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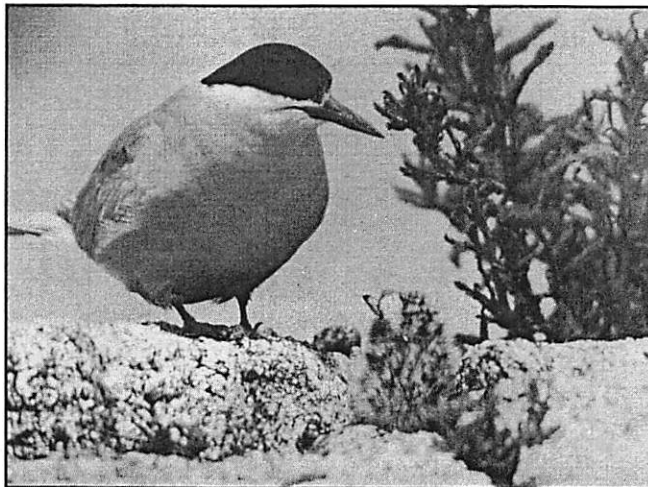
Stephen W. Kress, Director

Newsletter of the Fratercula Fund of the National Audubon Society

ARCTIC TERNS NEST AT SEAL ISLAND AFTER 35 YEAR ABSENCE

Sixteen pairs of Arctic Terns and one pair of Common Terns nested at the northern tip of Seal Island National Wildlife Refuge this summer. The new colony marks the first nesting of terns at Seal Island in 35 years. This encouraging event is the result of 6 years of patient management by National Audubon Society (NAS) biologists who are working to restore Atlantic Puffins and Arctic Terns to this remote island, 18 miles south of Rockland off mid-coast Maine.

In 1885, Common and Arctic Terns nested on about 75 Maine coast islands. By 1890, persecution from milliners' agents had reduced the number of colonies to about 50% (32 colonies). Ten years later, the number of colonies had again been halved—16 colonies remained. The passage of the 1916 Migratory Bird Treaty Act, combined with protection of seabirds at key nesting islands, allowed terns



Stephen W. Kress

The first Arctic Tern chick hatched at Seal Island in 35 years and its parent.



Arctic Terns were slaughtered at Seal Island in 1887 to decorate "fashionable" hats.

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to increase their numbers through 1940. At that time, about 8,000 pairs each of Common and Arctic Terns nested on approximately 25 Maine islands.

Since 1940, numbers of Common and Arctic Terns have declined by about 50% and the number of nesting islands is now greatly reduced. By 1989, there were approximately 2,741 pairs of Common Terns and 4,151 pairs of Arctic Terns nesting on 21 islands in the Gulf of Maine. Although Gulf of Maine tern populations have stabilized since 1984, present numbers are maintained only through intensive management at several key nesting islands. At Machias Seal Island, Petit Manan Island, Matinicus Rock and Eastern Egg Rock resident warden/biologists actively keep Herring and Great Black-backed Gulls away from the islands. These islands support 84% of all Arctic, Common and Roseate Tern nests, and virtually all of the young terns produced in Maine come from these four islands. Although Arctic Tern numbers have remained stable in the Gulf of Maine for the past six years, the number of colonies has continued to decline. In 1984 there were 18 Maine colonies, but by 1989 there were only 8 colonies.

(Continued on page 6.)

DARK-RUMPED PETREL PROJECT CONTINUES IN THE GALAPAGOS ISLANDS

First Egg Layed in Artificial Burrow

In 1988, National Audubon Society began a cooperative seabird conservation program with the Galapagos National Park and the Charles Darwin Research Station to help the endangered Dark-rumped Petrel (see *Egg Rock Update* 1988). These burrow-nesting birds of the Galapagos highlands, known locally as *pata pegada* (the web-footed ones), have been excluded from large areas of former habitat by encroaching farmland, and are now threatened by introduced predators such as rats, dogs, and pigs. Even within the protected areas of the Galapagos National Park, few young avoid the rat predators that enter burrows. Some recent studies suggest that Galapagos Dark-rumped Petrel populations are declining at the rate of 30% per year—the species is likely to become extinct in 10-15 years.

