

Gulf of Maine Seabird Working Group (GOMSWG)  
24<sup>th</sup> Annual Summer Meeting, August 12, 2008  
Hog Island, Bremen, Maine

Compiled by: Ellen Jedrey, Coastal Waterbird Program, Mass Audubon

The GOMSWG minutes report highlights from the 2008 nesting season such as productivity monitoring, feeding studies, and predator activity from various seabird colonies within the Gulf of Maine (GOM) through “Island/Site Synopsis.” A table including the 2008 GOMSWG census results and gull control efforts is attached to complement the island summaries. Abstracts and progress reports from research projects within the Gulf of Maine and surrounding areas are included in the “Research Presentations” section. All notations made within brackets [] indicate that the information was recorded during the meeting itself (verbal).

## ***Summer 2009***

The 2009 GOMSWG meeting will be held on August 12 on Hog Island. The compiler for next summer’s meeting minutes will be Maine Coastal Islands NWR. *Previous compilers are as follows: 2003- ME Division of Inland Fisheries and Wildlife; 2003-Maine Coastal Islands National Wildlife Refuge; 2004-National Audubon Society--SRP; 2005-BRlloon; 2006-Shoals Marine Laboratroy; 2007-Monomoy National Wildlife Refuge; 2008-Mass Audubon Coastal Waterbird Program.*

## ***Introduction***

Final 2007 numbers for the GOM are now available, and indicated that the GOM supported approximately 20,386 pairs of Common Terns (a decrease of 4% from 2006), 4,233 pairs of Arctic Terns, (an increase of 3% since 2006), and 391 pairs of Roseate Terns (an increase of 5% since 2006). Laughing Gull numbers 5,687 in 2007 compared to 5,033 pairs in 2006 (an increase of 13% since 2006) and 1,769 pairs of Least Terns nested in the GOM (an increase of 19% since 2006).

In 2008, terns nested at approximately 50 or more sites in the GOM from Nova Scotia to outer Cape Cod, Massachusetts. Preliminary 2008 numbers are as follows: 20,905 pairs Common Terns, 4,286 pairs of Arctic Terns, 326 pairs of Roseate Terns, 1,404 pairs of Least Terns and 6,293 pairs of Laughing Gulls. Both Common and Arctic Terns appeared to have increased slightly (2% and 1%, respectively), while Least Terns appeared to have declined by about 27%. Roseate Terns declined (16%) at all sites in the GOM except Eastern Egg Rock. Roseate Terns also declined significantly in Massachusetts (21%) and in New York (17%), resulting in a regionwide decline of about 19% across the entire population. The most common food items observed during feeding studies were herring, hake, sand lance, and euphausiids; euphausiids seemed to increase particularly in mid-late July across the GOM. Important predators included mink, Great Horned Owl, Merlin, Peregrine Falcon, Herring Gull and Great Black-backed Gull, and efforts to control these predators continued at managed islands.

Once again, Machias Seal Island did not support any nesting terns in 2008. Nearly 3,000 pairs of Arctic and Common Terns have abandoned the island since 2005. Concern continues for the loss of Machias Seal Island as a breeding site.

***PART 1 – ISLAND/SITE SYNOPSIS, 2008***  
***from North to South***

***North Brothers Island, Nova Scotia, CA***

Ted D'Eon volunteer steward

Early in the season the Brothers Island colony had eggs depredated by crows. An attempt was made to eradicate the crows but eventually they ceased depredating eggs naturally. The 22 adult terns were depredated by a Great Horned Owl. Eleven of those were Roseate Terns. The owl was subsequently trapped using a leg hold trap and taken to a wildlife refuge (see photo).



**Census**

North Brother Island was censused on June 8 and a total of 590 nests were counted. 35 of those were Roseate Nests. During a second Census it was determined that there were actually 55 Roseate nests.

## **Productivity**

Productivity is not known as of yet but will be determined by how many fledged chicks are present when CWS visits the island to band Roseate Terns.

The number of Roseate Tern pairs is lower than previous years (68 in 2007) and the colony size is within the normal range of the North Brother Island

## ***Machias Seal Island, New Brunswick, CA***

Notes from Tony Diamond's verbal report

Atlantic Cooperative Wildlife Ecology Research Network, University of New Brunswick

[Terns abandoned again this year, and therefore no census was conducted in 2008. Terns arrived 16<sup>th</sup> May, 1<sup>st</sup> egg on 28<sup>th</sup> of May, terns sometimes present/absent, very flighty; stopped hanging around mid-June. There were additional gull problems—numbers of gulls have increased steadily, and the gulls are acclimating to people]

[Atlantic Puffins—81% of burrows had eggs; hatching success = .67; feedings indicated an equal distribution of hake, herring, euphasiids]

[Razorbills--hatching success = .71. Herring was a major component of diet, followed by hake and sandlance]

[Wilson's Storm Petrels nested on the island, as well as murre]

[1<sup>st</sup> Black Guillemot breeding on island this year (1 egg).]

[There were some Common Ravens, as well as a Peregrine Falcon (2 ATPUs taken).]

[The Island continues have tourists visiting]

[Pyrotechnics used for gulls, however they didn't work, and there was no hunter this year to shoot gulls.]

## ***Eastern Brothers Island***

Supervisor Lauren Harter

Maine Coastal Islands NWR continued efforts to establish a new tern and alcid breeding colony on Eastern Brothers Island in Jonesport, Maine. The 17 acre island has cliffs ranging from 80-100' on the southern side of the island. We initiated gull control efforts (gull distress system, harassment, and pyrotechnics) in mid April. We also began an Adaptive Management Study on Eastern Brothers Island. As part of this effort, we placed 26 sheep on the island in May to try and improve habitat conditions for nesting terns. We also established several permanent vegetation monitoring plots so we can document what effect the sheep are having on the island vegetation.

### Alcid and Tern Decoys

On April 9<sup>th</sup>, the Refuge placed razorbill and puffin decoys on the cliffs. During the second week of May, we placed 50 tern decoys and set up the sound system on the eastern end of the island.

### Mink Trapping

For the second year, we continued to have mink predation on both storm-petrels and black guillemots. We placed traps on the island in mid May, but did not catch the animal until July 16<sup>th</sup>. At least 15 black guillemots and eight storm-petrels were killed by the mink this season. In addition, we believe the mink predated eggs from 17 guillemot borrows. Our trapping efforts were confounded by the sheep, who despite our best efforts, managed to get caught several times in our traps. As the season progressed, we designed several “sheep safe” mink traps.

### Common Terns

Terns were first observed on Eastern Brothers Island on May 22<sup>nd</sup>. While no terns nested on the island this summer, we did observe up to 150 terns feeding in the vicinity of the island. One tern attended the decoys (tried to feed fish and copulate with them) throughout the summer.

### Alcids

Razorbills and puffins were observed throughout the season flying past the island, and loafing in the water adjacent to the cliffs. We suspect that birds landed on the island, outside of the regions we could observe from the blind. We documented over 1,000 razorbills and 100 puffins feeding south of the island on several occasions. We routinely counted over 500 black guillemots on the water adjacent to Eastern and Western Brothers.

## ***Petit Manan Island***

Laura Kennedy, Island Supervisor

Census: The GOMSWG census was conducted from June 19<sup>th</sup>-20<sup>th</sup>. During the census we counted tern, laughing gull and common eider nests across the entire island. We documented 2,436 tern nests with a Lincoln Index (1.05%) corrected total of 2,562 nests. This is a 7% increase from 2007 (2,386 nests). Our species ratio was determined by identifying incubating terns on 1,070 nests (42% of tern nests) across the island. We determined that the colony consisted of 49% ARTE (1,255 nests) and 51% COTE (1,307 nests). The island only supported four pairs of ROST this season. PMI also supported 105 pairs of common eiders.

<b>Year</b>	<b>Common</b>	<b>Arctic</b>	<b>Roseate</b>	<b>Puffin</b>	<b>Laughing Gull</b>
2004	1312	911	29	35	1042
2005	1007	595	9	51	1151
2006	1601	779	22	70	1282
2007	1343	1038	5	53	1350
2008	1307	1255	4	93	1363

Tern Productivity: Overall, COTE and ARTE numbers showed increased reproductive successes as compared to the previous two years, with only the pooled mean clutch size decreasing. ARTE reproductive success was more than twice the level we observed in 2007. We banded 603 tern chicks

this summer. This season’s weather remained mild, with no extreme storms or weather events causing obvious issues for the terns. We followed tern chicks beyond the GOMSWG 15 fledging date, and found that reproductive success decreased by 22% during this time period.

<b>Productivity Measure</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
Mean Hatching Success					
(COTE)	87.0	92.0	78.0	64.8	85.3
(ARTE)	79.0	81.0	83.6	41.1	75.3
(ROST)	82.0	89.0	81.8	50	67
# Chicks fledged/nest					
(COTE)	0.62	0.51	1.18	0.75	1.12
(ARTE)	0.77	0.51	0.84	0.42	0.95
(ROST)	0.62	0.22	0.78	0.20	1.00

Tern Provisioning:

We followed up to 34 ARTE and COTE nests for a total of 1,071 hours, including 633 prey deliveries. Average number of food items delivered per hour for Arctic terns was 1.02 and 0.89 for common terns. The primary prey delivered to both ARTE and COTE chicks was Atlantic herring (*Clupea harengus*). A-chicks (first hatch) received 62.6% of the food deliveries while B-chicks (second hatch) received 23.1% of the food deliveries.

<b>Diet Item</b>	<b>% COTE diet</b>	<b>% ARTE diet</b>
Herring	68.3	58.0
Bluefish	0.9	2.4
Sand Lance	10.4	9.3
Invertebrate	3.0	23.8

ARTE Metapopulation Project: We continued to participate in the ARTE Metapopulation Project in 2008. We read 61 bands this season, including 35 ARTE, 13 COTE and 13 ROST. We utilized modified bow net traps to trap ARTE and COTE on the island. We trapped 12 ARTE and 35 COTE during the 2008 season.

Predators and Control Efforts:

In an effort to reduce competition for nesting habitat and to reduce predation on tern eggs and chicks, we continued to control the nesting distribution of laughing gulls on PMI. A “LAGU-free” area has been created on the north and east side within which all nesting attempts (eggs and nests) were destroyed. These areas support the greatest density of nesting terns. During the census, all LAGU eggs were poked resulting in a total of 1,185 nests counted and destroyed. Twenty-nine additional nests were destroyed prior to the census (possible re-nesting attempts found during census), and three known new nests were destroyed later in the season. As part of a multi-island management plan, Refuge staff removed 111 adult LAGU this season. We observed at least 73 tern eggs missing or destroyed by predation throughout the season. Three HEGU and two GBBG were shot by crew when observed pre-dating or found near tern nesting areas.

Bald eagles visited PMI and Green Islands 36 days during the nesting season, but focused their efforts on common eiders. Peregrine falcons visited PMI over 100 times, for 55 days of the season, landing on the lighthouse twice despite efforts to attach deterrents. Visits from peregrine falcons increased significantly when chicks began fledging. We observed a merlin a minimum of seven times and a northern harrier was also seen on seven occasions. Other known predators included five visits by a common raven, one great blue heron, and parasitic jaegers on one occasion.

Alcids: Alcid use of PMI continues to increase. This season we documented 93 pairs of puffins, representing a 75% increase over 2007. We also documented over 90 pairs of black guillemots. Seven of the artificial nest burrows were used by nesting puffins. The alcid high counts for the season were 248 Atlantic puffins (6/7), 213 razorbills (6/12), 27 common murrelets (6/9) and 475 black guillemots (5/17). We observed one successful razorbill pair producing a chick to fledging. We banded 43 puffins this summer (20 chicks and 23 adults). Puffin productivity was 0.54 chicks / burrow.

Student Research: A graduate student, Sarah Spencer, has initiated a project that monitors puffin behavior, burrow attendance, and species of prey delivered to chicks. The dive depth and duration of foraging trips is also collected using a TDR (temperature depth recorder) attached to leg bands of known-breeders.

## ***Observation of Seabirds, primarily Great Cormorants and Terns, along mid coast Maine during the spring and summer of 2008 (Jericho/Penobscot Bay)***

*Submitted by John Drury*

Supported by the Maine Department of Inland Fisheries and Wildlife

Observer: John Drury PO Box 102 Vinalhaven, 04863

**Gull and Eider Ground counts,** for Fish and Wildlife Service.

Preliminary to ground counts, I conducted a boat count of adult Guillemots and Male Eiders within @100meters of the islands SE of Vinalhaven, May 16 in the morning 06:30 Carvers -08:38 Brimstone.

### **May 16:**

*Hay,* 180 male COEI, 60 BLGU

*Robert's and Little Roberts,* 400 male COEI, 180 BLGU.

*Otter,* 600 male COEI, 580 BLGU

*Brimstone,* 335 male COEI, 150 BLGU

*Little Brimstone,* 130 male COEI

*Carvers,* 300 male COEI, 185 BLGU.

