

MINUTES OF THE GULF OF MAINE SEABIRD WORKING GROUP BREMEN, MAINE - 10 AUGUST, 1998

Compiled by: Monomoy NWR

WELCOME & OPENING REMARKS - By Steve Kress

At 9:15, Kress welcomed the group to the 13th summer meeting of GOMSWG (formerly GOMTWG) at the National Audubon Society's (NAS) Hog Island Sanctuary. Following introductions, Kress briefed the group on the history of GOMSWG, which was formed in 1984 to try and reverse the declining tern populations, that had been declining for 50 years along the Maine coast, and restore them to the levels that existed in the 1930's. In 1931, during a statewide census, 275 pairs of ROST, 6500 pairs of COTE, and 8000 pairs of ARTE nested in the Gulf of Maine. By 1984, only 76 pairs of ROST, 2500 pairs of COTE, and 3200 pairs of ARTE nested.

Kress referred to last years minutes and reviewed the numbers of pairs of nesting terns on the Maine coast last year compared to 1984.

	<u>1984</u>	<u>1997</u>	<u>% change</u>
ROST	76	237	+211%
COTE	2500	7100	+184%
ARTE	3200	4000	+ 24%

ARTE numbers were increasing until a few years ago, when they declined by about 700 pairs between 1995 and 1996, and 400 pairs between 1996 and 1997 (which may be a function of the species ratio used at Machias Seal Island). However, the long term numbers are still slowly increasing. Kress cautioned that although the goal for the numbers of nesting COTE has been reached, and the goal for the number of nesting ROST is being approached, the group can not back off from restoration and management efforts. These populations are not self-sustaining.

Since the founding of GOMSWG, the group has expanded to include participants from states other than Maine, and Canada. The Gulf of Maine region is defined by the map included in the 1996 minutes. These minutes contain summaries of activities from MA north to the Bay of Fundy. In 1998, the island reporting began at the north end of the range.

NOVA SCOTIA - Reported by Andrew Boyne

Boyne provided a brief summary of activities in Nova Scotia. Nova Scotia has an Atlantic Canada Tern Working Group which has been defunct for the past few years, but will hopefully be active again beginning this fall. The endangered species program's focus is mostly on ROST and they don't have a good handle on the COTE and ARTE populations. There are 80-125 pairs of ROST in Canada on 3 main colonies, Country I., Grassy I., and Brothers I. (compared to about 150 in the early 1980's).

Country I - In 1996, there were 45 pairs of ROST. In 1997, they were wiped out due to gull and corvid depredation. In 1998, nonlethal control (human presence, noisemakers etc. . .) control was started. Zero gulls nested this year, compared to 250 pairs in 1997. While tern numbers increased this year, there were only 3 pairs of ROST.

Grassy I - In 1997 there were 30 pairs of ROST nesting, but this year the island was washed over early in the season and no terns nested.

Brothers I - This year there were 59 pairs of ROST, the highest ever. Unfortunately, bad weather in June

resulted in only 1 or 2 chicks fledging.

Boyerne noted that there aren't any large stable colonies and that the terns move every year between the islands, but there are still 20-30 pairs of ROST that are unaccounted for.

Discussion:

Fefer asked if there was an aquaculture site adjacent to the Brothers I. Boyerne said that there were steelhead salmon cages 100 meters for the island for the past 3 years but that there didn't seem to be any impact. Initially there was concern that it would attract gulls. Tern numbers here have actually increased, but it may not be related to the presence of the aquaculture site.

Kress asked if people lived on Country I. Boyerne said that people had lived there for the last 3 years. In 1996 and 1997, they were present until after the gulls had set up, but in 1998 they were present before the gulls set up and only 23 nests were destroyed. Kress remarked about how well human presence deters gulls. Boyerne added that this year there were multiple helicopter landings (6-7 over a two day period) to get supplies to the island. The landing site was in the middle of the gull nesting area. Gulls were only on territories at this point and this may have helped dissuade them from nesting. Country I. is 8km offshore.

Nisbet asked about the crows and ravens on Country I. Boyerne said there was no depredation this year. One raven nest, and 8 crow nests (which was likely 2 pairs reneating) were destroyed.

Megyesi asked about nesting COEI on Country I. Boyerne said there are usually 20-40 pairs. This year the numbers may have been down, but not significantly and their nesting was delayed this year. They have had a big problem with gull depredation on COEI ducklings and there is some indication that this was lessened this year. Gulls were still roosting in the area and there was still some depredation, but not as much as in past years.

MACHIAS SEAL ISLAND - Reported by Julie Paquet and Tony Diamond (post meeting)

Significant Dates:

TERNS

1 st tern nest	31 May
ARTE peak lay	6 June
COTE peak lay	9 June
1 st tern chick	20 June
ARTE peak hatch	27 June
COTE peak hatch	1 July

ALCIDS

1 st ATPU egg	1 May (calculated)
ATPU peak lay	14-21 May
1 st ATPU chick	8 June (calculated)
1 st RAZO egg	15 May (calculated)
RAZO peak lay	21-28 May
1 st RAZO chick	20 June (calculated)

Breeding Success:

	sample size	avg. clutch	eggs htched/nest	fledglings/nest
ARTE	41	1.8	1.34	.76
COTE	31	1.84	1.42	.77
ATPU	59	1	49/59	34 chicks banded and fledged, 1 chick found dead and 14 burrows were empty at time of check (may have been depredated, or already fledged)
RAZO	47	1	37/47	18 chicks banded and fledged, 19 burrows empty at time of check, 1 st wave of hatching probably missed

Food Provisioning:

	herring	hake	other
ARTE	57.7%	27.3%	15% (sandlaunce, butterfish, inverts, pollock)
COTE	53.5%	36.0%	10.5% (sandlaunce, butterfish, inverts, pollock)
ATPU	87%	12.2%	0.8% (sandlaunce, butterfish)
RAZO	16.8%	80.4%	2.8% (pollock, sandlaunce, butterfish)

Other Events:

A tern census was conducted this year and 2985 nests with eggs were counted, with a 10% error. This census is conducted every other year, and in 1996 empty scrapes were counted. Scrapes were not counted this year. The species ratio is estimated at 30% COTE, 70% ARTE.

2 ROST were observed courting on 11 June, but no nest was found.

ATPU fledglings were also banded at night around the lighthouse and 230 had been banded as of the meeting day. A few banded ATPU were sighted. One seen on 22 July was from Egg Rock and had blue/red on the right leg and red/USFWS on the left leg. Also a bird from Seal Island, U21 (yellow) was seen.

An inventory of nesting petrels was conducted this year for the 1st time.

2 murre copulations were also observed, and a high count of 62 murrees were seen during the season, but no eggs were found.

A Canada Goose visited the island for a few days.

Last summer a grid was set up on Machias Seal Island, similar to Petit Manan Island.

Vegetation identification was done last year, and this year a general inventory of distribution was conducted.

Ticks were found on researchers and birds and were submitted to the Maine Medical Center.

Paquet also gave a summary of her research project. She is investigating time budgeting of ARTE and seeing if there is any correlation of time spent on different activities relative to weather, and the stage of reproduction. Observations were conducted at the nest. Adults were color marked with fabric dyes. Also, to learn more about the behavior away from the nest, small emitter, weighing 1.3g, were placed on ARTE. She was able to locate them up to 1km off the island using triangulation. Birds were also sexed using PCR.

Discussion:

Nisbet asked if there are ants on the island. There are not.

Kress inquired about the low number of ATPU eggs that had hatched and if it was most likely due to disturbance or something else happening on the island. Devlin reported that this year the amount of disturbance was actually less than in past years, and that some gull depredation did occur in the fog. They also did find some cold eggs. Kress asked how many of the ATPU nests are in soil and rock. Amey said that most are in soil adjacent to rock but there are also a few nests in rock jumbles.

Kress also asked about the method used for determining species ratio. Devlin replied that the CWS warden for the island conducted the species ratio and was not able to attend the meeting. He identified 580 nests to species on various parts of the island, but Devlin did not know the details.

Other Seabird Research - Reported by Tony Diamond after the meeting:

1) Arctic & Common Terns

Objective (i): compare clutch sizes within 20m of tourist path with those outside (does regular tourist traffic reduce clutch size?).

Rationale: Bridget Morrison's Honours thesis (1996) suggested that in 1995 clutch sizes may have been slightly smaller closer to the path used by tourists, but her sample was small.

During the biennial census carried out in 1998 by R. Newell and CWS and ACWERN personnel, nests within 20m of the tourist path were recorded separately. Only 30-m grid squares (n=17) in which at least 1 nest was within 20m of path were included.

Results: mean c/s near path 1.64 (n=225 nests), away from path 1.67 (n=190 nests). No significant difference.

Objective (ii): band as many tern chicks as possible throughout island (to establish future known-aged marked population); use mark-recapture index to estimate actual numbers of chicks; compare ARTE/COTE ratios with those of adults provided by Jason Hudson.

On 13-16 July, Nikki Benjamin and I searched the island slowly, banding all tern chicks old enough to identify and recording grid square in which each was banded. We also recorded numbers of any chicks too small to identify* (& therefore to band - 'tinies'). On 2 days we returned to an area previously searched to record proportion of chicks banded.

Results: 318 chicks banded: 246 ARTE, 72 COTE, 38 'tinies' i.e. 22.6% COTE. An earlier census of identifiable adults by Jason Hudson found 406 ARTE, 174 COTE, i.e. 30% COTE. Chick banding likely underestimates COTE % as they nest slightly later and may suffer greater mortality from interference by alcids. It was my impression (uncontaminated by data!) that we found more dead chicks in rocky areas where puffins & razorbills nested densely, & that these chicks (mostly COTE) may have died as a result of alcids blundering across them en route to & from their nests. We plan to investigate this quantitatively in future years.

Mark/recapture experiments: I conclude that ~68% of chicks are found on one banding pass:

14 July 98				15 July 98			
	ARTE	COTE	TOTAL	ARTE	?	COTE	TOTAL
Recap	34	7	41	15	2	3	20
New	14	4	18	8	0	2	10
			59				30
% recap = 69				% recap = 67			

Applying this to our total of 356 banded (or marked as 'tinies') suggests there were actually 524 chicks alive between 13 and 16 July.

* Our criterion for identifying species, based on MSI growth curves measured by Krista Amey, is: wing-length $\geq 50\text{mm}$: tarsus $\geq 17\text{mm}$, COTE; tarsus $< 17\text{mm}$, ARTE. Wing-length $< 50\text{mm}$: ??

Objective (iii): assess whether the recent increase in apparent ratio of COTE on MSI represents a real increase in COTE - and therefore decrease in ARTE - or improved measurement of % COTE.

This is important because MSI holds most of the Gulf of Maine ARTE population, which is derived from the total census apportioned to COTE and ARTE according to estimates of the species ratio.

Jason Hudson kindly made available to me his counts of tern species ratios from 1994 through 1998. In 1996, 1997 and 1998 he added new counting points to achieve better coverage of the island. To assess whether the ratio has actually changed recently we need to follow ratios measured at the same points in

each year; only 3 points have been used in all 4 years (no count was made in 1995). Below I show separately the COTE ratios derived from these 3 count-points, and those derived from the total number of points counted each year::

3 constant points	YEAR			
	1994	1996	1997	1998
N (birds)	237	110	172	187
% COTE	5.5	11.8	16.3	12.8
All points: n	8	7	9	13
N (birds)	363	266	383	580
% COTE	6.6	27.1	26.1	30

There does seem to have been an increase between 1994 and 1996. This shows in both the subset of 3 points counted each year, and the total set of an increasing number of points over the years. However because the 3-point subset shows a COTE ratio of about half that of the total set from 1996 through 1998, I conclude that:

- (i) the actual proportion of COTE on MSI has been consistently between 26% and 30% since 1996, and
- ii) prior to 1996 the actual proportion of COTE on MSI was underestimated by a factor of about two (i.e. the real proportion was twice what it was estimated to be).

I would therefore recommend that historical Gulf of Maine ARTE and COTE population estimates be revised accordingly.

FUTURE PLANS

1) Terns

Objective (iv): determine the extent of movement and interchange among Arctic Tern colonies in the Gulf of Maine. We wish to implement a proposal, discussed in previous years, to mark ARTEs breeding (or fledging) on MSI, Petit Manan, Matinicus Rock and Peter Island (NS) with single island-specific colour bands bearing an individual alpha-numeric code. We would also undertake genetic analysis using 2-3 feathers plucked from the breast of each bird handled (or a sample thereof if numbers handled exceed funds for genetic analysis). Ideally this would include trapped adults as well as chicks. At this point I am seeking feedback from GOMSWG as to the likely extent of collaboration and help in seeking funds for this project. Twofold aims are to measure extent of movement (and 'interchange', i.e. breeding by birds that move) between islands, by documenting movement through resightings of banded birds; and to examine the population impact of this movement through the genetic structure of the 'metapopulation' (if such it proves to be). The conservation implication of course is that if the GOM 'population' is actually a metapopulation, management interventions on one island will affect others.

2) Puffins

Objective: to establish a marked cohort of ~200 known-aged individuals in the breeding population in order to track year-to-year changes in survival.

Until last year we had been continuing David Nettleship's program of colour-banding chicks caught at night at the light while fledging. We continue to band fledglings this way but have abandoned the colour-bands David was using as the material used was lasting poorly. Ian Jones has better plastic colour-bands that he is using in Newfoundland and Labrador and we plan to use these from 1999 on, for adults as well

as chicks, in a small area of the island which we can monitor intensively. We will continue the colour-coding used by David as it accords with the overall colour-marking scheme used throughout the Gulf of Maine. I have investigated possible anodized (coloured) metal bands but am advised - by all but the band manufacturers! - to stick with Darvic or a similar plastic.

We wish to enhance this study to examine the genetic structure of the GOM Puffin population and seek GOMSWG's collaboration in collecting samples of 3-4 breast feathers plucked (not cut) from all individuals handled in the next 3-4 years. A detailed proposal will follow but at this stage I am seeking feedback from GOMSWG as to the likely extent of collaboration. It will be particularly interesting to see if we can measure the extent of introgression of Newfoundland birds into the GOM population, and ACWERN's personnel in Newfoundland will be particularly helpful in this regard.

