



ENDANGERED ROSEATE TERNS REACH RECORD NUMBERS AT EGG ROCK

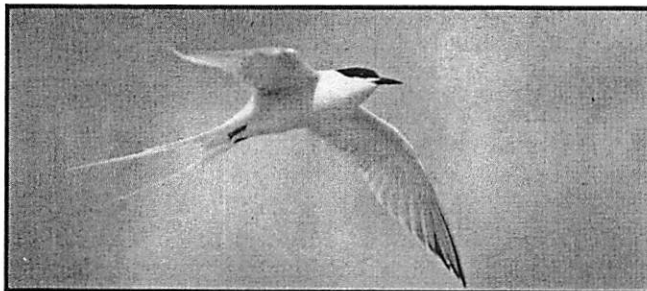
This was the fifth consecutive year that the Roseate Tern population at Eastern Egg Rock increased. The colony at Egg Rock (also known as the Allan D. Cruickshank Wildlife Sanctuary) has grown from 2 pairs in 1987 to 50 pairs this year.

Common and Arctic Terns were re-established at Egg Rock in 1980 after a 43-year absence using a combination of gull control and attraction with decoys and tape recordings (see *Egg Rock Update* 1980). Since Roseates nest only with Common Terns in the northeastern United States, we were not surprised when a few joined the Egg Rock colony, but recent increases have exceeded our expectations. In addition to Roseates, 869 pairs of Common Terns and 65 pairs of Arctic Terns nested there this summer.

Some young terns produced in Massachusetts are finding their way to protected, managed Maine tern sanctuaries. At least two of the breeding Roseates at Egg Rock were banded as chicks at Bird Island, Massachusetts. In 1987, there were only 52 pairs of Roseates nesting on Maine Islands, but this number increased to 128 pairs this summer at seven islands.

Roseate Terns were placed on the federal Endangered Species List on November 2, 1987 because of declining numbers and concentration at just a few nesting islands. During the last 60 years, the number of Roseates on U.S. islands decreased from about 8,500 pairs in the 1930s to a low of 2,500 pairs in 1977. The numbers have fluctuated between 2,500 and 3,300 pairs since 1977. This summer, 91% of the Roseate Terns in North America nested at Bird Island in Buzzard's Bay, Massachusetts and Great Gull Island located off the eastern tip of Long Island, New York.

This concentration is extremely dangerous since the birds are at great risk to a catastrophe such as an oil spill or outbreak of disease like avian cholera or botulism. Predators can also have great impact when too many eggs are "in one basket." This year, for example, two Peregrine Falcons took up residence at Bird Island and kept the entire colony from breeding for several weeks. One falcon was trapped and relocated. Only then did the other falcon leave, and the terns finally nested. Although the Maine Roseates comprise a small fraction of the North American population, restoring the Roseate Tern to the northern part of its historic range spreads the risk



Pat Lynch

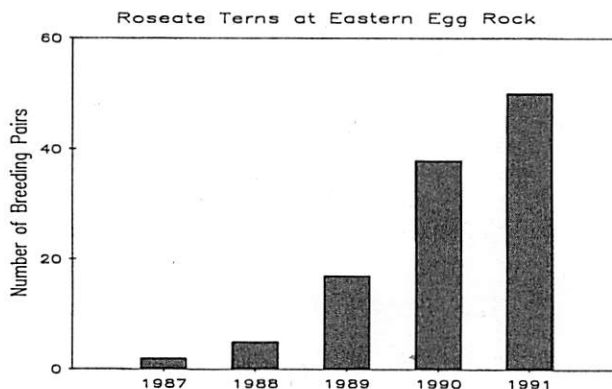
Roseate Tern

for the species by increasing the distance of the colonies from coastal Massachusetts and New York.

The increase at Egg Rock is part of a larger trend. This year, an additional 52 pairs of Roseates nested at Petit Manan, a National Wildlife Refuge located off Milbridge in downeast Maine. This site is managed by the College of the Atlantic.