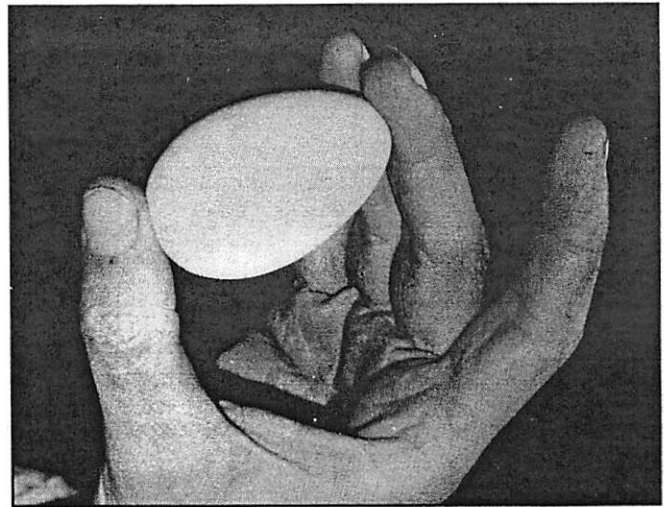
Encouraged by the successes with establishing colonies of puffins, terns, and Leach's Storm-Petrels on the Maine Coast, Stephen Kress and Richard Podolsky began the Dark-rumped Petrel Project in 1988. The primary goal of this project is to develop techniques for encouraging petrels to nest in artificial burrows where they can be protected from predators. They reasoned that if young petrels chose to nest in dense associations (rather than as scattered individuals in natural cavities), the park wardens would have a better chance of controlling predators. Mirador Volcano on Santa Cruz Island, a long-extinct collapsed cinder cone overgrown with lush ferns and endemic miconia shrubs, was selected as the study site.

In 1988, 80 artificial burrows were hand-dug into the sides of Mirador and an additional 80 burrows were excavated in 1989. During both seasons, "double-intensity" recordings of Dark-rumped Petrel colony sounds were broadcast from outdoor speakers located among the burrows. Experiments conducted in 1988 showed that double-intensity recordings (a recording of petrel calls that was recorded over itself—to simulate an exceptionally large colony) would have strong attraction to young petrels looking for a prospective nest site. These recordings were produced for the project by the Library of Natural Sounds at the Cornell Laboratory of Ornithology.

Experiments to determine the relative attraction of different Dark-rumped Petrel vocalizations were repeated in 1989. These involved random broadcasting of 1/2-hour recordings of different vocalizations under three 12-meter mist nets. In both 1988 and 1989, the double-intensity colony sounds were the most attractive: a total of 600

Dark-rumped Petrels were captured and most of these were banded.

The 1989 field season began at Mirador on May 15th with great excitement. Manuel Fajardo and Washington Arevalo, two students from the University of Ecuador in Guayaquil, were checking the 1988 artificial burrows when they discovered that burrow D-17 had been excavated far beyond its original depth. Reaching to its deepest corner, they scooped a handful of soil and examined it carefully—EGG SHELLS!



Richard Podolsky

Dark-rumped Petrels laid their single, white egg in an artificial burrow in Mirador volcano late in the 1988 field season. Several new pairs may join the colony in 1989.

At the close of the 1988 field season in mid-August, it was clear that many of the burrows had been visited and that some petrels were spending a day or two at a time in the burrows. It was a surprise, however, to find that a pair had excavated one of the artificial burrows and laid an egg. While it was impossible to know the outcome of this first nesting, the discovery was an exciting start for the 1989 Galapagos field season.

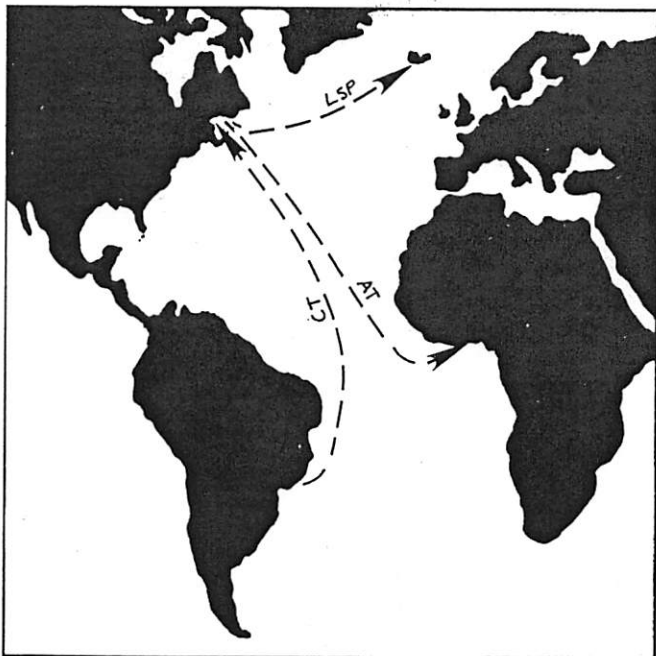
Petrels continued to visit the artificial burrows in 1989, and by the end of the field season 71% of the 160 burrows had been visited at least once. Nocturnal visits were confirmed by either visual clues (petrel footprints, excrement, or dropped feathers) or by noting disturbance to a row of toothpicks set across the burrow entrance. Petrels were found sitting in 5 burrows during the morning checks and one burrow (D-17) housed a petrel for 26 nights.