PETIT MANAN ISLAND - Reported by Yasmin Lucero

After an otherwise normal beginning the 1998 season took a somewhat inauspicious turn with the arrival of an immature Snowy owl, who proceeded to take up a nightly roost on the west side of the island. The owl was seen taking terns along the boardwalk, and also seems to have developed a taste for adult Laughing Gulls, as a number of headless adult gulls were subsequently found near their nests in the northwest quadrant of the island. The owl was present on the island for at least 5 nights, at which point the entire tern colony abandoned the island. FWS personnel brought out leg-hold traps in an effort to secure the owl, but it departed on its own before the traps could be deployed.

Terns subsequently returned to Petit Manan, although it appears that a substantial number may have sought more favorable nesting areas in Blue Hill Bay. The first 2-egg clutch was seen on May 30, and the first tern chick was seen on June 19th, suggesting that laying and incubation may have resumed on around May 28th - approximately one week late.

The island-wide count was conducted on June 20, which may have been slightly early as we appear to have had a number of late nesters, some showing up as recently as the first week of July. A total of 1305 nests were located, with a correction factor of 0.066, giving us a corrected total of 1397 terns for the season. A detailed survey of species numbers throughout the island produced a total of 298 Arctic terns and 1005 Common terns, suggesting an overall 23/77% species ratio. This is down from previous years, but we feel that the extreme clumping of Arctic terns may have lead to overestimates in the past. Applying the correction factor we conclude that a total of 318 Arctic terns and 1079 Common terns were nesting on the island in late June of this year.

Roseate terns were censused by intense observations from blinds along the island's periphery. A number of nests appeared outside of the official census window, so we feel that our estimate of 19 is low by approximately 7-8 pairs. Several "field readable" bands were read during the course of the season, and were particularly gratified to find a 1994 Petit Manan chick breeding with a 1995 Petit Manan chick.

Average clutch size at the time of the count on June 20th for Arctic terns was 1.45 (sd = 0.53, N = 131, range 1-3) for Common terns the average clutch size was 1.67 (sd = 0.61, N = 239, range 1-5) and for Roseates average clutch size was 1.13 (sd = 0.34, N = 19, range = 1-2). This estimate is also probably on the low side as several nests in our study plots had additional eggs added outside of the census window.

Fledging success for Arctic terns was 0.96 chicks/nest (sd=0.71, N=30 range = 0-2), for Common terns fledging success was 0.98 chicks/nest (sd=0.76, N=55, range = 0-2) and for Roseates, fledging success was 1.05 (sd=0.22, N=19, range = 0-2).

Perhaps the most dramatic tern activity was the almost total abandonment of the entire northwestern quarter of Petit Manan, with all species crowding into the East and particularly the southeast along the berm and immediately south of the Generator. Arctics totally dominated the area immediately south and east of the helipad, while Commons were in the great majority along the immediate edge of the vegetation along the eastern and southern periphery of the island.

Food appeared to be good throughout the season, with Herring and Hake serving their usual role as primary food components for the terns. Herring constituted 59% of identified prey, while Hake made up 26%. A surprisingly strong showing by Pollock (12%) may suggest a shift in prey species in the vicinity of the island. We also saw Butterfish (8.6% of total identified) being fed successfully to large chicks.

Puffin activity was high throughout the season, with puffins on shore throughout the daylight hours. Our high count for the year was 98 on the 11th of June. By July 28th we had confirmed 17 nests and banded 10 chicks. Several additional nests were suspected. We were delighted to see several returning Petit Manan-banded birds, as well as individuals from Seal Island and Machias Seal.

Razorbills were observed throughout the season, with a high count of 16 on June 29. Although we saw repeated copulation we have no evidence of nesting this year.

Guillemot numbers appear to be down from previous years. We estimate 82 nesting pairs this year. Suitable habitat appears to be in short supply, as a number of eggs were laid (And subsequently abandoned) in shallow cracks and crevices in the rocks. Survival in more protected areas appeared to be good.

The Laughing gull census this year was interrupted by a run of bad weather, and by the time we could resume there were multiple chicks already hatched out and dispersing from nest sites. Five hundred and nine (509) nests were counted with an estimated 15% recap error, giving a corrected total of 599 nests - a number similar to previous years. Laughing gulls reappeared east of the boardwalk & continue to spread into the Northwest, although predation by the owl may have deterred some birds from fully exploiting former tern areas.

Discussion:

Nisbet asked about the owl on the island. The Snowy Owl was last seen on 20 May, so there was an 8 day gap from the time the owl left and the terns began laying eggs. Benedict added that when the owl left, a non-breeding Peregrine Falcon showed up for 3 days, causing the terns to abandon again for 3-4 days. Some of these terns had already begun laying. Normally the island receives repeated short visits from peregrines breeding at Acadia, but this one remained for 3 days straight. A Bald Eagle was also seen visiting the intertidal area between Green and Petit Manan I.

Megyesi asked about ATPU chicks. Welch said 13 chicks were grubbed and banded, but that more were suspected to have fledged. A high count of 111 ATPU (including juveniles on the water) were counted in the 1st week of August.

Kress asked about LAGU depredation on terns and changes in nesting distribution. Lucero said that as the vegetation changes, terns generally leave the area and LAGU moves in. In the NW quadrant of the island (where terns abandoned) signs of depredation were found, but they are not sure of the cause. There was no direct depredation observed, but researchers were not specifically looking for it.

COMMON EIDER WORK ON GREEN I / PETIT MANAN - Reported by Brad Allen

This was the final year of Kim Mawhinney's Ph.D. study on Post-hatch Ecology of the Common Eider . . . Does gull control increase duckling fledging success? Once again, no HERG's or GBBG's

were allowed to nest on these islands but both species were present loafing on the island during the eider nesting, hatching, and brood-rearing period. As many as 100 GBBG's were present at the peak eider hatch (2-3 weeks later than normal this year) and were observed predated ducklings as they are so capable of. This year, 1086 COEI nested on 5-acre Green Island, with another 75-100 estimated for PMI. In 1998, 131 hen eiders (132 in 1997) were captured and fitted with nasal disks of various shapes and sizes and many were observed with ducklings during the brood-rearing period. In general, many (if not most) of the hen eiders appear to take their duckling to brood rearing habitat around PMI. We've always suspected that some females take their young to mainland brood rearing habitats 2-5 miles away. This past summer, 5 marked hens were observed on the mainland with ducklings. We surmised that the foggy June weather may have provided the cover these ducks need to escape the gauntlet of Black-backed gulls from nesting island to the mainland. There is much more to report on this study and I would be glad to provide anyone interested in eider research with the final report once all the information is analyzed and the final report is written.

Discussion:

A discussion followed about COEI nesting and the effects of GBBG and HERG. Nisbet suggested it would be better to let HERG nest and only discourage GBBG, because HERG protect COEI against GBBG and crows. Nisbet said that HERG don't really eat COEI ducklings. Allen said he had never seen HERG take ducklings and asked if anyone had seen this to let him know. Only one observation had been made in the group of a duckling being taken (as it was making its way to the water). One person had also observed swoops. Schick reminded the group that the large COEI population had not been there before the gull control on Green I. Initially both HERG and GBBG were controlled. 60-80 pairs of HERG tried to nest on Green this year.

SHIP AND TRUMPET ISLANDS - Reported by Christina Sulzman

Tem Census: The first COTE nest was discovered on Ship Island on 24 May this year. No tern activity was observed on Trumpet Island. A nest census was conducted on 19 June on Ship Island and a total of 500 COTE nests were counted (0 unmarked nests were counted for Lincoln Index correction). However, on 18 June it was discovered that a large section of the colony had been depredated during a stretch of rainy and foggy weather when island personnel were off the island. Gull tracks were discovered in this area and a HEGU with an injured leg was observed loafing nearby at low tide. During the census, 40 nests were counted with evidence of predation in this area and another 40 to 60 nests were estimated to have been predated based on previous observations of the colony from a blind. Therefore, the colony nest total is estimated to have been between 570 to 600 nests before this predation event (an increase of at least 100 nests from last year). A re-nest census was conducted on 7 July to estimate re-nesting effort. A total of 156 unmarked nests were counted. However, some of these nests may also have been late nesting COTE.

ROST were seen or heard on Ship Island on 5 different days throughout the season. On 20 June, one pair was observed several times throughout the day and landed briefly in the colony. However, no ROST nests were found on Ship this year.

Productivity: Average clutch size for the colony was $1.78 \pm .58$ (N=473). For nests followed to 15 days after hatching in productivity plots and feeding studies, average clutch size was 1.85 eggs/nest $\pm .57$ (N=33), hatching success was 95%, and productivity was 1.70 fledglings/nest $\pm .55$ (N=33).

Chicks within the productivity plots (24 nests) were followed until first flight (usually between 24 and 28 days after hatching). Out of these nests, one chick died before turning 15 days old and 5 additional chicks died after reaching the age of 15 days (between 15 and 28 days old).

Feeding Study: A total of 2001 feedings were observed at 21 COTE nests during 214.25 hours of feeding study observation on Ship Island this year, yielding a feeding rate of 2.22 items/hour.

Known Prey Items (68 % of total):

	<u>1998</u>	<u>1997</u>
Herring	48%	67 %
Pollack	24%	1.5%
Hake	8%	20 %
Other fish	3%	1.5%
Insects/Amphipods	16%	9 %

Unknown Prey Items (32% of total):

Unknown item/Unknown length	50%
Unknown Fish	26%
*Unknown item \leq 1.0 in length	24%

*Many of these items likely to have been insects/amphipods but small size made accurate identification difficult.

Percentages of Herring and Hake decreased while percentages of Pollack and Insects/Amphipods increased from last years numbers (1997 - Herring 67%, Hake 20%, Pollack 1.5%, Insects/Amphipods 9%). Herring dominated over all other prey items early in the season and then declined while the number of Pollack observed increased as the season progressed.

COTE Adult Recapture: Since COTE have only been nesting on Ship Island in significant numbers since 1997, ten nesting COTE adults with bands were trapped to determine from where terns in this new colony may be coming. Of these 10 birds, 5 were banded as AHY on Petit Manan Island (1 in 1993, 1 in 1994, 2 in 1995, 1 in 1997), 2 as chicks on Petit Manan Island (1 in 1987, 1 in 1992), 1 as a chick on Seal Island (1993), 1 as a chick on Stratton Island (1995), and 1 was banded at Punta Rosa in Argentina.

Gulls: A total of 16 GBBG nests were destroyed on Ship Island from 21 May to 25 May (15 with eggs, 1 with no eggs). No gull nests were destroyed on Trumpet Island. A single HERG was observed predating a COTE nest with eggs on 22 June and taking a chick from the colony on 26 June. Two pairs of GBBG were shot this season on Ship Island. One pair was observed loafing near the COTE colony at the high tide line in late June and the second pair was observed making low-flying passes at the colony and taking a chick from the colony in mid July.

COEI: A total of 39 COEI creches were observed around Ship and Trumpet Islands in the months of June and July. A high count of 25 chicks in a creche was counted on 10 June, but most had under 10 chicks. A pair of GBBG were observed attempting to take chicks from 9 of these creches (6 attempts were successful).

A post-hatch nest census was conducted on Trumpet island in mid July (3/4 of the island was censused). A total of 186 nests were found. Of these nests, 108 had evidence of hatching, 46 had evidence of predation, and 46 had no evidence of eggs being present.

Discussion:

Spendelow asked if the ROST were banded. No bands were seen.

Spendelow pointed out that the depredation of nests in the beginning of the season is not accounted for in the productivity estimate. Also, 5 of the banded chicks from plots died after age 15d and were not subtracted from the productivity estimate.

Nisbet asked about the gulls removed from Ship. Both pairs removed were in adult plumage and were not breeding on Ship, but probably were breeding on nearby Trumpet or the Barges. The GBBG that was preying on nests early in the season, was probably taking both chicks and eggs.

Bald Eagles seen just about every day on Trumpet, with a high of 5 hanging out on one day for at least 1/2 day on Trumpet and the Barges. A Merlin (possibly a pair) was also seen hanging around at the end of season and visited daily for 2-3 weeks. 1 chick and possibly 1 adult, or fledged chick, was taken.

Other Islands Surveyed by Petit Manan NWR staff

June 11 - No terns found at: Jordans Delight, Egg Rock (Pigeon Hill Bay), The Castle, Bonney, Chase Ledge, Little Ledge (Dyer Bay), Eastern Island, Bald Rock, Sally, Sheep, Bar, and Western

Island (Gouldsboro Bay)

June 12 - No terns found at: Big Black Ledge (Prospect Harbor), Schoodic Island, and Rolling Island (Schoodic Harbor)

June 19 - Canary Nub - 73 COTE nests (7 - one egg, 41 - two egg, 25 - three egg clutches). Squid Island - 23 COTE nests (4- one egg, 9- two egg, 10- three egg clutches, and two chicks). One COTE nest (2 egg clutch) on Nash Island.

No terns found at: Big Nash, Pot Rock, Ladle Ledges (Pleasant Bay) Sheldrake, Carrying Place, Bar, Shabbitt Island Ledge, Duck Ledges (Wohoa Bay), Black Rock, Flat Island, Little Drisko, Stanley Ledge, Seaduck Rock, Browney Island, Norton Ledges, Batson Ledges, Fisherman Island, Crumple Island, Curlew Rock, Green Rock, Seal Rock, and Egg Rock (Western Bay), Popplestone Ledges, Freeman Rock, and Little Cape Point Ledges (Eastern Bay).

** Port Clyde Brothers was not surveyed in 1998.

Mill River, Milbridge: One pair of COTE continue to nest in the Mill River. Last year the pair successfully raised one chick in a dinghy belonging to a local landowner. This year the pair returned to the site, and laid an egg on the bow of a boat. On 6/1 we moved the egg into a manmade nest on a float. The pair immediately tended the egg, and on 7/2 we banded two chicks.

TERN NESTING ISLANDS, MID COAST MAINE - Reported by John Drury

This work was supported by the Maine Department of Inland Fisheries and Wildlife.

Little green,

May 20,

14:54 6 adult Arctic Terns seen over the eastern beach.

