

ALASKA MARITIME NATIONAL WILDLIFE REFUGE
HOMER, ALASKA

ANNUAL NARRATIVE REPORT
CALENDAR YEAR 1996

U.S. Department of Interior
Fish and Wildlife Service
NATIONAL WILDLIFE REFUGE SYSTEM

ALASKA MARITIME NATIONAL WILDLIFE REFUGE

Homer, Alaska

ANNUAL NARRATIVE REPORT

Calendar Year 1996

Department of Interior
U.S. Fish and Wildlife Service
NATIONAL WILDLIFE REFUGE SYSTEM

REVIEWS AND APPROVALS

ALASKA MARITIME NATIONAL WILDLIFE REFUGE

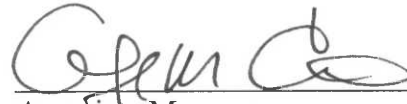
Homer, Alaska

ANNUAL NARRATIVE REPORT

Calendar Year 1996



Refuge Manager Date

 12/13/97

Associate Manager Date
Refuges and Wildlife

 12/13/97

Regional Office Approval Date

INTRODUCTION

The Alaska Maritime National Wildlife Refuge was created by the Alaska National Interest Lands Conservation Act (ANILCA) in 1980. The purposes for which it was established were: 1) to conserve fish and wildlife populations and habitats in their natural diversity; 2) fulfill international fish and wildlife treaty obligations; 3) provide opportunities for continued subsistence uses by local residents; 4) provide a program of national and international scientific research on marine resources; 5) ensure water quality and necessary water quantity within the refuge. This Act consolidated management of eleven existing refuges with 460,000 additional acres resulting in a 3,500,000+ acre refuge. Although relatively small in land mass, its lands are scattered along most of the coast of Alaska and extend from Forrester Island in Southeast Alaska along the Gulf of Alaska to the western end of the Aleutian Islands and northward to the Icy Cape area southwest of Barrow in northwest Alaska. There are more than 2,500 islands, islets, and pinnacle rocks within the refuge which are used annually by millions of seabirds of at least 30 species. The Maritime Refuge is divided into five units which includes all former refuges and some other federal lands/waters within those designated units. Homer, Alaska, is the refuge's headquarters and the home port of the *Tiglax*, the refuge's ship which supports field operations.

Gulf of Alaska

The Gulf of Alaska Unit comprises 435,156 acres and extends over 800 miles from Alaska's southcentral coast near Kodiak Island, eastward to southeast Alaska, and includes four former refuges: Tuxedni, St. Lazaria, Hazy and Forrester Islands. Major seabird colonies occur on the following islands or island groups within the unit: Chisik, Barren, Gull, Pye, Chiswell, Middleton, St. Lazaria, Hazy and Forrester. This unit is the only one which supports forest habitat on the Maritime Refuge. Spruce-hemlock forest is the dominant plant community on nearly all the islands east of Cook Inlet. The transition zone occurs in the Barren Islands, where there is only a small forested area on Ushagat Island. Shrub-comprised communities of elderberry and salmonberry associations, and coastal maritime grass communities dominate in non-forested areas. As in most of the refuge, topography in this unit is often precipitous, with seabirds using cliffs, talus slopes, burrows, boulder rubble, and rock crevices to breed and nest. About 420,000 acres of submerged lands around Afognak Island and Kodiak Island are managed as part of the Refuge. Seabird colonies in this unit are probably the most visited of any in the state. Unlike most other units, two colonies are readily accessible by marine vessel: St. Lazaria Island, which is fifteen miles from Sitka, and the Chiswell Islands, which are thirty-five miles from Seward.

Alaska Peninsula

The Alaska Peninsula Unit is the second largest of the Alaska Maritime National Wildlife Refuge. More than 800 islands totaling 420,371 acres comprise this unit, which incorporated two refuges established before designation of the Maritime Refuge. The Semidi Islands,

designated a refuge in 1932, and Simeonof Island, a refuge since 1958, also are the only areas in the Alaska Peninsula Unit where jurisdiction extends below mean high tide. Over 6,000,000 seabirds comprised of at least 25 species nest in this region. Few of the islands remain truly pristine due to introductions since the 1800s of foxes, rodents, and ungulates. Foxes destroyed seabird colonies on numerous islands and left remnant populations on other islands. Ground squirrels and voles, released with foxes as food sources, do intense damage on seabird colonies.

Aleutian Islands

The Aleutian Islands Unit comprises 2,395,768 acres in southwestern Alaska and extends over 1,100 miles from Unimak Island to Attu Island. The chain of islands is 20-60 miles wide with a maximum elevation of 9,400 feet above sea level. The unit includes over 200 mostly treeless islands, islets and rocks. Some islands are wave-cut platforms, less than 600 feet above sea level, while other islands are intensely glaciated mountainous islands as high as 3,000 feet above sea level. The islands are divided into seven island groups: Krenitzen Islands, Fox Islands, Islands of the Four Mountains, Andreanof Islands, Delarof Islands, Rat Islands, and the Near Islands. The AIU provides nesting habitat for several million seabirds, the Aleutian Canada goose and other waterfowl. The unit is an important migration and staging region for waterfowl, shorebirds and passerines and provides wintering habitat for emperor geese and other waterfowl. Asiatic birds are frequently seen in spring and autumn. Thirty-five percent of all bird species observed in the Aleutians breed only in Asia; some 260 bird species have been recorded in the Aleutian Islands Unit. This unit also provides habitat for thousands of marine mammals, including sea otters, harbor seals, and endangered Steller sea lions.

Bering Sea

The Bering Sea Unit extends over 600 miles and comprises 147,564 acres. It includes far-flung islands and headlands between the Aleutian Islands and the Bering Strait. The topography within this unit varies from small sandy islands to large volcanic islands. These areas provide habitat for nesting seabirds, as well as haul-out and rookery areas for marine mammals. This unit is divided into five different groups: 1) Hagemeister Island; 2) Pribilof Islands; 3) St. Matthew Island group; 4) Sand Islands; 5) the Norton Sound islands and capes.

Chukchi Sea

Lying primarily north of the Arctic Circle, the Chukchi Sea Unit extends nearly 500 miles from west of Point Barrow to just north of the Bering Strait and comprises 132,419 acres. Unlike other units in the refuge, this one includes sizeable acreage of mainland areas. Topography varies from low, sandy barrier islands in the Arctic Ocean to high, rocky spires in the western Brooks Range. This unit includes the former Chamisso National Wildlife Refuge, established in 1912. Nearly half a million kittiwakes and murres breed on cliffs at Cape Lisburne and Cape Thompson. Chamisso and Puffin Islands in Kotzebue Sound are the largest island colonies in the

unit. Black guillemots, a species normally found in the north Atlantic, extend as far south as Cape Thompson. The most common bird species nesting on low barrier islands between Cape Lisburne and Point Barrow is the common eider. Up to several hundred walrus haul out annually at Cape Lisburne when the sea ice recedes. In winter, polar bears roam Cape Lisburne; other terrestrial mammals in the unit include grizzly bear, musk ox, wolverine, marmot, Dall sheep and caribou. The Western Arctic Caribou herd congregate near Cape Lisburne and Cape Thompson for summer post-calving.

Description of Major Refuge Programs

Ecological Monitoring.--With such a geographically diverse refuge, most of which is isolated wilderness, an ecological monitoring program has been set up using indicator species to identify ecosystem problems. The approach is to annually record population trends, several parameters of reproductive success, and favored prey for selected species of seabirds at 10 sites scattered throughout the refuge. Also at these "annual ecological monitoring sites" off-road point count routes are used to monitor passerine populations, beaches are surveyed for oil, and sea water temperatures are monitored. Even with 10 sites, coverage of the refuge is sparse, so efforts are made to survey additional sites at reduced frequency (some at 3-5 year intervals and some once a decade) to determine the geographic extent of trends observed at annual sites (see Monitoring and Studies Section).

Support of Research.--One of the establishing order purposes for the refuge was to support an international research program. The establishment of Research Natural Areas and an International Biosphere Reserve on the refuge has drawn further attention to the area as a research site. In most years 10-20 research projects are either conducted on the refuge or with samples collected by refuge staff from the area (see Monitoring and Studies Section).

Technical Assistance.--Since the Alaska Maritime NWR has one of the largest marine bird and mammal conservation programs in the world, there are numerous requests for technical information about seabirds and marine mammals from the public and other agency personnel. There are also numerous requests for members of the refuge staff to participate in technical workshops and professional meetings and to provide technical reviews of manuscripts and reports, study proposals, impact assessments, and management plans (see Technical Assistance in Monitoring and Studies Section).

Management of Alien Species.--A number of alien animals have been introduced to the refuge, particularly on the Alaska Peninsula and Aleutian Islands units. Some of the introductions were intentional, such as arctic and red foxes for fur ranching (prior to WWII) and reindeer and caribou for use by local people on inhabited islands like Atka and Adak. Others were accidental, such as Norway rats which became established on most islands occupied by military forces during WWII or as a result of ship wrecks. These introductions and others have extirpated some species of native birds and reduced populations of others to low levels. The refuge has ongoing programs to remove introduced foxes from selected islands to restore native biodiversity, to prevent further introductions of rats, and to try to manage ungulates to reduce habitat damage (see Habitat Restoration and Fish and Wildlife Management sections).

Endangered and Threatened Species Management.--The refuge continues to be involved in recovery programs for threatened Aleutian Canada geese and for endangered Steller sea lions and Aleutian shield ferns. Although a recovery plan is not yet in place for endangered short-tailed albatrosses, a standard monitoring protocol has been developed for observations from the M/V *Tiglax*.

Public Use.--The refuge public use program consists of a visitors center in Homer which is open from late April through September. Naturalists lead bird and beach walks throughout the summer. A Service naturalist also provides interpretation aboard certain Alaska Ferry System vessels in southcentral and southwest Alaska. The visitor center in our Adak office is only open several hours each day; visitation has declined to almost nothing with the closure of the Naval Facility. An environmental education program in Homer reaches approximately 2,000 students each year with an emphasis on marine ecosystems. A Stewardship Program in the Pribilof Islands provides both cultural and natural resource education to the young people of St. Paul and St. George.

TABLE OF CONTENTS

	Page
CLIMATE	1
1. MONITORING AND STUDIES	
A. Surveys and Censuses	1
B. Studies and Investigations	2
C. Outside Research: On-Refuge	8
D. Technical Assistance, Presentations, and Publications	9
2. HABITAT RESTORATION	
A. Wetland/Upland Restoration: On-Refuge	13
B. Wetland/Upland Restoration: Off-Refuge	nothing to report
3. HABITAT MANAGEMENT	
A. Manage Water Levels	nothing to report
B. Manage Moist Soil Units	nothing to report
C. Graze/Mow/Hay	nothing to report
D. Farming	nothing to report
E. Forest Cutting	nothing to report
F. Prescribed Burning	nothing to report
G. Control Pest Plants	nothing to report
4. FISH AND WILDLIFE MANAGEMENT	
A. Bird Banding	nothing to report
B. Disease Monitoring and Treatment	15
C. Reintroductions	nothing to report
D. Provide Nest Structures	16
E. Predator and Exotic Control	16
5. COORDINATION ACTIVITIES	
A. Interagency Coordination	18
B. Tribal Coordination-Indian Self-Determination Act of 1994 ...	nothing to report
C. Private Land Activities (Excluding Restorations)	nothing to report
6. RESOURCES PROTECTION	
A. Law Enforcement	nothing to report
B. Wildfire Preparedness	nothing to report
C. Manage Permits and Economic Uses	18
D. Contaminant Investigation and Cleanup	18
E. Manage Water Rights	nothing to report
F. Manage Cultural Resources	20
G. Federal Facility Compliance Act	nothing to report
H. Land Acquisition	21

7.	PROVISIONS UNIQUE TO ALASKA	
8.	PUBLIC EDUCATION AND RECREATION	
A.	Visitor Services	21
B.	Outreach	21
9.	PLANNING AND ADMINISTRATION	
A.	Comprehensive Management Planning	nothing to report
B.	Outreach	nothing to report
C.	Training	28
D.	General Administration	28
E.	M/V Tiglax Operations	28
10.	FEEDBACK	nothing to report

CLIMATE

Month	Avg Temp (°F)	Min Temp (°F)	Max Temp (°F)	Precip. (inches)	Precip Dev. (inches)
JAN	18.8	-2	42	0.18	-2.22
FEB	23.1	-1	47	2.17	+0.04
MAR	33.5	15	49	0.21	-1.49
APR	38.6	18	55	0.97	-0.31
MAY	44.8	28	61	0.46	-0.69
JUN					
JUL	46.5	28	68	3.20	-0.09
AUG	53.8	38	67	1.76	-0.48
SEP	46.5	28	68	3.20	-0.09
OCT	32.1	10	55	1.23	-2.01
NOV	29.6	11	44	0.38	-2.24
DEC	28.0	-2	47	0.41	-2.41

1. MONITORING AND STUDIES

A. Refuge Ecological Monitoring Program

The approved refuge wildlife inventory plan calls for annual observations of selected parameters for indicator species at 10 sites, selected for their geographical distribution within the refuge. Funding does not allow for full implementation of the monitoring program every year, but in 1996, most of the annual sites were monitored and a number of less-frequently visited sites were also surveyed (see below). Results of seabird monitoring are provided in Appendix A.

