ALASKA MARITIME NATIONAL WILDLIFE REFUGE

Homer, Alaska

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ANNUAL NARRATIVE REPORT

Calendar Year 1987

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

GULF OF ALASKA UNIT

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REVIEW AND APPROVALS

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Refuge Manager	Date	Refuge Supervisor Review	Date

_____	_____
Regional Office Approval	Date

INTRODUCTION

Gulf of Alaska Unit

Alaska Maritime National Wildlife Refuge

The Alaska Maritime National Wildlife Refuge (Maritime Refuge) was created by the Alaska National Interest Lands Conservation Act in 1980. It was established to conserve fish and wildlife populations and habitats in their natural diversity, fulfill international fish and wildlife treaty obligations, provide opportunities for continued subsistence uses by local residents, provide a program of national and international scientific research on marine resources and 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 through most of coastal Alaska and extends from Forrester Island in Southeast Alaska along the Gulf of Alaska to the Aleutian Islands and northward until near Barrow in northwest Alaska. There are about 3,000 islands, islets, and pinnacle rocks within the refuge which are used annually by millions of seabirds of at least 30 species. The Maritime Refuge has five units with all former refuges designated subunits.

The Gulf of Alaska Unit extends from Alaska`s southcentral coast near Kodiak Island then 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 has the only forest habitat on the Maritime Refuge. Spruce-hemlock forests are the dominant plant community on nearly all islands until Cook Inlet. The transition zone occurs in the Barren Islands where there is only a small forested area on Ushagat Island with alpine tundra the dominant vegetation type. Like much of the refuge, topography in the unit is often precipitous with seabirds using cliffs, talus slopes, burrows, boulder rubble and rock crevices to breed and nest. Besides terrestrial habitat, submerged lands also occur around Afognak and some waters around Kodiak Island.

Seabird colonies in this unit are probably the most visited in Alaska. Unlike most units, two colonies are readily accessible by charter boat or pleasure craft: St. Lazaria Island is 15 miles from Sitka and the Chiswell Islands are 35 miles from Seward.

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K. FEEDBACK

A. HIGHLIGHTS

Environmental assessment prepared on a right-of-way permit request by the Afognak Native Corporation to construct a log transfer facility at Afognak Island. (Section F.3).

Gull Island, Chisik and Duck island's kittiwakes experience reproductive failure. (Section G.5).

Stormy weather floods storm-petrel burrows at East Amatuli Island. (Section G.4).

Fox eradication project begins at Ushagat Island. (Section G.15).

B. CLIMATIC CONDITIONS

Although it does not extend as far south as the Aleutians, the Gulf of Alaska has the most moderate climate among units of the Alaska Maritime National Wildlife Refuge. Winter temperatures normally remain above 0° F except for lands adjacent to the Kenai Peninsula. The temperate climate in Southeast Alaska is often overcast, but seldom experiences the wind and summer fog of the other units.

The year began with the second wettest January on record in Homer, with 6.25 inches of precipitation, 4.60 inches above normal. The snow pack on hills above Homer was close to twice as much as normal. By April most of the winter snow accumulation had melted. In June, rain was recorded on 19 days. Field camps in the Gulf experienced even worse conditions with high winds and heavy rains. Rains continued in July with 16 days of rain. By contrast, August was unusually dry with only five days of rain and 0.59 inches of precipitation. October was the second wettest on record for Homer with 6.87 inches of rain. Our first snowfall occurred on November 12 when 1.2 inches fell. During the first 10 days of December, we had 15 inches of snowfall, but precipitation turned to rain toward the end of the month.

A stream at East Amatuli Island backs-up, creating a small pond after several days of rain. (6-87,MLN).

Stormy weather during late June at East Amatuli Island created high surf conditions. (6-87,MLN).

Table 1. Meteorological Data - Homer 1987

	Temperatures			Precipitation		
Month	Max.	Min.	Avg.	Dep. Norm.	Total	Snow
Jan	45	-2	29.6	8.8	6.25	11.1
Feb	44	14	32.1	7.8	2.95	6.3
Mar	49	6	31.6	4.7	2.43	T
Apr	51	19	36.7	1.6	0.77	0.8
May	57	31	45.0	2.8	1.06	0
Jun	62	37	50.1	1.3	1.07	0
Jul	75	38	54.7	1.9	1.06	0
Aug	71	38	54.9	2.1	0.59	0
Sep	62	27	45.6	-1.7	5.12	0
Oct	51	18	39.7	2.4	6.87	0
Nov	43	15	31.2	2.3	2.33	6.5
Dec	45	0	24.7	2.9	1.99	15.3

D. PLANNING

1. Master Plan

See Homer office section.

2. Management Plan

See Homer office section.

5. Research and Investigations

AMNWR NR87 "Adult survival of black-legged kittiwakes on Middleton Island, Alaska" (49224)

Personnel of the Alaska Fish and Wildlife Research Center conducted studies of seabirds on Middleton Island from May 4 to August 20 in 1987. The field party initially consisted of Scott Hatch (Project Leader), Jeff Harding, Betsy Chronic, and Jon Syder (volunteers). Major activities in early May included rocket-netting and banding of black-legged kittiwakes and installation of electronic balances under nests of kittiwakes to monitor body weight dynamics of adults and young. Hatch and Syder left the island on May 20 and May 19 respectively, while Chronic and Harding remained to conduct further banding operations and monitor the electronic weighing devices. Hatch returned on June 3, accompanied by Margo Rossi (volunteer), who replaced Betsy Chronic for the remainder of the field season.

Hatch spent the weeks of June 3 to 10 and August 5 to 12 on the island, while Harding and Rossi were present continuously until final departure on August 20. Banding operations were highly successful this year as we were able to band more than 350 adult kittiwakes with individual combinations of color and metal leg bands. No death or injury to birds resulted from the use of rocket nets. The sample of individually marked birds (presently numbering nearly 400) is now adequate to provide statistically sound estimates of overwinter mortality in future years, as long as sufficient effort to resight the marked birds is invested each spring. Follow-up observations are planned for the 1988 season and beyond.

The performance of solar-powered weighing platforms was also encouraging. Eight platforms functioned nearly flawlessly for most of the summer. Data files, which consist of weight measurements accurate to ± 1 g taken at 10-minute intervals at each nest, have been uploaded to the Region 7 Data General minicomputer for processing, but much analysis of the data remains to be done. Further field trials of the platforms are planned for Middleton Island in 1988.

Other field activities in 1987 included island-wide censuses of kittiwakes, pelagic cormorants, murres and glaucous-winged gulls and productivity studies for kittiwakes, cormorants, and gulls. The kittiwake census indicated the lowest population of nesting birds on the island since systematic counts began in 1976, possibly a reflection of the poor productivity of kittiwakes that has occurred in recent years. Kittiwake production in 1987 was essentially zero for the third straight year (fewer than 20 young were fledged by a population of some 36,000 nesting pairs). By contrast, glaucous-winged gulls had high breeding success in 1987, and their population is increasing rapidly on Middleton Island (some 8,000 birds in 1987 versus 1,400 birds in 1978).