June 21,

11:40, 20-25 ad Terns east beach,

@10 Ad arctic west of the landing,

west of landing, 1 nest w/ 1 egg, 1 nest w/ 2eggs, 1 nest w/ 1 chick, 1 nest w/ 2 chicks, chicks @ 2 days old, total 4 nests

Eastern beach, many scrapes 0 eggs found on the N end of the beach, along the beach I found, 2 nests w/ 1 egg, 7 nests w/ 2 eggs, 1 nest w/ 3 eggs, 1 nest w/ 1 five day old chick, 1 nest w/ 2 2 day old chicks, Total, 12 nests, these nests were spread out along @160 meters of the beach.
1 adult common seen,

July 21, 10:30,

8 very active adult arctic Terns west of the landing, diving on a herring Gull, and sailing around busily.
3 fledglings seen.

Eastern beach,

one pair at the Northern end of the beach, 8 adults at the south end @12 in the middle, @ 22 adult east side, 5 fledglings seen, there were certainly some more. I saw one adult Common,
I did not go ashore it was calm enough to row up along the eastern shore, a very good year here.

Island total, 16 nests found 9 fledglings seen.

Wooden ball

June 17,

4 adult Arctic tern over nesting area ,
no nests found on a search of the nesting area.

July 14

10:45 12 adult arctic Terns up from the nesting area on the NW. shore.

July 20,

12 Arctic Terns over the nest area, 0 nests found, one scrape.

July 23

8 adult arctic Terns, they sail off as we watch from the boat. There was some breeding effort made here this year though apparently late.

Great Spoon Spit.

June 6, 2 Common terns over the spit.

June 19,

10:30, 25-30 Adult Common Terns.

1 nest w/ 1 egg, 13 nests with 2 eggs, 8 nests w/ 3 eggs,
22 total nests.

July 19,

11:00 Great Spoon spit, @ 40 adult common Terns, 4 fledglings seen, 3 found in good cover ashore, one seen flying, I suspect that there are many more. The adults were very attentive, there has been good success here. Also one nest with three warm eggs. Leave 11:50.

Dry money ledge,

June 6, 13:14

6 ad common Terns, can't get them to flush, could be quite a few more,

June 19,

13:00, 30-35 common Terns adults,

3 nests w/ 1 egg, 7 nests w/ 2 eggs, 8 nests w/ 3 eggs, 2 eggs dumped , 3 eggs cold
18 total nests,

13:30 leave dry money ledge,

July 19,

13:00 30 adult Common Terns, 3 fledglings seen flying,

High count of five fledglings 4, seen on row around the island, one in the nesting area, 8 well used nests,

6 nests w/ eggs probable re-lays. 35 adults attending fiercely. There were no gulls on the ledge.

Three bush Island,

June 8, 12:50, 2 groups of Common Terns, 60 on the western shore, 30 on the NE corner.

June 19,

14:22, @150 Adult Common Terns.

North Eastern corner group: 6 nests w/ 1 egg, 26 nests w/ 2 eggs, 9 nests w/ 3 eggs. 1 nests w/ 1e, 1chick, 3 nests w/ 2 chicks, 1 nest w/ 1chick+ 2 eggs.

Total, 46 nests.

There is a gap and the rest of the Terns were nesting from the S tip of the island around to near the eastern group all up the western shore, the gap seems to have been caused by the presence of a Herring gull nest.

Western group, 18 nests w/ 1 egg, 73 nests w/ 2 eggs, (2 nests w/piping eggs, 25 nests w/ 3 eggs, 1 nest w/ 2 chicks, 2 nests w/ 1egg+ 1 chick, 1 nest with piping eggs. Total 119 in western group

island total 165 nests,
@200 adult terns around as we leave.

July 19,

15:30 @200 adult Common Terns attending vigorously, @ 20 fledglings seen, there were certainly many more.

I made a quick visit to part of the well used nesting area, I found only 2 chicks in the veg.
There has been good success here this year.

Hog island

June 21, 14:56, , 5 ad arctic eastern beach, 0 over the southern nesting area,
1 nest w/ 1 chick, @ 2 days old, 1 nest w/ 2 eggs, 1 nest w/ 2 chicks. Total 3 nests.

Metinic S end,

June 21,

@ 50 adult over nesting area west of the houses,

3 adult Common seen, the large majority of these were Arctic,

8 nests w/ 1 egg, 14 nests w/ 2 eggs, 2 nests w/ 3 eggs, 4 nests w/ 1 Egg + 1 chick, 2 nests w/ 2 chicks.

Total 30 nests,

2nd clump, @60 meters south along the western shore,

2 nests w/ 1 egg, 6 nests w/ 2 eggs, 3 nests w/ 1 egg, 1 chick,

Total, 11 nests.

3d clump on the SW facing beach @ 80 adults, @ 1/2 Common,

11 nests w/ 1 egg, 32 nests w/ 2 eggs, 11 nests w/ 3 eggs, 1 nest w/ 2 chicks, 1 nest w/ 1 chick, 1 nest w/ 1 egg + 1 chick,

total 57 nests,

20-25 adult Arctic Terns over the SW tip disjunct by @ 30 meters from last clump,

4 nests w/ 1 egg, 6 nests w/ 2 eggs, 1 nest w/ 3eggs, 3 nests w/ 1 egg+ 1 chick, 2 nests w/ 1 chick, 3 nests w/ 2 chicks,

Total 19 nests,

S end Metinic total, 117 nests @ 30 of which were Common.

July 21,

12:00, Metinic, western shore SW of the houses,

7 fledglings and 25 adult at the first nesting group,

15 fledglings seen and 80 adults the flock is much augmented here perhaps birds that failed elsewhere and were drawn in by this active successful site.

60 adult terns @1/4 common 40 from off the seaweed below what was the largest nesting area SW corner,

@30 out of the nesting area, one adult Roseate seen, 5 fledglings seen,

30 adult terns 4-5 common, and 5 fledglings seen at the last SW tip group.

SW shore of Metinic @200 adult terns seen total, 32 fledglings seen from the dory, this has been a good year here. Quite a lot of the adults seemed unemployed perhaps a mid day loaf perhaps birds who did not breed or failed elsewhere, (the brothers Port Clyde?)

Little Two bush,
May 20, 0 terns

June 21, 18:00 3 @ 3day old common Tern chicks, at 1 nest site.

July 22,
4 adult Common Tern seen, at least one fledgling seen 2nd?

There was also a report of terns nesting in Seal Bay on Vinalhaven on a place raccoons can walk to at low tide. Downy young were seen this year, but needs to be confirmed.

Zero Tern Islands:

Jericho bay:

Saddleback ledges Mason ledge, Heron island (western shore), Brimstone (Burnt coat harbor) John's island, Gooseberry (Burnt coat harbor), High Sheriff, Southern Mark, Fog Island knob, Green Ledge (Fog Island), Egg Rock, (west of Casco passage), Halibut rocks, Little Spoon,

Penobscot Bay:

Large Green, Yellow ridge, Hurricane, clam ledge, Oak island, crescent island, two tree N of High island, Medric rock, Diamond rock, Green ledge (east side of VH.) Carvers, Roberts, Little Roberts, Otter, Hay, Brimstone, Little Brimstone, Moores Harbor Knob (isle au Haut), The Brothers July 22(Tenants harbor)

Matinicus group:

Green ledge, High ledge, Camp cove ledge, pudding island, Ten pound, two bush, No man's land,

Great Cormorants

There were 150 great Cormorant nests counted at 10 sites on 8 islands. There were 147 nests counted in '97. There were 260 counted in '92

The counts were made from a boat by John Drury except Seal island which were counted from shore by Andre Breton and Terry Goodhue.

Little Roberts, May 31, 8 nests. July 25, 16 chicks.

Little Spoon,

SE group, June 6, 42 nests, July 19, 47 chicks and 4 adults brooding small unseen chicks.

NW group, June 6, 27 nests, July 19, 26 chicks from @12 nests.

The average success for both groups was @ 1 chick per nest, though at the NW group apparently more than half the nests failed altogether.

Great Spoon Spit,

N. end from the east, June 6, 22 GC nests, July 19, 42 chicks, at 20 nests.

Highest part of the spit, June 6, 8 nests, July 19, 8 chicks at 5 nests.

Brimstone island (Burnt Coat Harbor)

June 6, 1 nest, July 19, the nest was abandoned.

John's Island,

June 6, 2 GC nests on the southern shore, below 35 Double-Crested cormorant nests.

June 19, 2 GC nests NE corner, July 19 2 chicks from 1 nest, the other abandoned.

Southern Mark.

June 8, 16 GC nests, July 19 41 GC chicks at @15 nests.

Green Ledge,

June 8, 12 GC. nests July 19, 15 GC chicks at 8 nests and there was 1 adult brooding small unseen chicks.

Seal Island @ May 30, 10 GC nests counted from shore.

Razorbills, Murre

Freeman rock,

June 7, 07:45 58 adult.

Yellow Murre ledge, June 7, 11:30, @100 adult Razorbills and 100 adult Murre.

Estimate 50-60 breeding pairs of each.

20 Herring Gulls Roosting and 3 Immature Great Cormorant.

Old man Island,

June 7, 150 adult Razorbills counted around the island.

0 Great Cormorant nests. 2 immature GC.

There were @5 Canada Geese at each, Old Man, Eastern Libby and the eastern Brother.

Mink, Guillemots On, Otter, Roberts, Hay, and Carvers.

We set Mink traps on all four islands starting on April 9. The last traps were taken up on May 7.

We caught just 1 Mink it was on Otter. There had been 4 Mink caught in '97, 3 from Otter and 1 from Roberts.

Two Mink were trapped on Otter in '96

The Island were surveyed by five observers during the first week of August for evidence of breeding effort by Guillemots.

Roberts Guillemots.

May 14 52 adults, May 16, 42 adults.

In '97 there were 3 sites with live chicks and 5 with dead chicks.

This year we found 3 sites with live chicks and none with dead chicks, and 5 sites that had unhatched eggs.

Carvers Guillemots

May 14 , 156 adults counted around the island. May 16, 143 adults.

In '97 we found live chicks at 2 sites and dead chicks at 10 sites.

In '98 we found live chicks at 8 sites, dead chicks at 2 sites and we also found 18 sites that had chick guano where no chick was seen that we judged to have possibly fledged.

Hay Guillemots,

May 14, 41 adult Guillemots counted around the island, May 16, 50 adult.

In '97 we found, 1 dead chick, 4 dead eggs at three sites, and two dead adults.

In '98 we found, 9 live chicks at 5 sites, 1 dead chick and one site with chick guano no chick seen possibly fledged.

Otter Guillemots,

May 14, 57 adults around the island, May 16, 96 adults.

In '97 we found, abandoned eggs at 2 sites, dead adults at 3 sites, and dead chicks at 5 sites.

In '98 we found, 10 live chicks at 8 sites, 8 sites with chick guano no chick seen possible fledge, and 2 dead chicks.

Brimstone Guillemots,

There were 100 sites found on Brimstone with evidence of Guillemot breeding effort this season most of these sites were successful.

Discussion:

Kress asked if the distribution on Petit Manan Island and Ship accounted for the change of distribution in terns in the mid coast. Drury didn't think there was much change and that the numbers were similar to last year. Nobody got to Port Clyde this year until Drury's visit on 22 July when no terns were observed. Drury noted that there were a lot more birds late at Metinic this year and that maybe they failed someplace else first and were attracted by a successful site.

Spendelow cautioned about using the presence of adults and fledged chicks at a site as evidence of successful nesting at that site. Spendelow has observed birds in CT bringing their young to sites where breeders have failed, and there could also be 2 and 3 year old birds prospecting.

The dead BLGU chicks found on Carvers Island may not be due to mink. Drury doesn't think a visiting mink will stay for long, unless it is present at a site before the gulls come back and establish and has time to acclimate to the gulls' presence.

The Common Murres on Freeman Rock have traditionally been there and there were ~ 24 adults in 1984.

There was also a pair of Merlins on Green this year that raised 2 young.

EAST PENOBSCOT BAY - Reported by Brad Allen

As in past years, I census the islands that periodically receive use by Common Terns in East Penobscot Bay. For the last few years, it looked as though terns were settling down on the Department-owned Dagger Island in North Haven. However, during the 1997 nesting season, they left Dagger (owl harassment?) and began nesting on islands with substantial gull populations. This year, terns were observed in May prospecting around several islands that they have nested on in the past between North Haven and Deer Isle (i.e. Grass Ledge West, Colthead, Spectacle, Hardhead, Eaton Island Ledge, Pond Island and Thrumcap) but for the most part fledging few to zero young.

On 6/19/1998 I found 5 COTE nests on Grass Ledge West, 2 COTE nests (and 20 adults) on Spectacle Island (West) that looked like a renesting attempt, and 1 COTE nest on Buck Island. In early August I revisited all three sites to look for fledgers but observed no terns on or around these islands. On 5/28/98, while flying and counting adult male eiders, I observed for the first time in many years between 20-30 terns flying over Thrumcap Island, near Little Deer Isle. This has always been a site (IFW-owned) suggested as a candidate for tern management activities in this part of Penobscot Bay. But, recent use of Dagger Island (80-100 pairs in 1996), 10 miles down the bay, put Thrumcap on the back burner. I believe it's time to discuss tern management in this part of the coast again.

SEAL ISLAND - Reported by Andre' Breton

Tem Timetable:

5/18/98	30-50 terns flying over NE end
5/19/98	600-800 terns in am. 15 terns present by 1500.
5/20-5/23/98	1000-1200 in am. Low numbers by 1100
5/24/98	1200-1500 terns in am. gone by noon
5/25/98	1200-1500 terns in am. FIRST TERN EGG (ARTE). 50-100 present at dark. FIRST OVERNIGHT STAY.
5/26/98	FIRST COTE EGG.4-6 additional 1 egg clutches. 100-200 present at nightfall. 1000-1200terns in am.
5/27/98	800-1000 present all day. 300-500 spend the night.
5/28/98	entire colony spends the night. first two clutch observed.
6/16/98	first ARTE chick.
6/20/98	first COTE chick.
7/9/98	first flight for ARTE.

GOMSWG Census Results:

Dates:6/18-6/19/98
Unadjusted Count:1,848
Lincoln Index:1.068
Adjusted Count:1,973

Species Ratio: Sample size of 353 nests identified to species provided a ratio of 187 ARTE (53%)/166 COTE (47%). This ratio applied to the entire colony count of 1,973 nests results in a species ratio of 1046 ARTE/927 COTE.