1. Cape Lisburne: Minerals Management Service (MMS) Funding
2. Bluff: Office of Migratory Bird Management Funding
3. St. George: Refuge Funding
4. St. Paul: Refuge Funding (Ecosystem Initiative)
5. Buldir: Refuge Funding
6. Kasatochi/Koniuji: Refuge Funding (Ecosystem Initiative)
7. Aiktak: Refuge Funding (Ecosystem Initiative)
8. Chowiet: No work
9. E. Amatuli: Exxon Valdez Oil Spill Trustee Council (EVOS) Funding
10. St. Lazaria: Refuge funding

Besides annual sites, we have an objective to collect similar types of data at "calibration sites" at 2-3 year intervals. The expectation for funding for these sites is low through refuge sources, but data were collected at several of these sites with other funding:

1. Chisik: MMS and EVOS funding
2. Middleton: U.S. Geological Survey funding

Finally, our plan calls for opportunistically visiting a number of other sites at least every 10 years to conduct non-replicated counts of seabirds. In 1996 the following refuge sites were surveyed with no special funding by using vessel time and available staff. Reports summarizing results follow: Site # 1 below (in prep.), Site # 2-9 below (see Byrd, G.V. and J.C. Williams. 1996. Seabird and marine mammal surveys in the central and eastern Aleutians Islands, Alaska, in June 1996. U.S. Fish and Wildl. Serv. Rep., AMNWR 96/06. Homer, Alaska 31 pp), Site # 10 below (Paragi, T.F. 1996. Index counts of least and crested auklets in 1996 on Gareloi Island, Alaska. U.S. Fish and Wildl. Serv. Rep. AMNWR 96/09, Homer, Alaska, 28 pp), Site # 11 below (in prep.):

1. 60-foot Rock
2. Kalagagan
3. Kalagagan Islets
4. Tanginak
5. Baby Is.
6. Egg
7. Duskot
8. Seguam
9. Salt
10. Gareloi
11. Attu

In addition to seabird monitoring at annual sites, off-road point count routes for passerines are surveyed as part of a statewide Partners-in-Flight program. In 1996 surveys were made at:

1. St. Lazaria
2. Aiktak/Ugamak
3. Kasatochi
4. Buldir
5. St. Paul
6. St. George

B. Special Studies by Refuge and Other Fish and Wildlife Service Personnel

Endangered Species Surveys.--There were no refuge projects associated with the Aleutian goose in 1996 because there was no funding. An opportunistic translocation of geese from Buldir to Skagul was planned, but other funded work usurped the time slot. Incidental observations were made of Aleutian Canada geese (e.g., timing of breeding events at Buldir I.),

short-tailed albatrosses (several sightings from the M/V *Tiglax* in the Aleutians), and spectacled eider (during response activities for the M/V Citrus oil spill between February 19 - March 5, 1996, two separate observations were made, one appeared to be oiled and the other not, both were females).

Apex (Alaska Predator Experiment) Barren Islands Project.--This is a cooperative project with a number of other investigators sponsored by the Exxon Valdez Oil Spill Trustee Council (EVOS). Term Wildlife Biologist Roseneau and Term Biological Technician Kettle conducted the study at East Amatuli, one of the annual monitoring sites on the refuge.

APEX Project Component J - Barren Islands Seabird Studies.--The objective of the APEX component was to monitor the breeding and foraging parameters of common murres (*Uria aalge*), black-legged kittiwakes (*Rissa tridactyla*), and tufted puffins (*Fratercula cirrata*) at the Barren Islands, Alaska. By comparing information from these species with results from other years, we are investigating responses of seabirds to changes in food availability and quality. The three study species were chosen because of their different foraging behaviors. Both murres and puffins dive to capture prey, but puffins generally feed closer to their breeding colonies, closer to shore, and closer to the surface than do murres. Kittiwakes are surface feeders. Because the foraging strategies of these species differ, their responses to changes in forage fish availability may also differ, giving us the opportunity to learn how changes in the prey base affect seabird reproductive success.

During the 1990s, population size and/or reproductive success has been low in some seabirds and marine mammal populations in the Gulf of Alaska, Cook Inlet and Prince William Sound. This and other APEX studies were started in 1995 to identify the ecological processes that affect seabird and marine mammal breeding and foraging behavior in these areas, to determine the magnitude of natural environmental change and its effect of forage fish, seabird and marine mammal populations, and to assess the ability of populations to recover from these changes and man-made perturbations.

Data from previous seabird studies at the Barren Islands are available for comparison. Associated APEX project components include similar seabird studies at other locations in Cook Inlet and in Prince William Sound, forage fish surveys, and studies of forage fish energy content and nutrient values.

Murre Restoration Project.--Also funded by EVOS, Roseneau, the project leader, surveyed murres in the Barren Islands to evaluate population recovery following the oil spill.

Restoration Project 96144-Common Murre Population Monitoring at the Barren Islands, Alaska 1996.--In 1996, the Alaska Maritime NWR implemented Exxon Valdez Oil Spill Trustee Council Project 96144 to recensus the Barren Islands murre colonies and reassess the recovery status of these injured birds in the spill area (see Roseneau, D.G., A.B. Kettle, and G.V. Byrd. 1997. Common murre population monitoring at the Barren Islands, Alaska, 1996. Unpubl. annual rept. by the Alaska Maritime NWR, Homer, Alaska for the Exxon Valdez Oil Spill Trustee Council, Anchorage, Alaska. Restoration Project 96144. 54 pp.). Birds were counted at the East

Amatuli Island - Light Rock and Nord Island - Northwest Islet nesting complexes using methods employed during the 1993-1994 restoration projects. Data were analyzed for differences among years and trends after they were pooled and averaged with corresponding information from 1989-1994 U.S. Fish and Wildlife Service, 1990-1992 University of Washington, and 1991 Dames & Moore post spill studies. No convincing evidence was found that indicated murre populations changed at the colonies over the 8-year post spill period. Although an increase was evident on one small set of plots counted at East Amatuli Island - Light Rock since 1989, another small East Amatuli Island - Light Rock plot set that had shown an increase during 1990-1994 no longer exhibited a trend when 1996 data were included in the analysis. Trends were also not present at Nord island - Northwest Islet, or on the larger sections of East Amatuli Island - Light Rock over the 1989 - 1996 interval. Furthermore, all data collected since 1993, when sampling efforts were increased at the Barren Islands, suggested that murre populations have been relatively stable at this northern Gulf of Alaska nesting location over the past four years.

Using Predatory Fish to Sample Forage Fish Abundance.--An EVOS project begun in 1995 was continued in 1996 (see below), and Wildlife Biologist Art Sowls and Biological Technician Mike Cavin began a similar study at St. Paul.

St. Paul Study

Predatory fish like Pacific halibut (*Hippoglossus stenolepis*), Pacific cod (*Gadus macrocephalus*), and sculpins like Irish lords (*Hemilepidotus* spp.) are opportunistic feeders that sample potential prey for fish-eating seabirds. The Alaska Maritime National Wildlife Refuge (NWR) is interested in the effect of changes in seabird diets on their productivity and population trends in the Pribilof Islands where a long-term monitoring program is underway. In summer 1996, we formed a partnership with the Central Bering Sea Fisherman's Association to evaluate opportunities to obtain stomachs of predatory fish caught at St. Paul in commercial, sport and subsistence fisheries near the island. Due to excellent cooperation from local fishermen, we obtained stomachs from 558 halibut, 35 cod, and 32 Irish lord. Analysis of stomach contents indicated that halibut consumed large zooplankton, primarily euphausiids (60% of stomachs), crab (26% of stomachs), and octopus (17% of stomachs) more frequently than fish. Nevertheless, sculpins, gadids (pollock and cod), and flatfish were present in 7%-8% of stomachs, but nearly all were larger than could be eaten by seabirds. Invertebrates also were the most common prey of cod and sculpins. Few forage fish were found in stomachs of predatory fish in 1996. Interestingly, kittiwakes and murrelets experienced low reproductive success. We predict that in years when forage fish are common in the area, predatory fish will prey on them and seabird reproductive success will be higher. (Excerpted from: Wachtel, J. E., A. Sowls, and V. Byrd. 1997. Using predatory fish (halibut, cod, and sculpin) to sample availability of potential seabird prey near St. Paul Island, Alaska in 1996. U. S. Fish and Wildl. Serv. Rep., AMNWR 97/09. Homer, Alas. 33 pp.)

SMMOCI.--The Seabird, Marine Mammal, Oceanography Coordinated Investigation (SMMOCI) was conducted at Kasatochi, central Aleutians in late July and early August 1996. The following explains the concept of the cooperative program which began in 1995 [see Byrd, G.V., R.L. Merrick, J.F. Piatt, and B.L. Norcross. In press. Seabird, Marine Mammal, and

Oceanography Coordinated Investigations (SMMOCI) near Unimak Pass, Alaska. Proceedings of International Forage Fish Symposium, Anchorage, Alaska].

Forage fish comprise the primary prey base for many species of marine birds and mammals breeding in Alaska. Some populations of seabirds and marine mammals have declined over the past 20 years in the Bering Sea and Gulf of Alaska, and major shifts in fish stocks have also been noted. Knowledge of ecosystem processes is critical for understanding causal mechanisms. In 1995 National Marine Fisheries Service, the Univ. of Alaska, Biological Resources Division of the U.S. Geological Survey, and the refuge agreed to cooperate in an effort to characterize foraging habitat for seabirds and Steller sea lions (*Eumatopias jubata*) near Aiktak and Ugamak islands, adjacent to Unimak Pass in the eastern Aleutian Islands. In 1996 the project moved to Kasatochi.

Our objective was to gather information about the ecosystem that ultimately would describe links and provide a basis for predicting responses of upper-level predators to fluctuations in relative abundance of various forage fish. The study sites were selected because ongoing sea lion and seabird studies are providing background information about population trends and food habits. These projects continued in 1996, and additionally hydroacoustic data were collected along a series of transects within a 20-km radius of the islands to describe the distribution and biomass of potential prey. Mid-water and bottom trawls were conducted to support the hydroacoustic surveys, and long-line sets were made to help characterize the bottom fish fauna. Marine bird and mammal observations were made during all daylight transects. Preliminary results suggest such studies can adequately describe ecosystem components and may ultimately reveal patterns that demonstrate the response of top-level predators to fluctuations in the prey base.