The field team left Mirador before most first-breeding petrels would have laid eggs, but it's likely that some of the artificial burrows will have breeding petrels this year. The Galapagos National Park now has a keen interest in protecting these burrows and is committed to ongoing rat poisoning and monitoring of Mirador Volcano.

While the *pata pegadas* of Galapagos are still highly threatened by predators, we are optimistic that the petrels of Mirador will have a brighter future because of National Audubon Society's efforts. The idea of attracting seabirds to safe nesting habitats by broadcasting vocalizations also has potential for someday attracting the Dark-rumped Petrels to a truly predator-free island.■

RECENT BAND RECOVERIES LINK MAINE SEABIRDS TO THREE CONTINENTS

Seabirds are well-known for their ability to wander the globe, taking advantage of global air currents and ocean streams. However, there are few details about these migrations for specific populations, such as the seabirds which nest on the Maine Coast. Where do the puffins, terns and petrels go after they leave Eastern Egg Rock and Matinicus Rock?



Interpreting the dispersal of birds from a few recoveries is risky, since finding banded birds and reporting the bands are both rare events. Both depend largely on chance encounters with people interested enough to send the necessary information to the Bird Banding Office of the U.S. Fish & Wildlife Service (USFWS). Reports of pelagic seabirds such as Arctic Terns, Leach's Storm-

Petrels, and puffins are especially rare since they wander vast regions where there are few people. With these considerations in mind, band recoveries from distant countries are particularly amazing. Such encounters offer an unusual glimpse about how far "our" Maine seabirds roam. Three recent recoveries illustrate this point:

- A **Leach's Storm-Petrel (LSP)** captured in a mist net at Eastern Egg Rock at 1:24 AM on July 17, 1980 was recaptured on August 21, 1988 on Ellidaey Island in southwestern Iceland—8 years later. Since storm-petrels usually do not visit land until their second year, this bird was at least 10 years old when it was recaptured. Also, this is the first time that a Leach's Storm-Petrel banded in North America has been recovered in Iceland.
- A **Common Tern (CT)** juvenile was banded on April 1, 1987 at Lagoa do Peixa, a coastal lagoon in southern Brazil. It flew from southern Brazil to Eastern Egg Rock where it was killed by a mink (see *Egg Rock Update* 1988) on June 17, 1988. Although several terns banded at Lagoa do Peixa have been recovered in New York and Massachusetts, this is the first time one has been recovered in Maine.
- An **Arctic Tern (AT)** banded as a chick at Matinicus Rock on July 14, 1988, crossed the North Atlantic and was entangled in a fishing net on September 19, 1989 near Tema New Town, Ghana, West Africa. The bird was captured and then released so that it could continue its long migration—perhaps as far as Antarctica. While there have been previous recoveries of Arctic Terns travelling between North America and Africa, this is the first such record from Matinicus Rock.■

1989 PUFFIN TRANSPLANT

The 1989 puffin transplant got off to a smooth start as we collected 200 puffin chicks the morning of July 13th. We arrived earlier than usual with the chicks at the St. John's airport, only to discover that an intense weather system, with "inbedded thunder storms" was blocking our return to Maine. For the first time in 15 years of transplants, we were forced to stay overnight enroute with the chicks! At the invitation of Pierre Ryan, a Canadian Wildlife Service biologist, we tucked the chicks (still in their cases) into Ryan's dark, cool, root cellar. The storm passed during the night and we made it back to Maine in good time, arriving by early afternoon on the 14th. All of the chicks survived the trip. Of the 200 transplanted this year, we successfully fledged 190, which brings the total fledged from Seal Island to 912.■

TELEMETRY PROJECT PROVIDES INFORMATION ABOUT PUFFIN FEEDING SITES

There is little known about puffin feeding habits in the Gulf of Maine. Recently, our detailed observations from blinds have revealed information about the frequency of feedings, types of foods, and sizes of meals which wild puffins feed their young (see *Egg Rock Updates* 1983 and 1987). However, answers to even the most basic questions about foraging habits remain unknown. For example, how far from the colony do puffins usually feed? In what water depth do they feed? Do individual puffins have favorite feeding areas or do most of the puffins in a colony feed in the same locations? Such information is important for puffin conservation efforts because feeding areas need as much protection as nesting islands.