The 353 nests includes 70 nests identified to species within the island productivity plots (four plots) and 283 nests identified from 6 island research blinds.

COTE Productivity:

Method: Fenced Plot
Sample Size: 31 nests
Mean Fledge: .87 (sd=.34) (mean fledge 1997=1.1)
Mean Hatch: 1.81 (mean hatch 1997=2.04)
Mean Clutch: 2 (sd=.52) (mean clutch 1997=2.25)

ARTE Productivity:

Method: Fenced Plot (39 nests), Feeding Study (21 nests)
Sample Size: 60 Nests
Mean Fledge: .90 (sd=.33) (mean fledge 1997=1.1)
Mean Hatch: 1.60 (mean hatch 1997=1.65)
Mean Clutch: 1.83 (sd=.38) (mean clutch 1997=1.85)

ROST Timetable:

6/12 Pair observed in courtship feeding.

6/20 Pair observed in vocalizing/courtship flight.
7/4 Pair observed vocalizing/courtship flight.
7/23 (1) egg clutch found.
7/30 egg cold/abandoned.
7/30 - 8/9 (1-2) ROST's observed vocalizing in flight and landing frequently in tern colony.

Feeding Study Results:

Species: ARTE
Sample Size: 21 nests
Mean Fledge: .90
Total Hours observation: 902.75
Total Feedings Recorded: 2089
Feeding Rate: 2.31/hour
Feedings Recorded to Species: 1824
Top Four prey Items with number of feedings observed in 1998: 1998:Hake=58%,
Amphipod=15%, Herring=9%, Ant=2%

Gull Census:

Dates: 6/19,6/23,6/26,6/27,7/12
Method: Direct nest count
Results: GBBG=129, HEGU=90
All eggs in nests were poked; 35 of the nests were destroyed because they were in close proximity to nesting terns or ATPU.

Cormorant Census:

Dates: 5/24/98-land count (GRCO), 6/10/98-boat count (DCCO)
Method: Land count and boat count
Results: GRCO=10 well built nests (wnb), DCCO=21 wbn

Puffin Colony Size:

Colony Size: 76 breeding pairs (as of 8/9/98) (colony size in 1997=58 pairs, in 1996=40 pairs).
High count of 112 in 1997 and 168 so far for 1998. Productivity not available yet.

Discussion:

Drury asked what percentage of COTE had 3-egg clutches. Breton Of the 320 COTE and ARTE nests (353 used in final species ratio estimate), only 16 had 3 eggs, all of which were COTE. This led to 53% ARTE and 47% COTE.

Lucero asked if Breton felt comfortable that they overcame the problem of clumping when they were calculating species ratio. Breton said he was confident of the percentages; they got the same ratio from the 353 nests and the 70 nests in the four productivity plots. Lucero added that they have had problems with species ratio on PMI and feel that in past years they have been overestimating the percentage of ARTE. On PMI, they feel really comfortable with the outcome of the species ratio this year.

MATINICUS ROCK - Reported by Christina J. Maranto

Introduction

Matinicus Rock, a 32 acre island situated in outer Penobscot Bay, is an important breeding site for many seabirds. The diversity of the seabird colony on Matinicus Rock is exhibited by three species of terns, Razorbills, Atlantic Puffins, Black Guillemots, Leach's Storm-Petrels and Laughing Gulls. In 1998, we continued the research that was begun on the seabird colony in 1979. This report will summarize the results of the census, as well as research conducted on Arctic Terns, Atlantic Puffins, Common Murres, Razorbills, and Laughing Gulls. The daily activity of a Manx Shearwater and the apparent increase in the seabird tick *Ixodes uriae* will also be discussed.

GOMSWG Census

The census was conducted between 18 June 1998 and 20 June 1998 (3 days due to fog conditions). The total count for Arctic and Common Tern nests combined was 877, with a corrected value of 888 using the Lincoln Index. This total is down 136 nests from 1997 (13.3% decline).

The species ratio of Arctic and Common Terns was performed by identifying nests to species from various locations in a portable blind in Tern Census Sector 1, the main nesting site of Common Terns on the island. Sixty-seven percent (55/102) of the nests in Tern Census Sector 1 were identified to species. Of these identified, 54% were Common Terns (COTE) and 46% were Arctic Terns (ARTE). This yields a total of 84 COTE nests for the main COTE area. Additional sightings of COTE nests add 13 to the total, yielding 97 COTE nests and 791 ARTE nests.

Laughing Gulls were also censused. A total of 343 nests were counted, exhibiting an increase in 21 nests (6.5%) from 1997's number of 322.

Arctic Terns

Productivity

Productivity was determined for Arctic Terns by following chicks, up to a fledging age of 15 days, from two enclosures and 12 feedings studies (72 nests). From these nests, mean clutch size was calculated as $1.77 \pm .45$. Mean # hatched/nest and mean # fledged/nest were also calculated as $1.13 \pm .86$ and $.43 \pm .62$, respectively. The productivity calculation (mean # fledged/nest) is extremely low when compared to previous years. It is suspected that the reason for the decline in productivity this year is most likely a result of Laughing Gull predation suspected in the largest tern enclosure, which includes 40 of the 72 nests. Due to the suspected predation, the productivity for the largest tern enclosure was calculated separately as $.075 \pm .26$.

Chick Provisioning Study

Twelve Arctic Tern nests were observed for a minimum of 36 hours (12 hours/week) in the provisioning study. A grand total of 1375 feedings were recorded for the combined nests. 88.8% of these feedings (1221/1375) were identified. Out of the 1221 identified feedings, 11.4% (139) were amphipods, 12.6% (154) Herring, 68.8% (840) Hake, and 7.2% (88) other (includes food items that were represented less than 5% in the diet).

Relative sizes of food items were also recorded in the chick provisioning studies. The size of the food was estimated by comparing the length of the food item to that of the bill, from the tip of the bill to the culmen. Data were analyzed for only major food items. Amphipods were the smallest in size, averaging $.25 \pm 0$ bill lengths. Hake and Herring were larger with average values of $1.15 \pm .46$ and $1.76 \pm .42$ bill lengths, respectively.

Atlantic Puffins

Breeding activity for Atlantic Puffins was established by checking all puffin burrows on the island and by observing puffin feedings. Burrows were considered active by the observance of a feeding or the presence of eggs, eggshell fragments or chicks. This year a record high of 171 burrows were found to be active. This is an 18 percent increase from 1997(141 active burrows). The increase in the number of recorded active burrows is most likely a result of an earlier starting date for puffin grubbing and an increasing effort to band chicks. Out of 171 active burrows, 77 chicks were banded, compared to 54 chicks banded in 1997 (42.6% increase).

Razorbills

Razorbill burrows were checked for activity in late June by the presence of eggs, eggshells, or chicks. The number of active burrows has been increasing over the years. This year, however, 42 active burrows (15 eggs, 24 chicks, and 3 eggshells) were found, which is a 47 percent decline from the recorded number of active burrows in 1997 (80). The significant decline is due mostly to the loss of painted burrow numbers and fewer days of grubbing.

Common Murres

The Common Murre attraction program continued this year, the seventh season of the program. Peak numbers of murres occurred in early June and slowly waned throughout the season. The murre high count this year was 16 recorded on 9 June, and was 8 more than the high count in 1997.

Manx Shearwater

The most exciting event of the season was nesting behavior, specifically burrow construction, exhibited by a Manx Shearwater. The Manx was detected several times in late May, flying low over the island at dusk to the west of the boathouse. On 6 July, a burrow was found in the grass that was thought to be of a width similar to a Manx burrow. Observations were conducted in the light tower and from a blind to confirm Manx activity in the burrow. Manx Shearwater daily burrow activity was monitored from 18 July 1998 to 7 August 1998 by placing toothpicks at the front of the entrance for 24 hour periods. During this time, the Manx visited the burrow daily except on 25 and 26 July 1998. The Manx continued to dig the burrow throughout the season, reaching a depth of 19 inches as of 8 August 1998.

The Seabird-Associated Tick *Ixodes uriae*

A dramatic increase in the number of seabird ticks was seen this year. During a grubbing stint, it was not unusual to find 15 to 20 ticks on a person. In addition, many ticks were found on puffin and razorbill chicks, primarily on the feet, the cloaca, the cere, and the nares. Ticks were collected from puffin and razorbill chicks throughout the season and sent to Dr. Peter Rand for analysis. Results of the analysis have not yet been determined.

Discussion:

Drury added that the Manx Shearwater was coming ashore in the morning at first, and that last year a bird was observed visiting the island in May. He suggested there is likely more out there and that people should be looking for them during the night, particularly on Seal I.

Nisbet asked if there were any ants. There are not.

Maranto said that the most ticks were found in the middle of July, with numbers declining at the end of July and early August. Terns were not searched for ticks. No ticks were found on Seal or Metinic; ticks were found on alcids on PMI and submitted to the Maine Medical Center.

METINIC ISLAND - Reported by Wing Goodale

Introduction:

Metinic is a 300 acre island. The USFWS owns about ½ of the island on the northern end. Both people and about 150 sheep inhabit the island. On the southern end of the island (not USFWS owned) and on a nearby smaller island, there is a colony of nesting terns which has stayed about the same size. This was the 3rd season of researcher presence on the north end of the island, and the 1st season of active tern attraction. Historically, a high of 600 terns nested there. In 1996, there were only 33 nest attempts and 7 fledglings and in 1997 only 1 fledgling survived.

Gull/Sheep control:

Non-lethal gull control (pyrotechnics, human presence, etc) and destruction of all nests on the north easternmost part of the island began in 1998. On 28 May, 152 gull nests were counted outside of the tern attraction area. All the eggs in these nests were punctured. Eighteen gull nests were destroyed in the attraction area between 19 May - 16 July. There were problems with the egg rings in determining species ratio, but based on the rings and individual observations, about 15% of the gulls were GBBG. To keep sheep from the designated tern attraction area, a fence was placed across the narrow part of the peninsula.

Terns - north end:

This was the 1st season tern attraction equipment was erected on Metinic Island. Around 20 June, there was increased activity around decoys and terns were landing and staying up to 3 hours. Courtship feedings and copulations were also observed. However, 2 days later, activity dissipated and the terns left. A high count of 16 terns was observed over the attraction area with an average of 4-6 terns seen. The majority of terns observed were ARTE. The COTE high count was 5. No terns nested on the northern end of the island this year.

Terns - south end:

A tern census was conducted on 21 June on the southern end of Metinic and Hog. Only one sweep was made so the Lincoln Index was not used. On Hog Island, one tern nest was found, and three chicks observed, 13 adults were seen which were all ARTE. 115 nests were found in 4 distinct colonies on the southern end of Metinic, 11% were three egg nests, ~200 terns were seen over the colonies (~80% ARTE, ~20% COTE).

BLGU:

Sixteen BLGU nests were found. Seven of these were active and had nine total chicks.

COEI:

Thirty-nine COEI nests were counted on the northern end of the island. A high of 32 ducklings were observed in a creche. Observations of creches were began at the beginning of the extended foggy period in June (making observations difficult) and lasted until 16 July. Some observations resulted in no COEI observations. Only 2 GBBG depredations were observed, or 0.08 depredations of ducklings per hour. COEI spent time in the area where non-lethal gull control was conducted. An average of 33 gulls were seen here at any one time and ranged from 0 - 125 loafing gulls. Only 10 depredation attempts were observed.

Other:

A total of 16 breeding and 59 visiting species of birds were observed.
One American Widgeon was on the island for 1½ weeks, but didn't nest.

Discussion:

Allen asked if BLGU beyond USFWS property were searched for. There was no active grubbing

on non USFWS land, but there are more BLGU on the island on the Post's property. On both the east and west side, 20-30 loafing birds were regularly observed. There isn't much habitat for them to nest on the island.

Drury asked about the reasoning for discouraging terns from nesting on the hillside. There were 600 birds that nested here in 1985. In the past 2 years, terns nesting on the hillside have been depredated by the adjacent gull colony. The peninsula was chosen as the attraction site to concentrate efforts in an area where sheep can be excluded and gulls can be controlled. There are also quite a few COEI on the hillside. Nesting gulls may be fairly scattered on the hillside but there is a large concentration of loafing gulls around the rock wall on the hillside. Nisbet asked if trapping gulls would affect the COEI. There are about 150 gull nests there, but it could be done. Nisbet suggested only trapping GBBG.

Allen asked if they were successful at keeping sheep out? They were not. Sheep went through the water to get around the fence. They were herded out of the area twice per day, and there was an average of 8.6 sheep/visit. The sheep were also herded at the end of May by the owners. The herding went through the COEI nesting area but herders avoided nests and only 2 hens were flushed off their nest. The next day, 43% of the nests were checked and none looked disturbed. Hatch asked how COEI respond to sheep vs. people. They don't seem to be disturbed by sheep. The COEI nest in raspberry patches and the sheep stick to trails around the raspberry. Island staff also avoided the area as much as possible. Someone asked how gulls respond to sheep. Terns were seen chasing and dive bombing sheep and gulls were seen dive bombing sheep later in the season when they had chicks. Hatch asked why they were bothering to exclude sheep then. Benedict stressed that it was more of a vegetative decision. In the past few years they have observed adults trying to move their chicks soon after they hatch to any type of cover available because the grass has been grazed so short. If sheep are excluded from an area, the vegetation can regenerate. The soil is very acidic with a pH of 4 - recommended 11,000 lbs lime /acre. A vegetation study was conducted this year that showed vegetation grows higher when sheep grazing pressure is reduced. There are verbal accounts of sheep and terns coexisting, but the productivity of the terns are unknown. On Green Island, when sheep were taken off the island, the grass grew and the terns left, and on many other islands the problem is vegetation that is too high, not too short. Maybe a controlled amount of grazing at certain times of the year will be best. Hatch also suggested that sheep may eat tern chicks. Nisbet wondered where the sheep get their calcium from. Do they eat seaweed? Yes. Someone suggested increasing the fertility of the soil on part of the island. Kress doesn't think fertility is the problem and suggested tern chick shelters as cover. These have been used in the past, but gull depredation is still an issue.

Schick was surprised at the low response of the terns to the sound system and wondered if it would be better to use ARTE sounds. Kress didn't think the colony sound was the problem, but ARTE recordings would probably be better. He suggested the competition with a real colony on the south end of the island may be responsible for the low response to the attraction at the north end.