Clean Air Monitoring.—Simeonof Island is a Class I air quality area which requires that stringent air quality standards be met (Clean Air Act, 42 U.S. Code 7401 et seq.). The Act specifically protects Class I areas against significant deterioration. Simeonof Island is relatively remote; nevertheless, it is important to establish element baselines so there will be a point of reference for the future against which the magnitude and significance of change can be determined. The purpose of the 1996 visit was to establish element-concentration baselines for the lichen, *Cladonia rangiferina*, and the moss, *Hylocomium splendens*. Also, plant components of Simeonof were characterized by establishing a floristic list -- lichens, mosses, and vascular plants -- with habitat and distribution information.

Waterfowl Surveys at Shemya I.—The U.S. Air Force funded two waterfowl studies at Eareckson Air Force Base Shemya I. Julian Fischer continued his harlequin duck study and Term Wildlife Biologist Joe Meehan conducted a study of relative abundance of all species of wintering ducks and geese.

The Department of Defense Legacy Resource Management Program, through the U.S. Air Force, contracted with the U.S. Fish and Wildlife Service (Service) to conduct a wildlife monitoring program on Eareckson Air Station at Shemya Island, Alaska. The island is part of the Alaska Maritime National Wildlife Refuge which is designated as an International Biosphere Reserve by the United Nations.

The Aleutian Islands provide critical habitat for millions of seabirds, waterfowl, and marine mammals. The monitoring program at Shemya I. was designed to inventory and describe avian and marine mammal species using the island and its nearshore marine environment during the winter of 1995/96. This program was a continuation of surveys initiated the previous year as part of the Legacy Program. An emphasis was placed on species listed as endangered or threatened under the Endangered Species Act of 1973 and those designated as a "species of concern" by the Service. These data will be used to detect future trends in populations and distribution of species on a local level. When combined with data from other locations, trends can be determined throughout the species range and will alert managers to potential problems.

The abundance and distribution were described for all species observed at Shemya I. Military managers can incorporate this information into their activities so they cause minimal disruption to these species and their habitats while carrying out their military mission. During these surveys, 43 avian and 4 marine mammal species were recorded, including 2 threatened species and 3 "species of concern." Waterfowl and seabirds accounted for the majority of avian species observed. Incidental observations of arctic foxes (an introduced predator) suggested there were fewer foxes on the island than during the winter of 1994/95.

These surveys also investigated elements of the winter ecology of 3 species that met the criteria of the Legacy Program's special management concerns, including the emperor goose, harlequin duck, and common eider. Survey results suggest the proportion of immature emperor geese in the local population and the size of family groups significantly decreased during winter, an indication that differential mortality of immature geese might have occurred on the wintering grounds. Range-wide differential mortality has been proposed as one factor preventing the emperor goose population from returning to historic levels. These surveys suggest that immature geese survived winter at a rate of only 70.7% that of adult geese. Additionally, when compared to data from fall staging grounds on the Alaska Peninsula, these surveys suggest that immature geese survived from fall through winter at a rate of only 61.6% that of adult geese. Likewise, these surveys suggest the size of family groups declined at least 38.1% during winter and at least 44.1% between fall staging and the end of winter.

These surveys indicated that the nearshore environment within 100 m (328 feet) of shore was important habitat for harlequin ducks and common eiders, which were scattered along the coast in small flocks of 1-2 individuals. (Excerpted from: Meehan, J. P., and M. A. Krom. 1997. Winter wildlife surveys at Eareckson Air Station, Shemya Island, Alaska - winter 1995/1996. Final report for U.S. Air Force work order number 85252. Prepared for U.S. Air Force, 611th Air Support Group, Civil Engineer Squadron/Environmental Flight, Elmendorf Air Force Base, Alaska. U.S. Fish and Wildlife Serv. Rep. AMNWR 97/02, Adak, Alaska. 60pp.)

In 1995, the U.S. Air Force 611th Air Support Group contracted with the U.S. Fish and Wildlife Service to determine if petroleum hydrocarbons are entering the food web of harlequin ducks (*Histrionicus histrionicus*) at Eareckson Air Station, and to investigate harlequin winter food habits, time-activity budgets, and body condition dynamics to better understand their winter habitat and resource requirements on Air Force managed lands. Data collection began in December 1995 and continued through early April 1996. In April, harlequin duck prey items were keyed to taxa and were summarized as percent occurrence and aggregate percent dry weight. Data collection resumed in November 1996 and will continue through early January 1997.

Shoreline oil surveys from 1992-1994 revealed a high frequency of oil pollution at Eareckson Air Station at Shemya Island in the western Aleutian Islands of Alaska. Approximately 500 harlequin ducks spend the nonbreeding season at Eareckson Air Station and may be at risk of contamination if oil is present in their food items. Concerns of oil contamination increased when oil was observed on the heads and feet of a small proportion of wintering emperor geese at Eareckson Air Station. The geese presumably were contaminated with oil in intertidal areas where they forage. Harlequin ducks also feed in intertidal areas where oil may be concentrated.

Gastropod and bivalve mollusks bioaccumulate a wide range of pollutants in their tissues, and in many regions mollusks represent a significant portion of harlequin duck diets. However, no information is available on the foods of harlequins wintering in the Aleutian Islands. An investigation of harlequin winter food habits will indicate if ducks consume foods prone to bioaccumulate hydrocarbons. In addition, diet studies increase our understanding of habitat use, resource allocation, and environmental and nutritional requirements.

Time-activity budgets combined with feeding ecology studies can be used to determine seasonal habitat needs of waterfowl and can help explain behavioral and physiological responses to environmental factors. Moreover, optimum time of day for censusing harlequin ducks may be determined through time-activity studies. Lastly, variations in time budgets between the sexes may suggest differing risks of exposure to oil. Information on feeding habits and behavior is needed to better protect harlequin ducks from oil spills, shoreline modifications, and other disturbances.

Time-activity budget data from one area may not be applicable to other regions. While winter time-activity budgets have been examined for harlequin ducks in Iceland, Newfoundland, and Washington, no studies have investigated behavior in the Aleutian Islands.

To further our understanding of harlequin duck winter ecology, we will collect data on body condition that can help explain mechanisms and evolutionary strategies of nutrient acquisition and use. In waterfowl, lipids serve as energy reserves and insulation. Reserves built on the wintering grounds are associated with over-winter survival, annual survival, and reproductive potential. Information on the dynamics of winter body condition is lacking for harlequin ducks.

The negative effects of oil on birds has been well documented. In this study we will investigate the presence of oil contaminants in the food items of harlequin ducks. Gastrointestinal tract samples, if contaminated, will establish an unequivocal link to exposure via the food chain.

To increase our understanding of winter ecology and possible oil contamination of harlequin ducks at Eareckson Air Station, we will address four objectives: 1) Describe harlequin duck food habits, 2) Investigate the relationship between behavior patterns and sex, temporal and environmental variables, 3) Examine seasonal dynamics and inter-sexual differences in body condition, and 4) Determine if petroleum hydrocarbons occur in harlequin duck food items. (Excerpted from: Fischer, J. B. 1996. Wintering Harlequin Ducks: Diet, Activity Budgets, Body Composition, and Oil Contamination at Eareckson Air Station, Shemya Island, Alaska. Annual progress report for U.S. Air Force project MIPR number N6550195N0156. Prepared for U.S. Air Force, 611th Air Support Group, Civil Engineer Squadron/Environmental Flight, Elmendorf Air Force Base, Alaska. U.S. Fish and Wildl. Serv. Rep., Adak, Alaska.)

Development of a Camera to View Burrow-nesting Seabirds.--WB Slater developed a burrow probing camera system that was used to determine the presence or absence of burrow nesting seabirds at nest sites not otherwise viewable.

C. Support of Outside Research on the Refuge

In 1996, the refuge staff coordinated with and supported to various degrees the following researchers working on the refuge:

Research projects conducted on Alaska Maritime NWR in 1996.

Researcher	Affiliation	Subject
George Hunt	Univ. of California, Irvine	Feeding ecology of auklets
Fiona Hunter	Cambridge Univ., England	Sperm competition in seabirds
Ian Jones	Simon Frazier Univ., Canada	Behavior of Auklets
Doug Siegal-Causey	National Science Foundation	Cormorant systematics
Richard Merrick	National Marine Fish. Serv.	Steller sea lion ecology
Don Calkins	Alaska Dept. Fish and Game	Steller sea lion ecology
John Piatt	U.S.G.S/Bio. Resources Div.	Seabird ecology
Ed Murphy	Univ. of Alaska, Fairbanks	Kittiwake and Murre ecology
Hector Douglas	Wake Forest Univ.	Function of odors in auklets
Vicki Friesen	Queen's Univ., Canada	Murre genetics
Jim Lovvorn	Univ. of Wyoming	Seabirds energetics
Julian Fischer	Univ. of Mass	Harlequin duck feeding
Jim Estes	U.S.G.S./Bio. Resources Div.	Sea otter ecology
Stephen Loring	Smithsonian Inst.	Archaeology
Brenda Norcross	Univ. of Alaska, Fairbanks	Marine fish ecology
Martin Robards	U.S.G.S./Bio. Resources Div.	Sand lance ecology
Alan Springer	Univ. of Alaska, Fairbanks	Seabird prey
Holly Welsh	Queen's Univ., Canada	Auklet genetics
Ada Fowler	U.S.G.S./Bio. Resources Div.	Oiled carcass persistence

D. Technical Assistance, Presentations, and Publications

Assignments to Technical Committees.--Staff members served on various committees as follows:

Wildlife Biologist Steve Ebbert served as Chairperson of the Region 7 Bear and Firearms Safety Committee during 1996.

WB Art Sowls served on the Pribilof Working Group (PWG) - a USCG lead group addressing concerns of marine safety and environmental issues for the Pribilof Islands. It includes Pribilof government, industry, NMFS, ADF&G, EPA, Pribilof Stewardship Program, and Alaska Pilot's Association. Art Sowls participated and provided information related to wildlife in regard to oil spills, aircraft disturbance, threat of rodent introductions, and other issues.

SWB Vernon Byrd served as leader of the Aleutian Canada Goose Recovery Team and as a member of the Steller Sea Lion Recovery Team.

Technical Workshops.--The staff participated in the following workshops in 1996:

Exxon Valdez Oil Spill Trustee Council workshop--Term wildlife biologists Dave Roseneau and Arthur Kettle, and SWB Vernon Byrd presented papers on EVOS funded work on the refuge (Barren Island seabird studies) and participated in the annual technical workshop in Anchorage.

BESIS (Bering Sea Impact Studies) Workshop--SWB Byrd participated in a workshop in September 1996 in Girdwood, Alaska, held by the Arctic Research Council to develop proposals for studying impacts of warming on ecosystems in the arctic regions.

Presentations.--The refuge biological staff presented papers at the following technical meetings in 1996:

Forage Fish Symposium--SWB Byrd (SMMOCI--see above) and Term WB Roseneau (Using predatory fish to sample forage fish--citation below) presented papers and submitted manuscripts for the proceedings of an international Forage Fish Symposium sponsored by the Alaska Sea Grant program in November 1996.

Roseneau, D.G and C.V. Byrd. Using Pacific halibut to sample the availability of forage fish to seabirds. Published as part of proceedings of the International Symposium on the Role of Forage Fishes in Marine Ecosystems held in Anchorage, Alaska 13-15 November 1996.

Pacific Seabird Group Annual Meeting--SWB Byrd and WB Slater present papers at this meeting in Victoria, British Columbia in January 1996. Abstracts are published in *Pacific Seabirds*. 1996. 23: 22-57. Titles follow:

Byrd, G.V. and E.P. Bailey. Removal of introduced foxes: a restoration method for seabirds injured by the T/V Exxon Valdez oil spill.