NR87 "Botanical Reconnaissance of Chisik Island, Alaska Maritime National Wildlife Refuge, Alaska"

The wilderness portion of Chisik Island, defined as a Class I air quality area, requires stringent air quality standards be met. The island lies about 50 miles southwest of emission sources. Prevailing winds are from the north and northeast dispersing pollutants to the southwest. Potential industrial growth in the city of Kenai area would intensify pollutant effects. There have been no baseline air quality studies of Chisik Island and the flora is almost unknown. Since many species of plants, including lichens and mosses, are especially sensitive to pollutants, it is important to (1) document if

sensitive species are present and (2) identify those known to be responsive to environmental pollutants. This study is a first approximation, preparing the way for more detailed studies and monitoring efforts. The lower elevations were sampled in late June and early July with higher areas sampled in late August to early September. About 1,200 plant specimens were collected and 48 plant communities were described.

E. ADMINISTRATION

1. Personnel

See Homer office section.

2. Youth Programs

See Homer office section.

4. Volunteer Program

See Homer office section.

5. Funding

See Homer office section.

6. Safety

See Homer office section.

7. Technical Assistance

Information on the biological resources of Tugidak Island was provided to Fish and Wildlife Enhancement - Anchorage, relating to a proposal to mine the island.

We continued to work with Kenai Fjords National Park in preparing a report on the Kenai Peninsula survey conducted in 1986.

8. Other

In addition to the special use permit for grazing, the refuge issued 22 other special use permits.

Thirteen special use permits were issued for camp sites on Chisik Island in support of commercial fishing (eight for herring and five for salmon). Two other permits are in existence to use cabins on the north end of the island.

One permit was issued for the pursuit of mussel and oyster mariculture on Afognak Island.

The U.S. Bureau of Mines was issued a permit for geologic sampling on Elizabeth Island, the U.S. Coast Guard for a boat ramp on Kodiak Island, the City of Kodiak for discharge of seafood processing wastes, Maritime Helicopters for helicopter access to the Barren Islands, and lastly, Gerry Lemmo for photography on St. Lazaria Island.

F. HABITAT MANAGEMENT

3. Forests

Forested islands exist only in the Gulf of Alaska Unit, with Ragged Island (5,400 acres) in the Pye Islands being the largest island totally covered by spruce. Except for Forrester and St. Lazaria in southeast Alaska, all forested islands including Discoverer and Delphin Islands near Afognak Island were incorporated into the refuge by the Alaska Lands Act. Though better timber exists on other Federal, State and Native lands, Alaska National Interest Lands Act provides the Afognak Joint Venture use of timber on both Discoverer and Delphin islands. Both islands are heavily used by Sitka black-tailed deer and brown bear. Delphin also has a small seabird colony and nesting eagles. Delphin Island is particularly important to wildlife and has magnificent trees up to five feet in diameter.

Studies by the Alaska Department of Fish and Game suggest that old growth forests provide important winter range for black-tailed deer by retaining snow on the forest canopy and reducing ground snow depth and hence access to winter feed. Due to slow growth rates, Alaskan old growth forests have been recognized as a non-renewable resource.

In the past, former U.S. Forest Service lands on Afognak Island have been logged and the timber transferred through a barge loading facility at Perenosa Bay. Under Alaska National Interest Lands Act, these lands were transferred to Native Corporations. In 1986, several Native corporations working through Koncor, Inc., resumed logging on the north side of the island. Logging continued through 1987. A dive survey conducted in October 1987 indicated that bark had accumulated on the submerged lands adjacent to the transfer facility.

The Afognak Native Corporation is planning to construct a low gradient slide log transfer facility at Kazakof Bay, Afognak Island. Much of the year was spent preparing an environmental assessment for the project. The assessment was initially prepared by a consultant firm hired by the Afognak Native Corporation. The refuge assumed writing the document when we were dissatisfied with the product. The project would require construction of artificial reefs and eelgrass transplants to mitigate loss of marine habitat. In October, a pre-project dive survey was conducted off the proposed transfer site.

Sowls suits up for a dive at Discoverer Bay, Afognak Island, to investigate impacts created by bark deposits from a timber harvest. (10-87,MLN).

6. Other Habitats

Nearshore marine habitat on the refuge exists at Womens Bay, and Karluk along the Kodiak Island coast, and the former Afognak Forest and Fish Culture Reserve surrounding Afognak Island. Both Womens Bay and Afognak are threatened by development activities. A Coast Guard Base, freight transfer facility, and seafood reduction plant have been constructed at Womens Bay. Numerous fuel spills and leaks have been associated with the Coast Guard facility. In addition, military landfills (abandoned and active), military barrel storage areas (abandoned), and an extant golf course produce leachates that could potentially enter the Buskin River, which discharges immediately north of Womens Bay.

Within two miles of the Kodiak town site, is a seafood reduction plant that has created air and water pollution problems in the past. The plant has been taken over by the City of Kodiak and renovated. The city has applied for a special use permit, but delayed signing it. The plant has allegedly violated conditions of an Environmental Protection Agency National Pollution Discharge Elimination System permit and enforcement action is currently pending by that agency.

Womens Bay supports a herring fishery which resulted in landings of 95.9 tons in 1984. Dungeness crab commercial and subsistence fisheries also occur in the bay. The bay provides habitat for large numbers of king and tanner crab as well as shrimp and several species of salmon. It is used as a staging area by waterfowl and as a wintering area by seaducks. Several seabird colonies occur on islands within Womens Bay and have been monitored by various Fish and Wildlife offices.

Although the fishery resources appeared healthy and there were no strong signs of toxic discharges in the bay, the division of Fish and Wildlife Enhancement identified Womens Bay as a site that required investigation for contaminants. In late August, Fish and Wildlife Enhancement biologists Rod Jackson and Brian Anderson, and Steve Albert collected 62 sediment samples and 58 samples of biota from Womens Bay. These were sent to the Patuxent Analytical Control Facility for analysis, but the results are not expected back for perhaps another year.

A plume of seafood wastes can be observed from the Kodiak Reduction, Inc. plant at Gibson Cove. (2/87, TJE).

Moss Landing Laboratory biologist Peter Slattery loads hydraulic jet equipment on skiffs off Afognak Island where the lab is studying relationships between clams and sea otters. (10/87, MLN).

7. Grazing

The only grazing permit issued was for Bear and Harvester Islands in Ugak Bay, Kodiak Island. This permit covers 430 acres on the two islands with total cattle not to exceed 30. In 1987, recruitment was six and three bulls were butchered for a year end total of 21 head. Both islands have been selected by a Native Corporation and the State of Alaska; therefore, active range surveys are not warranted, especially with the small number of cattle being grazed.

Late in 1986, a new house was constructed by the permittee on Harvester Island. This was done without our permission and contacts were made to determine the use and nature of the structure. Both the State and Natives who have selected the island have no objection to the structure, provided that total square footage of all buildings does not exceed that originally permitted. The permittee plans to remove two older deteriorating buildings.

A new house was recently constructed on Harvester Island, near Kodiak Island, where refuge lands are used for cattle grazing. (9-87, TJE).

12. Wilderness and Special Areas

On October 23, 1970, the islands of: Forrester (2,832 acres), Hazy (32 acres), St. Lazaria (64 acres), and Chisik (Tuxedni subunit) (5,597 acres) were designated wilderness areas in the unit.