Nisbet asked if there are cats on the island. Drury said there are no feral cats, but the Post's sometimes bring theirs out in the summer.

Also observed were Northern Harrier (once), American Kestrel (once), Merlin (twice), and an immature Bald Eagle (two days). No owls were seen.

EASTERN EGG ROCK - Reported by Terry Goodhue

PUFFINS

- 25 burrows observed to have feedings up from 20 similarly defined in 1997 (22 were considered active in 1997)
- 6 burrows did not reach the fledge date of 21 days by the time we close the EER station
- 3 burrows were discovered the last week we were there

7/17/98 Loafing → Seen on MSI
 (R) (L)
 BL RED
 RED MONEL

Yellow (R) leg
 U21

Seen also earlier perhaps

TERNs: JUNE 19 CENSUS

Common Terns

- 1370 nests
- 1396 with Lincoln Index applied (1997: 1441 nests)

Productivity: 66 Nest Sample

- Mean fledge 1.17 fledgers/nest S.D.: 0.76
- Mean clutch 2.64 eggs/nest S.D.: 0.54
- Mean hatch 2.21 chicks/nest

FEEDING STUDY: 21 NEST SAMPLE

- 1152 feedings: 908 with identified species: 79% identified

1998	1997	1996
80.9% White Hake	61%	45%
13.0% Atlantic Herring	15%	10%
.4% Butterfish	1%	22%
3.9% American Pollock	.88%	1.9%
.9% Stickleback		
.2% Amphipods		
.3% Lumpfish		
.3% Sand Lance		

ARCTIC TERNS

- 81 nests from ground count (94 in 1997)
131 eggs/81 nests
clutch size = 1.62

ROSEATE TERNS

- 144 nests from direct count (138 in 1997)

Productivity: .84 fledgers/nest from sample of 25 nests S.D.: 0.69 (1.4 in 1997)

- Mean clutch: 1.88 eggs/nest S.D.: 0.33 (2.0 in 1997)
- Mean hatch: 1.36 chicks/nest (1.87 in 1997)
- Clutch size from total population of Roseates: 1.5 eggs/nest

LAUGHING GULLS

- 575 nests from island wide census up from 550 last year.

Discussion:

Goodhue also compared weather and productivity losses. There were 2 weeks of bad weather in June with 50mph winds, days when it rained 3 inches (many days had 1/2 inch of rain) and only 2 days when the visibility was more than 2 miles. For 5 days in a row, the temperature never got out of the 60's. Of the 120 chicks that died before fledging, 64 died during this two week period, and of the 221 total eggs that didn't hatch, 123 were lost during this period.

Nisbet asked how ROST productivity was measured. 25 marked nests were used and chicks were followed for 10 days and weighed until day 3. The productivity estimate above is based on survival to 10 days but they will also be plugging weights into the function to compare the two methods. They hope to cut back on using the 10 day method because it is very disturbing and probably underestimates ROST survival.

There was some evidence of LAGU depredation where nests were really close to terns.

During the rainy period, terns were building nests higher and higher-sometimes the center of the nest was a few inches above rock. Nisbet added that they can build nests 4-6 inches within a few hours. Deluca added that in N.H. in salt marshes, nests often get flooded out and they can easily nest 3 times each time building their nest higher (up to 8+inches).

THRUMCAP - Reported by PMNWR

No terns nested this year. One pair of American Woodcocks and 1 pair of Common Eiders nested.

GOOSE LEDGE - Reported by Damariscotta River Association

Due to foggy and inclement weather we did not go aboard the very small Goose Ledge during the survey period and restricted observations to those possible from a boat. On two occasions (16 and 19 June), six Common Terns were counted on and above the ledge, two of which were on nests. From bird counts on these and other nearby dates, we estimate that there were, in fact, three nests, one of which we did not see.

On 2 July, two chicks were spotted; circa 10 adults were counted on the ledge and flying nearby.

On 17 July, three nearly fledged chicks were seen huddled together at the water's edge,; at one point 12 adults were on the ledge and 4 others were overhead. All were defensive and seemed to be protecting the chicks.

On 19 July, at the time of our visit, no terns were seen on Goose Ledge. However, were counted three newly fledged chicks and a number of adults resting on oyster trays at a nearby aquaculture site. We assume that these were the same three seen on the ledge two days earlier and, if so, they represent the first confirmed fledglings in a number of years.

Large numbers of Common Terns were routinely seen feeding on the upper third of the Damariscotta River during mid - and late July. We suppose that most were commuters from Eastern Egg Rock.

POND ISLAND NWR - Reported by Keri Parker

Gull Control

Gull control on Pond Island in the past has included nest destruction, the shooting of problem birds, treatments using the avicide DRC 1339, and human presence on the island. During the 1998 season only nest destruction and human presence were necessary.

A total of 92 gull nests were destroyed this season, including 25 Herring Gull nests, 24 Greater Black-backed Gull nests, and 43 empty nests. These numbers indicate a substantial decrease in gull activity on Pond Island, as 226 nests were destroyed in 1997, and 1126 nests were destroyed in 1996.

Owl Predation

Two Swedish Goshawk traps baited with live pigeons, and two leg-hold traps were operated and maintained this season. The traps were placed in areas of the island where owl predation was evident early in the season. Two Great Horned Owls were trapped; both birds were captured in the leg-hold

traps. The first, caught on June 6, was previously captured and banded on Pond Island during the 1996 season. The second owl - previously uncaught, was captured and banded on July 4. Both owls were relocated to areas more than 50 miles away from Pond Island.

Eider Productivity

This is the second year the hatching success of Common Eiders has been followed on Pond Island. Out of the 40 nests followed this year, 45% were determined to have hatched, up from 27% in 1997. 7.5% of the nests were determined to have been depredated by gulls, down from 15% in 1997. 22.5% of the nests were abandoned, and 5% of the nests were washed out of flooded areas. This is an increase from the 13% abandoned in 1997, possibly due to the flooding which occurred on the island during the month of June. The outcome of 20% of the nests was unknown, mostly due to the scattering of nest remains by heavy rains. This is down from 44% unknown in 1997.

Common Tern Social Attraction Monitoring Program

1998 marked the third year of Common Tern social attraction on Pond Island. The program included 149 hours of observation, during which 4,715 landings were recorded at a rate of 31.64 landings per hour. During the 1997 season, a rate of 50.05 landings per hour was noted, while a rate of 14 landings per hour was noted in 1996. The average Common Tern high count near the decoys this season was 6, including terns on the ground and in the air. The highest number of Common Terns observed near the decoys was 14.

Early this season, four pairs of Common Terns were observed prospecting among the decoys. However, social attraction efforts resulted in only one three-egg Common Tern nest. This is a decrease from five nests in 1997, none of which hatched. It is suspected that the decrease in nesting is due to nocturnal abandonment resulting from owl predation, problems with the colony sound system resulting from foul weather, and the nesting failures of 1997.

Common Tern Chick Fostering

After thirty-one days of incubation, one egg from the three-egg nest pipped. Unfortunately the egg died. To encourage the nesting pair to remain interested in Pond Island, a chick transfer was performed. Two downy Common Tern chicks were transferred on July 7 from Jenny Island in Casco Bay to Pond Island. The two chicks were adopted within 5 minutes of being placed in the nest. The first feeding was observed within 15 minutes of adoption. After several days, the Common Tern chicks and adults moved to another, more secluded part of the island. It was later determined that the chicks moved more than 200 feet, over steep terrain and through knee-high vegetation to reach this new location. The foster chicks fledged, and were followed through 20 and 21 days of age. The two chicks are the first to be reared on Pond Island in more than 60 years.

Fish Identification

We began recording the size and species of fish being brought into the colony on June 9. 327 fish were noted, and the species percentages are as follows:

HERRING	SAND LAUNCE	HAKE	POLLACK	UNKNOWN
32%	18%	6%	1%	43%

Chick provisioning was noted when possible, and 86 feedings were observed. It should be noted that the waters surrounding Pond Island support productive fisheries, and fishing flocks of up to 300+ terns were observed throughout the summer. Our transfer chicks benefitted from this, and on several occasions chick feeding rates were greater than one feeding per minute.

Roseate Terns

Roseate Terns were seen regularly from Pond Island. Typically one or two a day could be observed flying over the decoys or fishing nearby. Towards the end of the season a high count of seven Roseate terns flying past the island was noted. Three Roseate landings were recorded this summer, the first to be observed on Pond Island. One Roseate was observed loafing among the decoys for forty minutes. As Pond Island supports ample potential habitat for Roseate Terns, these observations are encouraging.

Discussion:

Spendelow asked if the chicks were seen making the trip to the gorge or were just found at a later date. The adults were seen hovering over an area away from the nest, and were watched from a distance until the chicks were seen.

There was no lethal control of gulls this year. Each part of the island was censused every 3 days until no nests were found for a period of 10 days in July. Gull walks were increased from 4 to 6 times a day to spook loafing gulls.

Nisbet asked about owl relocation and why the owl was killed. Kress said that they haven't had any owls return, except one which had only been moved 25 miles away. Owls trapped this year were relocated at least 50 miles away. Kress said they do not have a permit to kill owls, and will not apply for one at this time.

Megyesi asked how the attraction site on the island was chosen, and if maybe the gorge was a better site for attraction, based on the chicks and adults moving there. Kress said the site was picked because it looks the most like tern nesting habitat on other islands. There isn't information on where they historically nested on this island. Kress wondered if the chicks moving was a function of the fostering. Spendelow said that occasionally they foster with ROST chicks and that in general, movements are usually initiated by the adults. Nisbet added that COTE don't usually move chicks because of adjacent territories and suggested the chicks got trapped there.

POND ISLAND NWR, THE "REAL" STORY - Reported by Anne & Walter Gamble

Census Dates: May 22 to August 9, 1988

Species Observed: Staff, supervisor, and interns, seabirds, rock doves, and 2 owls

Census Method:

 Direct On-island, off-island , and high powered telescope. Later, after Audubon personnel abandoned the site, by boat circumnavigating the island

 Indirect Channel 34, upper side band, 27.345 megahertz

Productivity: One desk, one table, and one chair, (called Knute's throne).

Clutch Size: 3 rock doves per cage

Special Remarks: All eggs were laid in nest area on ground, none formulated on intern's head this year.
Engine failure required Coast Guard assistance because movie crew didn't recognize distress signals. (Robert Redford and Kevin Kline not observed.)
Nest-tent predated by major storm- necessitated replacement, courtesy of L. L. Bean.

Behavior Observations: Pond Island crew always on time for 6:30 A.M. radio checks
... unlike occasionally sleepy base ...
Super saturation from days of storm brought crew ashore for drying-out period.
One intern noted to be susceptible to hypnosis by owl stare.

Feeding preferences: Tuna, mayonnaise, and finally one striped bass. Also, there may have been an addiction to "Woodchuck Draft Cider" (5%). However, direct observations of wholesale predation by crew on maple leaf sandwich cookies place this food source high on their list of choices.

Other Comments: It was noted that staff failed to consult with social worker prior to adoption of chicks. Adoption papers are yet to be submitted to the proper authorities, and journals.

Since operations on the island have concluded, we have continued to monitor bird activity. Two puffins, unbanded, were noted to be loafing on the rocks near the harbor. With appropriate equipment, they were captured and banded. For confirmation purposes, they have been photographed and transported here. *At this point, puffin finger puppets shown.*

To celebrate this monumental meeting and event, we have brought a round of their favorite food to share with everyone. *Maple leaf sandwich cookies distributed to everyone.*

Observers: Anne & Walter Gamble

JENNY ISLAND - Reported by Krista Amey

Jenny Island opened the weekend of May 9th and 10th. During this visit the blinds were set up and the enclosures repaired. On May 27th, the tent was erected. Jenny was revisited again on June 15th, to check on the state of the camp following the strong south westerlies of the 12th and 13th. The first Common Tern (COTE) and Roseate Terns (ROST) chicks were found on June 15th. The island was up and running on June 16th with full-time wardens (Krista Amey, supervisor, and Ming Lee Prospero, volunteer from Roger Williams zoo, Providence, Rhode Island) until June 27th. Josie Crawford, Puffin Project intern replaced Prospero, on June 29th). Jenny Island closed for the season on July 21st.

GOMSWG Tern Census

The GOMSWG tern census was conducted on June 17th (15:20-16:20) and 18th (10:00 - 12:30) (3.5 hours - total time). The counters on June 17th were Scott Hall and Ming Lee Prospero; on June 18th, Ming Lee Prospero, Keri Parker, and Mandy Lightcap. The recorder for both days was Krista Amey. The census yielded a count of 1111 COTE nests, corrected, using the Lincoln Index, to 1167 nests, and increase of 100 nests from 1997. On June 21st, Amey and Prospero censused Ram and Pond Islands in Casco Bay. There was no evidence of nesting terns on either island. Two terns were sighted approximately .025 miles from Ram Island. Both islands had nesting Great Black-backed Gulls (GBBG) and Herring Gulls (HEGU). Common Eiders (COEI) were observed on the islands and the surrounding water, however, no ducklings were sighted.

Eight ROST nests were located prior to the census; two approximately 25 m SW of camp and six in the northeast corner of the island.

Productivity

A total of 83 COTE nests were monitored for productivity, 63 in two chicken wire/hardware cloth enclosures and 20 feeding study nests. The mean clutch size for all nests combined was 2.45 ± 0.61 . The mean number of chicks hatched per nest was 2.19 ± 0.83 and the mean number of chicks fledged per nest was 1.57 ± 0.74 . The decrease in the # of chicks fledged per nest from 1.88 in 1997, may be attributed to a suspected increase in gull predation (GBBG and HEGU) or an underestimation due to the vegetation in the plots creating ideal cover and thus hindering the locating of chicks.

The chicks in one of the enclosures were weighed and measurements of natural wing chord were taken every three days to estimate growth rate.

The mean clutch size for the eight ROST nests was 1.88 ± 0.35 ; 1.62 ± 0.52 chicks hatched per nest. Weights of chicks of know age were taken within the first 3 days of life. Two chicks were found dead after hatching. The minimum # chicks fledged per nest was 0.38 ± 0.74 , however the fledging success could be as high as 1.38 ± 0.52 chicks per nest. Following of all chicks to 10 days was attempted, however difficulties came with trying to relocate chicks. Three chicks were sighted post 10-

days of age and feedings were observed going to several locations in the vegetation up to July 18th.