Major increases in Common Terns this year at Matinicus Rock and Seal Island also attracted Roseate Terns. The Common Terns at Matinicus Rock increased from 25 pairs in 1990 to at least 200 pairs this summer with 5 pairs of Roseates. One of these was banded as a chick at Bird Island, while the other was banded as a chick at Petit Manan.

The increase in tern numbers was even greater at nearby Seal Island. Here the mixed Common and Arctic Tern colony increased from 130 pairs in 1990 to 650 pairs this summer! These were split between Common (57%) and Arctic Terns (43%). Four pairs of Roseate Terns nested in a cluster among the Common Terns. ■



NEW TERN RESTORATION PROJECT BEGINS AT JENNY ISLAND

Jenny Island, located near Cundy's Harbor, Maine is a 2-acre, treeless island. This summer it was a new site for tern restoration—the first in Casco Bay. Common and Roseate Tern numbers have declined in Casco Bay for nearly 70 years, as Herring and Great Black-backed Gulls displaced terns from all of their historic nesting islands on this vast stretch of the Maine coast.

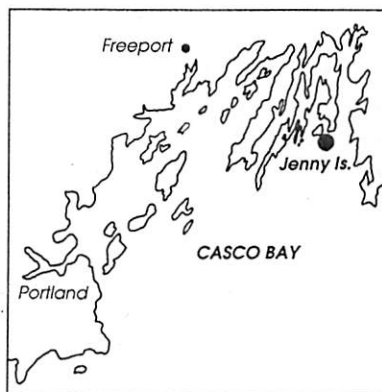
Gulls have effectively forced the small, migratory terns to nest at marginal sites too close to the mainland where they are vulnerable to predators such as fox, raccoons, mink and Great Horned Owls. Predation and nocturnal abandonment of eggs and chicks leads to chronic nesting failures and ultimately to colony abandonment. The tradition for terns to nest in Casco Bay has been fading for many decades.

In 1885, there were nine tern colonies in Casco Bay, all located on outermost islands, but hunting for the millinery trade eliminated most of them by 1900, and gulls completed the displacement of terns by 1918.

In late June, 1990, project co-directors Steve Kress and Jane Arbuckle inspected all of the historic tern nesting islands in Casco Bay. They noted that these once-important tern nesting islands were now crowded with nesting Great Black-backed and Herring Gulls. Unfortunately, they also found the islands so steep-sided and rugged that it would be very difficult to establish and supply a field camp—a necessary early step in the tern restoration process.

Gulls interfere with tern nesting because they claim the best sites for their own nests before the terns arrive from their southern hemisphere wintering areas. Gulls also prey on tern eggs and young. Herring and Great Black-backed Gulls find abundant waste from local fisheries (e.g. offal and lobster bait discarded from fishing boats). Although some communities have switched to incinerators, garbage remains available at many landfills and this is an especially important food for gulls during lean winter months.

Disturbance from picnickers and others who land on seabird nesting islands during the breeding season also affects



terns. During the incubation period, tern eggs can overheat or chill if the parents are displaced for too long.

During their tour of historic tern nesting islands, Steve and Jane chanced upon tiny Jenny Island which at the time (June 1990) had 45 pairs of Common Terns nesting on its northern shore.

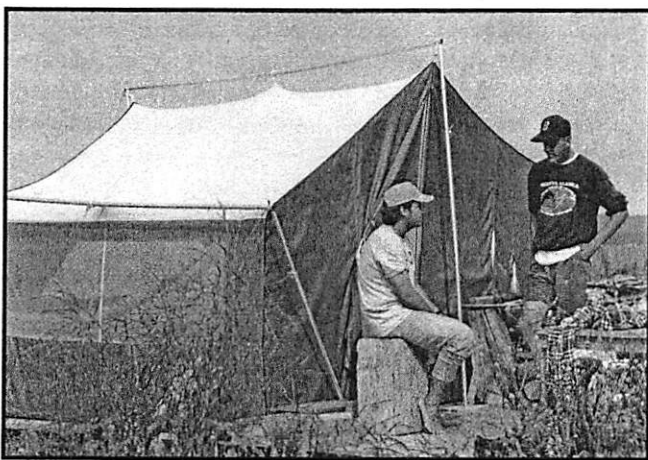
These were nearly the last of the Casco Bay terns. As they watched, the terns were diving at a group of picnickers who were having lunch in the midst of the colony. The picnickers eventually left, but no sooner were they gone than a Great Black-backed Gull began walking through the colony, searching for eggs.