In January 1986, the Office of Hearings and Appeals ruled that the trespass cabins on the wilderness area of Chisik Island must be removed. One structure, claimed by a commercial fisherman, was ruled to be owned by the government.

We informed the owners of the cabins that they had until the fall of 1987 to remove their structures. None were removed, but a request for placement of offshore structures was made to the State, adjacent to each cabin. These applications are still pending and we are awaiting a final ruling prior to destroying the trespass structures.

In November, we destroyed the government-owned cabin in the area. This operation was supported by the Tiglax. The entire structure was torn down and hauled to Homer and placed in the landfill.

Crews from Alaska Maritime National Wildlife Refuge and Kenai National Wildlife Refuge get ready to remove unauthorized cabins at Chisik Island. (11/87, TJE).

Refuge crews dismantle trespass cabin at Chisik Island. (11-87, TJE).

G. WILDLIFE

1. Wildlife Diversity

This is the only unit on the refuge which supports a population of forest birds. No other unit has forest habitat.

2. Endangered and/or Threatened Species

Occasional individuals of the endangered or threatened subspecies of the peregrine falcon may visit the area during migration.

3. Waterfowl

Migrating and wintering waterfowl are abundant around the Pye Islands, Afognak Island, Womens Bay at Kodiak Island and in the Barrens. Canada and white-fronted geese as well as brant visit the Barrens in migration. Populations of common eiders and white-winged scoters can be found in waters around Duck and Chisik islands.

4. Marsh and Water Birds

Little breeding habitat for loons and grebes exists, except for Ushagat Island in the Barrens. Many such birds winter around the Pyes, Chiswells, Barrens, and off Kodiak.

Cormorants. This year we found 29 pairs of pelagic cormorants and a pair of red-faced cormorants at Gull island. The pelagics produced an average of 1.96 chicks per nest. By contrast, 111 pairs of pelagics and 14 red-faced were counted in 1986. No attempt was made to census cormorants at Chisik and Duck islands, but one double-crested nest was seen in our kittiwake plots. Within the inner Chiniak Bay colonies, 372 pelagic nests were counted in 1987 compared to 466 the year before. There were 96 red-faced nests in the same area in 1987.

Storm-petrels. East Amatuli Island was visited June 19 to 30, to determine nesting attempts and continue banding studies of fork-tailed storm-petrels. Our field crew experienced extremely foul weather. Some rain occurred every day during our trip causing many burrows to be flooded. This year a total of 670 burrows were searched at eight sub-colonies. Active burrows ranged from 9.4 percent to 24.5 percent. The mean percent of active burrows was considerably lower than in previous years which could be partly attributed to flooded burrows and generally stormy weather. Fledgling success was determined from a visit September 8 to 15. The percent of previously active burrows that produced young among the eight sub-colonies ranged from 0 to 17.8 percent.

Nishimoto and Beringer monitor fork-tailed storm-petrels from marked burrows at East Amatuli Island. (6-87, DRN).

5. Shorebirds, Gulls, Terns, and Allied species.

Many species of shorebirds utilize the islands, especially Ushagat, during migration. Oystercatchers nest on nearly all of the islands.

Terns. In August, a local resident brought in a dead banded royal tern that was recovered by his dog. This band was forwarded to the Bird Banding Laboratory. Records from the banding laboratory indicate that this bird was banded in Virginia! It is believed to be the first record of this species in Alaska.

Glaucous-winged gulls. On Gull Island, Kachemak Bay, 296 nests were located on June 18. In this search we found 73.0 percent of the nests with at least 1 egg or chick. This year's number closely resembles that of last year when 286 nests were found with 80.2 percent containing at least one egg.

Murres. The sub-colony on Murre Rock (part of the Gull Island colony) was photographed as in past years as a way of monitoring gross changes in this colony. The common murres are located at the top of this rock and most of the sub-colony can only be viewed by climbing on another island. Frequent counts cannot be made without disturbing other seabirds.

Puffins. We continued to monitor tufted puffins on East Amatuli Island by searching burrows along four transects. Total burrow counts ranged from 0.3/m2 to 0.26/m2. It was difficult to estimate the percent of occupied burrows because heavy rains and strong winds had removed most signs of puffin use.

Black-legged kittiwakes. At Gull Island, Kachemak Bay, we censused eight cliff plots including 300 nests. However, only nine chicks were produced. This was the first time the colony failed in the four years it has been monitored. The stormy conditions in June may have affected these birds. At nearby Sixty-Foot Rock, kittiwakes were censused by a total colony count, but no chicks were produced. We censused seven cliff plots at Chisik and Duck islands on two trips. On July 10, 626 nests from seven plots were counted, which was about half of the number found in 1986. On August 21, we returned to find a total failure of this colony. No chicks were found in the plots or anywhere on the islands or surrounding waters.

The black-legged kittiwake colony at Duck Island (foreground) failed in 1987. (8-87,MLN).

Black-legged kittiwakes nest on this interesting sea stack near Duck Island. (8-87,MLN).

Several hundred black-legged kittiwakes were found sitting on the water at Chisik Island after failing to nest successfully.(7/87, MLN).

Nysewander and Beringer assisted in censusing seabirds at Chisik Island. (7-87, MLN).

6. Raptors

Bald eagles nest on many of the islands. Peregrine falcon eyries have been found in the Pyes, Chiswells, Barrens, and Forrester Island.

7. Passerines

Common ravens, four species of sparrow (golden-crowned, fox, song, and savannah), and two species of swallow (violet-green and bank) are commonly seen on most of the islands.

8. Game Mammals

Black bears wander onto the Pye Islands, while brown bears periodically visit Delphin and Discoverer islands, Latax Rocks and other islands near Afognak and Kodiak. Sitka deer inhabit Delphin and Discoverer islands.

9. Marine Mammals

Sea otters and harbor seals are common around the Barren Islands. Sugarloaf Island in the Barrens, Outer Island in the Pye Islands, and Forrester Island contain major sea lion rookeries. Minor haulouts are found on the Latax Rocks, Sea Otter Island, and on other islands.

Sea otters are commonly observed along the southeast side of Kachemak Bay. (8-87.MLN).

15. Animal Control

A five person field team stayed on Ushagat Island, one of the Barren Islands, from June 12 to 29 to eradicate arctic foxes by trapping. According to Bureau of Land Management files, 21 foxes were released on Ushagat in 1928.

Although it was obvious that the density of foxes was low since none were seen on earlier visits to the island, it appeared that more than 50 years of predation by introduced fox had exacted a heavy toll on breeding waterfowl, shorebirds, ptarmigan and probably some species of seabirds and passerines. Despite excellent waterfowl habitat in several areas, no breeding ducks have been noted. Likewise, excellent beaches were devoid of black oystercatchers, semipalmated plovers, and other breeding shorebirds.

Between June 13 to 28, 89 no. 1-3/4 leghold traps were set at 69 sites around most of the island. Despite being on the island for 18 days with five people, no fox were seen or heard except at trap sites, and only seven animals were killed. All foxes were trapped, except one female which responded to a predator call at a den site, and was shot. Trapping was severely hampered by stormy weather. Next spring, follow-up trapping will be needed.