To help answer some of these questions, 4 breeding puffins from 4 different nests at Matinicus Rock were trapped in July and tiny transmitters were glued and taped to their feathers. The transmitters were about the weight and size of a nickel with a 6-inch antennae. Three puffins received back mounts, while a fourth bird had the antennae attached to the underside of its tail.

The transmitters sent high-frequency signals to receiving antennae mounted below the wings of a single-engine Cessna piloted by Colin Pennycuik from the University of Miami. He and Holliday Obrecht (USFWS) circled over Matinicus Rock and vicinity listening for the signals from each transmitter. The transmitter signal carried 16-20 miles when the birds were flying and could be detected from distances of 1-10 miles when the birds were on the water or under the rocks. While Pennycuik and Obrecht searched from the air, Mark Fuller (USFWS), Susan Jewell (NAS), and other Audubon staff waited patiently at Matinicus Rock for the puffins to return to their burrows. The transmitters worked for an average of 4 days and probably stopped functioning when salt-water leaked inside through the antennae connection. The transmitters fell off the puffins after about 3 weeks.

Colin and Holliday located the birds at sea 27 different times. Each puffin appeared to have a favorite area in which sightings were clustered. Three of the 4 birds frequented locations within a 30-mile arc east of Matinicus Rock. Of these, 10 sightings were within 1/2 mile of Seal Island (site of the Project's puffin restoration effort). The at-sea locations averaged 13 miles from Matinicus Rock, while the furthest sighting was 35 miles SE of the Rock. Some puffins were located diving in water that was 500 feet deep.■

FEW YOUNG PUFFINS RETURN TO MAINE COLONIES

Only a few of the puffin chicks that fledged from Eastern Egg Rock, Matinicus Rock, and Seal Island during the period 1984 through 1987 have returned to the Maine Coast.

Puffins spend their first 2-3 years at sea before returning to land. During that time they must learn how to find ample food while avoiding predatory gulls and fish, plastics, oil spills, and entanglement in fishing gear. Weather and the amount of available food also vary between years and probably affect a puffin's chances for survival. Several favorable years for young puffins may be followed by several poor survival years. At best, adult puffins produce one fledgling each year, but they may live to be 34 years old allowing the chance to reproduce during one or more good periods. The period 1977-1980 was a good survival time since an average of 32% of transplanted young fledged during these years returned to the Maine Coast. In contrast, only 6 of 534 transplanted puffins to date have returned from the 1984-1987 transplants. However, 600 of the 912 puffin chicks transplanted are still too young to return, so this trend could reverse itself. We will know more about the fate of these birds by 1992.

Similar low puffin returns are also occurring among the wild populations at Matinicus Rock and Eastern Egg Rock. Adults continue to breed, but in order to persist, these populations will need a stretch of several years when high numbers of young return. The Eastern Egg Rock puffin colony is especially vulnerable because only 14 pairs nested there in 1989—a drop from the peak of 20 pairs in 1985.

On the positive side, some young, unbanded puffins (most likely from Matinicus Rock) have discovered the recently gull-cleared puffin habitat at Seal Island. This year as many as 5 at a time explored the rock crevices at the north end of the island. Puffins were on land for 38% of the observation days, marking an encouraging increase in sightings.■



Stephen W. Kress

Puffins spend their first 2-3 years at sea where they must find ample food while avoiding predators and various marine pollutants.

BOAT TOURS VISIT MATINICUS ROCK AND EASTERN EGG ROCK

Tours to Eastern Egg Rock continued this summer as several thousand passengers boarded boats in search of Egg Rock puffins, terns, gulls, guillemots, and eiders. Audubon biologists Evelyn Weinstein and Rose Borzik were on board for seven trips each week working as naturalists, historians, and representatives of the Puffin Project. Tours from Boothbay Harbor aboard the Pink Lady and from New Harbor aboard the Hardy III provide visitors with an unusual wildlife experience. At the same time, these tours help the Puffin Project, since the tour operators donate part of each fare to National Audubon in support of seabird research and conservation.