Provisioning Study

A total of 595.1 hours was spent conducting feeding observations at 20 COTE nests from June 23rd to July 18th. Eight hundred sixty-nine feedings were identified out of a total of 1089 (80.1%). Of those feedings identified, 50.1% were herring, 24.2% were hake, 6.1% were alewife and 5.6% were sandlaunce. Sizes of prey items were estimated by comparing them to the length of the bill of the bird. The mean size of herring delivered was 1.72 ± 0.34 bill lengths; hake, 1.53 ± 0.65 ; alewife, 2.81 ± 0.47 ; and sandlaunce, 1.76 ± 0.75 .

Discussion:

No Great Horned owls visited in 1998. Three owls in 1996, and 2 in 1995 were trapped and relocated more than 50 miles away, and none came back.

No ROST bands were read.

STRATTON ISLAND - Reported by Julia Dodge

TERNS

CENSUS

Common Terns: census dates: June 16th, 19th, and 20th

Unadjusted total: 933

Lincoln Index: 1.0384

Adjusted total: 969

1996 - 708 // 1997 - 821

Roseate Terns: 86 nests

// 1997 - 56

Arctic Terns: 12 nests

// 1997 - 6

PRODUCTIVITY

Common Terns: 99 nests: 23 feeding nests, 76 fenced plot nests

Average clutch: 2.63 (SD= 0.60)

Average hatch: 2.24 (SD= 0.92)

Average fledge: 1.35 (SD= 0.75)

1997= 2.13

Roseate Terns: 34 nests: 1 fenced plot, 33 unfenced plot

Average clutch: 2.0 (SD= 0.55)

Average hatch: 1.62 (SD= 0.60)

Average fledge: 1.12 (SD= 0.73)

1997=1.22

Arctic Terns: 12 nests: All unfenced plot

Average clutch: 1.83 (SD= 0.94)

Average hatch: 0.92 (SD= 0.90)

Average fledge: 0.25 (SD= 0.45)

1997=0.83

(Not too confident about fledge estimate)

COMMON TERN FEEDING STUDY

Sample size: 23 nests

Total feedings: 2,563 // 2,231 feedings identified to species, 332 unknown feedings

Hours of observation: 1,425.25

Feeding Rate: 1.81 feedings per hour

Top six food items and their percentages: 1. Sand Launce - 42%

2. Hake - 24%

3. Herring - 9.6% (includes alewife)

4. Insect - 5.6%

5. Pollock - 2%

6. Amphipods - 1%

Other odd items: 1 beetle, 1 bait, 1 seaweed, and 2 leaves

GULLS

GULL CONTROL

Nest destruction: 11 Herring Gulls // 27 eggs
7 Greater Black Back Gulls // 17 eggs
Adults removed: 2 Herring Gulls
4 Great Black-Back Gulls
(4 of these adults had broken wings, the other 2 were depreddating)

Although the numbers for gull control is less, the number of gulls on the island and on Bluffs seems to be up.

HERONS

HERON CENSUS

Census date: May 25th, 1998

Method: Direct count

Nest numbers:	Snowy Egrets = 128	1997 = 98
	Glossy Ibis = 124	1997 = 90
	Black-crowned Night Heron = 29	1997 = 16
	Little Blue Heron = between 5 - 10	1997 = between 5 - 10
	No Tri-colored Herons in 1998	

CORMORANTS

DOUBLE CRESTED CORMORANT CENSUS

Census date: July 8th, 1998

Method: Counted from the boat

Nest Numbers: 165 (1 colony on Stratton, 3 on Bluff) 1997 = 136

VISITORS

VISITOR NUMBERS

From June 1st to August 7th, there were 448 visitors. Only 9 of those were in June!

AMERICAN OYSTERCATCHERS

1 pair hatched 3 eggs and fledged 1 chick. This was the first year the nest did not have to be moved.

NORTHERN SHOVELER

One pair with 6 ducklings was observed.

LEAST TERNS

A high count of 62 LETE was observed roosting near COTE. The LETE left when COTE were establishing territories, but still stayed in the Stratton Island area, on the breakwater that connects Stratton Island to Little Stratton. Copulations and scraping were observed. This area washes over at high tide and LETE attraction was then started in an area that could be seen by breakwater. A few birds visited but were harassed by COTE. The decoys were then moved to better habitat on the open beach and fenced off. Total known landings near or within the decoys was 1 group of 9 and 1 group of 3.

Discussion:

Food fell off late in the season and affected productivity. There were many chicks almost of flying age dying. There were a few ROST chicks found dead, but they were all small.

Nisbet asked how ROST productivity was measured. A total of 34 nests were monitored and chicks were followed to 10 days and weighed for the 1st 4 days. Productivity estimates above are based on survival to 10 days. The two methods haven't been compared yet.

Someone asked how it was determined that adults were catching insects. They were observed at the nest being given to chicks. Nisbet added that he sees aerial foraging for winged ants, bees, moths, and

also taking of junebugs from the water. He added that worldwide COTE is primarily a freshwater species and all over North America, Europe and Asia they breed on fresh water rivers etc . . . feeding heavily on insects. This year on Stratton, chicks were seen picking up ants.

Nisbet suggested that LETE don't usually nest on islands and that it might not be a good idea to attract them there. He presumes the LETE know what is best for them. Jones disagrees.

LETE IN MAINE - Reported by Jody Jones

Only 2 LETE fledged in the state of Maine. There were 86 pairs at peak nesting, and 227 nest attempts. The two chicks were fledged at Laudholm. Terns also nested on Crescent Surf in Kennebunk and tried at Goose Rock in Kennebunkport. One pair nested in Saco at Goose Bear Brook. One of these adults was found dead and was banded with a metal band (not USFWS, 3 numbers on top, 4 on the bottom). Anybody know where it came from? LETE also tried to nest at Higgins Beach - this year MDIFW put up a 75 yard, 6 foot tall enclosure to try and keep humans (last year there were kids stepping on nests and building fires at this site) and predators out. There hasn't been a lot of depredation at the site up until now. Decoys and a sound system were placed inside the enclosure. There was a total of 3 nest attempts inside enclosure out of a total 45 nest attempts in the area. The enclosure was put up in May (LETE usually arrive 2nd week of June). Several PIPL territories in the area before the enclosure was erected, left afterwards. The primary problem LETE are facing are terrestrial predators, such as foxes. There are foxes at Popham now and a few chicks left which will probably be taken. Also, this year something was walking into PIPL enclosures and taking eggs. There are grackles in the area here and have been reported as predators elsewhere. There were small avian non-plover tracks seen.

Discussion:

Someone asked if there was anything done about the depredation? In the winter, MDIFW baited an area at Reef State Park and shot one fox. Trapping is usually done at the residences which are far from the beach. There has been no attempt to control foxes at Popham, but people in the community talk about having shot them.

Kress asked about the trend in population over time. Over the last 5 years, productivity has been very low - less than ½ chick per pair. The number of pairs has gone up and down between 20 and 100. The most chicks produced has been 16-20 fledglings. 40 pairs attempted to nest last year.

Jones said she was interested in how weather affected productivity in Maine because this year the PIPL productivity dropped for the first time in a while. Usually close to 100 chicks fledge - this year only about 70 chicks fledged.

There is no effort to list LETE federally now. They are state listed.

Black Tern Research in New Brunswick - Reported by Laurel Bernard

Project Goals:

- to discover what wetland features are correlated with use, to determine why only a few of the available impounded wetlands are used by the Black Terns for breeding.
- to discover what wetland features are correlated with increased breeding success in order to characterize high quality habitat.

Preliminary Results for the 1998 field season:

Survey of wetlands along the Saint John River floodplain:

- 167 adult Black Terns were seen in 10 wetlands, compared to 154 seen in 7 wetlands in 1997. With

the earlier and drier spring this year, the terns were using more marshes for breeding, with fewer in each marsh.

Breeding Success:

- 61 nests were found, and monitored to determine breeding success. The percent of nests in each marsh that hatched at least one chick was 70% (range 50% to 100%). The percent of nests that fledged at least one chick was 47% (range 25% to 70%).
- Three of the wetlands contained the majority of the nests (39 nests) and were monitored more thoroughly. From these wetlands the number of eggs that hatched successfully averaged around 60%, and there was an average of 0.6 - 0.7 fledglings per pair.
- The average date for nest initiation was June 2, with a range of May 25 - June 18. The average date for nest initiation last year was June 9, with a range of June 3 - June 18. Therefore the terns did start nesting a week or so earlier than last year but spread out nest initiation.
- The average clutch size was 2.9. Last year it was 2.5.
- One of the three wetlands had a much lower hatching success rate than the other two, two years in a row. This indicates that there is a difference in the quality of the marshes chosen for nesting.

Trapping, banding and color marking:

- Adults were caught using a wire mesh placed around the nest that had a top that could be pulled closed with a string when the tern landed on the nest. 30 adults were caught this way, then banded with a USFWS aluminum band and color marked on the head and white feathers under the tail using 2 colors of oil paints. The combination of colors identified pairs of adults and allowed me to tell who was still feeding young (as they move off the nest as the young get older). The colors stayed on until the terns started to molt in late July.
- Two terns were captured that had been among the 9 banded last year in the same marsh. Twelve terns were banded in two other marshes last year but none from those marshes were recaptured this year.

Feeding study:

- A feeding study was done on nests in each of the three marshes. The food items brought to the chicks by the adults were observed from a blind using binoculars. Preliminary tallies indicate that of the 228 items brought to 8 nests in 3 marshes, 15% were small fish, probably minnows and small pickerel, 41% were dragonflies and damselflies, and the rest were small unidentifiable insects.
- In each of the breeding marshes and in several of the marshes not used for breeding, an attempt was made to estimate Odonate abundance. I placed 5 cheesecloth fences that each encircled 1.5 square meters in each marsh. The cheesecloth reached the bottom of the marsh and allowed the Odonate nymphs to climb up on to it and to climb out of the water. Thus the nymphs would emerge into adults on the cheesecloth and leave their nymph casings behind for me to count. Data is still being collected, but the fences appeared to have been used by the Odonates. One fence had 24 nymph casings on it after two weeks.

Social Attraction:

- Another question I wanted to answer was if the terns could be choosing their nesting marshes using social attraction - using the presence of other Black Terns as an indicator of a good breeding marsh. I tested this by placing Black Tern wooden decoys in a previously unused marsh and an unused section of one they had used before. I also played Black Tern calls during daylight hours using a light sensitive switch on a tape player. I also put out eight artificial nesting platforms at each site that the terns had been known to use so there would be adequate nesting sites. Only one of my platforms was used and that was initiated very late in the season when most of the other terns' eggs had already hatched, and I had already taken the tape player in. The parents successfully fledged two young. I have to conclude that social attraction is not a strong selection factor for Black Terns; either that or I have to continue the experiment for several more years.

Unusual occurrences:

- I found three adult terns dead right beside their nests in three different marshes. All three terns appeared to be untouched (not predated) and the nests contained a full clutch of eggs. The other adult had abandoned the nest.

Discussion:

Kress suggested mink may have depredated the adults. Nisbet suggested taking water samples and measuring bicarbonates.

Hatch asked if any of the adults attending the 4 egg clutch nest was trapped. One adult was trapped, but the sex is unknown. Two of the eggs in this nest hatched and then died and 2 eggs were depredated.

Megyesi asked about the oil paints getting on the bills of terns. The oil paint was worked well into the feathers and didn't cause any problems.

Kress said that black terns in Maine shifted this year to the northern part of the state and more colonies further north were larger.

NEW HAMPSHIRE - Reported by Diane Deluca

In NH there are a small number of colonies which have done very poorly in the last 20 years. Last year, they decided to move forward with non lethal gull control on White and Seavey Islands because they are very small enough. This year began on April 21st. A total of 132 nests were counted (may be on high side) down from 192 last year. Only 10 of these nests contained eggs (13 total), and only 2 pairs attempted to renest. All eggs were discarded and rocks or bricks were placed in them. There was a dog on the island both years for the first few days of the project and pyrotechnics were used early in season. 20-40 gulls remained loafing in the area during the season.

Tern decoys and a sound system were set up by the end of April both years. Last year 6 pairs nested and raised 6 young by 24 September. This year, 25 pairs were counted on 22 June and 45 pairs were present on 23 July. Productivity was based on the first 25 nests (not exclosed). Average clutch = 2.56 eggs/nest; hatch success = 1.88 eggs/nest; fledge success = 1.52 chicks/nest. Feeding studies were conducted again this year, and better data was collected compared to last year. A total of 1522 feedings were observed as of 2 August.

44.9%	white hake
14.2%	unidentified
13.5%	pipefish (more towards end)
rest	insects, moths, ants, dragonflies etc.

Nisbet asked if the marshes were monitored. There were 50 pairs on Hampton Saltmarsh on 12 June. They were all wiped out and 30 pairs tried to renest. Productivity will be very low. Two of the other small colonies had Great Horned Owl problems and almost 0 productivity. Some birds may have moved to Isle of Shoals. Ten bands of breeding birds were also read; 2 from Jenny, 1 from Stratton, 2 from Great Gull Island. Sixty chicks have been banded so far.

Megyesi asked about nesting shorebirds and COEI. Gull harassment techniques do cause disturbance to COEI. Both years they lessened the use of pyrotechnics as terns arrived, and the COEI came back too. COEI are productive there. There are also some spotted sandpipers which don't seem to be disturbed by the noise.

CAPE COD BAY AND OUTER CAPE, MASSACHUSETTS - Reported by Ian Nisbet

At the time of GOMSWG, the Massachusetts meeting had not yet taken place, so a complete tally was not available. COTE increased on almost all colonies to give a total above 13000 pairs, which is

almost a 20% increase from last year. Of those, 8,500 were in the GOM. ROST numbers are up to just under 1700 pairs, which is almost back to the 1996 level after a decline in 1997 due to owl depredation on Ram Island. Twelve ARTE nests were found, compared to 5 last year. This may not be an actual increase, but rather more nests were found. There is no data yet on LETE, but they have been increasing in recent years and there were 2500+ pairs last year. One new colony of 900 pairs nested on a dredge spoil site in downtown Hyannis. The colony was enclosed by 2x4 inch fox wire. Birds were extremely productive and may have fledged 2 chicks per pair. There also was 1 FOTE nesting in the Plum Island marshes and has been breeding with a COTE for several years.

