured in a lethal trap on July 16. It is quite possible no Roseate Tern chicks fledged from The Brothers in 2004. The mink killed the majority of tern chicks of all three species. Only a few carcasses were actually eaten.

• 10 to 12 adult Roseate Terns are believed to have been killed by the mink. Most of these carcasses were collected and later picked up by CWS. At least one adult Roseate is believed to have been dismembered by an avian predator. About 10 adult Common and Arctic Terns also appeared to have been dismembered by some sort of avian predator. Owl? A few adult Common and Arctic Terns are also believed to have been killed by mink.

• Other tern colonies of the area: Green Rock (also shown as "Green Island" on the charts) had a small amount of Arctic Tern Nests (perhaps 10 pairs). Little Half Bald Tusket Island (a.k.a. Inner Bald and Mossy Bald) appeared to have had a small tern colony in 2003 and in 2004. I did not land on the island but only motored by.

• All in all, a devastating year for the terns of south-west Nova Scotia.

Part 2 – RESEARCH REVIEW PRESENTATIONS

TRACKING TERNS ON THEIR FEEDING GROUNDS THE TRIALS AND TRIBULATIONS

- Amie Black, University of New Brunswick and ACWERN (w01a5@unb.ca)

Machias Seal Island (MSI) is a federal migratory bird sanctuary located 18 km south of Grand Manan, New Brunswick. It is host to the largest colony of Arctic Terns in North America, as well as a large colony of Common Terns. Extensive data have been gathered over a number of years, including information on productivity, diet, and demographics. We now need to know where these seabirds find their prey. By identifying which marine areas constitute feeding habitat we can assess what management actions (e.g. Marine Protected Areas) might be appropriate. Flocks of terns can often be seen feeding within view of the island, but we do not know what proportion of the population feeds so close, whether they habitually feed at the same places, if both species share feeding sites, or the maximum distances they might travel to feed. By radio-tracking breeding birds I attempted to fill in some of these data gaps. As with any preliminary work, a multitude of hurdles were encountered, including equipment failure, poor working conditions, and almost total nest failure of the tern colony.

Despite this, some data were collected, and will be analyzed over the next few months to investigate any trends or differences between the two tern species.

HABITAT SELECTION IN THE BLACK GUILLEMOT ON GREAT DUCK ISLAND, HANCOCK CO., MAINE – Sarah Boucher, College of the Atlantic, Bar Harbor, ME
(icekarma16@yahoo.com)

Research was performed on Great Duck Island in Hancock Co., Maine, located approximately 15 km south of Bar Harbor. Great Duck Island is roughly 1.9 by 0.7 km with a variable berm. 291 confirmed nest sites of the Black Guillemot (*Cepphus grylle*) were located on property owned by The Nature Conservancy and College of the Atlantic. Nest sites ranged from inside cliff crevices to under rock jumble. Nests seem to occur most frequently in areas of berm with a mixture of large boulders and slabs. Three study sites and a total of 16 study nests were established in which daily temperatures were taken and egg/chicks were monitored/weighed. Black guillemots on Great Duck Island do not seem to choose nests based on temperature since there was no significant difference between temperature inside and outside nests, and no significant difference in variation. 60% loss of eggs or young occurred in the 16 study nests prior to fledging. American Crow (*Corvus brachyrhynchos*) predations on eggs and Bald Eagle (*Haliaeetus leucocephalus*), Great Black-backed Gull (*Larus marinus*), and Herring Gull (*Larus argentatus*) killing and aggression towards adults was recorded. 9 of 10 predated eggs were found on the eastern side of the island where the only cliff nests and the greatest number of ledge nests were located. Only one gull nest was located in this area. 7 of 12 dead adults were found in areas shared by nesting gulls and guillemots. June island-wide guillemot counts show that the number of guillemots on or around the island in June is less than the number recorded last season.