H. PUBLIC USE

1. General

Most public use in this unit occurs as wildlife observation from offshore waters. There are several charter boat services that offer tours from Sitka, Seward, and Homer, specifically to observe seabird populations on Alaska Maritime National Wildlife Refuge lands.

This year the British Broadcasting Corporation visited St. Lazaria Island to film a portion of their documentary "The Paradise Land". Eight one-hour long programs are being planned to depict North America as the first European explorers encountered it. This series will be aired in late 1989 or the spring of 1990.

17. Law Enforcement.

See Homer office section.

I. EQUIPMENT AND FACILITIES.

4. Equipment Utilization and Replacement

See Homer office section.

5. Communications Systems.

See Homer office section.

J. OTHER ITEMS

2. Other Economic Uses

The tanker M/V Glacier Bay transporting Prudhoe Bay crude oil from Valdez to a refinery in Nikiski, collided with a rock near the mouth of the Kenai River on July 2, 1987. The collision cracked the ship's hull causing a 125,000 gallon oil spill in Cook Inlet. Floating oil and debris concentrated in tidal rips at the center of the inlet. Oil and debris also washed ashore on both sides of the inlet and on Kalgin Island. The vessel is owned by the Trinidad Shipping Company. It was chartered by Standard Production Company, a division of Standard Oil, to deliver more than 16 million gallons of North Slope crude to the Tesoro refinery in Nikiski. No records of oiled bird carcasses were kept by oil spill clean-up crews. However, an Alaska Department of Environmental Conservation employee estimated that there were about three to four dozen dead oiled birds observed on beaches in Cook Inlet. Unidentified gulls were the most numerous species; unidentified ducks were also common. The small effect of this spill on seabirds is due to several circumstances. The oil did not get to the lower inlet where 28,000 black-legged kittiwakes, 22,500 common murres, and 6,000 horned puffins breed in the Tuxedni Subunit of the refuge (Chisik and Duck islands). Tule white-fronted geese were not affected even though a large portion of this subspecies breeds in marshes on the west side of Cook Inlet. The spill also did not occur during spring or fall, when large numbers of waterfowl stage on the mudflats of Cook Inlet. The spill probably had the greatest impact on the commercial salmon fishery. There were estimates of 50,000 to 75,000 tainted salmon which represents a loss of $80,000 to $120,000 to local fishermen. An emergency closure of the fishery may have cost fishermen another $1.5 million in potential revenue.

3. Items of Interest

See Homer office section.

4. Credit

This section was written by Nishimoto and Beringer, edited by Early and Nysewander, typed by Fellows and Honsowetz.

CHUKCHI SEA UNIT

ALASKA MARITIME NATIONAL WILDLIFE REFUGE

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F. HABITAT MANAGEMENT

1. General.....Nothing to report
2. Wetlands.....Nothing to report
3. Forests.....Nothing to report
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6. Other Habitats.....Nothing to report
7. Grazing.....Nothing to report

F. HABITAT MANAGEMENT continued

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10. Pest Control.....Nothing to report
11. Water Rights.....Nothing to report
12. Wilderness and Special Areas.....Nothing to report
13. WPA Easement Monitoring.....Nothing to report

G. WILDLIFE

1. Wildlife Diversity.....Nothing to report
2. Endangered and/or Threatened Species.....Nothing to report
3. Waterfowl.....Nothing to report
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6. Raptors.....Nothing to report
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10. Other Resident Wildlife.....Nothing to report
11. Fisheries Resources.....Nothing to report
12. Wildlife Propagation and Stocking.....Nothing to report
13. Surplus Animal Disposal.....Nothing to report
14. Scientific Collections.....7
15. Animal Control.....Nothing to report
16. Marking and Banding.....Nothing to report
17. Disease Prevention and Control.....Nothing to report

H. PUBLIC USE

1. General.....7
2. Outdoor Classrooms-Students.....Nothing to report
3. Outdoor Classrooms-Teachers.....Nothing to report
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5. Interpretive Tour Routes.....Nothing to report
6. Interpretive Exhibits/ Demonstrations.....Nothing to report
7. Other Interpretive Programs.....Nothing to report
8. Hunting.....8
9. Fishing.....Nothing to report
10. Trapping.....Nothing to report
11. Wildlife Observation.....Nothing to report
12. Other Wildlife Oriented Recreation.....Nothing to report
13. Camping.....Nothing to report
14. Picnicking.....Nothing to report

H. PUBLIC USE continued

15. Off-Road Vehicling.....Nothing to report
16. Other Non-Wildlife Oriented
    Recreation.....Nothing to report
17. Law Enforcement.....8
18. Cooperating Associations.....Nothing to report
19. Concessions.....Nothing to report

I. EQUIPMENT AND FACILITIES

1. New Construction.....9
2. Rehabilitation.....Nothing to report
3. Major Maintenance.....Nothing to report
4. Equipment Utilization and
   Replacement.....9
5. Communications Systems..... 9
6. Computer Systems.....Nothing to report
7. Energy Conservation.....Nothing to report
8. Other.....Nothing to report

J. OTHER ITEMS

1. Cooperative Programs.....Nothing to report
2. Other Economic Uses.....Nothing to report
3. Items of Interest.....9
4. Credits.....9

K. FEEDBACK

INTRODUCTION

Chukchi Sea Unit

Alaska Maritime National Wildlife Refuge

The Alaska Maritime National Wildlife Refuge (Maritime Refuge) was created by the Alaska National Interest Lands Conservation Act in 1980. It was established to conserve fish and wildlife populations and habitats in their natural diversity, fulfill international fish and wildlife treaty obligations, provide opportunities for continued subsistence uses by local residents, provide a program of national and international scientific research on marine resources and 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 through most of coastal Alaska and extend from Forrester Island in Southeast Alaska along the Gulf of Alaska to the Aleutian Islands and northward until near Barrow in northwest Alaska. There are over 3,000 islands, islets, and pinnacle rocks within the refuge which are used annually by millions of seabirds of at least 30 species. The Maritime Refuge has five units with all former refuges in designated subunits.

Lying primarily north of the Arctic Circle, the Chukchi Sea Unit includes scattered areas extending from just west of Point Barrow to just north of the Bering Strait. Unlike other units of the Alaska Maritime Refuge, this unit includes mainland areas. Habitats range from low, sandy barrier islands in the Arctic Ocean to high, rocky spires in the western Brooks Range.

Nearly half a million kittiwakes and murres breed on cliffs at Cape Lisburne and Cape Thompson; these are the most spectacular concentrations of seabirds on the unit. Chamisso and Puffin islands in Kotzebue Sound are the largest island colonies in the unit. An extra-limital population of black guillemots, a species which normally is found in the north Atlantic, extends as far south as Cape Thompson and may be increasing. The most common species of bird nesting on the low barrier islands between Cape Lisburne and Point Barrow is the common eider. One of the refuge islands, Solivik Island, has the largest eider colony in the Chukchi Sea (>500 birds).

Up to several hundred walruses haul out annually at Cape Lisburne when the sea ice recedes well offshore. In winter, polar bears occur at Cape Lisburne. Terrestrial mammals include grizzly bear, musk ox, wolverine, moose, Dall sheep and caribou. Thousands of caribou from the Western Arctic Caribou Herd congregate near Cape Lisburne in a summer post-calving aggregation.