### **Ground counts, Gulls and Eider**

#### **# Nests found**

*Otter Island :* GBBG 44; HERG 975; COEI 991

(Ground count in **1996:** GBBG 80; HERG 476;. COEI 460)

*Carvers:* GBBG Gull 62; HERG 492, COEI 468, MALL 1

(**1992** GBBG 46; 135 HERG; Gull sp. total 90; 271 gull nests counted. Total 174 COEI nests. )

(Ground count in **1996:** GBBG 44; HERG 227; COEI 335)

**Hay :** GBBG 3, HERG 178; COEI 85  
(Ground count in **1996:** GBBG 10; HERG 143; COEI 154; 17 empty gull nests)

**Little Brimstone:** GBBG 7, HERG 28, COEI 22,  
(A ground count in **1996:** GBBG 23; HERG 10; COEI 4; 63 empty gull nests)

**Brimstone:** GBBG 11; HERG 34; COEI 314

**Great Spoon:** Estimate of nesting pairs made walking around the island flushing the gulls. 300 GBBG; 340 HERG; additionally on the Spit there were 100 GBBG, 70 HERG.  
(Ground count in **1992:** 280 GBBG; 320 HERG; 494 COEI)

**Wooden Ball:** Flush estimate of Gulls on July 15: 1,200 GBBG; 1,400 HERG.  
(Ground count in **1992:** 295 GBBG; 404 HERG; 626 COEI)

## **Terns:**

**Wooden ball:** **June 11,** 20 arctic tern roosting on the shore including 3 portlandica , @25 up from the nesting area above the roost, 2 adult up from the second nest area east of *Mertensia* beach.

**June 24,** 40 adult roosting on the shore @3/4 arctic. @60 flush from the nesting area. 4 adult fly up from the second nest area. Estimate from the boat that there are @65 nests on the island.

**July 15,** the large nesting area has been abandoned, a single adult defending area where 4 had been on June 24,

There were 127 nests counted on Wooden ball in '07 many late nesting birds probably disturbed from Seal Island or Matinicus Rock. There were two fledglings seen near the colony in late July but the majority of birds failed.

**Eastern Cow Pen:** **June 19,** 30 adult common tern come up from the nesting area, ground count: 2 nests w/ 1 egg, 11 nests w/ 2 eggs, 9 nests w/ 3 eggs, total 21 nests found

**July 19,** 50 adult common terns, 0 chicks seen.

**Aug 4,** 45 Adult terns, 6 fledglings seen. This colony has done well this year.

There were 52 common tern nests found on the Eastern Cow Pen in '07 abandoned by July 21, there were 27 common tern nests found on the Western Cow pen in '07 also abandoned.

## **Three Bush Island,**

**May 30,** 100 common terns, 30 roosting on the shore

**June 19,** @300 adult common terns, estimate @230 nests.

53 nests w/ 1 egg, 159 nests w/ 2 eggs, 89 nests w/ 3 eggs. 25 scrapes.

6 piles of tern feathers, primaries primarily, Merlin? One herring gull nest.

Total, 301 common tern nests counted.

**July 19,** 250 adult common terns seen no chicks.

**Aug 4,** 0 terns. There may have been some early chicks fledged from here but I doubt it.

There were 87 common tern nests found on Three Bush in 07 it was a vigorous colony of @120 adult, five fledglings seen August 3 '07.

**Brimstone ledge, May 30,** 12 adult common tern.

**June 19,** 0 terns. There were @60 nests in '07.

**Dry Money Ledge, June 19** no Terns, there was white wash on the cobbles, crows in the beach pea. Rick Schauffler saw them from the air here this spring.

There were 87 common tern nests found on Dry Money ledge in 07 and they failed.

**Little Green:** one adult Arctic Tern sailing around no nests found.

**Hog Island (Metinic),** 12 adult Arctic Terns, 8 arctic tern nests found eastern shore 2 with one egg, 5 with two eggs, 1 with one egg one chick.

4 adult Oystercatchers acting territorial

## **Great Cormorants:**

There were a total of 80 check great cormorant nests counted at 7 colonies at the end of May, 12 at great Spoon, 15 at Little Roberts, 6 on the Black Horse, 14 on Brimstone, 4 on southern Mark, 12 on Green Ledge, and 17 on Seal Island. There were 97 Great Cormorant nests counted in '06 and 87 counted in '07. The colonies at Great Spoon and Green Ledge, 24 nests @1/3 of the population, were abandoned by June 19. There was late nesting and apparently re-nesting by some of those birds, as the colonies at The Black Horse and Brimstone were augmented over the course of the summer. Eagles were present and foraging at Southern Mark and Little Roberts and the Black Horse, and Brimstone Ledge. Despite that there were 30 Fledgling Great cormorant seen at Brimstone on August 29,

**Productivity,** On August 30 there were 14 fledglings seen at Little Roberts. On Aug 29 there were 8 seen at the White Horse, presumably from the Black Horse, 30 at Brimstone Ledge, 2 at Saddle back, On August 11 there were 22 GC chicks seen at Seal Island, Dispersal of some fledglings begins in mid August thus there may have been fledged birds gone from the colony by the end of August. Young cormorants prefer to stay close to the colony, facilitating predation by eagles. This was the best year for this population for several years nearly 1 chick per nest @August 30, despite close to 30% of nests abandoned. The presence and interest of a large resident population of eagles, is likely to have depressed fledging weight thus the first winter survival rate of this cohort, and first winter survival directly due to continued predation.

After all the effort that has been expended to protect terns who's populations were never nearly as threatened as these cormorants it would be some kind of racism not to make this small effort on behalf of the Cormorants.

**Recommendations:** This population is in grave danger of extirpation from the United States. Less than 100 breeding pairs these last 4 years, down from a high of 260 pairs in '92 . The presence of Eagles can disrupt the Great Cormorant breeding cycle at any point. To ensure that Eagles do not disrupt the colony at Seal Island It may be critical that observers get to the island at the end of April when the Cormorants start laying egg. Observer presence can keep the eagles off. This should increase the likelihood that there are great Cormorants persisting at Seal Island, the only colony where we can feasibly have any impact. These birds have shown a willingness to move if disturbed and if they are driven off Seal Island there will be little that we can do for them.

**Little Roberts' May 16,** 12, GC nests, DC?

**June 2,** 15 GC nests, 3 adults displaying @30 adults total,

**August 8,** @20 GC chicks, some DC chicks near the shore, driven by eagles,

**Aug 20,** Cormorant chicks on the shore 5 eagles between channel rock and the Roberts'

**August 30,** 14 Imm GC this years, 4 eagles

**Sept 11,** 8 this years fledgling. GC at *Little Roberts*

*Brimstone*, one this years GC. another on *Eastern Ledge*, 0 on *Diamond Rock*, 0 at *Saddleback*.



2 Eagle on Carvers, 3 Eagles Brimstone,  
2 imm GC *Yellow Rock*, 2 imm GC. in a group of passing DC,  
*Otter Island*, 1ad. 3 imm. Eagles  
*Roberts*, adult and imm. Eagle,  
.Sept. 17, 15 GC nests counted from shore.

***The Black Horse*, May 30**, 6 GC nests counted, also 5 adult GC displaying total 15 adult.  
@24 total DC nests.

**June 19**, 10 adult GC., 3 displaying 0 nest seen from the west.  
8 GC nests, 22 adult seen from the east, some ad seen both sides,  
@20 dc nests.

**July 19**, 5 GC nests from the west 3 with chicks. 11 more from the east 3 with chicks, from the east,  
total 16 GC. nests.

**Aug 4**, 25 adult, GC. from the west, 2 new nests 2 sub adult, 3 nests total, from the west. 8 GC nests  
from the east, there were small medium and 3 nests with large chicks, 2 adult brooding, 13 adult GC.  
Total 10 GC. nests.

**Aug 22**, 11:00, 25 cormorant on the half tide ledge south of the rock, 2 imm eagle on the Rock, no  
cormorant in nesting area. five of this years Imm GC.

**Aug 29**, 0 imm Gc. @35 tot DC.

*White Horse*,

8 Imm GC, this years. 6 adult GC, 10 DC.

***Great Spoon* : May 30** , 12 nests on the highest part of the spit seen from the east

**June 19**, adult and 4 imm eagle

14 empty GC nests on the spit, the colony has been abandoned. 2 adult and 1 imm. GC.

**July 19**, 3 adult GC SW corner,

**August 4**, 7 adult and 6 Imm eagle, Ashore, 16 total abandoned GC. nests counted form shore.

***Brimstone*, (Burnt Coat Harbor) May 30**, 31 adult Great Cormorant, 14 nests, 7 adult GC displaying,  
10 adult DC. 2 nests, from the south, no more cormorant nests from the north side.

**June 19**, 45 adult GC., 17 GC. nests, and 3 adult displaying,

**July 19**, 36 GC chicks, at about 17 nests,

**August 4**, 55 GC chicks, 10 adult GC. 12 DC. chicks.

*Heron Island*, August 4, 4 Imm. One adult Eagle.

**August 29**, 30 of this years GC Fledglings on the shore.

***Southern Mark* , May 30**, Eagle passing, 110 DC nests from the east, 4 Great Cormorant nests at the  
bottom edge, 75 DC nests SW corner, 90 DC nests NW end.

**June 19**, 5 GC. nests, 115 dc nests east shore, 75 dc nests sw corner, 90 dc nests nw end, total @280  
DC

**July 19**, 11 Great Cormorant chicks, 130 DC nests east side, chicks on nests.

**August 4**, About half of the cormorant chicks have been driven to the shore, some scramble back up  
because of us, 14 GC chicks, some DC chicks flying.

**August 29**, 2 imm. GC of the year one adult, on the shore. 40 imm Dc east side.

**Green ledge**, (Fog island) **May 30**, 12 Great Cormorant nests, 28 adult GC, 2 adult GC displaying, 6 adult DC 1 DC. nest. 2 eagle on Fog Island.

**June 19**, All cormorant nests abandoned, 2 adult eagle on Fog island (1/4 mile).

**August 4**, Ashore, 12 GC nests, one DC nests, **0 Gulls**,

**Seal Island** , **May 18**, 14 GC. nests

17 nests best count, @10 DC nests above.

**August 11**, 22 Great Cormorant chicks.

**Aug 21**, 12+ GC chicks, none at the mid south shore roost, one flying.

**August 29 Saddle back** (Pen bay) this years Great Cormorant

**August 30**, There were a few this years GC at *Brimstone*, one at *Diamond Rock* and one at *Saddleback* .

**Green ledge** (east of Vinalhaven), **May 30**, @70 DC nests, 1 adult GC. 0 GC nests

**Other islands without nesting Great cormorant**, Little Spoon, the White Horse, Spirit Ledge, Mason Ledge, Saddle back (Jericho bay), John's Island, No Man's Land, Green Ledge, (Creihaven) Wooden Ball, Metinic Green, Little Green,

## ***East Penobscot Bay***

***Submitted by Brad Allen, ME&IFW***

### **TERN CENSUS AND SEASON SUMMARY – 2008 GOMSWG**

**SUBMITTED by Brad Allen**

Census Date	Island Name	COTE #	ARTE #	ROST #	Island Census Method *	Productivity **				Clutch Size +		
						FL/Nest	N	SD	Method	x Size	N	SD
06/13/08	Eaton Island Ledge (59-716)	43	0	0	N	nd	nd	nd	nd	nd	nd	nd
06/13/08	Hardhead Ledge (59-782)	0	0	0	N	nd	nd	nd	nd	nd	nd	nd
06/13/08	Spoon Ledge (63-011)	5	0	0	N	nd	nd	nd	nd	nd	nd	nd

## GULL CONTROL DATA

Island Name	Gulls Killed		Nests Destroyed	
	HERG	GBBG	HERG	GBBG
Eaton Island Ledge, Hardhead Island, Spoon Ledge	0	0	0	0

## *Seal Island National Wildlife Refuge 2008 Summary*

*Island Supervisor: Matt Klostermann*

*Resident Intern: Malcolm Grant*

### Tern Census

Due to safety concerns on the island [lots of unexploded ordinance leftover], a complete tern census was not done in 2008. However, a partial census was conducted and the total number of nests in these areas has been determined to consistently represent, on average, 36.7% of the total nest number of the colony over the past six years in which a complete census was performed (2001-2006). The total estimated number of nests was 2,367.

	2004	2005	2006	2007	2008
Arctic Tern	1172	1064	1015	823	1084
Common Tern	1167	1219	1726	1005	1283
Roseate Tern	0	0	1	0	0
Laughing Gull	5	0	0	0	0

Table 1. Number of nests per species from 2004-2008. 2007 numbers are from the second census, conducted just before hatch.

### Tern Productivity

Tern productivity was relatively high in 2008. Gull predation was not as much of an issue as it was in 2007, and the island experienced mild, dry weather during chick rearing.

	2004	2005	2006	2007	2008
Arctic Tern	0.81	0.67	0.72	0.67	0.93
Common Tern	0.68	0.58	0.94	0.66	1.11

Table 2. Number of chicks fledged per nest for Arctic and Common Terns from 2004-2008.

### Tern Feeding

Tern chick diet was composed mostly of Euphausiids, however, Euphausiids were mainly absent until the third week of July, when they suddenly made up almost all of the diet. Before the third week of July, terns brought in mostly fish.

	Euphausiid	Hake	Herring	Sand Lance
Arctic Tern	35.88	13.44	6.98	6.16
Common Tern	38.09	8.87	12.69	8.87

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

### Predation

Gull predation in 2008 was far less severe than in 2007. Gulls were seen in the colony preying on tern chicks and eggs only sporadically throughout the summer.

	# Nests Destroyed	# Shot
Herring Gull	155	5
Great Black-backed Gull	93	3
Laughing Gull	0	0

Table 4. Gull control measures in 2008 by species.

### Atlantic Puffins

The number of active puffin burrows was estimated to be about 310, although counting will continue until September 1. Our high count of puffins was 492, which was down from 701 in 2007. Puffin productivity was estimated to be 0.80 chicks/pair as compared to 0.86 chicks/pair in 2007. Puffin chicks' diet was composed of 45.82% Euphausiids, 20.57% Herring, 12.10% Hake, and 8.13% Sand Lance.