Plymouth Beach increased to almost 5000 pairs of COTE, 10 pairs of ROST, 4 pairs of ARTE, and 150 pairs of LETE. The colony was enclosed completely by a mile of fence. There are coyotes but none entered colony. The site was very productive, but productivity was not measured.

New Island has had heavy owl predation for the past few years. This year there were 1700 pairs of COTE, 3-4 pairs of ROST, and 3-4 pairs of ARTE. Productivity was not measured.

MONOMOY ISLANDS - Reported by Stephanie Koch

I. North Monomoy

Only 11 Common Tern nests were counted on North Monomoy on 18 June. During subsequent visits in July no birds were observed. On 6 August, 30 birds were observed in the air, but no nests or chicks were found. Productivity is probably 0.

II. South Monomoy

COTE:

Phenology (In general, about 5-7 days earlier than 1997)

1st terns seen around the island - 1 May

1st scrapes - 16 May

1st eggs - 23 May

1st hatch - 17 June

1st observed fledger - 14 July

Last year birds settled in two separate colonies on the north end of the island, called Inner and Outer colonies. This year Common Terns settled in areas representing the inner (north end) and outer colonies almost simultaneously. These areas became densely settled very quickly and additionally, birds arriving throughout May and early June began settling in the area between these two dense spots. By the time of the census on 17 June, the terns were nesting as one contiguous colony, about 15 acres, with the highest densities at the northern and southern 1/3rds of the colony. Birds arriving after the A-count primarily settled in the middle third of the colony, as well as on the whole eastern edge of the colony.

A total of 2346 (228 1-egg, 1128 2-egg, 985 3-egg) Common Tern nests were counted on South Monomoy Island on 17 June, an increase from 641 in 1997. The Lincoln-Index correction yielded 2363 total nests. No B-count was done, but an estimated 400-500 additional pairs moved into the colony after the A-count.

Productivity was determined using marked nests in fenced plots.

Average clutch size: 2.56 eggs/nest (SD = .523, N = 84 nests, 215 eggs)

Hatching success: 2.27 eggs/nest (SD = .766, N = 84 nests, 215 eggs)

Reproductive success: 1.84 chicks/nest (SD = .707, N=83 nests, 212 eggs)

In addition to monitoring productivity, all chicks in productivity plots were weighed and measured every third day. Data has not yet been analyzed.

Ten of the nests in the productivity plots were also used to determine prey types and size provided to chicks until they were fledged. Data is still being analyzed, but the majority of the prey brought to chicks was sand lance.

In total, about 650 Common Tern chicks were banded, and 5 banded adults were trapped.

LETE:

Phenology:

- 1st terns seen around the island - 16 May
- 1st scrapes - 25 May
- 1st eggs - found 2 June, backdated to 27 May
- 1st hatch - 16 June
- 1st observed fledger - 21 July (south end colony)

Last year Least Terns attempted to nest on two areas of the island, the north end and the south end, by Powderhole, but A-count census numbers were only 1 and 5, respectively (141 total end of the year count).

This year Least Terns again started out prospecting in the two areas. Numbers at Powderhole had reached about 50 individuals, and pairs were seen courting and scraping in the 3rd week of May. Shortly after, however, numbers of Least Terns here declined and by the end of May, they had all left the area. On the north end of the island, the numbers of Least Terns increased from 4 on 16 May to 130+ birds on 30th May. In addition, on 7 June, 4 Least Terns were seen on the southeast tip of the island, and one bird was seen scraping. Only the north end was censused during the A-count. On 18 June, 246 nests with eggs (34 1-egg, 195 2-egg, 17 3-egg) were counted on the north end of the island. Sixty-one nests were marked to monitor hatching success. Unfortunately, the whole colony abandoned during the last weekend of June. The exact cause is unknown, but a major thunder and lightning storm yielding high winds and torrential rains is suspect. On 7/2, we censused the Least Tern colony that had grown on the southeast tip of the island and counted 75 nests with eggs. Many of these nests were probably there simultaneously with the north end colony, before it abandoned.

ROST:

Phenology:

- 1st terns seen around the island - 8 May
- 1st observed courtships - 23 May
- 1st eggs- found 10 June, backdated 2 June
- 1st hatch - 25 June

Last year there were no Roseate Terns nesting on Monomoy during the A-count, and only 1 pair for the total year count. This year we had 22 pairs nesting during the A-count. The end of the year total was 39-42 nesting pairs (42 nesting attempts, but two nests may have been renesters). Roseate Terns nested in 8 different "clumps" throughout the entire Common Tern colony.

Roseate Tern nests were checked almost every day, and chicks were followed for as long as possible. Chicks were also weighed.

Average clutch size: 1.45 eggs/nest (SD = .605, N = 20 nests, 29 eggs)

Hatching success: 1.05 eggs/nest (SD = .759, N = 20 nests, 29 eggs)

Reproductive success: 0.95chicks/nest (SD = .759, 20 nests, 29 eggs)

Four of the nests that did not hatch were incubated to term (and well beyond) before abandoning. The fifth nest that did not hatch, was incubated until the egg had just begun pipping and then was abandoned.

All Roseate Tern chicks were banded, and 11 banded adults were trapped.

BLSK:

Phenology:

- 1st seen around the island - 20 May
- 1st eggs- found 6 June, backdated 29 May
- 1st hatch - 23 June

We had three pairs of Black Skimmers nest on the north end of the island. One nest had 3 eggs, and the other two nests had 4 eggs. All of the eggs hatched and 8 chicks were fledged.

HARRIER AND OWL: Northern Harriers frequently visited the tern colony preying on birds. No owls were ever seen in the colony. Through the whole summer, only a few dead birds (<10) that indicated owl/harrier kills were found.

GULLS: This year we established the field camp on 1 May in an attempt to further dissuade gulls from nesting in Area A. We also conducted gull harassment in Area A every third day in April, and twice a day from 1 May to 23 June, when we only did it a few times a week until 1 August. Gulls in Area A and B were censused on 15 May. In Area A numbers were down to 11 nests from 366 nests. Only 6 nests with eggs were removed from Area A after the census. Gulls nesting in Area B also declined dramatically to 368 from 544. Gull eggs in Area B were punctured on this day and again on 9 June. Although the number of nesting gulls declined, we did have a few loafing gulls that persistently hung out on various edges of the tern colony, picking of young chicks, fledgers, and even adults. One predatory immature herring gull was removed on 28 June, and 2 adult GBBG continued to prey on terns. We repeatedly tried to remove these individuals but time after time were foiled by high winds, public use, and the gulls' steadily increasing knowledge of our intent.

BLACK-CROWNED NIGHT-HERONS: We began night-stints in early June a few times a week. Beginning 18 June, one person conducted a stint every night (weather permitting) after finding two abandoned nests with newly hatched dead chicks and a few broken shells in the same area on the day of the Common Tern census. No Black-crowned Night-herons were seen landing in the colony all season (until 1 August). No Black-crowned Night-herons were ever seen entering the colony. Through the course of the season, only a few depredated eggs were found that may have been due to Black-crowned Night-herons and no tracks were ever seen in or entering the colony.

COYOTE: On 3 July, a coyote was seen entering the tern colony at night. Some of the birds abandoned for the night. Tracks were seen entering the colony the next day, but were quickly lost. No dead chicks were found at this time. From 6 July - 1 August, two people sat up every night in different blinds. On 6 July, the coyote was seen entering the colony again and some birds again abandoned for the night. Twelve dead chicks were found (ranging 2-18 days old) in one area amongst coyote tracks the next morning. Staff was not able to remove the coyote either night it was seen in the colony. It is difficult to quantify the damage the coyote caused to the colony because none of our productivity plots were effected. We did, however, find some dead chicks and observe nocturnal abandonment and therefore assume some loss. On 7 July, we also began setting a live coyote trap baited with chicken and livers. All we ever caught was an immature gull.

Discussion:

Spendelow asked what criteria was used in deciding dead chicks were due to coyote. It was most likely coyote based on the large number of large chicks found dead in such a small area. The dead chicks were not there the day before and the area was covered with only coyote tracks. Some of the chicks had either a puncture wound or bloody head. Hatch asked what impact the coyote has on the gulls. The impact is unknown because we are not monitoring gull productivity.

Kress asked if there are weasel on the island. There is not.

Nisbet asked if GBBG were taking COTE fledglings? GBBG took fledglings and at least one adult.

BUZZARDS BAY - Reported by Ian Nisbet and Jeremy Hatch

BIRD ISLAND: This year there were just over 1900 pairs of COTE and just over 1100 pairs of ROST in the 2nd week of June. Due to a mild winter and high water temperature, birds were very early this year.

COTE nested the 2nd earliest ever (6 May) and ROST nested the earliest ever (12 May). There was very little late nesting this year. Both species started well with large clutch sizes and large eggs. This year ROST had the highest productivity ever, 1.45 chicks/pair, in spite of low hatching success (90% success from hatch to fledge). This year also had the highest incidence of supranormal clutches ever, 10% of 3-4 egg clutches. Based on hatch failure of 2 egg clutches, there were probably a lot of female-female pairs with 2 egg clutches, probably almost 20%. COTE also started well, but by mid-June the food supply went down and growth rates went down (based on 250 nests). COTE fledged 1.1 chicks/pair (based on 400 enclosed nests).

There was a little predation: a few chicks taken by great-horned owl, a few ROST eggs taken by an unknown predator on 20 May (most all relayed), and a few COTE fledglings taken by non-breeding GBBG.

There is a large excess of females (127 females for 100 males) on Bird Island. About 12% of all nests are female-female pairs and about 20% of nests in study plots are female-female pairs; they seem to concentrate in plots, even though plots are redistributed every year. The percentage is not as high on Ram. Female-female clutches are usually attended by 2 females and no males, but sometimes with 1 male, and occasionally by 3 females and 1 male. A 5 egg nest on Bird Island had 4 different birds attending, which were probably all females. It is unknown why there are so many more females. Over the years, about 45% of the eggs have been fertile.

RAM ISLAND: Ram Island is close to Bird Island and there is a lot of movement between the two colonies. This year 514 (+ 60 late nesting) pairs of ROST and 1300 pairs of COTE nested. In 1996, 700 pairs of ROST nested and in 1997, 250 pairs of ROST nested. The numbers declined in 1997 due to a Great Horned Owl which was eventually lethally removed. Productivity was similar to Bird Island. This year, there was no owl depredation, and GBBG depredation was negligible. Ruddy Turnstones were seen, but there is no evidence of eggs being pecked. There also were about 8 LETE nests. Nests were either depredated or washed out, or abandoned, and no young were raised. There was very little late nesting.

PENIKESE ISLAND: Historically Penikese was one of the ½ dozen most important tern sites in northeastern North America and one of only 2 sites in MA. It survived the millinery trade in 1880s and 1890s (probably due to its remote location and private ownership at the time) and grew to be a large colony in 1920-1940 when there were 10000-20000 pairs of COTE, and at least 2000 pairs of ROST. Gulls were lethally removed in 1972 and 1995, but the program was discontinued and the gull population built up again in 1996 and 1997.

This year, Brad Blodget and MDFW again began gull control. Funding was secured for one year from Massachusetts Environmental Trust (license plate money), with the stipulation that no lethal methods be used. Egg destruction was allowed. One, and usually 2 people, were stationed on the island from mid April to mid July.

Penikese is really two islands connected by a cobble beach. The project was limited to the smaller of the two islands and the cobble beach, a total of 9 acres. Dogs were used in late April and early May and were efficient at keeping GBBG away in particular. The dogs were taken off the island on 6 May when the terns began to settle, and then HERG also began to settle. Through the season, about 80 pairs of HERG laid eggs, which were constantly broken up and rockets fired at them. By the end of June, all HERG had left and 130 pairs of COTE had laid eggs, almost entirely on the cobble beach. Productivity was not measured, but there was no predation observed and they were highly successful. In the middle of May, about 2000 COTE and 600 ROST were landing on the beach and feeding in the area but most moved on and nested on Bird and Ram.

There are still about 900 pairs of gulls nesting on the main island, where there used to be 5000-6000 20 years ago. Penikese was thought to be more secure from predators, than Bird or Ram. There was one sighting of a Great Horned Owl in June, which was a transient and left the area. There are also two species of snakes. Garter snakes sometimes take eggs and chicks, but there was no evidence of this happening. There are also a few pairs of BCNH nesting on the island, but none were seen at the colony this year. Also 5 pairs of ARTE laid 7 clutches. They were not very productive.

LHSP are still nesting on Penikese Island. They had declined over the years due to gull depredation,

but probably have stabilized because of human presence from the halfway house that has been there for the last 20 years. The petrels nest in the old stone walls around the buildings. Penikese is the southern most nesting island for petrels and ARTE

FAULKNER ISLAND - Reported by Jeff Spendelow

This was not a good year for ROST. Only about 2/3 chick fledged/pair, due to BCNH depredation. There was very little late nesting by ROST on Faulkner.

Great Gull probably had another good year. Numbers are not yet available, but will probably be around 1700-1800 at peak.

The regional population of ROST must be close to 4000 and this year may be the 1st time its over 4000 since 1950's.

OTHER BUSINESS

1. The "Draft Roseate Tern Recovery Plan" should be coming out shortly. It was published in draft in April and all comments have been received. Also, the biography of ROST for BNA should come out in the next couple months.

2. Regional Tern Management Plan (draft outlines handed out) - Steve Kress

The idea is to create a management plan for island nesting COTE, ROST, and ARTE from Long Island Sound north to the Canadian Maritimes. From banding studies we know there is lots of mixing of populations and that it is best to look at a regional level, instead of island by island. Existing plans will be incorporated and there will be many participants. LETE were not included because they are mostly mainland nesters and management concerns are out of the scope of this project and more similar to PIPL. BLSK and Forsters Tern may need to be added in.

The outline was then opened up to suggestions including adding the following: BCNH under predator management; a section for reasons of concern/problems including predators, disturbance, human development, contaminants; a section looking at historical tern nesting islands and considering their viability as tern nesting islands today; visitor protocols and island ethics, under the public interest and demand section.