A. HIGHLIGHTS

Black-legged kittiwakes and thick-billed murres had good reproduction at Cape Lisburne and Chamisso. (Section G.5).

U.S. Air Force blasting at Cape Lisburne quarry was monitored and improved permit restrictions implemented. (Section G.1).

Cleanup of the Atomic Energy Commission debris at the Project Chariot site near Cape Thompson is proceeding. (Section E.7).

B. CLIMATIC CONDITIONS

Data from the National Weather Service station at Kotzebue probably best represents weather conditions for the Chukchi Sea Unit. The year was warmer than average with nine months having departures from average above normal (Table 1). Some meterologists feel the Chukchi Sea is undergoing a long term warming trend and 1987 seems to support that prediction. Such a trend could have quite an effect on marine wildlife in particular, because the Chukchi Sea is covered by ice for most of the year. Entirely different biological regimes are associated with the ice and any change in ice conditions from year to year directly affects prey available to seabirds and marine mammals.

Table 1. Temperatures at Kotzebue, 1987.

Month	Average Temp. (F)	Departure from Average (F)
Jan	-2.0	+1.0
Feb	-0.4	+5.7
Mar	4.2	+4.8
Apr	7.8	-4.5
May	32.7	+1.1
Jun	47.9	+4.1
Jul	56.6	+3.5
Aug	53.6	+2.9
Sep	37.8	-3.3
Oct	30.8	+7.1
Nov	5.5	-2.2
Dec	-2.6	+1.2

D. PLANNING

1. Master Plan

See Homer office section.

2. Management Plan.

See Homer office section.

4. Compliance with Cultural Resource Mandates

Archaeological Services, a cultural resources contracting firm from Pennsylvania, investigated the Pingasagruk archaeological site at Point Franklin, Chukchi Sea Unit, in 1986 (Contract No. 14-16-0007-86-6612). A draft report on this project is expected in 1988.

The site, parts of which are at least 500 years old, is probably eligible for inclusion in the National Register of Historic Places. It is also subject to substantial erosion. After a major storm in October, personnel from Archaeological Services were able to revisit the site, and were pleased to find that damage from that storm had been less than anticipated. The principal investigators have expressed an interest in excavating this site, and are seeking funding through other agencies.

E. ADMINISTRATION

1. Personnel

See Homer office section.

2. Youth Programs

See Homer office section.

4. Volunteer Program

See Homer office section.

5. Funding

See Homer office section.

6. Safety

See Homer office section.

7. Technical Assistance

On September 15, 1987, Sowls accompanied two people from the Corp of Engineers to Cape Thompson as part of the review of plans for cleaning up the "Project Chariot" site. Project Chariot was an Atomic Energy Commission study in the 1960's to determine if the site was appropriate for blasting a harbor with a nuclear detonation. The blast never occurred and the site was abandoned, leaving toxic materials (asbestos, oil and other petroleum products) as well as buildings and equipment. The Corp of Engineers, using superfund toxic cleanup monies, is preparing specifications for the cleanup which should start in 1988 or 1989. Cape Thompson has large seabird colonies, nesting raptors (including peregrine falcons in some years), grizzly bears, musk ox, and moose. The cleanup must occur without causing harm to the wildlife, habitat, or aesthetics of the area.

Abandoned "Project Chariot" site near Cape Thompson is planned for cleanup in 1988 or 1989. (9/87-194, ALS).

8. Other

Table 1. Special use permits issued, 1987.

Permittee	Location	Purpose
U.S. Army, Corps of Engineers	Cape Thompson	Toxic waste cleanup
Midnight Sun Adventures	Cape Thompson and Lisburne	Tours and big game guide
UNOCAL	Cape Thompson and Lisburne	Geologic sampling
U.S. Army, Corps of Engineers	Cape Lisburne	Rock for riprap
Shell Western	Cape Thompson and Lisburne	Photo tour
Greg Reinhardt	Point Franklin	Archaeological research

G. WILDLIFE

Wildlife monitoring was done by the refuge at Cape Lisburne, Chamisso, and Puffin Island during 1987. Work at Cape Lisburne was a combination of our annual monitoring and an effort to monitor blasting effects on wildlife from the United States Air Force quarry site on refuge lands. The Chamisso and Puffin island monitoring was the third visit on a once every five year schedule.

5. Shorebirds, Gulls, Terns, and Allied Species

At Cape Lisburne, population levels of thick-billed murres and black-legged kittiwakes appear to be remaining stable. Also, reproduction of kittiwakes was very good. Kittiwake clutch size was 1.55 and very little mortality had occurred when our monitoring ceased a week or two before fledging. At that time, there were still 1.26 eggs or chicks per nest.

At Puffin and Chamisso islands, productivity was also good. Kittiwakes had about .9 chicks per nest. This was the best production ever observed here and good kittiwake production for Alaska. Numbers of birds were up 15 percent and numbers of nests were up 6 percent from 1981. In 1981, the previous year

of censusing, it was nearly complete reproductive failure for kittiwakes. It was good to see that kittiwakes had not drastically declined and could produce young at Puffin Island.

Horned puffin numbers at Chamisso appear to be steadily declining since the first counts were made. High counts have declined from 2,083 in 1977, 1,387 in 1981, and 552 in 1987. The once-every-five year monitoring schedule for Chamisso and Puffin islands may need to be reconsidered in favor of a more intensive monitoring since puffin numbers seem to be declining.

Thousands of thick-billed murres are censused as part of the seabird monitoring program at Cape Lisburne. (7/87 - 19D, ALS).

Horned Puffins at Puffin Island. Erosion of soil may be degrading the puffin burrowing habitat. (8/87 - 19B, ALS)

8. Game Mammals

A single small bull moose was seen on Chamisso Island. This animal most likely came over to the island from the Choris Peninsula on the winter ice. This is the only known report of moose on Chamisso.

9. Marine Mammals

A young male sea lion was seen hauled out on a small rock at Cape Lisburne on July 20. Sightings of sea lions this far north are very rare and are usually of males. In July, walrus were seen at the Cape. In previous years over 300 walrus have been seen, but since attendance patterns vary greatly from day to day and year to year (depending on ice conditions, etc.), the smaller numbers seen the last two years does not indicate any real decline in walrus numbers.

At Chamisso and Puffin islands a maximum of 12 seals were seen. This was about the same as seen in 1977 and 1981.

Walrus periodically haul out at Cape Lisburne during the summer. (8/87-3A5 ALS).

14. Scientific Collections

At Cape Lisburne, Roseneau and Sowls collected four plankton samples for a measure or relative productivity for Dr. Alan Springer who is doing studies of oceanography in the Chukchi Sea as part of the Inner Shelf Transfer and Recycling program of the University of Alaska.

Roseneau and Sowls also collected 12 common murres, 26 thick-billed murres, and 18 black-legged kittiwakes off Cape Lisburne. The objectives of these collections are to examine changes in food habits of breeding seabirds at Cape Lisburne and in the size-at-age of the principal species of fishes consumed by seabirds, and to relate these changes to variability in the physical and biological environment.

H. PUBLIC USE

1. General

The Chukchi Sea Unit of the Alaska Maritime National Wildlife Refuge consists of wild remote areas. Since it is even rare for refuge staff to visit some of the refuge lands even once a decade, our data on visitation is poor. It is clear, however, that few, if any tourists normally visit these areas.