### Black Guillemots

This year was the second year that Black Guillemot productivity and growth were tracked on the island. Productivity was determined to be 1.13 chicks/pair, which was up from 0.22 chicks/pair in 2007. The guillemots benefited from weather that was much more mild and dry than last year.

### Razorbills

A total of 10 active Razorbill burrows were found on the island this year, which is up from 8 last year.

### Common Eiders

A total of 106 nests were counted in late May, although their main nesting area (Area 4) was not counted to minimize disturbance to the birds. The high count for ducklings was 201.

### Great and Double-crested Cormorants

The cormorant colony on the southern end of the island was counted by boat to minimize disturbance to the birds.

### Bird Sightings

A Red-billed Tropicbird was seen on the island again this year. It was first seen on June 2 and was last seen on August 10. It was seen on 20 days throughout the summer – much more often than last year.

## ***Matinicus Rock NWR 2008 Summary***

Katie Kauffman, Supervisor

Maria Cunha, Assistant

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

**Tern Census.** 1682 tern nests counted during census (June 15-24) were multiplied by a Lincoln Index correction factor of 1.003, yielding a corrected census total of 1687 tern nests. 257 of these were Common Tern nests (determined by direct count immediately following census), 1429 were Arctic Tern nests, and one was a Roseate Tern nest. Adding nests from study plots (not counted in census) yields overall totals of 1494 Arctic Tern nests, 298 Common Tern nests, and one Roseate Tern nest. The species ratio was 83% Arctic Tern to 17% Common Tern, and <1% Roseate Tern.

**Laughing Gull Census.** Breeding Laughing Gulls continue to increase in number on Matinicus Rock. The 1142 nests counted this year are a 13% increase over last year.

### **Productivity**

**Arctic Terns** fledged 0.71 young per nest. Hatch success was 1.41 and mean clutch was 1.74 for 66 nests. Twenty-six percent of clutches had one egg and 74% had 2 eggs.

**Common Terns** fledged 0.87 young per nest. Hatch success was 1.82 and mean clutch was 2.05 for 39 nests. Fifteen percent of clutches had one egg, 64% had two eggs, and 21% had three eggs.

**Atlantic Puffins.** Hatch success was 0.93 (n=70), fledge success was 0.90 (n=58), and productivity was 0.83 (n=63).

**Razorbills.** [343 active nest sites]. Hatch success was 0.73 (n = 59), and fledge success was 0.86 (n=35). Hatch success was similar to those of the last four years. This is the second year that fledging success has been studied, and this year's rate was much higher than last year's 0.50.

**Leach's Storm Petrels.** Hatch success was 0.93 (n = 27). We banded 33 chicks and 23 adults. Forty-two previously banded adults were recaptured in burrows.

### **Mortality**

**Weather.** An afternoon of rain on July 20 followed by rain and high winds overnight resulted in the deaths of many tern chicks. Chicks continued to die in elevated numbers for the next couple days.

**Starvation** killed a large portion of tern chicks in our study plots, and increased the susceptibility of chicks to exposure in storms. Food scarcity was also indicated by the small size of some puffin chicks as they neared fledging.

**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 in certain portions of the island. A Herring Gull was observed carrying off a large Razorbill chick, and gull predation may have been a significant source of mortality for Razorbill chicks. Two

Great Black-backed Gulls were observed eating a puffin fledgling or large chick in the intertidal zone, though it was unclear whether they killed it or found it already dead.

## **Feeding Studies**

### **Terns**

Arctic Tern feedings were primarily invertebrates; euphausiids (10%), amphipods (10%), and unidentified invertebrates (16%) together made up over one third of the feedings. Eighteen percent of feedings were recorded as “unknown,” and a large portion of these were probably invertebrates, meaning that up to 54% of feedings may have been invertebrates. Hake (12%) and sand lance (11%) were the most frequently fed fish. Average feeding rate was 1.73 deliveries/hour (389 nest-hours of observation at 11 nests).

Common Tern feedings included more fish and fewer invertebrates than the Arctic Terns. Feedings contained sand lance (22%), hake (11%), moth (9%), and euphausiid (9%). Average feeding rate was 1.06 deliveries/hour (480 nest-hours of observation at 13 nests).

### **Alcids**

Puffin bill-loads consisted of 29% unidentified fish, 26% sand lance, 19% euphausiid, 17% hake, and 3% herring. Sand lance was more prevalent and of larger size in the early part of the season.

Razorbill prey items were primarily large sand lance (70%), especially for the first portion of the chick-rearing period. Later in the season, large sand lance abruptly disappeared from the bill-loads, replaced by a variety of other species, of smaller size. Herring comprised 11% of prey items and hake 9%.

Razorbill chicks fledged before the period in late July when puffin bill-loads contained euphausiids. [In addition,

6 TDRs were put on RAZOs in 2008; recovered 2 TDRs, investigating foraging ecology.]

## **Gull Control**

### **Laughing Gulls**

During census, all eggs in all nests (1142) [up 13% compared to 2007] 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. Some new nests initiated approximately three weeks after census may have been re-nesting efforts by pairs whose eggs were poked. An additional four nests were destroyed outside the census period. 180 adult Laughing Gulls were shot on June 25, with effort concentrated where dense LAGU nesting areas abut tern nesting areas. Two adults were shot later in the season.

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

We destroyed 6 Herring Gull nests and 4 Great Black-backed Gull nests. We observed no chicks or fledglings. Adults killed include five Herring Gulls and four Great Black-backed Gulls.

## **Unusual Birds**

A **Red-billed Tropicbird** was observed on 10 days and landed on the island on three occasions. The tropicbird was not observed after July 12, although it was observed regularly after that date at Seal Island.

**Manx Shearwaters** were observed on 51 days, and a maximum of 13 individuals were seen from the island at one time. They were heard during 10 of 14 night-time listening periods, and a maximum of two distinct individuals could be distinguished. While placing a remote camera outside a suspected Manx Shearwater burrow, one individual was heard calling from within the burrow.

## ***Metinic Island (north end)***

Kate Williams (Island Supervisor),  
Aubrie Russell, Dominic Cormier

### **Census**

On June 19<sup>th</sup>, 2008 there were 668 nests on the north end of the island during the GOMSWG census (663 nests in unadjusted count; 110 out of 111 nests were marked when walked through colony for Lincoln index). Approximately 44 nests were initiated after the GOMSWG window, for a total of 712 nests. Approximately 409 of these nests were Common Terns, and 303 were Arctic; this ratio was determined by identifying the species of 504 nests in the colony, of which 42% were Arctic Terns. No Roseates nested on Metinic this year. The size of the colony this year is comparable to 2007 (Table 1), although the species ratio more heavily favors Common Terns; last year the colony was almost exactly evenly split between Common and Arctic Terns. The colony this year is the biggest it has been since 2004, which was the high point for the colony since staff began managing the site in 1996.

Table 1. Numbers of tern and Laughing Gull nests on the north end of Metinic Island, 2004-2008.

Year	Common Terns	Arctic Terns	Roseate Terns	Laughing Gulls
2004	331	392	1	
2005	88	134	0	
2006	322	138	2	
2007	321	338	0	
2008	409	303	0	0

### **Tern Productivity**

Mean hatch success was 83% for Arctic Terns and 85% for Common Terns this season. Tern productivity met the MCINWR goal of 1.0 fledgling/pair this year for both species. However, approximately 22% of fledged chicks died in July, due to a combination of low food availability and a series of severe weather events. If these deaths are included in productivity estimates, the number of chicks fledged per nest for Common Terns drops from 1.49 to 1.09 (n=47), and the number of chicks fledged per Arctic nests drops from 1.11 to 0.97 (n=36). Nevertheless, productivity this season remains an improvement over the 2007 season (Table 2).

Table 2. Number of fledglings produced per nest for tern species on Metinic Island, 2004-2008.

Year	Common Terns	Arctic Terns	Roseate Terns
2004	0.20	0.05	1.0
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

\*Poor food supply and significant weather events decreased estimated productivity by roughly 22% after the 15-day fledging period.

### **Tern Provisioning Study**

We included 15 Arctic and 13 Common Tern nests in the provisioning study on Metinic this season. The study was conducted for a total of 162 hours. Common Tern chicks were fed 1.5 times per hour on

average, and Arctic chicks were fed 2.4 times/hour. Herring and euphausiids were the most common prey items for Common and Arctic Terns, respectively (Table 3); abundant Atlantic Herring and Sand Lance stocks near the island gave out in early July, and euphausiids and other invertebrate prey became much more common thereafter. Common Tern feeding rates dropped sharply, on average, at this time, while Arctic Terns appeared to more successfully switch prey sources.

Table 3. Most common prey types (>5% of total feedings) for Common and Arctic Tern chick provisioning, Metinic Island 2008.

Prey Species	Common Terns	Arctic Terns
Atlantic Herring	44%	25%
Sand Lance	18%	4%
Euphausiid	17%	57%
Beetle	6%	2%
Lumpfish	2%	5%
Unknown	6%	3%

### **Predation and Predator Control Efforts**

Ten adult terns were predated early in the season. Most of these deaths were attributed to a Merlin that was seen repeatedly in the colony; a pair of Merlins has nested on Metinic in past seasons, although refuge staff could not locate a nest this year. A Peregrine Falcon was also likely responsible for at least one of the deaths. 50 nests were predated this season, with a variety of apparent causes; seven Arctic Tern chicks were taken on the wing by Herring Gulls, although as the gull or gulls did not land anywhere near the colony, lethal removal of the predators was not attempted.

Gull nesting near the tern colony was discouraged this season through a combination of human presence, 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. These tactics successfully deterred large numbers of gulls from nesting near the tern colony. All gull nests found in the northeastern quadrant of the refuge (closest to the tern colony) were destroyed or, in the case of the farthest nests, poked to discourage productivity and nesting in succeeding seasons. Refuge staff destroyed 33 and poked 29 Herring Gull nests, and destroyed three and poked one Great Black-backed Gull nest. Two adult gulls were lethally removed this season, one Herring Gull and one Black-backed.

### **Other Monitoring Activities**

43 Black Guillemot burrows were located on the north end of Metinic Island this season. We banded 27 chicks. We also located 37 Leach’s Storm-petrel burrows. Common Eider nesting was much more prevalent on Metinic this season than in the past several years, and female Eiders were banded in a cooperative effort with MDIFW. Eider crèches were both larger and much more numerous than in past seasons. Herring and Great Black-backed Gulls nested in large numbers on the southern end of the island, as well as on refuge-owned land on the western side of the north end. We monitored shorebird use of the refuge, as well as noting all bird species seen on the island. Twenty species of shorebirds were seen in the refuge, including large flocks of Purple, Semipalmated and Least Sandpipers, Black-bellied Plovers, Ruddy Turnstones, and Short-billed Dowitchers.

### **Other Island Notes**

No visitors other than neighbors, refuge staff and volunteers were recorded on the refuge-owned portion of the island during the breeding season. American Oystercatchers, Northern Gannets, a Black-legged



Kittiwake, an Indigo Bunting, a Pectoral Sandpiper, and a Summer Tanager were spotted this season, and the staff noted regular visits from a pair of Atlantic Puffins, which is an unusual occurrence for Metinic Island.

## ***Metinic Island (South End)***

### **Census**

The south end of Metinic Island is privately owned. A census was conducted on June 23<sup>rd</sup> by MCINWR. We found 9 Arctic Tern nests, including five with chicks, and saw 32 adult Arctic Terns diving at gulls in the area, so there may have been more nests we could not locate. Average clutch size was 1.78(±0.83). The south end was not revisited later in the season, so there is no productivity estimate for this location. However, the high number of gulls nesting in the vicinity has caused very low productivity.

## ***Eastern Egg Rock Summary, 2008***

Juliet Lamb, Supervisor

### **Census**

Island staff identified Arctic and Roseate tern nests between 7 and 20 June, with both species increasing over 2007 levels: Arctic terns to 111 total nests, and Roseates to 129. Given the general decrease in Roseate numbers throughout the Gulf of Maine, this increase is particularly notable. From 18 to 20 June, researchers conducted an island-wide Common tern and Laughing gull nest count. Common terns held steady from 2007, with a raw total of 1033 nests that was then corrected, via a Lincoln index of 1.023, to 1129 nests. Laughing gulls continued to increase dramatically, with a total of 1972 nests found. 135 Common eider nests were identified opportunistically during the census.

### **Larid Productivity**

Researchers studied tern productivity using both fenced and unfenced plots. The 72 nests in the common tern plots hatched at a rate of 1.95 chicks per nest, although the fledging rate fell to 0.87. This may have been due in part to severe summer storms in late July, which killed a large number of fledging-aged chicks. Roseates, generally less exposed, hatched 1.55 chicks/nest and fledged at a rate of 1.03 chicks/nest. Arctic terns were hit hardest by predatory gulls, as well as by late-season storms, and fledged only 0.71 of the 1.39 chicks hatched per nest. For the first time this year, a group of 20 Laughing gull nests was successfully monitored throughout the season; this group hatched 2.1 chicks/nets and fledged 1.2.