The Jenny Island Project began this year on May 3 when a team of volunteers assembled a pre-fabricated tent platform on the south end of the Island. Gull control (removal of 35 birds) was performed by an agent from the Animal Damage Control office of the U.S.D.A. on May 9. This disruption succeeded in causing the remaining gulls to abandon the island—thus opening it for the terns that were just starting to return from their winter habitat in South America.

Terns were first sighted at Jenny Island on May 11th, and by June 20 there were 57 tightly clustered Common Tern nests on the northeast corner of the island. The season ended with a high count of 75 nests.

Scott Richardson, island supervisor, spent the period from early June to mid-August camping in a tent on the south end of the island. Project interns and volunteers worked with Scott to protect this small and vulnerable colony. While sitting in observation blinds for three hours at a time, Scott and his assistants recorded the foods delivered to the tern chicks. They calculated that on average, 1.7 chicks were produced per nest. Several pairs successfully fledged all three of their chicks, an accomplishment that is rarely achieved elsewhere in Maine.

So, for the first time in more than a decade, terns reproduced successfully in Casco Bay. "It was certainly a satisfying sight for us to watch more than a hundred young terns test their wings for the first time over Jenny Island," said Scott. Clearly, these birds would not have been in the air without the dedicated effort of Scott and his crew. The terns that nested this year should return next summer, helping to attract even more terns to Jenny Island. When the colony grows to several hundred pairs, the terns should be capable of chasing away predatory gulls on their own, thus reducing the need for human presence.



Island supervisor Scott Richardson (right) and intern Jim Bradley discuss the daily work plan outside the Jenny Island field station—a tent donated by L. L. Bean, Inc.

The Jenny Island tern project is sponsored by National Audubon Society, Maine Audubon Society and Merrymeeting Audubon Society. ■

PINTA ISLAND—A NEW HOME FOR DARK-RUMPED PETRELS?

Audubon biologists explored remote Pinta Island this summer to assess its potential as a possible refuge for the endangered Dark-rumped Petrel.

The Galapagos Islands straddle the equator and are located about 600 miles west of mainland Ecuador in the Pacific Ocean. Dark-rumped Petrels nest on just four islands in the Galapagos archipelago. Since 1988, these crow-sized petrels have been the subject of a joint project of the National Audubon Society, Galapagos National Park and the Charles Darwin Research Station.

At Santa Cruz, Floreana, James, and San Cristobal Islands, the petrels nest in highland habitats where they suffer severe losses from introduced predators such as Norway rats, feral dogs, pigs and cats. In some years, predators kill nearly all of the young produced. Recently, the Galapagos National Park began a rat control program at Floreana and Santa Cruz Islands. While there have been some encouraging short-term gains, the long-term practicality of poisoning is uncertain, since it depends on ongoing funding, training and cooperation of park guards who are underpaid and poorly equipped.

In 1988, Audubon biologists began Phase I of an innovative program to test the idea that petrels could be attracted to playbacks of their calls and that such recordings would encourage the birds to breed in artificial burrows (see *Egg Rock Update* 1988–1990). Recordings of colony sounds with large numbers of petrels proved highly attractive and led to petrels breeding in artificial burrows on Santa Cruz Island in 1990. Phase II of the program is a test to learn if the attraction method

will encourage the petrels to colonize a new nesting island—one pre-selected for its absence of exotic mammals.