FORAGING HABITAT AND FEEDING BEHAVIOR OF TERNS NESTING ON COUNTRY ISLAND, NOVA SCOTIA - Jen Rock, Dalhousie University, Halifax, N.S. rockj@dal.ca, Andrew W. Boyne, Canadian Wildlife Service, 45 Alderney Drive, Dartmouth, N.S. andrew.boyne@ec.gc.ca, Marty L. Leonard Dalhousie University, Halifax, N.S. mleonard@is.dal.ca

Only 150 pairs of the Endangered Roseate Tern nest in Canada. The population, although small, has been stable for the last 20 years. Much is known about the breeding habitat requirements of the species but little is known about the role foraging habitat plays on the distribution, abundance, and recovery potential of Roseate Terns in Canada. At several colonies in the United States, Roseate Terns forage at only a few sites. More than one colony may share a single foraging site; for example, 20-25 % of the US population forages at one shallow water site. The foraging sites of Roseate Terns at Canadian colonies may also be localized and thus vulnerable, but their locations are unknown. A two-year radio telemetry project was initiated in 2003. In 2003, radio-transmitters were attached to five Roseate, five Common, and five Arctic Terns and in 2004 to five Roseate, 12 Common and 13 Arctic Terns. Foraging birds were tracked by airplane. In 2003, the mean foraging trip distances for Roseate, Common and Arctic Terns were 3.8 km, 2.7 km, and 4.6 km, respectively. All three species appeared to be feeding off two adjacent islands. Data from 2004 have not been analyzed completed but will be presented visually (maps). It is apparent that the foraging locations vary remarkably between years. In 2004, terns travelled in excess of 20 km from Country Island. In 2004, Roseate Terns feed almost exclusively off sandy beaches, Common Terns typically fed inshore while Arctic Terns feed offshore.

ENCOUNTER, SURVIVAL AND MOVEMENT PROBABILITIES FROM AN ATLANTIC PUFFIN (*Fratercula arctica*) METAPOPOPULATION - André R. Breton¹, Antony W. Diamond¹ and Stephen W. Kress² (¹Dept. Biol. and Atlantic Coop. Wildl. Ecol. Res. Network, Univ. New Brunswick, Fredericton, NB; ² 159 Sapsucker Woods Rd, Ithaca, NY 14850) d5nax@unb.ca

We performed a multi-site mark-resight analysis using 2,050 Atlantic puffins (*Fratercula arctica*) banded as chicks on four islands (colonies) over 24 years in the Gulf of Maine, USA and Canada. Within program MARK, encounter, apparent survival, pre-breeding movement (annual movements between colonies prior to breeding), and natal dispersal probabilities (single transition between natal colony and location five years after fledging) were modeled as functions of age, colony, various trends, and three covariates. Information-theoretic model selection criteria and estimated model effect sizes were used to (1) identify important effects and (2) select a model(s) to estimate parameters. Effects with strong support: resighting effort in encounter probabilities; age in survival; a declining age trend, origin and destination colony in pre-breeding movement (PBM); origin and destination colony in natal dispersal. Uncertain effects include colony effects in encounter, distance between colonies in natal dispersal, and ranked origin colony abundance in both dispersal and PBM. Encounter probabilities were extremely variable: ca. 20-95% annually; resighting effort was the strongest effect we detected. Survival probabilities from our top model increased to a peak at age five years (0.8871 ± 0.0618) then declined (0.6903 ± 0.0383). Low adult survival probabilities (age ≥ 5 years) may reflect inclusion of breeding and non-breeding adults in our sample. PBM and natal dispersal, and consequently philopatry, varied extensively between colonies and ages (PBM only): e.g., age 0-3 pre-breeding movement and dispersal estimates ranged from 10-50% and 8-25% across colonies respectively. Absence of a colony effect in survival in the presence of both colony and age variation in movement probabilities identifies the latter as a critical contributor to local population dynamics.