### **Diet**

Researchers observed 12 Common tern nests for a total of 639 hours. 52% of feedings were hake, followed by sand lance at 8%, herring at 3%, and several other species in small numbers. Hake was also the predominant fish in the six Roseate nests followed, comprising 60% of chick diets. 7% of ROST feedings were sand lance, 6.5% herring, and close to 2% each of Atlantic saury, butterfish, and lumpfish. This information resulted from 291 hours of observation. Arctic tern diets, determined from 183 hours spent observing four successful nests, were somewhat different: though hake was still the most frequent prey item, at 43%, it was followed closely by invertebrates (22%) and amphipods (7%). Boluses

collected opportunistically from laughing gull chicks were predominantly shrimp, although several also contained scarab beetles.

### Atlantic Puffins

Puffins had their most abundant year in Egg Rock history, with 101 active burrows on the island and a fledge rate of 0.95 chicks/nets. They fed almost entirely on hake— 67% of their diet—but also brought in large (average 3.1 bill length) sand lance at a 4% rate.

### Predation

Predation levels in 2008 were not significantly altered from previous years. Researchers shot 6 Herring and 2 Great Black-backed gulls over the course of the season, as well as destroying 5 HERG nests. A robotic scaregull was employed for the first time this season, although its frequent malfunctions complicate our data on the situation. Productivity in the vicinity of the gull appeared to match island-wide values, although loafing was down throughout the area. 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 93 adults at random.

### Other events

A single black tern nested on Egg Rock this year, laying one egg that it incubated for a few weeks before the egg disappeared [don't know if viable]. A single Manx shearwater called in the vicinity of the cabin nearly every night (a total of 42 nights over the season) although it demonstrated no evidence of breeding. Razorbills landed on the island on several occasions. Few rarities were seen this season. A graduate student project to improve vegetation for tern nesting habitat began with a pilot season this year, obtaining baseline measurements for vegetation diversity and growth on the island. [LESP present, but did not monitor.]

	2004	2005	2006	2007	2008
<b>COTE</b>					
census count	872	758	763	1206	1129
Clutch	1.90	2.01	2.11	2.04	2.31
Hatch	1.36	1.32	1.33	1.75	1.95
Productivity	0.64	0.59	0.64	1.19	0.87
<b>ROST</b>					
census count	110	136	113	118	129
Clutch	1.35	1.69	1.6	1.51	1.9
Hatch	1.1	1.32	1.15	1.15	1.5
Productivity	0.83	0.90	0.95	1.06	1.03
<b>ARTE</b>					
census count	84	81	80	101	111
Clutch	1.6	1.77	1.57	2	1.79
Hatch	1.15	1.08	1.23	1.48	1.39
Productivity	0.58	0.58	0.62	0.97	0.71

<b>LAGU</b>					
census count	1420	1638	1486	1705	1972
Clutch	--	--	--	--	2.57
Hatch	--	--	--	--	2.1
Productivity	--	--	--	--	1.2
<b>ATPU</b>					
number of nests	70	71	82	90	106
Productivity	0.97	0.86	0.89	0.93	0.95
<b>GULLS SHOT</b>					
GBBG	7	3	2	5	2
HERG	7	3	5	4	6
LAGU	0	1	0	0	93
<b>GULL NESTS DESTROYED</b>					
GBBG	4	3	1	0	0
HERG	6	0	1	2	5
LAGU	0	0	0	811	1982

## ***Pond Island NWR, 2008 GOMSWG Summary Report***

Adrienne J. Leppold, Island Supervisor

Census: We conducted the GOMSWG census this year on 18 and 19 June and counted 426 Common Tern nests. We applied a Lincoln Correction Factor of 1.02 to all nests not included in productivity plots or feeding studies. Our corrected grand total was 437. This was a 38.3% increase over last year and the second highest count in the history of the restoration program on Pond, surpassed only by 484 nests in 2006. We confirmed three Arctic Tern nests during the census and a fourth following the census window. No Roseate Terns nested on Pond this year though a pair was observed courting and scouting around the colony from mid-July through the end of the season. We did not conduct a full eider census this year.

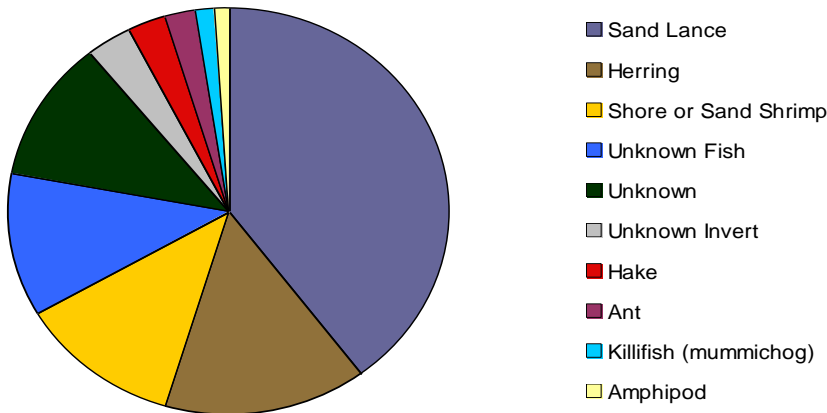
Productivity: Hatch was very asynchronous this season because of the high rates of disturbance (see predator accounts below), with the latest study nest hatching on 15 July. We used 45 nests to measure productivity this year. Only one of the four Arctic Tern nests hatched chicks. Unfortunately, both chicks were predated by an owl when they were just a couple days old.

Year	Avg. Clutch Size	Hatching Success	Fledging Success
2002	2.80 (0.41)	2.43 (0.85)	1.55 (1.8)
2003	2.20 (0.56)	1.67 (0.97)	1.10 (1.1)

2004	2.04 (0.22)	1.20 (0.16)	0.71 (0.14)
2005	2.47 (0.62)	2.28 (0.77)	1.09 (0.69)
2006	2.28 (0.61)	1.17 (1.16)	0.40 (0.69)
2007	2.5 (0.57)	2.37 (0.81)	2.03 (1.1)
<b>2008</b>	<b>2.68 (0.56)</b>	<b>2.33 (0.83)</b>	<b>1.06 (0.86)</b>

The majority of chick mortality resulted from nocturnal abandonment this summer though a couple other events played a significant role as well. Owl depredation between 20-21 July and a significant storm event the night of July 25<sup>th</sup>, were the other main causes of chick mortality. Occurrence of FUNK increased this summer from the four observed incidences last year to 22 this year throughout the colony. Symptoms were observed from hatch and included bloody nostrils, swollen/encrusted eyes, neurological damage, and one instance of bloody wing tips. Only a few of the most extreme cases did not survive. Of particular note was a provisioning study chick that hatched with bloody nostrils and as it grew, developed a severe beak deformity. This chick successfully fledged though it is uncertain if it will be able to feed for itself. Two chicks were also found with one droopy wing that developed into lock wing as they aged. Both chicks were unable to fly by the end of the season. This condition is believed to be independent of FUNK.

Provisioning: We followed 21 COTE nests as part of the feeding study this year. We observed a total of 1908 feedings over 717 observation hours. The average feeding rate was more than double last year at 2.32 feeds/hour and the average prey length was 1.57. Dominant species this year were Sandlance, Herring, and Sand (Shore) Shrimp. We observed 21 different prey items, including three unknown types. The top ten species are presented in the chart below. Other than one week in July where shrimp was the predominant prey item (this coincided with the passing of tropical storm Cristabol), food availability was very good this summer. Even late into the season, we regularly observed large 3.5-4 length Herring and Sandlance. Similar to last year, incidental observations showed large feeding flocks around Kennebec Point and along Popham Beach. Terns were frequently observed feeding in these areas to the north and northwest of Pond.



Common Eider Productivity: We followed 40 nests with an average clutch size of 3.96 and an average hatch rate of 3.17. Productivity was higher this year than in 2005 (2.0) and similar to 2002 (3.1). The maximum count of ducklings around Pond this summer was 50 and ~20 six+ week old ducklings were regularly seen around the island through the end of the season.

Predation: Predator control on Pond is always the utmost priority and this year was no exception. Gulls were actively discouraged from nesting or loafing on the island all summer. We destroyed two HERG nests and two GBBG nests early in the season. Six gulls were lethally removed (3 HERG and 3 GBBG) and we only confirmed one depredation of a chick by a HERG. We discovered the first sign of owl on the island upon arrival and this proved a challenge throughout the majority of the season. Persistent owl presence on the island resulted in massive nocturnal abandonment of the colony, and our constant trapping effort did not prove successful until 9 July, when the first of two owls was caught. A second owl hunted the colony for a few nights later in the month before getting caught on 21 July. Both owls were banded and successfully released near Presque Isle, ME. We observed mink tracks on the beach on 3 June and found one dead adult related to this event. We found tracks on the beach again a week later, but the animal eluded capture. No other kills were found and we presume it left the island within 2-3 weeks after arriving on Pond. We also had a number of visits (a minimum of 23 times) by raptors this summer, including Peregrine Falcon, Merlin, and a Cooper's Hawk. The Merlin, in particular, hunted the colony daily in final ten days of the season and we found a minimum of nine fledgling feather spreads.

Incidental Bird Sightings and Resights: We counted a total of 54 different species on Pond Island this summer, second only to the 57 species counted in 2002. Highlights were the first ever records of Black Skimmer, Blue Jay, and Cooper's Hawk for the island. We re-sighted a total of 33 unique bands this summer, including a Brazilian banded bird, the Black Skimmer [stayed for four days], and six Roseate Tern fledglings from Eastern Egg Rock.

Visitors and Other Disturbances: We had visitors land on the island on two different occasions and they were both greeted at the beach and given information about the restoration project. We also recorded low flying aircraft on two occasions this summer, both of which resulted in flushing of the entire colony. We immediately reported both instances to Jay Perez, the law enforcement officer for Maine Coastal Islands NWR.

## ***Jenny Island***

Island Supervisor: Charlie Governali

### **GOMSWG Census:**

A direct nest count was conducted on June 16<sup>th</sup> and 17<sup>th</sup>. 501 Common Tern nests were counted. The adjusted count was 556 nests. This number represents a drop of more than 18% from the 2007 season. One factor in this drop may have been the nocturnal predation on tern eggs by Great Black-Backed and possibly Herring Gulls that occurred between June 3<sup>rd</sup> and June 5<sup>th</sup>. Only two Roseate Tern nests were found—a very significant drop from the 16 present in the 2007 census. 10 Laughing Gull nests were also counted during the census. The 33% drop in Laughing Gull nests from the 2007 season may be the result of current and previous nest destruction efforts (15 total nests were destroyed and 2

breeding adult LAGUs were shot in 2008). After the GOMSWG census period, 5 additional LAGU nests were found and destroyed.

*Table 1 : GOMSWG Census Results 2004 — 2008*

<b>Year</b>	<b>COTE</b>	<b>ROST</b>	<b>ARTE</b>	<b>LAGU</b>
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

### **Tern Productivity:**

A sample of 45 Common Tern nests was monitored to determine productivity. The mean clutch size was 2.24, the mean hatch was 2.02, and the mean number of chicks fledged (reaching 15 days) per pair was 0.89. Common Tern productivity this season was nearly 50% lower than that on Jenny Island in 2007. A Roseate Tern productivity of 0 chicks per pair was estimated from nest visits. The discriminant function was not used because no B chicks hatched and both A chicks died within a couple days of hatching.

*Table 2 : COTE Productivity 2004 — 2008*

<b>Year</b>	<b>N</b>	<b>Avg.Clutch (SD)</b>	<b>Avg. Hatch (SD)</b>	<b>Avg. Fledging (SD)</b>
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)

*Table 3 : ROST Productivity 2005-2008*

<b>Year</b>	<b>N</b>	<b>Avg.Clutch</b>	<b>Avg. Hatch</b>	<b>Avg. Fledging</b>
2005	11	1.64	1.27	1.18
2006	11	1.45	1.36	1.00
2007	16	1.82	1.75	1.72
2008	2	1.5	1	0

The three most important factors in this season's low productivity were food supply, weather, and predation. From the beginning of the season through the first week of July the food supply was very strong. However, the bottom dropped out very sharply between the first and second weeks of July. Large herring became much scarcer and a wider variety of prey items were seen, including insects and very high numbers of shore (sand) shrimp. Shore shrimp, fed overwhelmingly in mid to late July, consisted of 11.22% of the diet. In 2008, Herring comprised 24.63% of the diet—very similar to its percentage in 2007. However, Hake dropped from 48.5% in 2007 to only 10.87% in 2008. The problems caused by a very poor food supply were compounded by generally wet weather in late July, as well as a severe weather event on July 20<sup>th</sup>. On July 21<sup>st</sup>, productivity was estimated to be 1.29 chicks/pair, however only five days later, following starvation and exposure related deaths of 18 monitored chicks, productivity

was reduced to its final value of 0.89 chicks/pair. Finally, the colony was subject to predation by a mink, which remained active on the island from at least the 17<sup>th</sup> of June to the 24<sup>th</sup> of June. A minimum of twelve adult Common Terns and one adult Roseate Tern were killed. The mink also affected the colony by causing large-scale nocturnal abandonment (at times, up to 80% of breeders) that continued for a week or more after the mink was trapped. In addition, the nocturnal gull predation that occurred early in the season forced a portion of the colony to re-nest, producing a number of late-hatching chicks that were more vulnerable to the poor weather in July.

**Predator Control:**

On the whole, predator control was a significant part of our work on Jenny Island this season. In efforts to remove the mink, 17,557.25 trap hours were logged, producing one probable mink (a trap set in an active mink run was pulled from shallow soil the following day – no further predation or evidence of mink was found after this event). 14 Herring Gulls and 13 Great Black-backed Gulls were shot. Subsequently, assiduous observation of the colony revealed not a single tern chick of any age taken by gulls. In contrast, during the 2007 season, gulls were observed taking at least 25 Common Tern chicks, and one Herring Gull was shot.