Alaska Bird Conference--The following papers were presented at the conference in Fairbanks in April 1996. Abstracts are included here since they were not published elsewhere.

STATUS OF THE ALEUTIAN CANADA GOOSE: A RECOVERING ENDANGERED SPECIES

Vernon Byrd (Alaska Maritime National Wildlife Refuge, 2355 Kachemak Bay Drive, Suite 101, Homer, AK 99603)

The Aleutian Canada goose (*Branta canadensis leucopareia*) nearly became extinct by the 1940s due primarily to predation following the introduction of foxes (*Alopex lagopus* and *Vulpes vulpes*) to most of its breeding islands. A formal recovery program began in the early 1970s following its listing as "endangered" under the Endangered Species Act. As a result of fox eradication on breeding islands, subsequent release of captive-reared or translocated wild geese from remnant breeding populations, and protection on migration and wintering areas, numbers of Aleutian Canada geese have increased from less than 1,000 birds in the mid-1970s to over 20,000 by 1995.

BARREN ISLANDS SEABIRD STUDIES

Dave Roseneau, Arthur Kettle, and Vernon Byrd (Alaska Maritime National Wildlife Refuge, 2355 Kachemak Bay Drive, Suite 101, Homer, AK 99603).

As part of the 1995 "APEX" seabird - forage fish project sponsored by the Exxon Valdez Trustee Council, we conducted a pilot study to collect information on common murres (*Uria aalge*), black-legged kittiwakes (*Rissa tridactyla*), and tufted puffins (*Fratercula cirrhata*) at the East Amatuli in the Barren Islands. The abundance of capelin and presence of other forage fish species (e.g., sand lance, *Ammodytes hexapterus*) in surrounding waters provided a prime opportunity to study seabird - forage fish relationships and natural ecological processes that might help explain why populations of some seabird species have not increased in the T/V Exxon Valdez oil spill area. Data collected during the field study included information on nesting chronology, productivity, growth and feeding rates of chicks, time budgets of adults, and types and amounts of prey fed to chicks. Although data are still being analyzed, preliminary results indicate that sufficient types and amounts of information can be collected at this northern Gulf of Alaska colony to help test 3 APEX project hypotheses: (a) composition and amounts of prey in seabird diets reflect changes in relative abundance and distribution of forage fish near the nesting colonies; (b) changes in seabird productivity reflect differences in forage fish abundance as measured by amounts of time adult birds spend foraging for food, amounts of food fed to chicks, and provisioning rates of chicks; and (c) seabird productivity is determined by differences in forage fish nutritional quality.

MONITORING SEABIRDS ON THE BERING SEA UNIT OF THE ALASKA MARITIME NATIONAL WILDLIFE REFUGE: A LONG-TERM APPROACH TO ECOSYSTEM MANAGEMENT

Vernon Byrd, Art Sowls, Don Dragoo (Alaska Maritime NWR, 2355 Kachemak Bay Dr., Suite 101, Homer, AK 99603) and Jeff Williams, (Alaska Maritime NWR, Aleutian Islands Unit, PSC 486 Box 5251, FPO AP 96506-5251).

As part of its ecosystem management initiative, the U.S. Fish and Wildlife Service is emphasizing long-term wildlife status and trends monitoring programs on National Wildlife Refuges in Alaska. The Alaska Maritime NWR contains 80% of Alaska's estimated 50 million seabirds of some 35 species breeding at several thousand sites. The proposed strategy for long-term monitoring on this refuge is to select indicator species of seabirds based on trophic guilds for which annual productivity, major prey, and environmental correlates would be measured annually at sites scattered geographically over the refuge. Population trends would be tracked from index plots surveyed at the sites at least every 3 years. Information from these annual sites would be used as a basis for identifying resource problems and for interdisciplinary studies of ecosystem processes. Geographic gaps would be filled by less frequent observations at other sites. In the Bering Sea, the following refuge locations have been identified as annual monitoring sites: Buldir (w. Aleutians), Kasatochi (c. Aleutians), Aikta (e. Aleutians), Pribilof (s. Bering Sea), and Bluff (n. Bering Sea). In addition, Cape Peirce on Togiak NWR is being monitored annually. At each site species are monitored which represent one or more of the following feeding guilds: piscivorous surface-feeders, piscivorous divers, planktivorous surface-feeders, planktivorous divers.

THE THREAT OF SMALL OIL SPILLS IN THE BERING SEA

Art Sowls and Vernon Byrd (Alaska Maritime National Wildlife Refuge, 2355 Kachemak Bay Drive, Suite 101, Homer, AK 99603), and Ron Britton (U.S. Fish and Wildlife Service, 1011 E. Tudor Rd., Anchorage, AK 99501).

Large oil spills like the now-famous Exxon Valdez are well publicized and studies of effects and recovery are funded at high levels, but less is known about the effects of small spills that generally are not closely evaluated. Such spills result from bilge pumping, now illegal within the U.S. territorial waters, accidental discharges of fuel during transfer on shore or at sea, and ship wrecks. The potential effects on marine birds of even small amounts of relatively crude oil, which most large ships burn, is illustrated by the recent event (February 1996) in the Pribilof Islands where hundreds of sea ducks were killed. Other indications that bunker "C" type oil enters the marine environment regularly have been found during beach oil surveys in the southern Bering Sea since 1990. The amount of ship traffic in the Bering Sea is likely to increase now that the oil import export ban will be lifted. The Great Circle Route between the continental U.S. and the orient takes ships through the southern Bering Sea.

INTRODUCED PREDATORS AND ISLAND-DWELLING BIRDS IN THE BERING SEA: AN UPDATE ON RESTORATION PROGRAMS

Vernon Byrd, Art Sows, and Steve Ebbert (Alaska Maritime National Wildlife Refuge, 2355 Kachemak Bay Drive, Suite 101, Homer, AK 99603).

The breeding avifauna of islands in the Bering Sea is characterized by large populations of colonial seabirds and by a number of endemic taxa of land birds. The major direct threats include purposeful introductions of foxes (in the Aleutian Islands) and accidental introductions of rats. Arctic foxes (*Alopex lagopus*) are native to islands in the Bering Sea as far south as the Pribilof and Commander islands, but they were introduced for fur ranching on most of the Aleutian Islands prior to WWII. An ongoing program designed to restore native birds by removing introduced foxes from selected islands is working. Rats, particularly *Rattus norvegicus*, has been accidentally introduced to at least 15 islands in the Aleutians, through shipwrecks and WWII activities. Recognizing the threat of additional introductions, a rat prevention program has recently been instituted for Alaskan islands, and advances in technology elsewhere now make it possible to consider exterminating rats where they have become established. Recent accomplishments and future plans are discussed.

REMOVAL OF INTRODUCED FOXES: A METHOD FOR RESTORING POPULATIONS OF SEABIRDS INJURED BY THE T/V EXXON VALDEZ OIL SPILL

Vernon Byrd, Ed Bailey, and Steve Ebbert (Alaska Maritime National Wildlife Refuge, 2355 Kachemak Bay Drive, Suite 101, Homer, AK 99603).

Black oystercatcher (*Haematopus bachmani*) and pigeon guillemot (*Cephus columba*) are two species that were injured by the T/V Exxon Valdez oil spill in Alaska in 1989. Removal of introduced foxes (*Alopex lagopus* or *Vulpes vulpes*) from islands is one method of restoring reduced populations. In 1994 and 1995, the T/V Exxon Valdez Trustee Council funded fox removal on Simeonof and Chernabura islands in the Shumagin group near the western edge of the oil's path. No oystercatchers successfully nested on Simeonof or Chernabura in 1994 when foxes were present. Nevertheless, failed or non-breeding birds, including some "pairs", were recorded on both islands. Following fox removal, these pairs could successfully nest. Indeed, we found 2 oystercatcher nests on Simeonof and 3 nests on Chernabura in 1995, the first breeding season following fox removal. Furthermore, breeding densities on nearby fox-free islands, suggested that ultimately Simeonof could support 21-88 pairs of oystercatchers and Chernabura could support 16-65 pairs. Pigeon guillemot populations apparently were depressed at Simeonof and Chernabura by fox predation. Densities on nearby fox-free islands suggested that restored populations of guillemots will eventually fall within the ranges of 136-314 birds on Simeonof and 245-567 guillemots on Chernabura. It is clear that removal of introduced foxes is an effective restoration tool for oystercatchers and guillemots. Future surveys will reveal the magnitude of the increases in populations of these injured species.

BERING SEA BIRDS: AN OVERVIEW (Introduction to a symposium on Bering Sea birds)

Vernon Byrd (Alaska Maritime National Wildlife Refuge, 2355 Kachemak Bay Drive, Suite 101, Homer, AK 99603)

The avifauna of the Bering Sea is dominated by large populations of breeding seabirds, a number of taxa of endemic land birds, and large wintering populations of sea ducks and seabirds. The ocean is the dominant physiographic feature and Alan Springer will discuss Bering Sea marine habitats. A presentation is included about an ecological monitoring program in this area which targets indicator species of seabirds, and one paper presents results from a monitoring site. Threats to birds in the Bering Sea are discussed, and we have a presentation on Kittlitz's Murrelet, an Alaska endemic that occurs in the Bering Sea.

Publications.--Staff members submitted 7 manuscripts for publication in 1996; one was actually published. Other titles will be listed when they are published in 1997.

Hunt, G. L., A. S. Kitaysky, M. B. Decker, D.E. Dragoo and A.M. Springer. Changes in the distribution and size of juvenile walleye pollock, *Theragra chalcogramma*, as indicated by seabird diets at the Pribilof Islands and by bottom trawl surveys in the eastern Bering Sea, 1975 to 1993.

2. HABITAT RESTORATION

A. Restoration of Maritime Tundra for Native Birds by Removing Introduced Foxes

In 1996, the ongoing introduced fox removal program continued. This program includes rechecking islands from which foxes have been removed in the recent past to insure that complete eradication had been accomplished and starting new islands. We developed a partnership with ADC this year and used their personnel along with ours to conduct fox eradication projects. A summary of the results for each island follow:

Rechecks of Islands.--Trappers searched four refuge islands, Little Tanaga, Segula, Ukolnoi, and Simeonof, for signs of foxes that might have survived previous eradication efforts. Eradication efforts began in 1989 on Little Tanaga, 1994 on Simeonof, and 1995 on Segula and Ukolnoi. No sign was detected, so we believe these islands were fox free in 1996. References follow:

Bailey, E. 1994. Eradication of arctic foxes on Simeonof and Chernabura Islands, and a recheck of Little Koniuji Island in the Shumagin Islands. U.S. Fish and Wildlife Service Report, AMNWR 94/15, Homer, AK. 24pp.

Ebbert, S. M. 1995. Recheck of islands for foxes during the 1995 field season: Simeonof, Little Koniuji, Chernabura, Ukolnoi, Kagamil, Herbert, Chugul, Little Tanaga, and Umak. U.S. Fish and Wildlife Service Memorandum to Files, November 24, 1995. 8pp.

Ebbert, S. 1997. 1996 Recheck of Simeonof Island for foxes. U.S. Fish and Wildlife Service

Memorandum to Files. March 5, 1997. 1pp.

Ebbert, S and E. Bailey. 1997. Eradication of arctic foxes on Ukolnoi Island, Alaska. U. S. Fish and Wildlife Service Report AMNWR 97/05, Homer, AK. 10pp.

Fischer, J. B. and A. G. Palmer. 1993. Survey and removal of introduced arctic fox at Little Tanaga, Umak, and Igitkin islands - June - September, 1992. U. S. Fish and Wildlife Service Report AMNWR 93/04. Adak, AK. 27pp.