Pinta Island, located approximately 67 miles northwest of Santa Cruz Island, has great potential as a predator-safe nesting island. Because of its distance from other islands and lack of human settlements, it is free of introduced mammals. The island consists of a single cinder cone volcano which is high enough to develop a moist zone, similar to that where petrels nest at other islands and is thus suitable nesting habitat.

Richard Podolsky, co-director of the Dark-rumped Petrel Project with Stephen Kress, conducted an expedition to Pinta Island for the month of July. His team of three set up base camp at the foot of the volcano and soon began working their way through dense and spiny vegetation to explore all elevations of the island, searching for occupied or inactive Dark-rumped Petrel burrows. Although there had been previous reports of petrels calling overhead, his team reported no petrel activity, either on the ground or in the air. However, they did observe Dark-rumped Petrels in the waters around Pinta upon their arrival and departure.

The next step in the attraction program will be to install an automatic tape-player system among a set of artificial burrows near Pinta's summit. The automated system will be controlled by a timing device that will turn on the tape player at dusk each day, and then switch it off by dawn the following morning. Powered by solar energy, the tape-playing system which will broadcast Dark-rumped Petrel colony sounds that may soon attract petrels to this predator-free island. ■

TERN CHICKS EAT MORE ATLANTIC HERRING

Atlantic herring was an important part of the diet for tern chicks at Maine Coast colonies this summer. This is good news for the terns and for those concerned with the Maine coast herring fishery.

In 1987, we began monitoring the foods delivered to tern chicks at Matinicus Rock, the largest U.S. colony of Arctic Terns (see *Egg Rock Update* 1987.) Surprisingly, from 1987 to 1989 herring was conspicuously scarce among the foods delivered to tern chicks: only 2 to 6% of all food deliveries were herring. White hake, the only fish that was abundant in these years, consistently comprised 59% of the chick diet. Invertebrates such as crustaceans and insects made up the balance of the diet, but have relatively low nutritional value compared to fish.

The small proportion of fish in the tern chick diet from 1987 to 1989 resulted in low productivity. Although Arctic Terns typically lay two eggs and can fledge up to two chicks per year, Matinicus Rock terns were fledging a mean of 0.8 chicks per nest during 1988 and 1989.

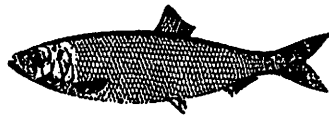
The proportion of herring in the diet of Arctic Tern chicks at Matinicus Rock reached a record high 24% this summer. Not surprisingly, tern productivity increased to a record high of 1.1 chicks per nest. Since this was a very mild summer with

a minimum of damp, rainy weather that can kill tern chicks, we plan to extend this study for at least another five years to evaluate other factors (such as weather and predators), that can affect tern productivity.

Our studies at other Maine Coast tern colonies concur with the results from Matinicus Rock. This year terns produced a "bumper crop" of fledglings and Atlantic Herring was in good supply at all of our study sites. At nearby Seal Island, for example, Arctic Terns fed their chicks on a diet of 70% herring and 23% hake and fledged a remarkable 1.7 chicks per nest.

The link between productivity and Atlantic Herring is not restricted to terns. The Atlantic Herring is also an important food for puffins, Razorbills and marine mammals such as minke whale and harbor porpoise. Herring is also the cornerstone of one of Maine's most important fisheries.

It's too early to know if the recent increases in herring observed indicate a trend toward larger stocks of herring, but it is clear that birds are valuable indicators to the abundance and availability of fish. Terns feed on herring that are smaller than legal catch size; thus their success at catching herring is a predictor of the availability of herring in future years, and an indicator of the adequacy of current fishing regulations. ■



PUFFINS INCREASE AT SEAL ISLAND

The number of returning translocated puffins doubled this summer as 102 of the 912 puffins from the 1984-1989 transplants put in an appearance at Seal Island or at one of the other Gulf of Maine puffin colonies.