This year, Maine WhaleWatch also sponsored 5 seabird trips each week from Rockland to Matinicus Rock and Seal Island. These trips, narrated by Audubon biologists Matt Drennan and Bob Bowman, also generated funds for the Puffin Project.

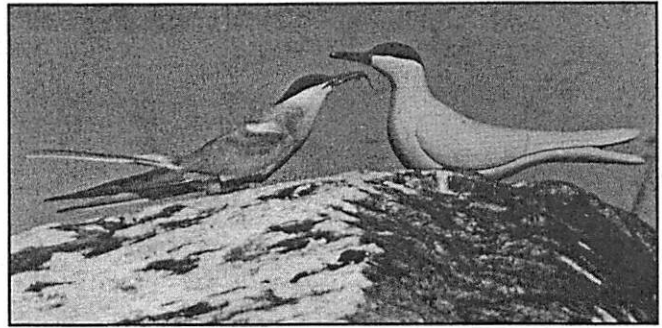
To learn more about the 1990 Audubon Puffin Tours, contact:

- R.N. Fish, Inc., P.O. Box 660, 65 Atlantic Ave., Boothbay Harbor Maine 04538
- Hardy Boat Cruises, R.R. 1, Box 53, Shore Rd., N. Edgecomb, Maine 04556
- Maine WhaleWatch, Northeast Harbor, Maine 04662.■

MAINE TERNS INCREASE AT MANAGED SANCTUARIES

Arctic, Common, and Roseate Terns on the Maine Coast are concentrating their numbers at a few intensely managed sanctuaries as Herring and Great Black-backed Gulls continue to crowd them off many historic tern nesting islands. This trend is especially conspicuous at Eastern Egg Rock, Matinicus Rock, and Stratton Island, three National Audubon Society Sanctuaries which are presently strongholds for the remaining tern population.

At Eastern Egg Rock, terns increased 43% from 654 pairs in 1988 to 936 pairs in 1989, making Eastern Egg Rock the largest Common Tern colony in Maine. The endangered Roseate Tern also increased at Egg Rock from 5 pairs in 1988 to 17 pairs in 1989. On Matinicus Rock, the Arctic Tern colony expanded from 981 pairs in 1988 to 1,166 pairs in 1989 (19% increase) to become the largest in the U.S. Likewise, the Common Tern colony on Stratton Island in southern Maine grew from 71 pairs in 1988 to 122 pairs in 1989 (42% increase).

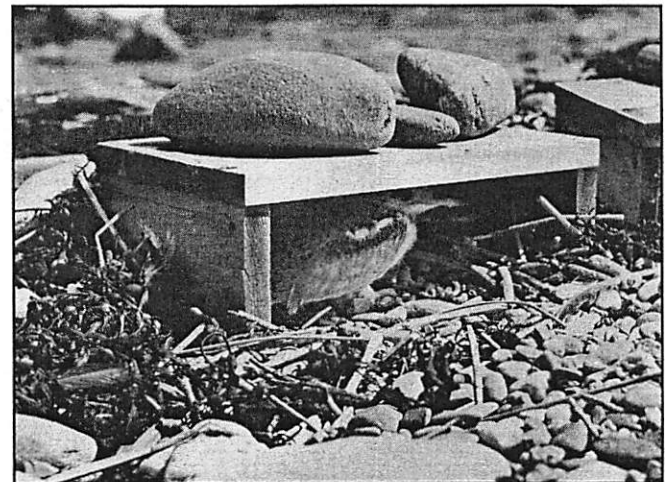


Stephen W. Kress

Tern decoys help to lure terns to sanctuaries where they find suitable nesting conditions.

Population increases at these colonies disguise the loss in the number of colonies statewide. The 1989 census by the Gulf of Maine Tern Working Group found that the number of Common Tern colonies declined from 28 in 1984 to 18 in 1989, while statewide, Common Tern populations remained virtually constant (2,543 pairs in 1984 to 2,741 pairs in 1989). Arctic Terns show a similar trend. In 1984, there were 18 Maine colonies, but this number dropped to only 8 colonies in 1989.