Schroeder, M. 1996. Discovery of gulls nesting on Simeonof. Letter to Files. U.S. Fish and Wildlife Service. Homer, Alaska.

Removal of Introduced Foxes--Gareloi I. (Excerpted from the report cited below).--

Trappers removed introduced arctic foxes from Gareloi Island during 31 May to 8 August 1996. Four trappers eradicated 54 adult and 23 juvenile arctic foxes from Gareloi by use of foothold traps (70%), snares (4%), and shooting (26%). Despite the presence of four large auklet colonies on upland talus and the lack of beaches for intertidal foraging, foxes were caught or shot more often than expected near the rugged coastline. The adult fox population was predominately female (80%), indicating with other circumstantial evidence that the fox population had recently declined and was exhibiting a density-dependent response conducive to population growth. Incidental to fox work, notes were taken on local birds, marine mammals, and human cultural sites. In addition, vascular plants were collected and tentatively identified, estimates were made on abundance and productivity of black-legged kittiwakes, index plots were established for least and crested auklets, and food habits of least auklets were sampled.

Paragi, T.F. 1996. Eradication of arctic foxes in 1996 on Gareloi Island, Alaska. U.S. Fish and Wildlife Service Report AMNWR 96/10. Homer, Alaska. 125pp.

Removal of Introduced Foxes--Seguam I. (Excerpted from the report cited below).--

Arctic foxes were removed from Seguam Island by the U.S. Fish and Wildlife Service, in cooperation with U.S. Department of Agriculture, Animal and Plant Health Inspections Service, Animal Damage Control Program during the summer of 1996. Arctic foxes were introduced on Seguam Island in 1924, and had depressed breeding seabird populations there by as early as 1936. During the summer of 1996, six fox trappers lived in three camps on Seguam Island for 66 days, and four trappers remained for an additional 39 days. A total of 162 adult foxes were captured and killed using foothold traps (107), conibear traps (3), M-44 devices (20), and by denning (2), calling and shooting (30). Evidence (scats, shed hair, tracks, prey remains) was found indicating that foxes were using (rearing pups, searching for food, traveling) every sand, cobble, and boulder beach on the island accessible by our crew. All foxes were killed within one-half mile of the shoreline, and there was no evidence foxes were regularly using the interior portion of the island. Only one fox was suspected to be still alive when we left Seguam at the end of the season. We plan to revisit the island in spring 1997 to determine if any foxes survived the eradication effort. Besides removing foxes, we kept a checklist of birds present on the island and locations of marine mammal haul-out sites.

Remnant populations of some species of native birds survived fox predation on Seguam and are likely to be the first to recover following fox removal. Seabirds still present in numbers included mostly ledge-nesting and crevice-nesting species, including common murre, pigeon

guillemot, whiskered auklet, horned puffin and tufted puffin. Whiskered auklets, previously unknown to occur in large numbers around Seguam, were apparently nesting in lava flow formations and feeding offshore. Native song birds included endemic Aleutian forms of winter wren, song sparrow, and rosy finch also will benefit from fox removal.

Ebbert, S. 1997. Eradication of arctic foxes on Seguam Island, Alaska 1996: Final Report. U.S. Fish and Wildlife Service Report AMNWR 97/01, Homer, AK. 19pp.

Reconnaissance of Islands where Introduced Fox Removal is Planned:-- In 1996, Wildlife Biologist Jeff Williams, Biological Technicians Greg Thomson and Tom Paragi, and Deputy Refuge Manager Dan Boone conducted a reconnaissance to evaluate the potential for successful fox eradication on five Aleutian Islands: Semisopchnoi, Kanaga, Little Sitkin, Attu and Great Sitkin. The report is listed below.

Williams, J.C., T. Paragi, and G. Thomson. 1996. A reconnaissance of selected Aleutian Islands for future fox eradication. U.S. Fish and Wildlife Service Report AMNWR 97/03. Adak, Alaska. 125pp.

Request for Approval to Use M-44 devices with Sodium Cyanide.--In accordance with '5 AAC 92.080(2), the U.S. Fish and Wildlife Service is required to seek permission from the Alaska Board of Game to use poison within the State. At their June 18 meeting, the Board granted permission to use M44s with sodium cyanide to remove foxes on 17 refuge islands. The Board requested a status report from the USFWS every 36 months. Wildlife Biologist Steve Ebbert presented the first status report to the Alaska Board of Game at their Meeting in Sitka on October 25, 1996.

4. FISH AND WILDLIFE MANAGEMENT

B. Disease Monitoring and Treatment

We received reports of dead wildlife (mostly bald eagles and sea otters) throughout the year. In most cases, we salvaged specimens to distribute to education, research or government entities. They included the National Wildlife Health Research Center (NWHRC), Law Enforcement (and subsequently, the Bald Eagle Repository), and the Marine Mammals Management office. Although the cases did not appear severe, 3 bald eagles had pox-like lesions on their exposed skin.

Injured live bald eagles were evaluated by a local veterinarian and then either euthanized, sent to "The Learning Center," a rehabilitation facility in Anchorage, or rehabilitated briefly in Homer by a veterinary health clinician and released.

WB Slater completed necropsies of 2 sea otters for Marine Mammals Management. Necropsies were completed locally on a trial basis to evaluate its cost-effectiveness with regard to the handling time involved in preparing and shipping carcasses.

D. Provide Nest Structures

Artificial nest boxes for storm-petrels and rhinoceros auklets at St. Lazaria Island were monitored to determine use. These boxes were installed in 1995, but to date, have not been used.

E. Predator and Exotic Control

During 1996 activities continued on two fronts related to keeping new exotic rodent species (primarily Norway rats) from becoming established on AMNWR lands, and attempts to lessen the number of rats on ships were begun.

Pribilof Harbor Defenses.--Continued improvement in design and numbers of stations occurred on St. Paul and St. George in 1996. At St. Paul three rats were killed in stations, all caught in snap traps. An additional probable reliable sighting of a rat was reported in the harbor on a block of ice which was overturned by a ship, and the rat is supposed drowned. All trapped rats were males caught on docks near where ships tied up. This helped convince people that the threat of rats was real and the preventive stations were an important part of keeping the islands rat free.

Shipwreck Response Preparedness.--Additional kits of traps, poison, bait stations and supplies were made and distributed for quick response. "Spike Camp Kits" were assembled and deployed which contain basic camping supplies for personnel to use during a rat or oil spill in remote areas where other facilities are not available.

Response to Shipwreck.--Our first responses concerned with rodents were made to shipwrecks in 1996. Mike Williams, a NMFS employee trained by us, boarded the ship, F/V All American, which became grounded on St. George Island in March, 1997. Mike inspected for rodents, placed bait stations on the vessel and tops of adjacent cliffs. Dan Magone, owner of a marine salvage company, was issued a kit as his ship is often the first one to a shipwreck. He took it with him to a wreck at Tanaga Island. Coordination efforts with the U.S.C.G. were also undertaken for the F/V Arctic Dawn wreck at St. Paul (March 1996), but the ship was salvaged before breaking up and deployment of stations was not necessary. There was no evidence that any of these ships carried rodents.

Report of Rats.--In 1996 rats were reported to have been on the floating processor Yardarm Knot which was to participate in Pribilof and other Alaskan fisheries in 1996 and 1997. Through communications with the company they underwent a rat removal program and prevention effort onboard before heading north from Seattle. Efforts to eliminate rodents from ships are thought to be important additional steps that can be taken to prevent introductions.

Evaluation of an Island to Determine if Rats Could be Removed.--Gary Kaiser, Canadian Wildlife Service, and Mark Drever, Simon Frazier University visited Great Sitkin Island (39,219 acres) to determine the feasibility of removing rats from this and other Aleutian islands. Because of its large size and excellent rat habitat Great Sitkin provides, Gary and Mark felt that it would be very difficult to remove rats from the island. They suggested that aerial application of bait

would be the only feasible method for such a project. Gary said project management for such a large removal project and safety would be important considerations. The visitors also said it was unlikely foxes were controlling Norway rats, but rats may expand their use of sandy beaches when foxes are removed.

Byrd, Vernon. 1996. Briefing by Gary Kaiser and Mark Drever. U.S. Fish and Wildlife Service Memorandum to Files, September 6, 1996. 8pp.

Impacts of Rats on Auklets.--On August 23, a crew of 13 people visited Kiska to examine the auklet colony at Sirius Point for evidence of rat distribution, abundance, and predation on nesting birds. They found evidence that rats occur throughout the colony, especially in the talus around the lava flow. Evidence of predation of adult auklets and eggs were described.

Williams, J. 1996. Reconnaissance for evidence of rats at Sirius Point, Kiska. U.S. Fish and Wildlife Service Memorandum to Files, August 23, 1996. 8pp.

Rats on Adak.--"Rats and the islands they aren't on yet!" was the topic of a memo by WB Williams concerning rats in the Adak headquarters field camp and equipment pantry rooms. In addition to more traps and bait stations, prior to the field season WB Williams stepped up efforts to train all staff and develop safe handling procedures to send gear/food to the field.

Caribou management.--Caribou (*Rangifer tarandus*) were introduced to Adak Island in 1958 and 1959 as a ready source of food in the event that a national emergency cut off the regular food supply to the military and to provide sport hunting opportunities for local residents. A Caribou Management Cooperative Agreement was developed by the U.S. Navy (Adak), U.S. Fish and Wildlife Service, and Alaska Department of Fish and Game. It was recognized from the outset that the absence of natural predators, the abundance of apparently excellent habitat, and the mild climate created conditions favorable for the herd to increase beyond the capacity of local hunters to control. The first hunting season (August 15-25) was conducted in 1964. The initial population objective was to maintain the herd of 200-250 with an annual harvest of 50 animals. Over the years both the herd and the harvest have increased beyond the original objective. At present, the population is estimated at 750 with an annual harvest of less than 50.

We have been concerned for some time that the herd has grown beyond the level where it can be controlled by hunting. With the downsizing of the naval facility at Adak and the potential for complete closure, we requested that the Game Board adjust the season and bag limit. Currently there is no closed season and no bag limit for caribou on Adak. If reuse fails and the naval facility closes, serious consideration will have to be given to population control or total removal.

5. COORDINATION ACTIVITIES

A. Interagency Coordination

The majority of coordination took place relevant to base closure issues. Extensive involvement occurred coordinating with the U.S. Navy. In February, the Undersecretary of the Navy visited Adak to make a site visit and address issues. Concerning base closure, much coordination continues with The Aleut Corporation, the newly formed United Aleut Nation, the LRA (Local Reuse Authority), and the Adak Restoration Advisory Board (RAB).

On ongoing study of sea otter population and ecology at Adak is a joint project with the USFWS, U.S. Navy, and the National Biological Service at the University of California, Santa Cruz. Another sea otter research project at Shemya Island is jointly conducted with the USFWS, the U.S. Air Force, and UC Santa Cruz.

6. RESOURCES PROTECTION

C. Manage Permits and Economic Uses

Activities occurring or proposed to occur on the refuge were reviewed by biologists. The Gulf of Alaska Unit was particularly active. Those activities requiring Special Use Permits involved log transfer facilities, a rocket launch site, and small parcel acquisition of islets and tidelands near Kodiak Island. Refuge jurisdiction includes some nearshore marine waters at Womens and Karluk bays (Kodiak Island) and waters surrounding Afognak Island. Womens Bay and Afognak Island waters lie next to communities and upland resource extraction operations which cause marine degradation. Infrastructure includes a U.S. Coast Guard base, freight transfer facilities, a seafood reduction plant, and a sewage treatment plant. Two Native corporations owning land adjacent to Refuge waters actively logged their lands in 1996. The particular concern with log transfer facilities is the accumulation of bark deposits at the bottom of the water column in the vicinity of the log slide and log rafting area. Bark accumulations essentially smother macrofauna, and as the bark decomposes, it creates a highly acidic environment which prevents the survival of naturally-occurring fauna.