National Audubon Society and the Canadian Wildlife Service launched the effort to restore puffins and terns to Seal Island in 1984. The puffins were extirpated from the island in 1887 due to excessive hunting for food and feathers. Terns had been absent since 1953 when Herring and Great Black-backed Gulls crowded them off the island.

Two-week-old puffin chicks were translocated from Great Island, Newfoundland to Seal Island National Wildlife Refuge where they were hand-reared in artificial burrows. The chicks were banded and permitted to fledge from the shores of Seal Island with the hope that they would someday return to recolonize the island.

After a slow start and few returns, the Project took a positive turn in 1990 when a total of 52 puffins from the 1987 and 1988 transplants returned (see *Egg Rock Update* 1990.) In 1990, observers were elated to see as many as 12 puffins at once, but these numbers were soon out-distanced by the 1991 puffin activity.

From mid-May to mid-August, our Seal Island staff hid in observation blinds for three-hour stints and patiently waited for the puffins to land and show their leg bands. By carefully reading band numbers through a powerful spotting scope, this year's Seal Island interns identified a total of 66 individual puffins. These included 15 that were observed previously in

1990 and 51 that were sighted at Seal Island for the first time this year. Thirty-six additional Seal Island transplanted puffins were reported at Machias Seal Island, Petit Manan Island and Matinicus Rock.

A total of 113 Seal Island translocated puffins have returned to date. Eighty percent of the birds observed in 1990 were also sighted in 1991. In addition to the translocated puffins, as many as ten unbanded puffins were observed at one time at Seal Island this summer.

The majority of the returning Seal Island puffins belong to the 1988 transplant group. This group made an excellent showing in 1990, with 41 of the 190 transplants returning as two-year-olds. This summer we observed an additional 31 members of this age group, bringing the total returns from 1988 to 72. This represents a return rate of 38%. Returns by the 1989 age group are promising; to date, 29 of 190 birds have returned. Burrow prospecting was seen more frequently. This is a behavior where puffins inspect the crevices under large boulders staking out potential nesting places. Since most of the returning puffins will be four years old next summer, a few may be just old enough to breed for the first time; however, most puffins usually wait until they are five years old to breed.

It remains a mystery why the return rate varies so greatly between years. The lesson, however, is that variable survival rates affect both populations and efforts to restore species. Restoration projects which run for just a few years, could miss the occasional high survival year that makes the difference whether a project succeeds or fails. ■



Stephen Kress

PUFFIN BOAT TOURS

If you would like to see Maine puffins, terns, guillemots, eiders and other seabirds, consider taking a National Audubon Society-sponsored cruise to either Eastern Egg Rock, or to Matinicus Rock and Seal Island. Narrated by Audubon biologists, the tours provide authoritative insight into the lives of seabirds, excellent opportunities to view seabirds up close, and help fund our research. A portion of each fare is donated to National Audubon Society's Puffin Project.

For Eastern Egg Rock trip schedules and reservations:

- R.N. Fish, Inc., P.O. Box 660, 65 Atlantic Avenue, Boothbay Harbor, Maine 04538
Phone (207) 633-3244
- Hardy Boat Cruises, R.R. 1, Box 53, Shore Road, North Edgcomb, Maine 04556
Phone (207) 677-2026

For Matinicus Rock and Seal Island trip schedules and reservations:

- Maine WhaleWatch, PO Box 78, Northeast Harbor, Maine 04662 Phone (207) 276-5803