**Feeding Studies:**

Common Tern feeding studies were continued this season, while Roseate Tern feeding studies were not conducted. Eighteen Common Tern nests were monitored. Approximately 912 hours of observation produced 1141 feedings, resulting in an average rate of 1.26 feedings/hour. The mean prey length was 1.41 bill lengths.

*Table 4 : COTE Diet 2008*

Prey Item	% of Diet
Herring	24.63
Unknown Fish	12.62
Shore Shrimp	11.22
Hake	10.87
Unknown	10.78
Sand Lance	6.13
Amphipod	6.13

**Kleptoparasitism:**

A kleptoparasitism study was conducted this season on Jenny Island. Observations were made daily during one hour stints from the tower between July 2<sup>nd</sup> and July 26<sup>th</sup>. 623 Common Tern food deliveries were recorded. 75 kleptoparasitism attempts (12% of total deliveries) were recorded. 16.9% of known-outcome attempts were successful. In total, 1.9% of prey items brought in were successfully stolen by kleptoparasites. Common Terns participated in 93.3% of recorded klepto attempts, while Laughing Gulls participated in only 30.7%. As expected, the percentage of deliveries that were chased increased with prey item size. The percentage of attempts that were successful also increased with prey item size, as did the average number of chasers.

Prey Size	0.25-1.25	1.5-2.5	2.75-4.25
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<b>Deliveries</b>	133	290	106
<b>% of Total Deliveries</b>	21.8%	47.5%	17.4%
<b>Klepto Attempts</b>	5	30	35
<b>% Chased</b>	3.8%	10.3%	33%
<b>Successful Attempts</b>	0	4	8
<b>Success Rate</b>	0%	13.3%	22.9%
<b>Avg. # of Chasers (when chased)</b>	1.200	2.138	2.629
<b>Avg. # of LAGU</b>	0	0.483	0.829
<b>Avg. # of COTE</b>	1.200	1.655	1.800

**Common Eider Productivity:**

A census of Common Eider nests was conducted on Jenny Island on June 1<sup>st</sup>. Nests were counted again during the GOMSWG census on June 16<sup>th</sup> and 17<sup>th</sup>, and were checked on several later dates. Of 22 total nests, 9 were determined to have hatched, 3 were determined to have failed, and the success of 10 was unknown. It is valuable to note that at least 40 eider ducklings were observed consistently around Jenny Island for the entire season following hatch. The high count was 66 ducklings, reported on July 7<sup>th</sup>.

**Other Notes:**

- One albino Common Tern chick was discovered. The chick was banded by island staff and was still alive when researchers left Jenny Island on July 29<sup>th</sup>.
- Two Black Skimmers were observed on the 16<sup>th</sup> flying low over the island and calling. On the 17<sup>th</sup>, one Black Skimmer briefly returned.

***Hen Island, ME***

(Unmanaged)

Monitored by Charlie Governali, Supervisor of Jenny Island

**GOMSWG Census:**

On the 19<sup>th</sup> of June, a nest count was conducted; 121 Common Tern nests were found; 66% were three egg clutches. The mean clutch size was 2.595 (SD=0.61344). Fifty-five pairs of Common Terns nested on Hen Island in 2007.

**Productivity:**

On July 12<sup>th</sup>, a visual estimate of 100 Common Tern chicks was made from a boat. On July 21<sup>st</sup>, 124 Common Tern chicks were counted from a boat. All chicks counted appeared to have passed 15 days, and approximately 100 chicks appeared to be capable of flight.

**Predation Notes:**

During the census on June 19<sup>th</sup>, only one sign of predation was found: a single punctured egg in the inter-tidal zone. No Herring or Great Black-backed Gulls were noted loafing on or near the island. On July 12<sup>th</sup>, two Herring Gulls were noted loafing on or near the island. Two Laughing Gulls present, and a klepto-parasitism event was observed. On July 21<sup>st</sup>, three Herring Gulls were noted loafing on or near the island. The island was visited again on July 27<sup>th</sup>, by which date the majority of the colony



appeared to have departed. Very low numbers of chicks and adults remained, and no further evidence of predation was noted.

## ***Western Casco Bay, Maine, Summary, 2008***

surveyed by Bob Houston (USFWS); Survey date: June 19, 2008

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

Survey by boat revealed no terns present. No terns present in 2007 either.

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

Nest survey by boat revealed no terns present. Last year 1 pair of common terns were present with 1 probable nest.

### **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 this year.

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

Nest survey by boat – no terns seen. No terns seen in 2007, but in 2006 2 common tern nests were seen.

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

Survey by boat– no terns seen. No terns seen in 2007 or 2006 either.

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

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

## **Kennebec River to Damariscotta River**

(survey by Bob Houston, USFWS and Jenny I National Audubon crew; 13 June 2008)

The following islands were surveyed by boat and no terns were seen.

**Pumpkin Island, Boothbay (65-28 )**

**Outer Heron Island and ledges, Boothbay (65-279, 65-281, 65-282)**

**Inner and Outer White Islands, Boothbay (65-278, 65-276)**

**Thrumcap Island north and south, South Bristol, (65-266, 65-267 )**

**Thread of Life Ledges, South Bristol (65-258, 65-257, 65-256)**

**Hypocrits, Boothbay (65-275, 65-272)**

**The Cuckolds, Southport (65-466)**

**Lower Mark Island, Southport (65-461)**

**Dry Ledge & Cat Ledges, Southport (65-453, 65-455, 65-454)**

**Sugarloaf Islands north and south, Phippsburg (73-213, 73-280)**

*Submitted by Bob Houston, USFWS, Gulf of Maine Coastal Program.*

## ***Outer Green Island***

Jennifer Knight, Supervisor

### **Census**

The annual island-wide tern census was conducted on June 16<sup>th</sup>. A team of four researchers counted 737 nests. This figure was multiplied by a Lincoln Index of 1.059, derived from a mark-recapture sampling of the colony, and added to our productivity and feeding study nests to obtain a corrected total of 828 Common Tern nests. This year's population decreased by 108 nests, or 12%, from the 2007 census total of 936. The population has fluctuated over the last four years, as shown in the table below. Although the colony has decreased this year, the terns nested in a more even distribution around the island. Grid squares 1, 2, 8, and 12 had no nests during the 2007 census, and were occupied by 37 nests this year, with the highest new occupancy in grid 1 at 23 nests. Grid square 4 also showed a considerable increase in nests over the 2007 census with 40 nests occupying the grid in 2008, up from 7 nests in 2007. Noteworthy this season was our first Arctic Tern nest, found on July 11<sup>th</sup>. There were no Roseate Terns nesting on Outer Green Island this year, down from 8 nests in 2007.

	2004	2005	2006	2007	2008
COTE					
Census count	497	971	732	936	828
Clutch	2.26	2.22	2.35	2.48	2.32
Hatch	1.92	1.69	1.92	2.24	2.08
Productivity	1.45	0.67	1.13	1.71	0.61

### **Productivity and Feeding**

The average clutch size was 2.32 eggs per nest (n=50), which is lower than 2007 and 2006, but higher than 2005. The average hatch per nest was exceptional this year at 2.08 eggs hatching per nest, falling just behind the 2007 high of 2.24. However, the average chicks fledged per pair (0.61) was at a historic low in 2008. The two main factors contributing to this were an apparent decrease in food availability during the second week of July, with the worst of the shortage occurring around July 12<sup>th</sup> where, in one plot, more intraspecific kleptoparasitism was observed than actual feedings. The food rebounded for a day or two with terns bringing in large 3-4 bill length sandlance again, and then dropped off sharply as was reflected in a late season diet dominated by amphipods, euphasids, and insects with a few hake, lumpfish and butterfish. This was followed by a series of large rain storms, which occurred from the evening of July 18<sup>th</sup> to the morning of the 28<sup>th</sup> bringing a total of 3.43 inches of rain, and many mortalities, including several chicks over a month old considered to be fledged.

The average prey size was 1.49 bill lengths, and the average feeding rate was 0.86 feedings per hour. The percentage of prey items composing the overall diet was as follows: Hake 29.68% (a decrease from 38.44% in 2007), Sandlance 13.37%, Unknown fish 13.37%, Herring 10.96%, Amphipods 8.02%, Lumpfish 6.02%, Rosefish 2.54%, and Butterfish 2.54% with Stickleback, Pollock, Atlantic Saury, Bluefish, Cunner and Killifish combined for 3.46% and invertebrates and insects comprising the remaining 2.13%.

## Predation

The predation pressure from Black-backed and Herring gulls continued throughout the season. Many loafing pairs had established territories before researchers arrived, and although non-lethal harassment continued, they were present throughout the breeding season. Gulls were observed depredating eggs and chicks. As individuals were identified as problems gulls we attempted to remove them from the island utilizing a .22 rifle. We shot a total of 6 Herring Gulls and 5 Great Black-backed Gulls throughout the season. We had only 3 Herring Gull nests on Outer Green this season and no Great Black-backed Gull nests. The total number of nests destroyed on Outer Green and Junk of Pork was 10 Great Black-backed Gull nests and 5 Herring Gull nests. This is the fewest in Outer Green Island history, and reflects the efforts of our last several years of gull control. We also had several visits from a Peregrine Falcon, who took 3 adults and 2 fledglings. A Black-crowned Night Heron was observed flying over the colony, but never landed, and a Merlin was chased off by the terns on several occasions.

Number of Nests Destroyed	2004	2005	2006	2007	2008
Great Black-backed Gull	30	48	28	16	10
Herring Gull	3	33	8	9	5
Total	33	81	32	25	15

## Other Species

The 2008 field season was the second year of monitoring Black Guillemots. Researchers located all potential and historic nesting sites on the island early on in the season. Ten guillemot pairs successfully laid eggs, and eight hatched chicks. Our known burrow count doubled this year, adding 6 new burrows to the 2007 total of 6. The average clutch size was 2 eggs per nest. The average hatch was 1.5 chicks per nest. Productivity was 1.29 per nest over 7 nests that had or were close to fledging when researchers left the island at the end of July. Common Eiders also nested again on Outer Green Island. A total of 14 nests were found, of those, 6 hatched successfully. Three were depredated, and the remaining 5 had unknown outcomes. The Leach's Storm Petrel social attraction continued for a fifth successive season. On eight occasions individuals were heard calling over the island. Petrel scented peat, obtained from burrows on Seal Island NWR, was placed in artificial burrows on Outer Green in June. At the end of July fabric that had been placed in petrel burrows on Seal Island was brought to Outer Green and placed in alternating artificial burrows. Researchers attempted nocturnal mist netting for petrels, but no birds were present in late July.

A migration banding station was operated from the beginning of May until June 10<sup>th</sup>. Nets were open for a total of 392 hours, catching 522 birds of 43 species. Noteworthy species for the island were 2 Nelson's Sharp-tailed Sparrows, 2 Orchard Orioles, and 2 Eastern Kingbirds. Other rarities visiting the island throughout the season were a Red-bellied Woodpecker, an American Bittern, an American Oystercatcher, one Great Cormorant, a Black Tern, 2 Atlantic Puffins, and 2 Razorbills.

## ***Stratton Island Summary, 2008***

Pam Loring, Island Supervisor, National Audubon Society SRP

### **Census**

Complete nest counts were conducted for Common, Roseate, Arctic, and Least Terns. A total of 846 Common Tern nests were counted during the census; this was corrected for observer error (Lincoln Index = 1.048) and 64 feeding study and productivity plot nests were added to yield an adjusted total of 951 Common Tern nests. This is a 26% increase from 2007's total of 752 Common Tern nests. Prior to the Common Tern census, Roseate and Arctic nests were enumerated and flagged. This year's count of 64 Roseate's was lower than 2008's count by 16%. Arctic Tern nest numbers also fell from 12 in 2007 to nine in 2008.

Least Terns have nested on Stratton Island since 2005. Three colony wide censuses were conducted in 2008. During the first census on June 13, 59 active nests were found. On June 26 and July 15, 13 and 4 new nests were found, respectively. The total season count was 77 nests. The 113 Least Tern nests in late June of 2007 followed a severe depredation of mainland nests. This second wave of nests did not occur in 2008.

**Table 1.** Number of tern nests found on Stratton Island from 2003-2008

<b>Year</b>	<b>COTE</b>	<b>ROST</b>	<b>ARTE</b>	<b>LETE</b>
2003	305	40	4	0
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

### **Productivity**

Common Tern productivity (fledglings/nest) was estimated from a sample of 64 nests in four fenced enclosures and two unfenced feeding studies. Sixty seven Roseate and 9 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 2007, clutch sizes and hatching success were similar for Common and Roseate terns. Fledgling success was lower for both Common and Roseate Terns this season, at 1.00 and 1.25, respectively. In 2008, Arctic Tern productivity of one fledgling per nest was a dramatic increase from last season's 0.18, during which the majority of nests were washed out by high tides.

Chick survival in 2008 was likely influenced by a combination of weather events, food availability and predation pressure throughout the season. Total rainfall in 2008 was higher than 2007 at 13.71 inches. Thirteen dead Common tern chicks were found in late June following a storm producing over 2 inches of rain. During a period of intermittent thunderstorms throughout the latter part of July, 22 Common Tern fledglings within our productivity sample died of exposure. Gull predation also increased in late July as number of fledglings were taken. Lastly, food availability seemed to shift beginning in mid July, as chicks were observed being fed a higher proportion of invertebrates over fish. Food stress was further

suggested by increased kleptoparasitism during this period. 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 2008. Data for 2007 shown in parentheses.