D. Contaminant Investigation and Cleanup

Response to Oil Spill.--On February 16, the M/V *Citrus* anchored north of St. Paul and requested assistance from the Coast Guard as the ship was listing to port. A few days later, residents of St. Paul reported oiled birds coming ashore. The Coast Guard chartered a flight to St. Paul on February 20 to determine the extent of the spill. Art Sowls accompanied the Coast Guard. He reported hundreds of oiled birds on the island, primarily King Eiders, but no oil on the shore. Within two days, the oil spill response was in place with an Incident Command Center in Anchorage, the International Bird Rescue and Research Center (IBRRC) on contract to capture and rehabilitate birds, and an interagency response team on the island.

Personnel on the island collected carcasses, estimated the number of birds oiled, and captured live-oiled birds for rehabilitation. Over an eighteen day period, people from the community and processors, personnel from Fish and Wildlife, the National Biological Service (NBS), and IBRRC worked together to collect over one thousand carcasses and nearly two hundred live birds for rehabilitation. Basic measurement data, tissue and feather samples were taken from the carcasses. The Coast Guard analyzed oil from feathers to develop a "fingerprint" of the oil, which was subsequently used to identify the M/V *Citrus* as the ship that spilled the fuel. After cataloguing, most carcasses were burned. Carcasses in good condition were kept for museum specimens and some carcasses were kept as evidence. In addition, FWS and NBS conducted a beached carcass survey to determine the turnover rate of carcasses on the beach and surveyed bird distribution and abundance near the island. Information from the surveys will be used to estimate the total number of birds likely affected by the spill.

The spill primarily affected King Eiders (1038 out of 1146 birds collected). Other species observed oiled or collected included: Common Murre, Crested Auklet, parakeet Auklet, Oldsquaw, Harlequin, Pigeon Guillemot, Red-faced Cormorant, and Pelagic Cormorant. The number actually collected as carcasses or as birds for rehabilitation is a fraction of the birds actually affected by the spill. Preliminary estimates are that between two and ten thousand birds may have been oiled during the spill. In addition to the oiled carcasses, biologists collected a number of Common Murre carcasses that were not oiled. These birds were likely the result of a natural die-off. Specimens were collected for further analysis by the FWS wildlife health lab. Under normal circumstances, foxes would scavenge murre carcasses quickly. Given the saturation of the island with the oiled carcasses, scavengers were overwhelmed and many carcasses remained. Birds that were not oiled are not included in mortality estimates for the spill.

Rehabilitation of live-oiled birds took place in Anchorage as appropriate facilities were not available on the island. Birds were captured and stabilized on the island, then shipped to a bird rehabilitation center operated by IBRRC in Anchorage. At the center, the veterinarian checked blood protein values, weight and general condition of each bird upon arrival. Most birds arrived dehydrated, emaciated and unable to eat on their own. Initially, all birds were tube-fed high protein mix three times a day and an electrolyte solution an additional three times per day. Birds were first kept in four by four foot box enclosures with a net bottom, which allowed easy cleaning and minimizing keel sores and feather damage. (Diving birds are prone to keel sores as they rest on their breasts; the prominent keel bone will rub on any hard surface, resulting in sores.) Once the birds stabilized, they were washed. Following washing, birds were placed in enclosed pools where they were able to feed on their own. Birds were held in Anchorage until they reached (or approached) an average weight, hematology values returned to normal, they remained waterproof and exhibited normal behavior. Upon reaching an acceptable condition, birds were returned to St. Paul for release. Island residents, including school children, assisted tremendously in releasing the birds.

The M/V *Citrus* has been charged with spilling the oil. The U.S. District Attorney filed criminal charges against the owner and operator of the ship (Excel Navigation, S.A.), and the ship's master for violations under the Refuse Act and the Migratory Bird Treaty Act.

Adak Contaminants Cleanup.--Cleanup process is underway on Adak as part of the procedures outlined in the BRAC (Baser Realignment and Closure Act). The BRAC cleanup team is composed of individuals from the U.S. Navy, U.S. Environmental Protection Agency, and Alaska Department of Environmental Conservation.

ROS Greffenius and WB Williams provided comments to Ecological Services contaminants staff for revisions on the draft Environmental Baseline Survey Report, Naval Air Facility Adak.

Aleutian Islands Unit contaminants.--ROS Greffenius and WB Williams provided comments to Dames & Moore, Inc. for revisions on the draft of a report addressing contaminants issues on Semisopochnoi Island.

URS is preparing an EIS for base closure. Refuge staff provided boat support to URS biologists for marine sampling.

A team of contractors and Ecological Services contaminants specialists did sampling on Amchitka Island.

In October, a 77 ft. longliner went aground at Tanaga Island. Immediate concerns were rats on board the vessel and a fuel spill. Apparently no damage to resources occurred.

Wire cleanup at Simeonof.--Simeonof Island is managed by the U.S. Fish and Wildlife Service as part of the Alaska Maritime National Wildlife Refuge. The entire island and surrounding waters was designated as a wilderness in 1976. It is a Class I air quality area and protected against significant deterioration. Additionally, the U.S. National Park Service administers it as a National Natural Landmark. During 1996, two National Park Service employees gathered, bundled, and stockpiled an estimated 960 m of 2-8 strand fencing for later disposal. An estimated 400 m remain on the island.

F. Manage Cultural Resources

While doing bird surveys on Shemya Island, WB Meehan reported to the regional archaeologists on the appearance of archaeological sites. Already known was that looting had occurred on Shemya prior to 1994, but no evidence of more recent looting was noted.

A team of archaeologists led by Stephen Loring of the Smithsonian Institution spent the summer digging on Agattu Island.

The Adak Navy Museum was packed up and closed this summer. Concern arose as to the disposition of the archaeological material from the Aleutian Islands, which is FWS property. The historic material is of interest in preserving the history of the refuge. With consultation from FWS regional archaeologists plus state and Navy historic preservation personnel, a satisfactory solution was to keep the collection intact. It was packed up and transported to a reputable museum in Alaska, the Anchorage Museum of Art and History.

H. Land Acquisition

Extensive meetings and discussions occurred throughout the year relating to Adak's base closure process, FWS reality and contaminants issues, rescue of the facilities, and land exchange negotiations with The Aleut Corporation.

In September, the Adak Reuse Summit Meeting convened on Adak. Participants included FWS personnel, U.S. Navy representatives from Washington, D.C. and the Engineering field Activity Northwest, Department of Interior staff from Washington, D.C. and Anchorage, The Aleut Corporation, environmental groups' representatives, and other interested parties.

8. PUBLIC EDUCATION AND RECREATION

A. Visitor Services

Planning for the refuge's proposed headquarters was stalled in 1996 as design funds were rescinded by Congress in 1995. Alaska Department of Fish and Game's Glen Seaman, head of the proposed Kachemak Bay National Estuarine Research Reserve (NERRS), met with ORP Benson and toured the headquarters site to discuss the possibility of a joint facility. Since designation of the reserve is still a few years off, no commitments were made. The reserve would be administered by the state but is a federal program funded by the National Oceanographic and Atmospheric Administration.

Planning for a trail on the 60 acre headquarter's site continued throughout the year with several meetings and site visits. The trail is a joint project with the city of Homer with funding coming from the Alaska Department of Natural Resources (Exxon Valdez settlement money) and the Department of Transportation (ISTEA money).

There were approximately 2,000 visitors to the Adak Fish and Wildlife Center during the year. Visitors are able to view displays, obtain free informational brochures, and purchase educational items through the Alaska Natural History Association. At Clam Lagoon, there are nine information signs, three viewing platforms, and duck blinds. These provide an excellent means for people to view wildlife at the lagoon.

B. Outreach

This was a year of retrenching for the public use program due to a Regional Office's decision not to replace Park Ranger Denise Witte who left in 1995. This 50% cut in permanent outreach staff on top of the lingering effects of the 95-96 furlough, meant a decline in most existing outreach efforts and, with one exception, no new starts.

All programs except one were kept going at some level due to drawing down of Alaska Natural History Association funds to pay for more seasonal staff, the free gift of a Career Institute Awareness student, Jose Carillo; the detail from Ketchikan of the very capable Steve Brockman;

and dedicated, experienced, returning seasonals and volunteers. The Shorebird Sister Schools program, started on this refuge in 1994, was turned over to the regional office due to the staff shortage. An exception to this downward trend was the refuge's first National Wildlife Refuge Week celebration, a very successful open house on the M/V *Tiglax* with 432 participants.

In spite of the loss of Witte's position, the environmental education program increased by 25% to 1,996 students. This increase is due to an extremely busy May and September when 60% of all environmental education activities occurred. The growing popularity of Shorebird Sister Schools accounts for much of the May increase.

Seasonal staff started earlier this year (April 1) to prepare for the spring onslaught. Volunteers Phyllis Benham and John Bertrand, seasonal Park Ranger Emily Cover, and Wildlife Biologist Steve Brockman formed the spring E.E. team. Training Instructor Carmen Field helped with training and some programs. Brockman, Cover and volunteer Andrea Vyenielo were the fall team. Brockman was detailed from Ketchikan Ecological Services office March 15 to help solve the refuge's staffing shortage. He did an excellent job of organizing the refuge's E.E. program.

Much of the increase was due to the popularity of the Mud Bay field trip which is part of the Shorebird Sister Schools Program (SSSP). This is the third season for SSSP which was taken over by the Regional Office in December of 1995. The RO was able to take the program to a higher level creating a web site (<http://www.fws.gov/~r7enved/sssp.html>), a shorebird list server, and involving more Anchorage schools. Eleven schools did their shorebird field trips with the refuge, since Homer is the most convenient shorebird stopover in south central Alaska. The refuge also got involved in the Save Our Migratory Birds (SOMB) program by locating an Anchor Point school that was willing to partner with Brazilian and Boston schools.

The September E.E. season was especially strong because WB Brockman sent a letter to local schools offering seabird, wetland and estuary programs. Nine programs resulted from that effort. By the end of September, Brockmann and the fall volunteers had departed.

SO Kevin Bell spent three days giving his Aleutian program and M/V *Tiglax* tour to all Homer 4th graders as usual. In November, Brenda Eliason was hired as a Refuge Operations Specialist with 40% of her time to be spent managing the environmental education program. At year's end, Eliason and Benson were working to define those duties and plan next year's program.

Pribilof Stewardship Camp--This was the fifth year of this nature day camp for the mainly Aleut children of St. Paul and St. George islands in the Pribilof island group. The camp is the result of a challenge cost share agreement with the cities of St. Paul and St. George; the native corporations, Tanaq and Tanadgusix; St. Paul Traditional Council; St. George IRA Council; the Pribilof School District and the Nature Conservancy. The Fish and Wildlife Service is the principal funder at \$23,000 with the school district next at \$12,000. Other funds came from National Marine Fisheries Service, a high school employment program and fundraising.

ORP Benson again handled the grant administration and made two planning and monitoring trips to the islands. The school district handled the day-to-day administration including hiring most of

the employees. Aquilina Bourdukofsky headed up the St. Paul camp aided by Karen Holser, Tara Bourdukofsky, Chikayo Daniels, and elder Mary Bourdukofsky. Dana Stevens and St. George City recreation director Julie Anderson were the St. George instructors. Training Instructor Carmen Field spent a week assisting the St. George camp in bird studies.

The camps ran for seven weeks on St. Paul and four weeks on St. George with several overnight camping trips. About 70 kids participated in the camps over the course of the summer. Fur seals, seabirds, invertebrates, flowers, native culture including foods and crafts, outdoor skills and the seal harvest were the principle topics covered in camp.