In 1987 two sea kayakers traveled from Kotzebue to Point Barrow, visiting Cape Thompson and Lisburne on their way. With the tremendous increase in popularity of sea kayaking, the refuge might expect an increase in such high adventure tourists in the future.

Kayakers paddling offshore from Cape Lisburne. (8/87-3A5, ALS).

8. Hunting

In 1987, a permit was again issued to Phil Driver, a registered hunting guide. He did no big game hunting in units of the Alaska Maritime Refuge except repeated aerial wolf trapping from mid-March to mid-April. He did not take any wolves or other furbearers.

The lone small bull moose observed on Chamisso Island survived through the hunting season, although sport hunters from Kotzebue tried hard to get it.

17. Law Enforcement

See Homer office section.

I. EQUIPMENT AND FACILITIES

1. New Construction

See Homer office section.

4. Equipment Utilization and Replacement

See Homer office section.

5. Communications Systems

See Homer office section.

J. OTHER ITEMS

3. Items of Interest

See Homer office section.

4. Credits

The report was written by Sowls, edited by Early and Nysewander, and typed by Honsowetz.

BERING SEA UNIT

ALASKA MARITIME NATIONAL WILDLIFE REFUGE

Homer, Alaska

ANNUAL NARRATIVE REPORT

Calendar Year 1987

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

REVIEW AND APPROVALS

ALASKA MARITIME NATIONAL WILDLIFE REFUGE

Homer, Alaska

ANNUAL NARRATIVE REPORT

Calendar Year 1987

_____	_____	_____	_____
Refuge Manager	Date	Refuge Supervisor Review	Date

_____	_____
Regional Office Approval	Date

INTRODUCTION

The Bering Sea Unit

Alaska Maritime National Wildlife Refuge

The Alaska Maritime National Wildlife Refuge (Maritime Refuge) was created by the Alaska National Interest Lands Conservation Act in 1980. It was established to conserve fish and wildlife populations and habitats in their natural diversity, fulfill international fish and wildlife treaty obligations, provide opportunities for continued subsistence uses by local residents, provide a program of national and international scientific research on marine resources and 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 through most of coastal Alaska and extend from Forrester Island in Southeast Alaska along the Gulf of Alaska to the Aleutian Islands and northward until near Barrow in northwest Alaska. There are over 3,000 islands, islets, and pinnacle rocks within the refuge which are used annually by millions of seabirds of at least 30 species. The Maritime Refuge has five units with all former refuges in designated subunits.

The Bering Sea Unit includes far-flung islands and headlands between the Aleutian Islands and the Bering Strait. Although the topography varies from small sandy islands, like the Sand Islands off the Yukon Delta, to large volcanic islands, like St. Matthew, the areas all provide habitat for nesting seabirds. Marine mammals also occupy many of the sites.

Some of the most serious potential threats to the seabirds and marine mammals are related to oil development in the outer continental shelf. Not only can oil spills cause decimation of the birds and their food chain, but increased activities from airplanes, boats, and people in these relatively undisturbed areas may adversely affect marine animals.

Long-term refuge objectives include establishing a seabird monitoring scheme that involves all the major species and which is of sufficient intensity to detect population changes of 20 percent or greater with 90 percent confidence, and also to measure annual changes in reproductive success. In addition, we should be able to identify the major causes of change. This will require a cooperative effort with other divisions in the Service, other federal, state, and local government agencies, and private organizations. In 1987 monitoring was conducted at two sites; the Pribilof Islands (refuge personnel), and Bluff (University of Alaska personnel under contract to the refuge).

There are significant opportunities for interpretive programs in the unit, particularly in the Pribilof Islands where several thousands of natural history oriented tourists visit each summer. Also, environmental education opportunities exist at schools in the Pribilof Islands, and at some of the villages in Norton Sound which occur near refuge seabird colonies.

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3. Forests.....Nothing to report
4. Croplands.....Nothing to report
5. Grasslands.....Nothing to report
6. Other Habitats.....6
7. Grazing.....7

F. HABITAT MANAGEMENT (cont.)

8. Haying.....Nothing to report
9. Fire Management.....Nothing to report
10. Pest Control.....Nothing to report
11. Water Rights.....Nothing to report
12. Wilderness and Special Areas.....Nothing to report
13. WPA Easement Monitoring.....Nothing to report

G. WILDLIFE

1. Wildlife Diversity.....Nothing to report
2. Endangered and/or Threatened Species.....9
3. Waterfowl.....Nothing to report
4. Marsh and Water Birds.....9
5. Shorebirds, Gulls, Terns and Allied Species.....11
6. Raptors.....Nothing to report
7. Other Migratory Birds.....Nothing to report
8. Game Mammals.....Nothing to report
9. Marine Mammals.....Nothing to report
10. Other Resident Wildlife.....Nothing to report
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H. PUBLIC USE

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9. Fishing.....Nothing to report
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12. Other Wildlife Oriented Recreation.....Nothing to report
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14. Picnicking.....Nothing to report

H. PUBLIC USE (cont.)

15. Off-Road Vehicling.....Nothing to report
16. Other Non-Wildlife Oriented
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17. Law Enforcement.....Nothing to report
18. Cooperating Associations.....Nothing to report
19. Concessions.....Nothing to report

I. EQUIPMENT AND FACILITIES

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Replacement.....17
5. Communications Systems.....17
6. Computer Systems.....17
7. Energy Conservation.....Nothing to report
8. Other.....Nothing to report

J. OTHER ITEMS

1. Cooperative Programs.....Nothing to report
2. Other Economic Uses.....Nothing to report
3. Items of Interest.....17
4. Credits.....17

K. FEEDBACK

A. HIGHLIGHTS

Kittiwakes had relatively poor reproductive success in the Pribilof Islands, but at Bluff the success was relatively good. (Section G.5).

Counts in the Pribilof Islands continue to suggest kittiwake and murre populations may be declining (except common murres at St. George which show no clear trend). (Section G.5).

Range survey of Hagemeister Island indicates reindeer are overgrazing the island. (Section F.7).

B. CLIMATIC CONDITIONS

The spring and summer of 1987 were relatively warm in the Pribilofs (Table 1). Spring temperatures may have a profound impact on the timing of breeding events of various species on the refuge. In 1987 red legged kittiwakes on both of the Pribilof Islands initiated nests earlier than average, as did black-legged kittiwakes on St. Paul Island.

The timing of nesting events at Nome, near Bluff, was somewhat earlier than average.

Table 1. Temperatures at St. Paul Island, 1987.

Month	Average Temp. (F)	Departure from average (F)
Jan	27.4	1.1
Feb	27.9	6.0
Mar	29.4	6.0
Apr	29.5	1.8
May	36.6	1.8
Jun	42.9	2.0
Jul	47.7	2.0
Aug	49.4	2.0
Sep	43.5	1.0
Oct	38.5	1.0
Nov	28.1	-5.2
Dec	25.9	-2.3

Table 2. Temperatures at Nome, 1987.