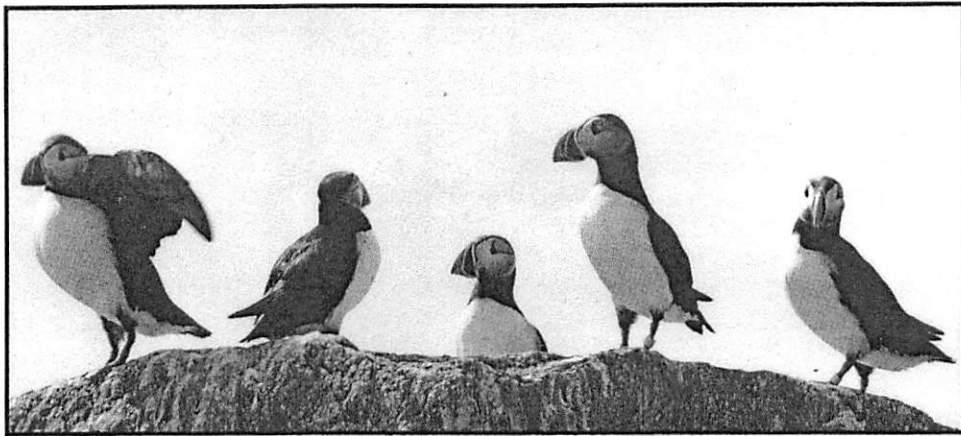
EGG ROCK PUFFINS 1981-1991

July 4, 1991 was the 10th anniversary of the first transplanted puffin nesting activity at Eastern Egg Rock. Between 1973 and 1981, 774 two-week-old puffin chicks were translocated from Great Island, Newfoundland and were hand-reared by resident staff.

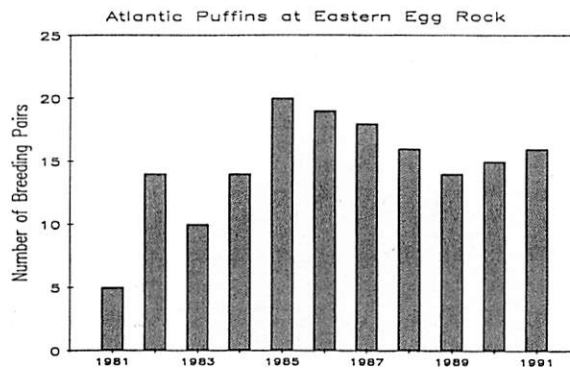
Five pairs nested at Eastern Egg Rock in 1981 and were the first to breed there since 1887. The number of breeding pairs increased to 20 in 1985 as more birds reached breeding age. The colony slowly declined to 14 pairs by 1989, but increased to 16 pairs this year as unbanded birds joined the colony. Over the ten years, the colony has ranged from 5 to 20 pairs with an average of 16 pairs per year. In eight of the ten years there have been at least 14 breeding pairs. This stability is due to the puffin's long life expectancy and the high survival rate of adults from one year to the next. In most years, no more than one adult is lost. Most pairs show remarkable tenacity for nesting in the same place with the same mate.

Of the 16 pairs that nested at Eastern Egg Rock this year, 14 had the same mate from the previous year. Only one of the 30 breeding puffins from 1990, 13-year-old Bi12, did not return for the 1991 nesting season. The other 14 returning pairs have been together for periods ranging from 2 to 9 years with an average of 5.4 years.

Observing a small number of puffins over many years provides abundant opportunity for watching individual behavior. En25 has one of the more interesting stories. In the



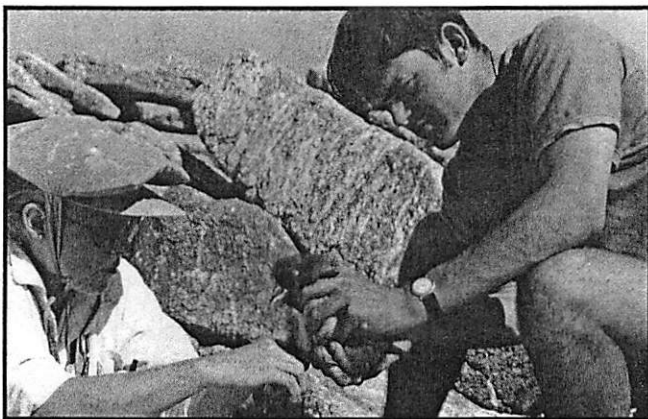
Stephen Kress



1990 Egg Rock Update, we explained that En25, then an eleven-year-old male, had three previous mates, two of which died and one who left him for another mate. In 1990, En25 was a bachelor, but that changed this year. He found his fourth mate, U04, an unbanded female who had mated with Bi12 for the past two summers. When Bi12 did not return this summer, En25 moved out of his burrow which he had occupied since 1985 and joined

U04 in her nearby rock crevice. Together they successfully raised a chick.