New this year was the Alaska Arctic Nesting Goose program on St. Paul which paired high school students with scientists for field work and mundane tasks such as data entry. The students were paid with youth employment funds. Because the Pribilof Islands have the largest fur seal rookery in the world and the largest bird colonies in North America, the islands play host to dozens of scientists each year. The AANG program was our best effort so far at getting kids involved with scientific work occurring on the islands.

PR Emilie Cover and RO Education Specialist Heather Johnson conducted a two hour teacher training on the Shorebird Sister Schools Program (SSSP). The training was part of the Shorebird Festival. The 12 teachers who attended had an opportunity to go on line and explore the SSSP website as well as participate in a model field trip to Mud Bay. ORP Benson and PR Carmen Field were part of a panel teaching interpretive techniques to volunteers for the Pratt Museum and Center for Alaskan Coastal Studies. An interagency group of which Benson is a member completed a brochure introducing teachers and others to the natural history educational resources available in Homer.

Planning continued throughout the year for the Beluga Slough Trail to be constructed on the refuge's new headquarters site and adjacent city land. Planning is complex because the trail has more than one fund source, Department of Natural Resources (Exxon Valdez settlement money) and the Department of Transportation (ISTEA money); more than one land owner, the City of Homer and USFWS; and wetland constraints.

The Homer visitor center was open only from May 1 to September 20 due to the loss of Witte's position. In spite of this, visitation declined just 1% to 12,801. Visitation has been steadily declining since 1993, the anniversary of the Alaska Highway which significantly increased "rubber tire" visitors to Alaska. It is thought that poor visibility and a store-front image limit visitor use of the refuge center to less than 5% of visitors to Homer.

WB Steve Brockman of Ketchikan Ecological Services arrived at the refuge in mid-March to set up the visitor center. Brockmann received a "Star" award at year-end for his outstanding job in taking over this program with very little preparation time. He created the best seasonal training program we have ever had. Returning volunteer John Bertrand arrived April 1 and created several new quality exhibits. Volunteers Andrea Vyenielo and Holly Offerman and Career Institute student Jose Carillo assisted Brockman during the summer months.

Center outreach was down about 50%. The beach walk/bird walk program did not start until July and other events such as the Street Fair were abandoned for reasons given above. The refuge bird hot line "235-PEEP" struggled through the year due to the departure of long-time refuge volunteer George West. West continues to return to Homer in the summer and runs the hotline, but winter coverage is hit or miss.

State Ferry Naturalist--PR Emilie Cover returned this year as naturalist on the state ferry *Tustemena*. This program is a challenge cost share agreement between the refuge and the Marine Highway Program which provides passage, room and board for the refuge naturalist. Cover covered all 7 day runs from Homer to Dutch Harbor and most runs from Homer to Kodiak. Volunteers John Bertrand and Holly Offerman handled shorter, one day trips to Seldovia. All volunteers, WB Brockman, and PR Carillo participated in at least one Kodiak run for training or as substitutes. Volunteer and well known local birder George West participated in one Dutch Harbor run to gather material for a ferry brochure he is preparing for the refuge.

The refuge naturalists presented interpretive programs including slide shows, videos and demonstrations, spotted and identified marine wildlife, provided roving interpretation and maintained a lending library onboard. The ferry passes through refuge waters, past refuge islands and past four other refuges. Three ports also host refuge headquarters.

Kachemak Bay Shorebird Festival--This was the fourth year for the event, the largest wildlife festival in Alaska. The educational aspects of the festival are managed by the refuge and funded by a challenge cost share agreement with the Homer Chamber of Commerce.

A highlight of this year's festival was the dedication of Kachemak Bay as a unit of international significance in the Western Hemisphere Shorebird Reserve Network (WHSRN). Interest and awareness of shorebirds resulting from the Festival were precipitating factors in the city's decision to nominate the bay for inclusion in WHSRN. RD David Allen gave a speech prepared by ORP Benson at the dedication ceremony. Jim Corven from WHSRN and Monomet Observatory as well as Alaska Department of Fish and Game Commissioner Frank Rue, Homer Mayor Jack Cushing, Parks Commissioner Jim Stratton and other dignitaries spoke at the outdoor ceremony.

Dr. Dennis Paulson, author of Shorebirds of the Pacific Northwest and director of the Slater Museum, was the keynote speaker. The festival offered over 50 events including guided shorebird viewing stations; guided bird walks; pelagic birding from tour boats, kayaks, and sailboats; various speakers on birding topics; an arts, crafts and education fair; a wooden boat show; art gallery migration; international migratory bird day count, and a birder's coffee were highlights of the festival.

The festival, which ran from May 9-12, was expanded this year to include Thursday night activities. Attendance is estimated to be about 1200, a 20% increase over 1995. Half the attendees came from the Anchorage area and 8% from outside Alaska, a 50% increase for outsiders. Attendance at viewing stations was more than double that of 1995 which we account to perfect weather.

Press coverage was the best ever with two Anchorage television stations in attendance. Refuge staff were interviewed by both stations and appeared on a KBBI "Coffeetable" about the festival. Homer high school students prepared and gave five reports on the migration over KBBI radio. PR Willy Dunne again ran the refuge's efforts which included planning and managing all the talks and birding events. Dunne and ORP Benson participated in planning sessions with the Chamber all year long.

National Wildlife Refuge Week--The refuge's first National Wildlife Refuge Week celebration was a huge hit. The open house on the refuge's 120 foot research boat the *M/V Tiglax* drew 432 people. The event, widely advertised in the elementary schools and in the local media, drew primarily families but also boat enthusiasts.

Each space on the boat was converted to a learning station. Every half hour in the galley, Benson gave a slide show orienting participants to the refuge, refuge system, and the boat. Food chain theme exhibits were in the labs and included dissection of halibut stomachs to determine prey and guessing games with forage fish samples. The hold was the "rat room" with exhibits and activities designed to raise awareness of the threat rats on ships and fishing boats pose to refuge wildlife. Captain Kevin Bell held forth on the bridge where participants learned about navigation and the boat's mission. A mock field camp--complete with furnished weatherport right down to the long underwear drying from the rafters, radio communication to the boat, and bio-techs in appropriate garb--was constructed at the harbor's edge. At the field camp, visitors learned about our field operations, and the kids could "dress up like a biologist" in Mustang suits and get take home Polaroid pictures of themselves. Kids had an opportunity to win prizes and become a junior biologist for the day by filling out a work sheet as they toured the boat. In addition, SWB Vernon Byrd and SO Kevin Bell participated in a half hour interview on KBBI about the work of the refuge and the *M/V Tiglax*.



The refuge's first **National Wildlife Refuge Week** celebration was a huge success with 432 participants touring the *M/V Tiglax*. Kids loved the opportunity to dress like a biologist and get take-home photos of themselves. The photos were taken at the "field camp" at the entrance to the dock. The field camp exhibit and the bio-techs who staffed it, gave the public a feel for what life is like doing biology on a remote Aleutian Island for three or more months at a time.



Mariner Park Overlook--Two panels on shorebird migration were completed and installed in time for the Shorebird Festival on a viewing platform at Lighthouse Village adjacent to Mariner Park slough. The panels were the result of a challenge cost share agreement with the owner of Lighthouse Village.

Cooperating Association--1996 proved to be a banner year for the Alaska Natural History Association (ANHA) outlet at the refuge visitor center due to the talent WB Brockman had for sales. He is in the wrong business! In spite of the 1% decline in visitors, sales increased by 20% to \$27,494. Dollar per visitor take increased to \$2.15. Dollar per visitor has been increasing steadily in excess of inflation since 1993 as the refuge has become increasingly more sophisticated about product mix and display.

The increasing ANHA profits allowed the refuge to tap these funds to help solve the labor shortage. PR Willy Dunne was brought on as an ANHA employee in February to complete ANHA business such as ordering but also planning the Shorebird Festival. PR Emily Cover became an ANHA employee September 1 and was kept on through early October to close out the ANHA year, present environmental education programs, and plan and participate in National Wildlife Refuge Week. Along with Benson, Cover attended three days of ANHA training in Anchorage in December.

Refuge Outreach - Major elements of the refuge outreach program include: visitor centers at Homer and Adak, a naturalist on the state ferry *M/V Tustemena*, the Pribilof Stewardship Camps for children of the Pribilof Islands, a school environmental education program including the Shorebird Sister Schools Program, the Kachemak Bay Shorebird Festival, and the National Wildlife Refuge Week celebration.

Refuge staff (Adak) responded to information requests, sending out quantities of brochures to Unalaska and Fairbanks Visitor centers, plus responding to individual requests. Information was provided to the Adak community through articles in the Navy newsletter, advertising on the radio, posting announcements, and presenting briefings at weekly Navy staff meetings.

Outreach activities extended to the westernmost extent of the Aleutian Chain at Eareckson Air Station on Shemya Island. This was part of the Natural/Cultural Resource Education project funded by the DOD Legacy Resource Management Program. Biologists working on Shemya provided educational materials and programs.

WB Meehan provided an overview of biology projects on Adak when he displayed posters at the Wildlife Society meetings in Cincinnati. Topics of the posters included sea otters, Aleutian Green-winged teal, and Marbled murrelets.

Cooperating Associations: Alaska Natural History Association, Adak Branch--The Adak ANHA outlet provided retail sales of educational materials and offered informational services at the Adak Fish and Wildlife Center throughout Fiscal Year 1996. Revenue for FY96 totaled \$9,577.

Sales decreased during the past fiscal year due to the decline in Adak's population, the Visitor Center closures due to staff shortages, and a reduction of inventory on sale. The Visitor Center and ANHA sales outlet continue to be a regular stop for new residents and the numerous temporary employees coming to Adak Island.

The primary expenditure of funds during FY96 included purchase of a computer used for biological reports, informative articles and layout for a local newspaper, and completing ANHA spreadsheets for quarterly reports. Additional funds were in direct support of our interpretive services and educational programs. These expenses included donations, aid to manager, and library/reference books. All volunteers at this field station are given items donated from ANHA as appreciation gifts for their time and effort contributed to biology and education programs.

Currently, the Adak Branch is managed by the Unit Manager (ROS Greffenius). Much assistance is provided by the Administrative staff (AT Wiggins), including information services in the Visitor Center and ANHA record keeping. The sales operations for the Adak Branch has lessened the diversity of inventory in order to eliminate slow moving items. Presently, the sales outlet offers items relevant to Adak including maps, postcards, and Aleutian books.

9. PLANNING AND ADMINISTRATION

C. Training

Refuge Wildlife Biologists Jeff Williams and Steve Ebbert attended the 1996 Refuge Management Training Academy, February 25- March 14, 1996, in Charleston, South Carolina. Jeff and Steve were two of four students attending the academy from Region 7. The National Education and Training Center administers the annual academy. The academy provided an overview of programs, policies, issues and mandates related to the operation of the National Wildlife System. Jeff and Steve participated in classroom instruction, field trips to local refuges, practical exercises, group discussions, and individual presentations.

MW Bell attended a two week class for comprehensive servicing of outboards. WB Meehan attended Pre-acquisition Contaminants Surveys for Non-contaminants Specialists in Anchorage. ROS Greffenius attended Managing Performance under the new Performance System, Refuge Outreach, ANCSA and ANILCA.

D. General Administration

A temporary administrative cabin was erected at St. Lazaria in April 1996. Though small (4 m X 6.5 m), it offers welcome shelter from infamous southeast Alaska rain.

E. M/V Tiglax Operations

In January, a ship's budget was prepared by Captain Bell, and a draft field season schedule was prepared by RM Martin and Supervisory Biologist Byrd. The schedule was sent out for review

and to all ship user groups.

Captain Bell traveled to Anchorage to pick up ship supplies, repaired inflatable boats and used office furniture from the RO.

Annual fire and emergency equipment inspections were conducted, and life rafts were inspected by the Coast Guard and repacked by Ocean Safety Services. The emergency equipment and deck gear needing replacement were purchased by Captain Bell.