Month	Average Temp. (F)	Departure from average (F)
Jan	6.1	0.3
Feb	10.5	7.2
Mar	16.8	9.5
Apr	18.6	-0.3
May	37.0	2.2
Jun	49.1	3.6
Jul	53.1	2.9
Aug	52.3	3.2
Sep	38.9	-3.2
Oct	33.3	4.8
Nov	11.9	-3.8
Dec	4.4	0.1

D. PLANNING

1. Master Plan

See Homer office section.

2. Management Plan.

See Homer office section.

5. Research and Investigations

AMNWR-NR87. Monitoring disturbance to seabirds from harbor construction and other activities at St.Paul Island.

Anne Harfenist, City of St. Paul, St. Paul Island.

Ref: Harfenist, Anne 1987. The productivities and population sizes of cliff-nesting seabirds near the City of St. Paul, Alaska. Draft report.

This study was the fourth consecutive year of observations of seabirds near the City of St. Paul, designed to determine if harbor construction or other man-caused activities were causing damage to seabird populations. Since the report is still in draft form, it would be improper to summarize the conclusions here, nevertheless, we were allowed to use data from city plots to supplement the refuge's monitoring effort in the Pribilofs. The fact that the city continues to monitor seabirds near the harbor site is an impressive example of local concern for wildlife resources. Unfortunately, it appears unlikely St. Paul will continue monitoring in 1988.

AMNWR-NR87, Behavior of least auklets at St. Paul Island, Alaska (74500-BSU-49207).

Ian Jones, Graduate Student, Queen's University, Kingston, Ontario.

Ref: Jones, I. 1987. Research on the behavior of auklets, St. Paul Island 1987. A report prepared for the Alaska Maritime National Wildlife Refuge.

Mr. Jones is interested in social signals of auklets, and the theoretical aspects of his research deal with evolution of behavior. Management aspects of his work addressed colony attendance patterns, identification of age classes from plumage criteria, timing of breeding activities, and the use of observations of marked birds carrying food to young to estimate breeding success. Although 1987 was only the first of three seasons of research, results suggest ways to improve monitoring techniques for this important species.

AMNWR-NR87. Seabird monitoring at Bluff

Ed Murphy, Institute of Arctic Biology, University of Alaska, Fairbanks.

Ref: Schauer, J.H. 1987. The 1987 Field Studies of Seabirds at Bluff, Alaska - A preliminary report.

Kittiwakes and murres were censused on plots as has been done in previous years. Numbers of black-legged kittiwakes were down slightly on the plots since last year but were still the second highest counts since 1979. Kittiwake counts of the entire colony were the highest made since censuses began in 1975. Murre counts on plots were also the highest since counts were started in 1979. Productivity information was also gathered on kittiwakes, murres, and cormorants and will be discussed further in the final report.

AMNWR-NR87 Differences in breeding success of common murres based on nesting density.

Jay Schauer, University of Alaska, Fairbanks.

Ref: Schauer, J. H. 1987. Factors Affecting Reproductive Success of Common Murres at Bluff, Alaska - A Report Prepared for the Alaska Maritime National Wildlife Refuge.

Reproductive success among common murres may be influenced by a number of factors, including location of nest site and number of breeding neighbors. Data was collected for nest sites

including dates of egg-laying, hatching, fledgling, egg or chick loss, and similar data for re-laid eggs. In addition, the number of breeding neighbors and the "security" of the nest site was recorded. It is these three variables - number of breeding neighbors, nest site descriptor, and plot - that are being examined for influence on reproductive success. This project is a masters thesis and data analysis is still proceeding.

AMNWR-NR87. Energetics of kittiwakes and murres: density dependent factors.(74500-BSU-49208)

George Hunt, University of California, Irvine.

Ref: Hunt, G.L. Jr. 1987. Effect of Colony Size on Seabird Reproductive Performance and Energetics. Research Cruise Rept. R/V Alpha Helix - Cruise #102

The objectives of this National Science Foundation funded project were to do pelagic surveys and colony studies. The pelagic work was to examine the distribution of foraging by seabirds and the prey items used by these birds.

Colony studies included measuring indicators of reproductive performance such as chick growth rates, fledgling weight, and age. Also energetic cost for adults in raising young was studied.

Hunt and his staff established plots on St. Paul and St. George Islands to study the reproductive ecology of thick-billed murres, but they studied black-legged kittiwakes only on St. Paul. A failure in red-legged and black-legged kittiwake reproduction on St. George prior to their arrival prevented working with these species on that island. No red-legged kittiwakes nested in workable areas on St. Paul this year.

Using whatever bird species that were available on each island, Hunt and crew measured chick growth, food intake using tritiated water, feeding frequency, and brooding duration during behavioral watches of color-marked birds. They measured field metabolic rate of adult birds that were feeding chicks using the doubly-labeled water technique and collected concurrent behavioral information about their activity time budgets. Food value, type, and nutritional quality were sampled in adults and chicks by collecting regurgitations from kittiwakes, collecting adult murres, and collecting fish dropped by murres on ledges.

The pelagic work consisted of a series of radial transects in which bioacoustics were used to estimate food supplies and the transects were used to estimate seabird numbers at sea. Analysis of data is currently being done and field work should continue in 1988.

E. ADMINISTRATION

1. Personnel

See Homer office section.

2. Youth Programs

See Homer office section.

4. Volunteer Program

See Homer office section.

5. Funding

See Homer office section.

6. Safety

See Homer office section.

7. Technical Assistance

Byrd worked closely with Anne Harfenist, seabird monitor for the City of St. Paul to insure comparability of data.

8. Other

Special Use Permits were issued to Ian Jones for auklet research on St. Paul Island, to George Hunt for seabird research on the Pribilofs, to Exploration Holiday Tours to conduct tours on St. Paul Island and to David Parmalee to collect birds on the Pribilofs. In addition, The National Oceanic and Atmospheric Administration was issued a permit for tidal gauges on Hagemeister Island.

F. HABITAT MANAGEMENT

6. Other Habitats

As summarized in the 1986 report, the City of St. Paul was permitted to remove boulders from the refuge for breakwater construction. The boulders came from an old, overgrown talus slope on the refuge south of Antone Lake. The slope had probably once provided nesting habitat for crevice-nesting birds (e.g. least auklets, snow buntings, rosy finches), but due to weathering and subsequent encroachment by vegetation, which covered the slope, the area probably no longer provided nest sites. The city placed small boulders in the quarry area in hopes that the new habitat would provide nest sites for crevice nesting seabirds. Within the first summer (1986) rosy finches and snow buntings began to use the new habitat, and there appeared to be at least inspection by least auklets. In 1987, Anne Harfenist was able to confirm that least auklets were sitting upon the surface of the newly exposed rubble and nesting near the edge of the new area. It may be only a matter of time before more of the new talus is used.