The 16th pair discovered at Egg Rock this summer were both unbanded. The number of unbanded puffins should increase at Egg Rock in future years as young birds join the colony. At present, this is the only unbanded pair, though six pairs now include at least one unbanded mate. The absence of bands suggests that these are probably returning native young hatched at Egg Rock four or five years ago. ■



Stephen Kress

Barbara North and Roy Taylor band a native puffin chick at Eastern Egg Rock.

ADOPT-A-PUFFIN

Help support Project Puffin by "adopting" one of the Eastern Egg Rock Puffins. An adopted puffin makes a unique birthday or holiday gift! Or, adopt a puffin as a school project to learn about the oceans and wildlife conservation.

For each \$100 gift, we will select one of the Egg Rock Puffins for you to sponsor. You will receive a certificate suitable for framing, and a color photo and biography of your puffin.

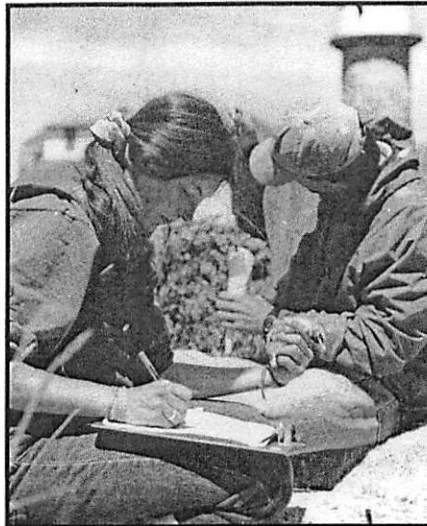
Write: Adopt-A-Puffin, National Audubon Society, 159 Sapsucker Woods Road, Ithaca, New York 14850 USA.

INTERN PROFILES

Fifteen student interns assisted the Puffin Project this year on the Maine Coast. The interns came from nine states and five countries, representing ten universities. Three came to the Project from the University of Maine at Orono, two each from College of the Atlantic, Cornell University, Universidad de Ecuador (Guayaquil), and one each from Evergreen College, Hampden-Sydney College, Idaho State University, the University of New Hampshire, Sheffield University (England) and Wanganui College (New Zealand). Ten interns were new to the Project and five were returning staff. This was Peter Duley's fifth summer, but Susan Schubel holds the record with seven consecutive summers.

The 1991 field season began with several days of staff training at the Audubon Camp in Maine on Hog Island. This pre-season training focused on data collection and censusing techniques as well as an overview of the ecology of the Gulf of Maine with an emphasis on seabirds and their conservation.

One of the more experienced interns serves as an island supervisor at each of the Project's five research stations (Stratton Island, Jenny Island, Eastern Egg Rock, Matinicus Rock and Seal Island.) Supervisors stay at their assigned island throughout the summer while research assistants circulate

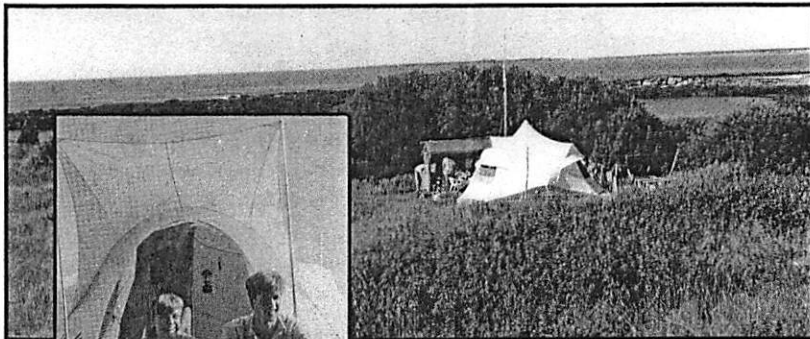


Susan Schubel and Trip Dennis weigh and measure Arctic Tern chicks at Matinicus Rock.