Species	Clutch size	Hatching success	Fledging success	Nests monitored
COTE	2.58 (2.55)	2.22 (2.37)	1.00 (1.79)	64 (67)
ARTE	2 (1.67)	1.57 (0.33)	1.00 (0.18)	9 (12)
ROST	1.98 (1.76)	1.63 (1.40)	1.25 (1.41)	52 (80)

Daily dusk counts were used to assess Least Tern productivity. A high count of 33 near fledglings and fledglings was generated on July 17. A more precise estimate was not available due to inclement weather during the high count period, nesting asynchrony, and mobility of fledglings.

### Tern Provisioning

Fourteen Common, 14 Roseate, and a subset of Least Tern nests were included in chick provisioning studies. Observers spent 651 nest hours watching Common Terns and 678 nest hours watching Roseate Terns, and 269 hours watching Least Terns. Feeding rates (items delivered/hour) were slightly higher than 2007 at 1.86 and 1.42 for Common and Roseate Terns, respectively. Average prey size (measured in tern bill lengths) was 1.54 for Common Terns, 1.42 for Roseate Terns, and 1.46 for Least Terns.

Common terns fed a variety of herring, hake, and sand lance to their chicks in 2008. During mid-July, Common Tern feedings shifted to include a higher proportion of invertebrates versus finfish. Roseate Terns fed predominately sand lance throughout the season. Least terns also consumed a large proportion of sand lance, among lesser numbers of hake, herring, and killifish. Kleptoparasitism of Least Terns by Common Terns was especially high towards the latter part of the season.

**Table 3.** Principal prey items (percent) in tern chick diet on Stratton Island in 2008. *n* is the total number of prey items observed.

Prey item	COTE	ROST	LETE
Herring	35.72	9.11	10.18
Hake	20.75	11.63	14.70
Invertebrates	10.09	0.29	3.55
Sand Lance	7.73	61.24	43.62
Stickleback	2.12	0	0.32
Lumpfish	1.55	0.19	1.78
<i>n</i>	1229	1032	619

### 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 5 and August 7. Gull eggs were poked on Little Stratton during a May 25 census, and on Bluff Island during a census on May 30 and June 3. Overall, 108 Herring Gull nests (146 eggs) and 178 Great Black-backed Gull nests (224 eggs) were poked or

destroyed on Stratton, and 84 Herring Gull nests (220 eggs) and 95 Great Black-backed Gull nests (218 eggs) were poked on Bluff. Five Great Black-backed Gulls and one Laughing Gull, in the tern colony with a broken wing, were shot.

### **Common Eiders**

A partial Common Eider nest census was conducted in 2008. On Stratton, 411 nests were counted between May 20-28. In 2007, a count restricted to the south side of the pond revealed 115 nests, with 206 nests in that area in 2008. Clutch size was recorded for a sample of nests. Overall, average clutch size was 4.92 ( $n = 206$  nests). High numbers of ducklings were consumed by Great Black-backed Gulls soon after hatching. Thirteen older (class II) ducklings were observed in July, an increase from only four class II ducklings in 2007.

### **Wading Birds**

A wading bird census was conducted on May 20 – 22 in 37.75 person hours. Nest numbers for Snowy Egret 99 nests, Glossy Ibis 85 nests, Little Blue Heron 6 nests, and Black-crowned Night-Heron 17 nests were similar or slightly lower than previous years. The number of Great Egret nests increased from seven nests in 2007 to 25 nests 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. One hatch year was observed near Prout's Neck Yacht Club. Up to nine adult guillemots were observed.

### **American Oystercatcher**

One American Oystercatcher nest was confirmed on Little Stratton Island. Up to seven adults and one hatch-year bird were observed.

### **Other Notes**

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

2) Sightings of rare or unusual species included:

Yellow-crowned Night Heron observed regularly throughout July and August

## ***2008 Maine State Synopsis of Nesting Least Terns***

A minimum of 166 least tern pairs nested within the State of Maine in 2008. 94 of those least tern pairs nested on mainland beaches in Maine, while 72 nested on Stratton Island. All colony sites were simultaneously surveyed on June 26<sup>th</sup>, during the least tern window count. This count recorded 166 pair on nests on 3 beaches. A total of 166 pairs produced approximately 89 fledglings, with the bulk of those 56, produced on Crescent Surf Beach. Productivity values were most likely a little higher, as the least terns departed before a dusk count could be completed, and there was evidence of at least 15 fledglings being predated at Crescent Surf, prior to daytime counts. Rainy weather prevented the dusk counts from

occurring earlier. Overall least terns in Maine had a moderately successful season, achieving an estimated productivity

	WELLS	LAUDHOLM FARM	CRESCENT SURF	GOOSE ROCKS	FERRY/WESTERN BEACH	STRATTON ISLAND	HIGGINS	RAM ISLAND	SEAWALL	POPHAM	REID STATE PARK	TOTAL
<b>2003</b>	0	20(0)	57(8)	8(0)	0	-	38 (53)	0	0	0	33(5)	156 (66)
<b>2004</b>	15 (10)	1(0)	[50 (3)]	0	0	-	45 (54)	0	0	0	50(2)	146 (69)
<b>2005</b>	0	4(1)	[52 (7)]	0	[40 (3)]	18(9)	[22 (0)]	0	[17 (0)]	0	0	114 (20)
<b>2006</b>	[1(0)]	0	30 (10)	[25 (1)]	0	103 (15)		0	0	0	[1(0)]	134 (26)
<b>2007</b>	1(1)	0	[37 (1)]	[45 (2)]	0	113 (108)	0	0	0	0	0	150 (112)*
<b>2008</b>	0	0	92(56)	2(0)	[2]	72 (33)	0	0	0	0	0	166 (89)*

[ ] colony deserted

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

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

Jordan Kramer and Angie Chessey, Maine Audubon

Population Estimate:

A small number of terns returned to the site in 2008 but did not nest.

Comparison: One pair produced one fledger in 2007. There were zero nesting pairs of least terns in 2006. In 2005, although there were about ten pairs of least terns scraping, no nests were located, and 15 nesting pairs produced 10 fledglings in 2004.

Predator Control: None.

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

Shonee Strickland 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.

Predator Control: None at Laudholm, however across the Little River at Crescent Surf there was predator control.

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

Shonee Strickland and Kate O'Brien, Rachel Carson NWR

Population Estimate: Our high count of nests was 97 on June 13 during the GOMSWG window, however peak nesting within the entire state was not recorded until June 26, when Crescent Surf had 92 nests as some had already hatched. Nest counts on June 13 were used to calculate approximate productivity values of 0.57 fledgers per a pair, or a total of 56 fledglings produced. Mean clutch size was 2.1, SD +/- 0.51. Although we were unable to complete a dusk count due to weather and the abrupt departure of terns, day time counts were used to estimate fledgling rates. However, previous to our daytime counts we determined a fox was predating recently fledged birds on site. Canine tracks were documented and followed to areas where birds were killed. In most cases only the wings were found. We know over 15 fledgers were taken by this predator, depressing our productivity rates.

Comparison: In 2007, a high count of nests was 37, on July 12<sup>th</sup>; however 10 days later, at peak hatch, a mink decimated the colony, leaving behind only a few chicks and only one fledger was recorded. In 2006, 30 pair produced 10 fledglings. The last several years show a drastic decline from 2002, when a total of 145 fledglings were produced from 81 pair.

Predator Control: USDA wildlife services removed predators from the Crescent Surf beach area from April 2<sup>nd</sup> to July 31<sup>st</sup>. During this time, key predators were taken including six red fox, twenty-one raccoons, six skunks, seven crows, twelve great black-backed gulls, and one opossum. A local Game Warden removed at least an additional four crows. The predator control program in 2008 was very successful, and an integral part of restoring a productive tern colony at Crescent Surf.

To aid USDA wildlife services in controlling predators, wildlife cameras were also used at Crescent Surf beach. There was a minimum of one to a maximum of three flash and infrared cameras in use at Crescent Surf beach from June 19<sup>th</sup> to August 1<sup>st</sup>. Although the cameras were collectively set off more than 500 times, only a single photo of a predator was captured (Fig 1). The photo is of a coyote, confirmed by tracks of the predator the following day. We plan to use cameras in 2009 as well, and possibly will set them to record video.

We used a solar powered electric net fence at Crescent Surf Beach successfully, however the bulk of the colony nested outside the net fence

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

Jordan Kramer and Angie Chessey, Maine Audubon

Population Estimate: There were 4 active nesting pairs of Least Terns on the Batson River sand spit of Goose Rocks Beach this season (as recorded during the June 13 nest survey -14 adults were seen). Average clutch size was 2 eggs/ nest. These nests were predated on June 26 possibly by weasel. A walking nest count on July 7 found 3 new nests each with an average of 1.67 eggs. A very new chick was spotted in a nest cup on July 28 but did not survive to fledging. A high of 22 adults was seen in the colony on June 4.



Comparison: Last season 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. The six remaining terns defended the two remaining nests. Three fledglings were observed during a day survey on August 1, though only one was believed to survive until migration. Nests were present on the small rocky islands offshore, but were washed over during astronomical high tides.

Other notes: There was near-constant aggression between the Least Terns and the high population of Piping Plovers present at the site.

Predator control: USDA Wildlife Services removed predators from the Crescent Surf beach area from April 2<sup>nd</sup> to July 31<sup>st</sup>. During this time, key predators were taken including two red fox, twenty-eight raccoons, eleven skunks, five crows and two opossum. Predator control was not able to be implemented over the entire property as much of it is under private ownership.

### ***Western:***

Lucy LaCasse, Prouts Neck Country Club

Population Estimate: Similar to other least tern nesting sites, Western Beach has available nesting habitat and a history of predation. There were 2 nesting pairs in 2008, however they abandoned after a skunk predated their nests. Clutch size was 2.5 eggs per a nest, SD +/- 0.71

Comparison: 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.

Other notes: On July 17, approximately 20 least tern fledglings and 12 adults were seen roosting on Western Beach. On July 30<sup>th</sup>, 16 adults and 9 fledglings were documented roosting there as well. It is likely Western Beach provided an important refuge for the birds, where competition from common terns was not an issue. Before the 2005 nesting season, Western Beach was part of a beach nourishment project where 267,000 square feet of new habitat was created.

Predator Control: None.

### ***Stratton Island:***

Pam Loring and Scott Hall, National Audubon Society

Population Estimate: An estimated 77 pairs of least terns nested on Stratton Island in 2008; 59 were present during the GOMSWG census window. The first chick hatched on June 22<sup>nd</sup>; the first fledgling was observed on July 15<sup>th</sup>, dusk counts started immediately. On July 17<sup>th</sup> 33 fledgling and near fledgling chicks were observed. Dusk count frequency was limited due to poor weather; by July 29<sup>th</sup> no birds were present in the LETE colony. Estimated productivity for the island for peak nesting LETE only was 0.56 chicks/pair; the overall estimate for the island was 0.43 chicks per pair in 2008 (a significant decrease from 2007).

It appears that the first nesting wave was the only productive group on Stratton this year, late nests appear to have failed at higher rates as evidenced by declining numbers of fledglings seen on the island after July 17. Food appeared to be limiting on site as common terns frequently kleptoparasitized least terns. On July 27<sup>th</sup> 12-20 LETE fledglings with a similar number of adults, were seen on Western Beach in Scarborough, all chicks were banded – suggesting that birds from Stratton departed perhaps due to elevated COTE kleptoparasitism on Stratton. A total of 83 chicks were banded with USFWS metal bands and color bands. However of those banded chicks, 15 died and another 8 unbanded chicks were also documented as dead.

Diet studies were conducted on Stratton for the second year in a row. During 279 observation hours, 619 prey deliveries were recorded; principal prey types were Sand lance (43%), hake (14%), herring (10%) and mummichog (5%).

Comparison: 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: 5 Great Black-backed gulls were removed.

### ***Higgins Beach:***

Jordan Kramer and Angie Chessey, Maine Audubon

Population Estimate: No nesting pairs

Comparison: In 2007, there were no nesting pairs, although there was scraping. 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. 10 fledglings were spotted staging in the area in late July.

### ***Seawall:***

Jordan Kramer and Angie Chessey, Maine Audubon

Population Estimate:

Comparison: In 2007, there appeared to be a large amount of suitable nesting habitat near both the the Sprague River and Morse River. Perhaps because these beaches has had a history of predation, and in 2007 and 2008, had an abundance and variety of predator sign, no least terns established nests. In 2006, no nesting pairs used Seawall. 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.

**Reid State Park:**

Jordan Kramer and Angie Chessey, Maine Audubon

Population estimate: There were no nesting least terns at this site in 2007. A pair was observed for three weeks in June loafing on Half Mile Beach and in August common and least tern adults and fledglings were observed fishing and loafing in the salt marsh behind Half Mile Beach.

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

Predator Control: None.