This year, 92% of the Arctic Terns nested on just 3 managed sanctuaries: Machias Seal Island, Petit Manan Island, and Matinicus Rock. This concentration makes the terns vulnerable to catastrophic events such as predation (e.g. mink), oil spills, and diseases such as avian cholera. These risks become more profound as the number of colonies decrease. Without the few managed sanctuaries, these elegant birds would eventually disappear from the coast.■



William E. Duffey

A Common Tern chick finds shelter from storms and parching sunlight under a wooden chick shelter. In 1989, students at Kennebunk High School built 100 tern chick shelters for Stratton Island. Tern management activities such as gull control, vegetation clearing, and chick shelters are helping to boost tern numbers and productivity at Audubon sanctuaries.

PLANELOADS OF PUFFINS!

Dr. William Brennan certainly holds a rare distinction. His Beechcraft Baron has held more puffins than any airplane in the world. Each year since 1984 he has airlifted 200 young puffins from Newfoundland to Maine as part of the joint National Audubon Society and Canadian Wildlife Service program to restore puffins to Seal Island. This year he welcomed the 1200th puffin aboard. One of his 1984 puffin passengers bred this summer at Matinicus Rock and others continue to cruise the Maine Coast. Someday he may be able to boast that he once had an entire puffin colony on board!
Thanks Bill! ■

ARCTIC TERNS NEST AT SEAL ISLAND

(Continued from page 1.)

Vast numbers of Arctic Terns nested on Seal Island prior to 1885, but during the next 2 years raids by milliners' agents decimated the original colony. At the close of the millinery trade era, tern numbers once again increased, but began to decline again after 1940. By the mid-1950s, competition for nesting space from Herring and Great Black-backed Gulls resulted in the disappearance of terns as breeding birds on Seal Island.

The program to restore puffins and terns to Seal Island started in 1984 with a gull-control program to discourage Herring and Great Black-backed Gulls from nesting on the island. In 1977 (the last statewide census), these gulls nested on approximately 220 Maine islands. At that time, about

26,000 pairs of Herring Gulls and 10,000 pairs of Great Black-backed Gulls nested in Maine. Gull numbers have flourished since 1900 primarily because abundant food is easily scavenged from coastal fisheries (e.g. lobster and herring) and garbage dumps.

From 1984 through 1989, Herring and Great Black-backed Gulls were shot on the northern 8 acres of the island, and between 1985 and 1988, gulls were poisoned throughout the island by the U.S. Fish and Wildlife Service. These efforts successfully restored the historic tern nesting habitat. Terns were also attracted to the island using Arctic Tern decoys and tape recordings of Arctic Tern colony sounds. Fifty decoys were set in suitable habitat on the north end of the island and recordings were played each year from 1985-1989.

Terns have landed and courted among the decoys for the past several years, but apparently numbers were too few for colonization to occur until 1989. Arctic Terns are noted for their tendency to return to nest in the exact location where they nested the previous year, so it's likely that the terns that nested at Seal Island in 1989 will return in 1990 and these will attract additional terns to Seal Island next summer.

Seal Island has great potential to become another large Arctic Tern nesting colony, since there is a vast amount of good nesting habitat, no resident mammal predators, and ready access to food supplies. The island is also protected as a National Wildlife Refuge by the USFWS, and the National Audubon Society maintains a field station during the summer to protect the birds from human disturbance and gull predation. ■

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Joe Johansen of the Audubon Camp in Maine gave invaluable logistic support.

We also thank Fausto Cepeda Proaño, Director, and his staff at the Galapagos National Park and Dr. Daniel Evans, Director; Oscar Aguirre, Manager and Sylvia Harcourt, Director's Assistant 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:

- Jim Braun for donating materials and constructing the composting outhouse on Stratton Island.
- Drs. Bill and Betsy Brennan who have flown the collecting team to Newfoundland for the past six collecting trips.

- Cabela's, Inc. for donating 4 tents used by our research staff in the Galapagos.
- William Duffey and the Kennebunk High School (ME) students for construction of 100 tern chick shelters for Stratton Island.
- Hardy Boat Cruises, R.N. Fish & Son, Maine WhaleWatch and Outward Bound for assistance with logistics.
- Tom Taylor for creating and donating use of his art print, "Passion for Puffins," for our fundraising efforts.
- Mrs. Meredith Webster for donating a propane refrigerator for Stratton Island.
- Dr. Christine Welch for providing vitamins for the transplanted puffin chicks.

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1988-1989⁺ CONTRIBUTORS

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