SEXING SEABIRDS, HOW USEFUL ARE DISCRIMINANT FUNCTIONS - Kate Devlin and Tony Diamond, Dept. Biol. and Atlantic Coop. Wildl. Ecol. Res. Network, Univ. New Brunswick, Fredericton, NB. i65v9@unb.ca

As field biologists we seek ways of identifying our study species as quickly as possible. Many of our questions deal with differences between the sexes, and with some species telling them apart is often a challenge. Many seabird species are difficult to sex because males and females are of similar color and size. However, differences between the sexes can be found through the use of genetics and morphometrics. We examined the sexual size dimorphism of Arctic Terns from a breeding colony in ne. North America. Each bird was sexed using DNA extracted from feathers. Body morphometrics recorded included mass, natural wing chord, head-bill, tail fork, culmen, depth of bill at the gonys, and tarsus. Two discriminant functions identified head-bill and bill depth as the best measurements to identify the sexes. Male Arctic Terns were generally larger in head-bill and bill depth than female Arctic Terns; however we did not find evidence for assortative mating. It is possible to calculate the probability of sexing individuals and this can help determine the usefulness of the discriminant functions. For some species where there is a high degree of size overlap between sexes, it may be necessary to use a combination of morphometrics and genetic analysis to obtain the highest accuracy of sexing individuals correctly. Comparison of the morphometrics of northeastern North American and British populations of Arctic Terns suggests that the discriminant functions we developed can be applied to both.

BREEDING ECOLOGY OF COMMON EIDERS ON STRATTON ISLAND, MAINE- *Christina Donehower, McGill University, Dept. Natural Resource Sciences, Macdonald Campus, 21,111 Lakeshore RD, Ste-Anne-de-Bellevue, QC H9X 3V9 Canada (cdoneh@po-box.mcgill.ca)*

We examined nest success and duckling survival of Common Eiders (*Somateria mollissima*) breeding on Stratton Island, Maine. We located 1,257 eider nests during systematic searches of the site. A sample of nests was monitored to estimate clutch size (4.5 eggs/nest, n = 227 nests) and hatching success (81%, n = 1031 eggs) and to determine nest fates (76% successful, 20% depredated, and 4% abandoned, n = 296 nests). Eiders nested in a wide variety of habitat types, but those in dense cover provided by raspberry (*Rubus idaeus*) and bittersweet (*Celastrus orbiculata*) were most successful and least likely to be depredated. Daily watches indicated that duckling survival was severely impacted by gull predation, and that few (if any) ducklings survived beyond ten days-old. Great Black-backed Gulls (*Larus marinus*) were the principal duckling predators and maintained near-constant attendance at crèches. Herring Gulls (*L. argentatus*) also took occasional young and eggs. Predation events included both single and group gull attacks. Group attacks were highly opportunistic, involved as many as 40 gulls, and generally resulted in complete crèche destruction. Future management actions to limit the number of loafing gulls at Stratton may improve duckling survival by reducing the potential for group gull attacks.

OVERVIEW AND UPDATE OF THE GULF OF MAINE SEABIRD CONTAMINANTS ASSESSMENT NETWORK - David Evers and Wing Goodale. BioDiversity Research Institute, 19 Flaggy Meadow Rd, Gorham, ME 04105

GOMSCAN is a standardized, long-term investigation to determine acute and chronic changes in contaminant profiles. Overall emphasis is on persistent bioaccumulative toxins (PBTs) with an initial, three-year focus on profiling the spatial and temporal distributions of mercury (Hg). This effort is strongly patterned after a successful program directed by the Canadian Wildlife Service (CWS) in the Maritimes and Labrador for the past 35 years and will be linked to other relevant programs. Mercury analysis is initially emphasized because (1) it is a leading regional, continental, and global environmental issue, (2) trends in some seabird species in eastern North America have significantly increased since the 1970s (even though atmospheric deposition trends in the U.S. are actually declining), and (3) analysis is relatively inexpensive and can be subsidized by BioDiversity Research Institute (BRI) and Texas A&M Trace Element Research Lab. The sampling effort will focus on five species, The Leach's Storm-Petrel, The Double-crested Cormorant, Common Eider, Common Tern, and Atlantic Puffin. This past season was a pilot year focusing on site selection and protocol refinement: we collected 30 Double-crested Cormorant blood samples and Brad Allen from Maine State Inland Fisheries and Wildlife and Scott Hall collected entire Common Eider clutches from six nesting colonies. Texas A&M will analyze these sample in November.