Outboard and engine room parts were purchased by Engineer Nelson, and repairs were made on refuge outboards and vehicles.

In late January, Captain Bell and Chief Engineer Nelson worked with Refuges & Wildlife, CGS personnel, and the MCI Shipyard contracting superintendent to budget, write and negotiate a shipyard contract. These negotiations lasted through February, and a final contract was completed with MCI Contractors before the ship sailed to Bellingham, Washington.

The entire ship's crew was assembled on March 1, 1996, to load food, water and emergency equipment. All ship systems were tested, and the *M/V Tiglax* departed Homer for the six day run to Bellingham. Upon arriving at MCI Shipyard, the cook/deckhand Macone and deckhands Snedgen and Jamieson were sent home. Captain Bell, Chief Mate Pepper and Chief Engineer Nelson worked the fifty-six day yard period making repairs and overseeing shipyard installations and retrofit work.

This major overhaul included a new boiler and ship heating system, a cathodic protection system for the hull and keel coolers, an overhaul of the forward and aft cranes, two new marine generator engines, and one new marine sanitation device. Both propellers and shafts were pulled. The propellers' pitch and diameters were changed, and one shaft was replaced. All fuel tanks were emptied, cleaned and inspected. The entire ship was spot sandblasted, primed and painted. The potable water tanks were also cleaned, prepped and painted. The four sets of engine controls were overhauled with rebuild kits. The old anchor chain was replaced and re-stowed in the chain locker.

All wheelhouse windows were removed, resealed and refit. Refrigeration systems were evacuated, and the old refrigerant was replaced with new. Other items removed were two generator engines, worn out marine sanitation device, old boiler and boiler keel cooler, the scientific winch and helo fueling station. The aft hydraulic and pot puller davit cradle were moved and rewelded on the foredeck.

Work was completed on May 4, 1996, and with the ship's crew and MCI personnel aboard, the *M/V Tiglax* got underway in Bellingham Bay for sea trials. All new and old systems were checked, adjusted as necessary and approved by Captain Bell.

The *M/V Tiglax* docked at the MCI pier, shipyard crews disembarked, shipyard equipment was removed, and cargo was loaded. The ship departed Bellingham, Washington, for the six day run

to Homer, Alaska. Upon returning to Homer, the crew made ready for the field season loading cargo, supplies, fuels, food and equipment.

On Monday, May 20, 1996, Mate Pepper conducted a safety briefing with passengers while the crew secured for sea. After a fire and emergency drill was conducted with all personnel on board, the *M/V Tiglax* departed for the 1996 field season.

The *M/V Tiglax* spent the next 129 days underway in the Pacific Ocean and Bering Sea, traveling 17,029 nautical miles, visiting 44 islands and supporting 11 field camps. With 83 research and scientific personnel representing six countries on board, the ship and crew completed a successful year.

The main highlight of the year was the rescue of two adults and two children from an overturned pleasure boat in the cold and dangerous waters of Cook Inlet. Without the timing, experience and luck of the ship's crew and biologists on board, these individuals would almost certainly have perished.

Administrative Technician Gail Wiggins was hired and arrived in April to fill the vacant AT position. MW Bell was hired and arrived in April to begin preparing field camps for departure.

Hazardous materials inventory was provided to the local Division of Fire Prevention in order to follow the recommendations of an environmental compliance audit. Radon tests were done in the Adak headquarters building in accordance with recommendations of an environmental compliance audit.

Two structural engineers made a thorough evaluation of the damage to the headquarters building from the June 7.7 earthquake. Findings included a cement floor cracked in several places in the second floor electrical room and numerous cracked ceiling beams in the offices.

Through an official agreement with the Navy, the FWS acquired the use of the large warehouse adjacent to the headquarters building. This is being used for vehicle, boat, heavy equipment and fuel storage.

Alaska Regional Director Dave Allen and RM John Martin visited Adak in April to provide an Adak orientation to RD Allen, meet with the base captain, and meet with the Adak staff to discuss national, regional, and local issues.

ROS Greffenius and WB Williams explored options in Unalaska/Dutch Harbor for an Aleutian Islands Unit headquarters office/maintenance and Visitor Center facility in this community as a possible base of Aleutian operations if the Adak facility is forced to close due to base closure and no reuse occurs. Community leaders and local businesses welcomed the prospect of having a FWS facility in their community, especially in light of their efforts to increase tourism there.

EARTHQUAKES rock and roll on Adak. On June 9 a magnitude 7.7 earthquake occurred in the central Aleutians only 40 miles from Adak. Nearly a hundred aftershocks occurred, including a

7.2 magnitude shock the following morning. Field camps were alerted via single sideband radio to go to higher ground due to a Tsunami warning. The FWS headquarters complex and FWS residences had many fallen items to clean up. The office building incurred some structural damage.

Personnel

PERMANENT FULL-TIME:

Kevin Bell	Ship Operator	WS-10	07/08/87-pres
Laurie Benson	Outdoor Rec. Planner	GS-11	07/17/88-pres
Daniel Boone	Assistant Refuge Manager	GS-12	06/26/94-pres
G. Vernon Byrd	Superv. Wildl. Biologist	GS-11	09/23/92-pres
Belinda Dragoo	OAC	GS-4	04/01/96-pres
Steve Ebbert	Wildlife Biologist	GS-11	04/02/95-pres
Trina Fellows	Accounting Technician	GS-5	11/28/83-pres
Laura Greffenius (Adak)	Refuge Operations Specialist	GS-11	12/01/91-pres
Carol Hagglund	Budget Assistant	GS-7	08/21/83-pres
John Martin	Refuge Manager	GM-14	12/21/81-pres
Eric Nelson	Marine Machine Mech.	WG-10	02/21/89-pres
Leslie Slater	Wildlife Biologist	GS-11	11/16/92-pres
Arthur Sowls	Wildlife Biologist	GS-11	09/28/86-pres
Chris Thorsrud	OAC	GS-4	03/25/96-pres
Jeff Williams (Adak)	Wildlife Biologist	GS-11	05/08/90-pres

Detail SAES:

Steve Brockman	Wildlife Biologist	GS-11	3/17/96-9/28/96
Ed Grossman	Wildlife Biologist	GS-11	5/12/96-8/17/96

PERMANENT INTERMITTENT:

Ivan Davies	Marine Machinery Mech.	WG-10	03/25/90-pres
Don Dragoo	Biological Technician	GS-7	05/27/87-pres
Marcia Macone	Cook/Deckhand	WG-8	08/08/88-9/21/96
William Pepper	Ship Operator	WG-11	04/27/95-pres
Gregory Snedgen	Deckhand	WG-5	06/01/89-pres
Robert Ward	Cook (Deckhand)	WG-8	04/19/92-pres

TERM:

Arthur Kettle	Bio Tech	GS-6	05/16/93-pres
Joe Meehan (Adak)	Wildlife Biologist	GS-7	07/23/95-pres
David Roseneau	Wildlife Biologist	GS-11	01/10/93-pres
Lisa Scharf (Adak)	Bio Tech	GS-5	05/01/94-pres

TEMPORARY:

Margi Blanding	Bio Tech	GS-5	06/03/96-06/30/96
----------------	----------	------	-------------------

Jose Carillo	Bio Science Tech	GS-3	06/16/96-08/24/96
Terry Carten	Bio Tech	GS-5	05/31/96-09/30/96
Lisa Climo	Bio Tech	GS-	06/09/96-09/14/96
Joel Cooper	Bio Tech	GS-5	05/17/92-pres
Emilie Cover	Park Ranger	GS-5	04/22/96-09/14/96
William Dunne	Park Ranger	GS-7	05/20/91-pres
Andrew Durand	Bio Tech	GS-5	05/12/96-08/03/96
Eric Fellows	Relief Deckhand	WG-5	07/30/96-08/30/96
Carmen Field	Park Ranger	GS-5	04/15/93-pres
Julian Fischer	Bio Tech	GS-5	01/07/96-pres
Rebecca Howard	Bio Tech	GS-5	07/08/96-pres
John Jamieson	Deckhand	WG-5	05/04/91-10/12/96
Mark Krom	Bio Tech	GS-5	10/29/95-02/09/96
Sharon Loy	Bio Tech	GS-5	05/12/96-09/28/96
Carl Lunderstadt	Bio Tech	GS-4	05/19/96-09/14/96
Lisa Meehan	Bio Tech	GS-5	04/14/96-09/30/96
Mieczyslaw Mscichowski	Relief Engineer	WG-10	06/03/96-08/02/96
Tom Paragi	Bio Tech	GS-7	04/22/96-09/30/96
Greg Thomson	Bio Tech	GS-7	05/12/96-09/30/96
Chris Thorsrud	OAC	GS-4	10/15/95-12/17/95
Jessica Wachtel	Bio Tech	GS-5	05/19/96-09/30/96
David Waters	Deckhand	WG-5	08/05/96-10/04/96
Susan Woodward	Bio Tech	GS-5	06/02/96-09/30/96
Stephanie Zuniga	Bio Tech	GS-5	05/12/96-09/30/96

VOLUNTEERS AND STUDENT CONSERVATION ASSOCIATION (SCA):

Carrie Alley	Arkansas	Barren Islands
Barbara Bingham	Sitka, AK	St. Lazaria
Margi Blanding	Homer, AK	Barren Islands
Daniel R. Boone	Homer, AK	Homer
Loren Buck	Fairbanks, AK	St. Lazaria
Emily Cover	Homer, AK	Visitor Center
Kent Hall	Sitka, AK	St. Lazaria
Brad Kriekhaus	Sitka, AK	St. Lazaria
Jonathan Maletta	New York	Barren Islands
Chris Maranto	Boston, MA	St. Lazaria
Beverly Minn	Sitka, AK	St. Lazaria
Janet Moore	British Columbia	St. Lazaria
Holly Offerman	New York	Visitor Center
Carl Pallister	Sitka, AK	St. Lazaria
Cornelius Schlawe	Sitka, AK	St. Lazaria
Michael Shephard	Sitka, AK	St. Lazaria
Jan Straley	Sitka, AK	St. Lazaria
Kathy Turco	Fairbanks, AK	St. Lazaria
Andrea Viello	Davis, CA	Visitor Center

Four of the five units are supported by personnel located in the Homer office. Personnel for the Aleutian Islands Unit are presented in the Aleutian Islands Unit section. The AIU personnel are located on Adak Island in the Aleutian Islands and are also supported by the Homer office.

Table 1. Staffing Pattern, Fiscal Years 1994 to 1996

FY	Location	Full Time	Term	Intermittent	Temporary	Total FTE
1996	Homer	11	2	1.4	5.3	19.7
	Tiglax	2	0	2.7	0	4.7
	Adak	2	2	0	2.7	6.7
						31.1
1995	Homer	13	3	0.8	6.9	23.7
	Tiglax	2	0	2.7	0	4.7
	Adak	4	2	0	2.8	8.8
						37.2
1994	Homer	11.7	2	0.6	4.4	18.7
	Tiglax	2.6	0	2	0	4.6
	Adak	5.1	1	0	5.5	11.6
						34.9

Table 2. Alaska Maritime Refuge Funding FY 1992 to FY 1996 (thousands).

	<u>FY 96</u>	<u>FY 95</u>	<u>FY 94</u>	<u>FY 93</u>	<u>FY 92</u>
1260	2,691.0	2,101.7	2,130.1	1,979.1	2,087.0
1113	0	110.0	126.0	114.0	206.0
8610	25.0	42.6	52.1	45.3	
1971	594.5	602.5	215.9	341.4	14.7
9821	205.9	148.6	333.9		
4960		.582	.580		
1115			2.0		
4650				103.4	206.0
6320/30				10.0	45.0
8381				182.5	
TOTAL	3,516.4	3,005.98	2,860.58	2,775.7	2,558.7