**White and Seavey Islands, NH 2008**

Shoals Marine Lab

Project Coordinator-Dan Hayward

Assistant Project Coordinator- Melissa Hayward

Field Biologist-Susie Burbidge

**Census:** Seventeen people were on hand to conduct the census on June 12<sup>th</sup>, 2008. Three Shoals Marine Laboratory (SML) biologists and the SML Seabird Ecology Class participated in the census. Two groups of 4 and one group of 5 surveyed Seavey while one group of 4 surveyed White. Common tern (COTE) numbers were down this year from 2121 pairs in 2007 to 2011 pairs in 2008. Roseate (ROST) and Arctic Tern (ARTE) nests were all marked and confirmed visually on or before June 20, 2008. ROST pairs decreased from 52 pairs in 2007 to 37 pairs in 2008. Prior to the census, 3 ROST nests were initiated and abandoned and were not included in the totals. ARTE numbers increased from 5 to 6 pairs. On White Island, there was a small decrease in the number of COTE nests from 204 in 2007 to 187 in 2008. One pair of ROST and 2 pairs 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 163 new nests on Seavey, based on new nests in productivity plots, and a ground count of 53 nests on White made for a B-Wave total of 216 nests. Two ARTE and three ROST nests were initiated after the census period.

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

Species	COTE	ROST	ARTE
Date	6/12/08	6/20/08	6/20/08
A-Wave (ground count)=	1653	37	6
+ Lincoln’s Index(265m,4um)=	1780		
+ White(187) + Plots(141)=Total	2011	After 6/20/08	After 6/20/08
B-Wave (July 9)	216	3	2
Season Total Nests	2227	40	8

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

Species/Year	2003	2004	2005	2006	2007	2008
COTE (prs)	2414	2582	2033	1736	2121	2011

ROST	42	107	61	33	52	37
ARTE	4	5	8	6	5	6

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

Species/Year	2003	2004	2005	2006	2007	2008
COTE (prs)	2414	2582	2478	2463	2539	2227
ROST	63	112	67	38	57	40
ARTE	6	7	9	8	6	8

**Tern Productivity:** COTE productivity increased from 1.22 in 2007 to 1.28 in 2008. The clutch size increased from 2.27 eggs per nest in 2007 to 2.35 in 2008. ROST productivity was almost identical in 2008, at 1.24 chicks per nest compared to 1.25 in 2007. ARTE productivity increased slightly in 2008 to 0.67 from 0.60 chicks per nest in 2007. The weather was mild during nest initiation with only 1.8 inches of rain from May 18 through the census on June 12. During peak hatch, from June 23 through June 27, we received 1.5 inches of rain, but the chicks seemed to do well despite the bad weather. We did see weather related mortality during peak fledge as we received over 7 inches of rain between the 18<sup>th</sup> and 24<sup>th</sup> of July. The vegetation on Seavey has shifted back to more dense grass and was represented in our productivity plot numbers. The overall population, at census, was down 5.2% but the nest density in the plots increased by 18.1%. There was a small B-Wave, 216 nests that had a productivity rate of 0.20 chicks per nest. The very synchronous A-Wave was not significantly impacted by the harsh weather and dense vegetation whereas the B-Wave seems to have been.

Predation on COTE eggs was observed in concentrated areas on the edge of the colony and it appears that many of the birds successfully re-nested. Gull predation, on 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 would swoop down over the colony, putting up the terns. When the terns flew off, newly fledged birds would fly out over the water and seem to run out of energy, 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 23 and 27, peaking on the 23<sup>rd</sup> of June. In 2007 the peak hatch occurred 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. The productivity for the B-Wave, 216 nests, was 0.20 with an average clutch size of 1.80 and a mean hatch of 0.87.

### Tern Productivity

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

Year	2003	2004	2005	2006	2007	2008
Nests Monitored	163	138	120	114 [163]	119 [145]	128 [143]
Mean Clutch Size	1.96	1.84	1.93	2.38 [2.17]	2.27 [2.19]	2.35[2.29]
Mean Hatch	1.61	1.67	1.14	1.87 [1.48]	2.13 [2.02]	2.08[1.95]
Fledglings/Nest	1.33	0.75	0.76	0.60 [0.47]	1.22 [1.21]	1.28[1.21]
Total Fledglings	3212	1936	1523	1041 [1158]	2588 [3047]	2614[2695]
Total Population	8040	7100	5585	4513 [6084]	6830 [8125]	6636[7149]

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

Year	2003	2004	2005	2006	2007	2008
Nests Monitored	30	55	56	33 [38]	52 [57]	37[40]
Mean Clutch Size	1.40	1.21	1.23	1.48 [1.42]	1.62 [1.56]	1.78[1.75]
Mean Hatch	1.07	1.13	0.82	1.24 [1.11]	1.42 [1.37]	1.46[1.35]
Fledglings/Nest	0.87	0.95	0.70	0.97 [0.87]	1.25 [1.21]	1.24[1.18]
Total Fledglings	26 [55]	52 [106]	46	32 [33]	65 [69]	46[47]

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

Year	2003	2004	2005	2006	2007	2008
Nests Monitored	4	5	6	6 [8]	5 [6]	6[8]
Mean Clutch Size	1.5	1.20	1.83	1.67 [1.75]	2 [2]	1.83[1.88]
Mean Hatch	1.5	0.50	1.67	0.67 [1.0]	1.20 [1.17]	1.33[1.25]
Fledglings/Nest	1	0.60	0.83	0.5 [0.75]	0.60 [0.50]	0.67[0.63]
Total Fledglings	4	3	5	3 [5]	3 [3]	4[5]

**Tern Feeding Study****COTE**

# Of Nests	Nest Hours	Feeding Rate
20	337.33	1.26

Species	Hake	Herring	Crustacean	Unk. Item	Sandlance
% of Diet	32.16	27.23	13.38	10.09	4.69

**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, 6 GBBG and 2 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 landed to depredate a nest. During the storms at the end of July GBBG and HERG were observed eating fledglings. 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. [Gull census was conducted on other Islands; raccoons were an issue on Appledore Island and were released there].

**Predator Control**

Species	Nests Destroyed	Eggs Destroyed	Adults Taken
GBBG	0	0	6(+4 relief kills)
HERG	0	0	2(+2 relief kills)

**Gull Control (May 3-Aug7)**

Control Method	Avg/Day
Human Control	1.24
Screamer	0.92
Banger	0.31
Problem Gull	0.08

Relief Kill	0.06
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**Other Nesting Species**

Species	COEI	SPSA	SOSP
# Of Nests	~18	~15	~6

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

BDOW-5/10	CORA (2)-4/23, 5/10
ROYT- 7/8	BLTE-5/29,
ATPU-5/12, 6/17, 6/23(2)	RAZO-5/25(2), 6/6(2), 6/17, 6/28, 6/30
COSH- 7/26	MASH-6/6
LAGU-regularly throughout the season	PEFA-5/11-12

***Monomoy Islands – Monomoy National Wildlife Refuge***

**Kate Iaquinto – Biological Technician, U.S. Fish & Wildlife Service**

**Jennifer Yantachka – Biological Intern, U.S. Fish & Wildlife Service**

***North Monomoy Island***

***Common Tern:***

Census: On 18 June, observers counted 70 Common Tern nests in the historic nesting area on the northwest portion of the island.

Productivity: An average of 100 adult Common Terns were generally observed in the nesting area throughout the season. Productivity was not quantitatively monitored, but nesting Common Terns on the island appeared to have been poor. Small chicks were seen, but no fledglings were recorded.

***South Monomoy Island***

***Common Tern:***

Census: On June 16-17, a total of 6716 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 6834 nests. This is a 14.0% decrease from the 7948 nests counted in 2007. A second census was not conducted, but an additional 72 nests (18.8% of the total 383 nests) were initiated in productivity enclosures after the census window, indicating an additional 1560 nests in the colony after 20 June.

Productivity: The reproductive success of Common Terns on South Monomoy was good based on 311 A-count nests in 34 fenced productivity enclosures located throughout the colony.

Average clutch size: 2.18 eggs/nest (SD = 0.71, N = 311 nests)	2.37 in 2007
Hatching success: 0.76 eggs/nest (SD = 0.38, N = 311 nests)	1.80 in 2007
Reproductive success: 1.12 chicks/nest (SD = 0.89, N = 311 nests)	0.70 in 2007

**Number of pairs and productivity of Common Terns on South Monomoy Island 2003-2007**

	2004	2005	2006	2007	2008
Number Pairs	8864	8834	9310	7948	6834
Productivity	1.59	1.41	0.96	0.70	1.12

Feeding Stints: Staff conducted 81 one-hour long Common Tern feeding stints from June 23 - July 29. An area of observation was defined by the observer and prey, prey length and recipient of prey was recorded during each stint. Sand lance was the most common prey item (89%). Other delivered prey items included herring, hake, butterfish, and bluefish. The average prey length was 2.51 inches and 88% of the prey items brought into the colony were delivered to chicks.

Adult Tern Trapping and Banding: Fifty-one banded adult Common Terns were recaptured this season using treadle traps. Thirty-three recaptured terns that were trapped were originally banded at Monomoy NWR. The remaining recaptured terns were banded throughout the northeast, including Gardiners Island, NY, Great Gull Island, NY, Wareham, MA, Waquoit, MA and Falmouth, MA. Two Common Terns with Brazil bands were also recaptured. A total of 27 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 30-August 18. Approximately 151 Common Tern fledglings (15-23+ days in age) 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. Samples of dead birds were collected and sent to the National Wildlife Health Center in Madison, WI for analysis. Dr. Julie Ellis and Dr. Becky Harris swabbed approximately twenty COTE fledglings for Salmonella in July and the results are currently pending.

***Roseate Tern:***

Census: Zero Roseate Tern nests were counted during the census on June 16-17. 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, they had a productivity of zero on South Monomoy Island.

**Numbers of pairs and Productivity of Roseate Terns on South Monomoy Island 2003-2007**

	2004	2005	2006	2007	2008
Number Pairs	1	1	2	2	0
Productivity	1.00	0	0.33	1.00	0

***Least Tern:***

Census: On 18 June, 126 Least Tern nests were counted on the west beach of the south tip of South Monomoy, 16 nests were found on the south tip, and two nests were found on the east beach of the south tip. A B-Count was not officially done, but 6 nests were found on the northeast beach on July 13. Very few chicks were recorded during the rest of the season.

Productivity: Productivity was not quantitatively monitored, but was estimated to be poor. Least Terns were impacted by gull and coyote predation in the northern and southern regions of the island during the nesting season.

***Laughing Gull:***

Census: On 16 and 17 June, 1317 active Laughing Gull nests were counted, which is down from the 2007 count of 1498.

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. A total of 1555 nests were destroyed in fifteen 60m x 60m grids during June 20-July 13.

***Minimoy Island***

***Common Tern:***

Census: On June 18-19, 1258 Common Tern nests were counted. No Lincoln Index was conducted to minimize disturbance. In 2007, 839 nests were counted during the 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 fair to good. Overwash, loss of habitat, and some predation by gulls and Black-crowned Night-herons impacted Common Terns throughout the season.

***Roseate Tern:***

Census: On June 18-19, a total of 30 Roseate Tern nests were counted. Seven B-count nests were found later in the season. Forty-three pairs of Roseate Terns nested on Minimoy in 2007.

Productivity: Productivity was estimated based on 30 A-count nests.

Average clutch size: 1.97 eggs/nest (SD = 0.61, N = 30)	<i>1.78 in 2007</i>
Hatching success: 1.37 eggs/nest (SD = 0.85, N = 30)	<i>1.36 in 2007</i>
Reproductive success: 1.00 chick/nest (SD = 0.89, N = 30)	<i>1.18 in 2007</i>

***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. Minimoy has been the only nesting site in Massachusetts for Black Skimmers since 2003.

Productivity: Productivity estimates were determined based on 5 A-count nests.

Average clutch size: 3.80 eggs/nest (SD = 1.19, N = 5)	<i>3.40 in 2007</i>
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Hatching success: 0.80 eggs/nest (SD = 1.10, N = 5)  
Reproductive success: 0 chicks/nest (SD = 0, N = 5)

1.20 in 2007  
0.55 in 2007

### ***Laughing Gull:***

Historically, Laughing Gulls have not nested on Minimoy Island. However, Laughing Gulls were seen loafing on the island, and 23 nests were found and destroyed in the Roseate Tern nesting area. No Laughing Gull chicks or fledglings were seen on the island.

### ***Predators***

***Great Black-backed Gull (GBBG) and Herring Gull (HERG):*** Gull harassment in area A (gull-free zone) was initiated on 8 June. Gull harassments were conducted weekly throughout June and once in July. No Gull census was performed this year. Gulls were present in the tern colony late-May through August. HERG were seen in the tern colony a minimum of 19 times and GBBG were seen in the colony at least 63 times. In addition, unidentified juvenile gulls were seen in the colony at least 28 times. Gulls were responsible for taking at least 106 tern eggs and at least one common tern chick. A total of 37 GBBG and 7 HERG were removed from the colony this season.

***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 21 times between 31 May and 18 August. At least one adult Common Tern and four Laughing Gull fledglings were found dead and likely killed by Northern Harrier.

***Coyote:*** A total of 19 coyotes were removed this season: 8 in April, 5 in May, 2 in June, and 4 in July. Evidence of coyote (scat, tracks – often seen in pairs) was found in or around the tern colony on 27 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 May during the refuge wading bird census. On South Monomoy Island, 0 nests were counted, but 13 individuals were seen during the census. On North Monomoy Island, 150 nests were counted. Black-crowned Night-herons were first seen in the tern colony on 23 June, and were observed at least one additional time during the day and at least five times at night during the nesting season. Black-crowned Night-herons were heard at least three separate times at night. There was some evidence of Black-crowned Night-heron predation on Common Tern eggs and chicks throughout the season.