Nisbet pointed out that in the central GOM, there are ARTE, COTE, ROST, but if you go to MA or Long Island, there are different assemblages of species. From Long Island to the Bay of Fundy the only tern species that forms a natural unit is ROST. None of the other species has a major discrete population in the area. Kress added that the boundary needs to be drawn somewhere. Nisbet thinks that natural boundary is Cape Cod.

Jones asked about including LETE. Maybe a LETE plan could be done separately. This plan should be a good model for other regional management plans.

Hopefully a draft will be available in a year.

3. Maine Medical Center Update

They have been interested in deer ticks in Maine and the ecology and spread of Lyme Disease for the past 10 years. On some islands in Maine such as Monhegan, Norway rats, instead of white-footed mice, are the primary reservoir for bacteria that causes Lyme Disease.

Similarly, on Isle au Haut, deer mice serve as the reservoir for bacteria. Throughout coastal Maine there is a patchy distribution of focal areas of Lyme Disease risk and they want to know what determines the distribution? They have been looking at deer herd density vs. tick density and have transects up and down the coast.

Recently, they teamed up with David Holmes and Sarah Morris in Appledore to look at ticks coming off migrant passerine birds which led to insight on the distribution and spread of the disease to new areas. Over 5 years, they found that 10% of spring migrants were harboring deer ticks coming into Appledore, and only 1% or less in the fall were harboring deer ticks. They also found that birds can be reservoir competent, maintaining the bacteria long enough to infect other ticks. Bird species that have a lower core temperature can be competent and those with a higher core temp, above 40 degrees, are less likely to be competent. Seabirds are of interest because some species are more typically around 38 degrees.

A few years ago, a Swedish physician looked at seabird ticks to see if they are infected. Seabird ticks, *Ixodes uriae*, live in cracks, crevices, and in burrows, and are distributed around the globe. He found they were infected with bacteria identical to one of the European species, of Lyme Disease bacteria, *Borellia greeniae* (?). There is a close cycle between seabirds and *Ixodes uriae*; the tick infects a seabird, a seabird carries it and then infects other ticks. Another study by Dr. Olsen showed that *Ixodes uriae* from the Northern Hemisphere carried a strain identical to that seen in samples in the southern hemisphere, suggesting in a paper with David Duffy that seabirds may be transmitting bacteria trans-hemispherically during migration.

Are ticks on seabirds infected? In Olsen's study, 4 ticks from Gannet Island and another 15 or so from GOMSWG two years ago were not infected. None from the US east coast have been infected. Some ticks from Alaska and Iceland were infected. In general there is a about a 10% infection rate. Another 40 or so ticks were sent in from GOMSWG this year. This year they will PCR studies to see if the bacteria that causes Lyme Disease is in the ticks.

Even if the ticks are infected, people may not be at risk for Lyme disease. In general a tick needs to be on a person for a couple days. Bites are painless, allowing the tick to stay on while it feeds and the bacteria multiplies. With *Ixodes uriae*, it is unknown how long the transmission takes. People on islands this summer indicated that the ticks are painful when attached and when they are pulled out they itch for weeks. Most ticks that were sent in were nymphs. The ticks may also carry some viruses which may cause seabirds harm, but there is no evidence it causes people harm.

Duffy's conjecture was raised that claims these specific ticks and ants do not coexist on the same island.

4. Education Report - Pete Salmansohn

This was the 11th summer of the ecotourism program. Each year an average of about 3,000 people participate and this year the total will be about 4000 on boats out of Boothbay and New Harbors.

The fall seabird education project begins in schools in a few weeks, this year being the 4th semester. Funds were received from NFWF, Downeast Energy, US Gulf of Maine Association, John Hay, John Sage Foundation, and Midcoast Audubon. In the past 3 years, 3000 kids in 40 schools in Maine have been reached. Many of the classes are visited several times which allows depth to be built into the curriculum. Also, in the spring, many of the classes come out on the boats to actually see the colonies they have learned about. Parents often come too which helps build more support for seabird conservation.

Teacher workshops are a new project this year. This past spring there were workshops held at Cape Cod Museum of Natural History, New England Aquarium, and Hog Island. In the fall, there will be bird teacher workshops sponsored through USFWS in October, Maine Audubon in November, and New Hampshire Audubon next spring.

The meeting was adjourned at 14:50

APPENDIX

CONTENTS:

1. GOMSWG Tern Census Summary, 1998
2. Tern Census Data, 1984-1998
3. Map of Gulf of Maine Watershed
4. Draft Outline for Regional Tern Management Plan
5. List of Attendees

MAINE ISLANDS

ISLAND NAME	CIR #	DATE	METHOD	COTE	ARTE	ROST	SPECIES	FLEDGE/NEST	N	SD	METHOD	EGGS/NEST	N	SD	OBSERVER
Machias Seal	79-367			896	2089		COTE	0.77	31			1.84	31		PAQUET
Machias Seal							ARTE	0.76	41			1.8	41		PAQUET
Petit Manan	79-933	20-Jun	N	1005/1079	298/318	19	COTE	0.98	55	0.76		1.67	239	0.61	LUCERO
Petit Manan							ARTE	0.96	30	0.71		1.45	131	0.53	LUCERO
Petit Manan							ROST	1.05	19	0.22		1.13	19	0.34	LUCERO
Nash Island		19-Jun	N	1											SKUTEK
Squid Island	59-221	19-Jun	N	23											BENEDICT
Dry Money Ledge	59-449	19-Jun	N	18			COTE	total of 5							DRURY
Conary's Nub	59-137	19-Jun	N	73											BENEDICT
Ship Island	59-341	19-Jun	N	500			COTE	1.7	33	0.55	1,2	1.85	33	0.57	SULZMAN
Buck Island		19-Jun	N	1											ALLEN
Colthead Island	59-685	19-Jun	VEB	0	0	0									ALLEN
Grass Ledge West	59-789	19-Jun	NP	5 (20 adults)	0	0									ALLEN
Grass Ledge East		19-Jun	VEB	0	0	0									ALLEN
Eaton Island Ledge	59-716	19-Jun	VEB	0	0	0									ALLEN
Spectacle Island	59-688	19-Jun	N	2	0	0									ALLEN
Dagger Island	63-015	19-Jun	VEB	0	0	0									ALLEN
Three Bush Island	59-980	19-Jun	N	165			COTE	total of 20							DRURY
Great Spoon Island	63-287	19-Jun	N	22			COTE	total of 4							DRURY
Wooden Ball Island	63-917			0	0	0									DRURY
Little Green Island	63-418	21-Jun	N	16			COTE	total of 9							DRURY
Little Two Bush	63-652	21-Jun	N	1			COTE	total of 1							DRURY
Hog Island	63-588	21-Jun	N	0	3	0	ARTE	total of 3							DRURY
Metinic (north end)	63-584		N	0	0	0									GOODALE
Metinic (south end)	63-584	21-Jun	N	30	87		COTE/ARTE	total of 32							DRURY
The Brothers	63-580	NOT CHECKED IN 1998													
Seal Island	63-923	18,19-Jun	N	868/927	980/1046		COTE	0.87	31	0.34	2	2	31	0.52	BRETON
Seal Island							ARTE	0.9	60	0.33	1,2	1.83	60	0.38	BRETON
Matinicus Rock	63-940	18-20-Jun	N	97	877/888		ARTE	0.43	72	0.62	1,2	1.77	72	0.45	SCHUBEL, MARANTO
Eastern Egg Rock	63-860	19-Jun	N	1370/1396			COTE	1.17	66	0.76		2.64	65	0.54	GOODHUE
Eastern Egg Rock		20,21-Jun	N		81	144	ARTE					1.62			GOODHUE
Eastern Egg Rock							ROST	0.84	25	0.69		1.88	25	0.33	GOODHUE, HALL
Goose Ledges	65-023	16,19-Jun	NP/VEB	3			COTE	1	3						NOYES
Thrumcap Island	65-267			0	0	0									PMNWR
Pond Island	73-282	19-Jun	N	1			COTE	2 (fostered)	1		1,3	3	1	0	PARKER
Pond Island	55-615	21-Jun	VEB	0	0	0									AMEY
Hen Island	73-178	NOT REPORTED													
Turnip Island	55-427	NOT REPORTED													
Uncle Zeke's Island	55-115	NOT REPORTED													
Ram Island	55-605	21-Jun	VEB	0	0	0									AMEY

MAINE ISLANDS (CONT.)

ISLAND NAME	CIR #	DATE	METHOD	COTE	ARTE	ROST	SPECIES	FLEDGE/NEST	N	SD	METHOD	EGGS/NEST	N	SD	OBSERVER
Jenny Island	55-159	17,18-Jun	N	1111/1167			COTE	1.57	83	0.74	1,2	2.45	83	0.61	AMEY
Jenny Island		18-Jun	N			8	ROST	0.38 - 1.38	8	0.74-0.5	3	1.88	8	0.35	AMEY
Stratton Island	81-002	16-Jun	N	933/969			COTE	1.35	99	0.75	1,2	2.63	99	0.6	DODGE
Stratton Island		19-Jun	N		12		ARTE	0.25	12	0.45	3	2	34	0.55	DODGE
Stratton Island		20-Jun	N			86	ROST	1.12	34	0.73	2,3	1.83	12	0.94	DODGE
1998 ME COAST TOTAL				7392 (22)	4524 (8)	257(4)									
1997 ME COAST TOTAL				7102 (21)	3976(11)	237(6)									

SELECTED NEW HAMPSHIRE SITES

Back Channel Island	NOT REPORTED														
Seavey Island		22-Jun	N	25				1.52			3	2.56			DELUCA
Hampton Marsh		12-Jun		50											DELUCA
Little Footman Island	NOT REPORTED														
Hen Island	NOT REPORTED														
Horn Island	NOT REPORTED														

SELECTED MASSACHUSETTS SITES

CAPE COD BAY

Plymouth Beach			N	4948	4	12									BLODGET
New Island			N	1766	2	3									BLODGET
Gray's Beach				117											BLODGET
13 sites < 100 prs each				279											BLODGET

MONOMOYS

North Monomoy		18-Jun	N	11	0	0									KOCH
South Monomoy		17-Jun	N	2346/2363	0			1.84	83	0.766	2	2.56	84	0.523	KOCH
South Monomoy		18-20-Jun	N			22		0.95	20	0.759	3	1.45	20	0.605	KOCH

BUZZARD'S BAY

Penikese Island			N	138	5										BLODGET
Bird Island		8-Jun	N	1903				1.09			2				NISBET
Bird Island		12-Jun	N			1113		1.49			2				NISBET
Ram Island		7-Jun	N	1307				1.2			2				HATCH
Ram Island		15-Jun	N			543		1.4			2				HATCH

TOTAL GULF OF MAINE

14577 4530 272

(EXCLUDES MONOMOYS AND BUZZARDS BAY)

Methods: N=nest count, NP=nesting pairs (visual estimate), VE=individual birds (visual estimate from island), VEB=individual birds (estimate from boat)

Productivity Methods: 1=feeding study, 2=fenced plot, 3=unfenced plot

Counts (x/y): actual/adjusted count (Lincoln Index)

Note: Productivity is expressed as the number of fledglings/nest, N=sample size, SD=standard deviation, 15-day old COTE and ARTE chicks are considered fledglings, study chicks found dead after fledge date are subtracted from productivity estimate. ROST chicks were considered fledged based on survival to 10 days and weights during the first few days of life.

Note: This table includes islands from the 1997 table. Please see the text portion of the minutes for additional islands that were checked and had zero nesting terns.

Number of Nesting Pairs of Terns off the Coast of Maine

YEAR	COTE	ARTE	ROST
1984	2543/28	3170/18	76/8
1987	2173/18	3170/11	52/6
1988	2955/19	3824/9	74/9
1989	2741/19	4151/8	81/6
1990	2810/20	3979/11	108/5
1991	4032/23	3898/11	128/7
1992	3716/23	4356/10	122/5
1993	4313/16	4478/10	142/7
1994	4361/21	5029/10	144/6
1995	5011/21	5138/10	153/6
1996	5847/23	4401/8	161/4
1997	7102/21	3976/11	237/6
1998	7392/22	4524/9	257/4

Data represent: Adjusted Counts (# of nests)/number of nesting sites

All counts include Machias Seal Island; this count is done on even years only, so odd years have the pervious year's results reported. All data are taken from the minutes of the Gulf of Maine Seabird Working Group.

DRAFT 3/23/98

**Regional Tern Management Plan
for Northeastern U.S. and adjacent Canada**

Participants: U.S. Fish & Wildlife Service, National Parks Service
Canadian Wildlife Service, Parks Canada
National Audubon Society
NE Roseate Tern Recovery Team and tern researchers
Provincial and State Agencies: New Brunswick, Nova Scotia, Maine, New
Hampshire, Rhode Island, Connecticut and New York

Species Covered: Common Tern, Arctic Tern and Roseate Tern

CONTENTS

- I. History of tern populations for the region
 - A. Major Events
 - 1. Egging, hunting
 - 2. Millinery trade
 - 3. Protective laws
 - 4. Sanctuaries
 - 5. Restoration
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 - 1. New York
 - 2. Connecticut
 - 4. Rhode Island
 - 3. Massachusetts
 - 4. Maine
 - 5. New Hampshire
 - 6. New Brunswick
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 - C. Current Status
 - 1. Protected status by state/province
 - 2. Population size and number of nesting islands
- II. Biology
 - A. Life histories and nesting phenology
 - B. Demographics
 - C. Foraging
 - D. Winter Distribution
 - E. Future Research Needs

III. Management Goals and Feasibility

- A. Distribution goals
- B. Productivity goals
- C. Minimum populations
- D. How this plan interfaces with existing tern recovery plans. e.g. Roseate Tern Recovery Plan, Canadian Tern Plan and Maine Tern Restoration Plan
- E. Feasibility discussion and funding needs to meet goals

IV. Restoration

- A. Criteria for selection
- B. Candidate islands for restoration (protection and possible acquisition)

V. Management Methods

- A. Predator management
 - 1. Gulls
 - 2. Owls
 - 3. Raptors
 - 4. Mammals
- B. Habitat Management
 - 1. Controlled burns
 - 2. Vegetation management
 - 3. Nest boxes
- C. Social Attraction

VI. Monitoring techniques

- A. Census
- B. Productivity
- C. Species ratios

VII. Public interest in and demand for species

VII. Literature Cited

VIII. Bibliography