between islands, spending stints of two to three weeks at one island before moving on to the next. The supervisors provide continuity for data collection and are able to witness the dramatic cycle of the season at "their" island. They have the option of scheduling time off, but most seldom leave. Responsibilities vary greatly between islands. On remote Seal Island, for example, visitors are not permitted to land and field work focuses entirely on the restoration and study of seabirds. In contrast, Stratton Island, located in southern Maine off Old Orchard Beach, had 674 visitors this summer. Stratton Island staff spent much of their summer discussing the importance of seabird nesting sanctuaries to insure that visitors do not disrupt the nesting season.

In addition to the full-season interns, the Project received assistance from 16 volunteers, representing 11 states. The volunteers donated a combined total of 23 weeks and took part in all aspects of the field work, including monitoring for puffin returns and observing tern behaviors.

Like the interns, the volunteers soon find themselves taking copious notes during the three-hour stints in cramped observation blinds. Though they come from diverse backgrounds, the volunteers have a common enthusiasm for wildlife and an eagerness for field experiences. ■



Scott Hedges and Heather Whitaker supervised the Stratton Island program, welcoming and educating more than 600 visitors. Moss Tent Co., of Camden, Maine, generously loaned us an Optimum 200 tent for use as the base camp on Stratton Island, Saco Bay.



Rick Schauffler, supervisor at Seal Island, inspects a three-week-old Arctic Tern chick.

Our sincere appreciation goes to the 1991 Maine and Galapagos seabird research interns and volunteers:

Interns: Washington Arevalo, Phil Battley, James Bradley, Trip Dennis, Peter Duley, Manuel Fajardo, Scott Hedges, Seth Isenberg, Barbara North, Ellen Orrell, Scott Richardson, Rick Schauffler, Susan Schubel, David Shealer, Roy Taylor, Heather Whitaker

Volunteers: Nancy Dennis, Robert Duffey, Kirstie Forbes-Robertson, Wendy Graffam, Cyndi Martin, Peter Novelli, Beth Orenstein, Anne Peterson, Carey Rowsom, Thane Ryland, Denise Senk, Jeff Simmons, Ingrid Slamer, Art Stackhouse, Veronica Vasquez, Steve Walker, Bryce Yates, Deborah Zombeck

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We thank the Maine Department of Inland Fisheries and Wildlife for permission to work on Eastern Egg Rock and Jenny Island, the US Coast Guard for the privilege of working on Matinicus Rock, the USFWS for allowing us to conduct our studies on Seal Island National Wildlife Refuge, and the cooperation of the Canadian Wildlife Service at Machias Seal Island. We also thank Robert Dorrance for providing use of the Hog Island facilities and Joe Johansen of the Audubon Camp for his invaluable logistic support.

Thanks to Fausto Cepeda P., Hector Serrano, and the staff of the Galapagos National Park, and Dr. Daniel Evans and Fionna Walsh at the Charles Darwin Research Station for providing logistic support essential to the Dark-rumped Petrel project. Special thanks to Luis Ramos for his assistance with transportation.

It is a special pleasure to acknowledge the generous assistance and gifts from the following people:

- Ann Allen for donating her miniature puffin carving as our Bird-A-Thon prize
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- Charles Walcott and the entire staff of the Cornell Laboratory of Ornithology for their continued cooperation with our projects

1990-1991 CONTRIBUTORS MEMORIAL GIFTS

In memory of Michael A. Apgar

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In memory of Robert A. Hauslohner

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