CONTAMINANT ASSESMENT OF COMMON TERNS IN THE GULF OF MAINE - Steve Mierzykowski and Linda Welch, USFWS; Scott Hall and Stephen Kress, NAS; Brad Allen, MDIFW; and David Evers, BRI.

Since 2001, developmental problems have affected 20% to 30% of the Common Tern eggs and chicks on three coastal Maine islands: Pond Island, Jenny Island and Stratton Island. The young terns are too weak to hatch, or are unable to completely emerge from their eggshell. Others birds that are able to

hatch quickly develop combinations of the following symptoms: swollen or encrusted eyes, bloody nares, patchy feather development, and necrotic skin at the base of the bill and legs. Chicks shake involuntarily or are extremely lethargic. Most affected tern chicks die within 5 to 7 days of hatching. In 2003, a proposal was submitted to USFWS to examine contaminant burdens in eggs and moribund chicks from the affected islands and two reference islands - Petit Manan Island and Eastern Egg Rock. Funding for the 2-year study was authorized in 2004. In 2004, moribund chicks from Pond Island NWR (n=4), Stratton Island (n=2) and Petit Manan Island (n=8) were submitted to Mike Opitz, DVM, UMaine Animal Disease Diagnostic Lab in Orono for examination. Diagnostic exams indicate the birds from Pond Island and Stratton Island died of systemic bacterial infection, specifically *Staphylococcus* and *Streptococcus*. Birds from Petit Manan Island, submitted for comparative purposes, did not exhibit any infection and appeared to have died from starvation. Several scenarios could explain the infectious outbreak at the affected islands - high levels of bacteria in the environment, environmental conditions that stimulate bacterial blooms, inadequate immune systems, underlying viral infections (none yet identified), or other stressors (e.g., nutritional, environmental, crowding, toxics). Egg and chicks samples collected from the five study islands in 2004 will be examined at USFWS laboratories for organochlorine pesticides and trace elements. Some samples will also be examined for dioxins, furans, and PCB congeners. Most analytical results should be available by the next field season.

SEX-SPECIFIC SURVIVAL- AND RETURN OF ADULT ROSEATE TERNS AT FALKNER ISLAND, CONNECTICUT 1993-2002 - Jeffrey A. Spindel, James D. Nichols, William L. Kendall, and James E. Hines, USGS Patuxent Wildlife Research Center, 12100 Beech Forest Road, Laurel, MD 20708, USA

Abstract: Capture-recapture/resighting data from 1993-2002 for breeding adult Roseate Terns (*Sterna dougallii*) sexed via a combination of genetic analysis and behavioral observations at Falkner Island, Stewart B. McKinney National Wildlife Refuge, Connecticut, were analyzed to examine sex-specific survival rates using new models developed to estimate such rates when the sex of an individual cannot be determined every time it is recaptured/resighted (Nichols et al., 2004, *Ecology*: in press). As suspected, based on the unequal sex ratio (approaching 3F:2M) in the breeding population, we found evidence of significantly higher survival-and-return rates for females than for males during periods of both relative population stability (1993-1996) and drastic population decline (since 1997). Model-selection statistics favored the parsimonious modeling of sex and time as additive effects on survival. Point estimates of survival were greater for females than males in each year of the study, but both sexes showed a sharp decline in survival-and-return estimates beginning the year Black-crowned Night-Heron predation and disturbance started. While it is possible adult males might be less "colony-site faithful" than females, it seems more likely that the sex-specific differences are due to differences in mortality, rather than immigration rates, of the two sexes.