***Laughing Gull:*** Laughing Gull kleptoparasitism stints were continued this year. A total of 124 one-hour long stints were conducted in the tern colony on South Monomoy Island. Approximately 2245 kleptoparasitism attempts were observed and recorded for an average of 18.3 attempts per hour. Laughing Gulls were successful in 47% of the attempts, Common Terns were successful 21 % of the time, the outcome was unknown 21% of the time, and prey items were dropped in 11% of the attempts.

## *Massachusetts Summary*

Dr. Ian Nisbet

[All species of terns in Massachusetts increased in numbers this year, except for Roseate Terns.]

[ROST declined 21% this year in Massachusetts, and decreased by 17% on GGNV; so altogether all sites have decreased except Eastern Egg Rock. There was a regional decline of about 19% this year. Numbers of Roseate Terns are now well below the population estimate from when they were first listed in 1987.]

## *Massachusetts Tern Census Numbers, 2008*

Recorded verbally during meeting.

Submitted by Dr. Ian Nisbet, and Carolyn Mostello (MA NATURAL HERITAGE AND ENDANGERED SPECIES PROGRAM)

	<b>COTE</b>	<b>ROST</b>	<b>ARTE</b>	<b>LETE</b>	<b>LAGU</b>	<b>BLSK</b>
TOTAL pairs in MA 2008	15,869.5	1,375	4.5	3,661	1,582	5
% CHANGE from 2007	+5	-21	+25	+18	+5	+25
MASS GOM (includes Monomoy NWR)	10,690	31	2	1,242	1,582	5

### OTHER NOTES

The Maine Field Office of the U.S. Fish and Wildlife Service has completed two contaminant reports related to terns: 1) Contaminant assessment of common terns in the Gulf of Maine and 2) Environmental contaminants in tern eggs from Monomoy NWR and Seal Island NWR. Both reports are available online at:

[http://www.fws.gov/northeast/mainecontaminants/EC\\_Reports.htm](http://www.fws.gov/northeast/mainecontaminants/EC_Reports.htm)

## **PART 2: RESEARCH PRESENTATIONS (8 Presentations)**

### **1. Post-breeding Use of Staging Sites by Roseate (*Sterna dougallii*) and Common (*S. hirundo*) Terns in Coastal Massachusetts**

**Katie Blake, Antioch University New England**

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**Abstract:** The post-breeding period is an important time in the avian life cycle. It is an especially critical time for the young of species such as Roseate (*Sterna dougallii*) and Common (*S. hirundo*) terns that remain dependent on adults for weeks after fledging. Despite many studies of tern breeding biology in the northeastern U.S., little attention has been given to behavior after nesting is completed and before fall migration begins. Massachusetts is an important breeding area for terns, particularly the endangered Roseate Tern; three islands in Buzzards Bay support nearly half of the northeast breeding population. Coastal Massachusetts is also an important area in the post-breeding period. Several areas throughout Cape Cod and the Islands are known to be used by large flocks of post-breeding terns, with some staging sites supporting the majority of the entire northeast breeding population of Roseate Terns. The concentrations of these birds and poor understanding of post-breeding behavior raises conservation concern. In 2007 and 2008 I studied terns at known staging areas by monitoring their use of sites and documenting factors influencing their use; this effort was enhanced by the contributions of a team of research collaborators who conducted weekly counts at selected sites. In 2008 I also conducted four aerial surveys in attempts to identify additional staging areas and to investigate how abundance and distribution of terns changes during the post-breeding period.

### **2. To Fledge or Not to Fledge: The Effects of Body Condition on Chick Productivity: Tern Recovery on Petit Manan Island**

**Stephen Agius, Rebecca Holberton, Linda Welch**

**U. of Maine-Orono, Maine Coastal Islands National Wildlife Refuge**

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**Abstract:** For the past century Arctic and common terns have responded differently to conservation efforts in the Gulf of Maine. The basis for these differences remains unclear. To better understand the basis for the differences in recovery responses between the two species, I compared the physiological condition of the birds throughout key periods of the prebreeding and breeding stages at Petit Manan Island (PMI), Maine. I examined the condition of the terns when they first arrived at the island and throughout the incubation and chick rearing stages to ultimately link this with tern productivity patterns. The ability of individual terns to successfully fledge young depends on their physical condition before and throughout the breeding season. To determine how well an individual is meeting its energetic demands, I examined baseline levels of corticosterone (the major energy-regulating steroid), and plasma metabolites (indicators of the processes of putting on or using fat), ultimately linking these with breeding success. Measurements of parental effort were monitored to document individual activity related to clutch productivity. The species differences in condition related to parental effort may explain their different population recovery rates.

Arctic terns arrived in 2006 in better condition than in 2007. In comparison, Common terns arrived in significantly better condition in 2007. In 2007, both species had higher levels of

corticosterone, triglycerides and glycerol, suggesting that while both were foraging and recovering fat reserves they were also burning fat during the prebreeding period. Arctic tern condition declined from the prebreeding to the breeding period by six percent, while Common tern condition declined by seventeen percent. In general, Common terns initiated breeding with more body reserves to invest towards breeding than Arctic terns. Throughout the study, Arctic terns burned more fat (elevated glycerol) throughout the breeding season than Common terns. While both species increased triglyceride levels as the season progressed, neither species were able to significantly improve their condition. Common terns up-regulated moderate levels of corticosterone, perhaps as a mechanism to increase foraging activity to support prey delivery to young without incurring the hormone's cost to their own health.

Overall, Arctic terns showed a greater decline in condition from the prebreeding to the breeding period, resulting in lower annual productivity. Common terns either maintained their body condition throughout the prebreeding and breeding stages, or were able to significantly improve prebreeding condition. Common terns fledged more young than Arctic terns. The inability of Arctic terns to maintain energy reserves at a critical threshold from the prebreeding to the breeding period may have had a greater effect on their breeding success. This study illustrated that resource managers working to restore tern populations in the Gulf of Maine need to take into account the impact of events (food availability and weather conditions) during the wintering and migration periods as well as on the breeding grounds to understand variation in productivity.

### **3. An Investigation of the Marine Food Web in the Bay of Fundy and Gulf of Maine**

**Anne Kirsten Bowser**

**University of New Brunswick, Atlantic Cooperative Wildlife Ecology Research Network**

**[akbowser@gmail.com](mailto:akbowser@gmail.com)**

**Abstract.** It has been long been established that seabirds are excellent samplers of the marine environment. As k-selected top consumers, seabird population survival is heavily dependant on a healthy and productive ecosystem. Recent shifts in seabird diet in the Bay of Fundy and Gulf of Maine (Diamond and Devlin, 2003) suggest changes in the marine food web. Potential perpetrators of the shift are commercial fisheries and the elusive and unpredictable foe, global warming (Diamond pers. comm.). In 1959 Sir Alister Hardy published a book, *The Open Sea*, which documented the natural history of the eastern Atlantic Ocean. Hardy's herring-related food web formed the structure from which Canadian Atlantic fisheries management plans are based (Diamond pers. comm.). The eastern Atlantic ecosystem has, until now, assumed to be comparable to its western half. However, with continued fisheries pressure, threats from global warming, and seabirds showing strong evidence of changes in the herring fishery, it is imperative that a first-hand examination be made of the western Atlantic food web. I aim to investigate the marine food web, in relation to seabirds, in the Bay of Fundy and Gulf of Maine. I hope to determine whether the presently accepted food web accurately describes the current ecosystem. Through long-term data collection of both 1) dropped seabird prey and 2) seabird diet composition, combined with oceanic sampling of fishing and scientific vessels, I hope to evaluate the validity of Hardy's food web in the western Atlantic.

Diamond and Devin. 2003. Seabirds as indicators of change in marine ecosystems: Ecological monitoring on Machias Seal Island. *Environmental Monitoring and Assessment*. 88: 153–175.

Diamond pers. comm.. August 2008. ACWERN. University of New Brunswick.

Hardy, Sir. A. 1959. The Open Sea: Its Natural History, Part II Fish and Fisheries. The New Naturalist. Collins. St. Jame's Place, London.

#### **4. Nest-site Selection and Response to Habitat Manipulation by Roseate Terns (*Sterna dougallii*) on Seavey Island, New Hampshire**

**Susie Burbidge, Antioch University New England**  
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**Abstract.** In the cold water portion of the Gulf of Maine, little research has been conducted on Roseate Tern (*Sterna dougallii*) nesting habitat, and the optimal conditions that the species requires are poorly known. On Seavey Island, New Hampshire, increasingly dense vegetation has caused parts of the island to become unusable by nesting Roseate Terns. To provide additional nesting habitat and possibly increase Roseate Tern productivity, habitat manipulation was implemented in 2006. Eighteen plots measuring 2m x 2m were established in areas where Roseate Terns historically nested but where increased vegetation density has apparently displaced the species in recent years. The treatment methods included (1) weed-whacking and hand-pulling vegetation around the rocks within each plot, and (2) the application of an herbicide to clear up to 50% of the plot. In the study plots, the two treatment methods and the control were randomly assigned to a total of 18 plots.

At each nest established within the plots, vegetation characteristics were measured during or immediately after nest initiation, within 5 days of chick hatching and at the end of the season within 5-7 days of fledging. Habitat variables were also measured at Roseate Tern nests located outside the study plots. In the fall of 2006, New Hampshire Fish & Game Department developed a comprehensive prescribed burn plan to manage the vegetation on Seavey Island. In 2007, similar vegetation measurements were collected at random points in each of the 2006 study plots.

#### **5. Monitoring Seabird Behavior on a Coastal Maine Island Developing Methods to Better Understand Potential Effects of Marine Finfish Aquaculture on Seabird Breeding Colonies**

**Monika Parsons**  
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**Abstract.** 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. Double-crested cormorants were part of the study design but failed to nest on Jordan's Delight in 2008. We used a combination of temperature loggers, time-lapse cameras, and motion activated cameras to measure nest attendance. 30 temperature loggers were placed in Great Black-backed Gull nests, 28 in Herring Gull nests and 48 in Common Eider nests. Data retrieved from these loggers have not yet been analyzed. Time lapse cameras set to take a picture once per minute were placed overlooking four gull nesting areas to measure colony attendance. Additional cameras were placed to record boat activity around the island. Motion activated cameras were placed at the entrance to 5 Black Guillemot nests to record provisioning activity during chick rearing. The data collected pertaining to provisioning, nest and colony attendance will be compared to boat activity and other disturbances. The same data 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.

## **6. Contaminants in Maine Bird Eggs**

**Wing Goodale**

**BioDiversity Research Institute**

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### **Executive Summary and Primary Findings**

**(taken from <http://www.briloon.org/pub/doc/2008Contaminant.pdf>)**

Starting in May 2007, BioDiversity Research Institute (BRI) and collaborators initiated a broadbased contaminant study on Maine birds, measuring both historical and emerging chemicals. This comprehensive project measured 192 synthetic contaminants in 23 species across Maine to determine in which species, habitats, and locations these anthropogenic compounds are concentrating. The compounds we analyzed in 60 egg composites were mercury (Hg), polychlorinated biphenyls (PCB), polybrominated diphenyl ethers (PBDE), perfluorinated compounds (PFCs), and organochlorine pesticides (OCs). Our preliminary findings are: Hg, PCBs, PBDEs, PFCs, and OCs are found in all species sampled across marine, estuarine, riverine, lacustrine (lake), and terrestrial ecosystems; these are the first records of PFCs in Maine birds. Our preliminary findings are:

- Hg, PCBs, PFCs are all found at levels that may cause adverse effects—there are currently no established adverse effects thresholds established for PBDEs in bird eggs. OCs are all significantly below adverse effects thresholds.
- Our Hg, PCB, and OC levels were generally consistent with levels recorded around the country. Certain species had PBDEs higher than other locations, while other species had lower levels. PFOS have not been widely studied in eggs; therefore, we could not directly compare our results to other areas.
- The total PCBs levels we recorded are lower than those in the past, indicating a continued decline in PCBs.
- Bald eagles have the highest overall contaminant load of the 23 species measured.
- We found all of the compounds across the entire state, but overall contaminant loading tends to be highest in southern coastal Maine. This geographic pattern suggests that these compounds are entering the environment both through atmospheric deposition, because they are found across the entire state, and through local point sources, because we detected higher levels in urban and industrial areas.
- PCBs, PBDEs, PFCs, and OCs levels are positively correlated, indicating that birds with high levels of one compound tend to have higher levels of the others. PBDEs and PCB have the strongest relationship.
- Birds that feed on terrestrial prey accumulated higher brominated PBDEs; DecaBDE is found in eight species with gulls and peregrine falcon having the highest levels.
- Of the samples we analyzed, birds feeding in estuaries have the lowest contaminant levels.
- The mouth of the Kennebec and Isles of Shoals tended to have high concentrations of contaminants.

**7. Foraging of Atlantic Puffins: Clowns of the Sea or Experts of Evasion?**

**Sarah Spencer**

**Dept. of Natural Resources Conservation, University of Massachusetts, Amherst**

**Abstract.** No abstract available.

Presentation summary:

Deployed 8 Time depth recorders on ATPU, recaptured 4 of 8. , also used observations from lighthouse to

- Describe foraging behavior
- Quantify parental attendance
- ??

**8. Perspectives on the loss of North America's largest Arctic Tern colony**

**Dr. Antony Diamond**

**University of New Brunswick, Atlantic Cooperative Wildlife Ecology Research Network**

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**Abstract.** No abstract available.

Collapse of the largest Arctic Tern colony in Atlantic Canada