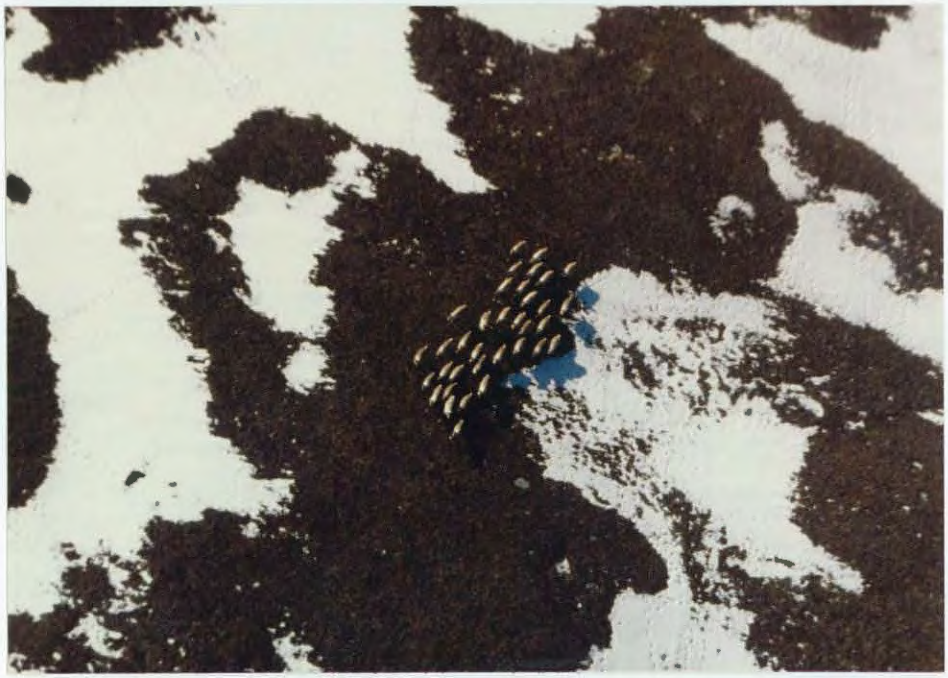
Rehabilitated talus habitat at Antone Lake, St. Paul Island. (6/87 - 186, ALS)

7. Grazing

On April 7, 1987, Lee Hotchkiss, Togiak National Wildlife Refuge, Ken Taylor with Alaska Department of Fish and Game at Dillingham and Sowls flew the annual reindeer survey of Hagemeister Island. The survey revealed a minimum of 773 animals present (Sowls, 1987). This was 123 more than in 1986 and over 323 animals over the permitted stocking rate of 450 reindeer. The reindeer were observed primarily on the wind blown tops of peaks where there was little or no snow cover. Surveys flown in other years revealed reindeer primarily in the valleys of the island.

The refuge entered into a cooperative agreement with the Soil Conservation Service to fund a range survey at Hagemeister Island in 1986, but because of poor weather, no field work was possible that year. Success was achieved in 1987 when a crew of six people were on the island from July 20 to July 24. The crew consisted of David Swanson, Daniel Laplant, and Steven Gregory, all from the Soil Conservation Service and Steve Talbott, Nils Talbott, and Sandy Looman of the Fish and Wildlife Service. Field efforts included 1) evaluating range condition and trend, 2) evaluating forage use by reindeer, and 3) identifying plants and collecting specimens. A report was completed in October (Swanson and LaPlant, 1987) documenting field efforts and giving an overview of reindeer grazing history from Fish and Wildlife Service files and providing grazing management options for the present range conditions. We chose the management option which would allow for the fastest possible lichen recovery in the shortest possible time, yet still allow a small reindeer herd of 50-100 animals. The herd would not require herding at any time and be maintained primarily for subsistence uses.

Hagemeister Island from the air. (4/87-18A, ALS).



Reindeer censuses are done from aerial counts and photographs taken of larger herds. (4/87 - 3E2, ALS).

G. WILDLIFE

The information summarized in this section comes from reports mentioned in the Planning Section (e.g. Harfenist 1987, Jones 1987, Schauer 1987,) and a summary report for the refuge monitoring program in the Pribilof Islands (Byrd, 1987. The status of ledge-nesting seabirds in the Pribilof Islands, Alaska, 1976-1987: An executive summary).

2. Endangered and or Threatened Species

In 1985 Fay and Sease reviewed the status of small mammals inhabiting Alaska's coastal islands for the endangered species office, United States Fish and Wildlife Service, Anchorage. The report indicated that the Pribilof shrew (*Sorex pribilofensis*) might be threatened, but that more information was needed to be learned about the animal before any action could be taken.

In 1986, we made an effort to learn what habitats the shrew occupied at St. Paul (Byrd and Mendenhall. 1986. Habitat use by the Pribilof shrew in summer). It was discovered that the shrew was found primarily in the tall-plant communities occurring in a relatively wide coastal band around the island.

In 1987 it was possible to give the project more effort and Norvell spent about one month live-trapping shrews in tall-plant communities. This appeared to confirm that shrews are widespread in the tall-plant habitats. They are particularly dense in communities dominated by beach rye. An analysis of obvious threats to the animals and their habitat revealed that there is little reason for immediate concern. Trapping was also conducted on St. George Island, but no shrews were found there. The report on this project is in preparation.

4. Marsh and Waterbirds

Northern fulmar. Information was gathered on this species only in the Pribilofs. Counts were slightly lower on monitoring plots at St. Paul and St. George than in 1986. There has been a great deal of variation in counts on these plots since 1976 when surveys began, but it appears there may have been a decline on St. George where most of the individuals occur.

Cormorants. At Bluff, pelagic cormorants did well with over 3 eggs per clutch and over 2.8 fledgling young per nest. For the Pribilof Islands, red-faced cormorants had the highest average clutch size so far (3.44 eggs/clutch). In spite of the excellent start, some egg loss and chick mortality reduced the reproductive output to 1.8 fledglings per nest, a rate similar to the past two years and higher than in the 1970s.

Red-faced cormorants are the common cormorant in the Pribilof Islands. (6/87-173, ALS).

Vern Byrd checking cormorant nests. (6/87-281, ALS).

5. Shorebirds, Gull, Terns, and Allied Species

Kittiwakes. The average number of eggs laid per pair of black-legged kittiwakes in 1987 was 1.8 eggs at St. Paul, but only 1.0 eggs at St. George. These values were at the high and low ends respectively of the overall range for all previous years.

Differences in reproductive success and overall productivity (the former being chicks that fledge per nest with eggs and the latter being fledglings per nest start) between St. Paul and St. George revealed moderate success at St. Paul but failure at St. George. Most of the loss of reproductive potential was at the egg stage. Indeed, there was relatively little chick

mortality in contrast to the past two years. It is possible that kittiwakes were unable to obtain sufficient food early in the nesting cycle to conduct normal nesting, but birds weathering that period seemed to be able to rear chicks relatively successfully. The rate of success for black-legged kittiwakes has failed to exceed 3 young in 10 nesting attempts for seven consecutive years in the Pribilof Islands after exceeding this rate in nearly every year from 1975 to 1980.

We have been concerned about chick mortality in the past, and as a result we had a pathologist as a volunteer (shared with National Marine Fisheries Service) so that he could examine dead chicks. There were very few dead chicks in 1987. Of three chicks examined by Dr. Spraker, two had food in their intestines suggesting starvation was not the cause of death. Cause of death was not apparent.

Counts of black-legged kittiwakes on monitoring plots in the Pribilofs were similar to 1986 at St. George, but lower than 1986 at St. Paul. Although there has been variation in annual counts, there appear to be fewer birds present on plots now than in 1976, the first year of counts.

At Bluff, black-legged kittiwakes had both a high population level and very good reproductive success. Kittiwakes were observed collecting nesting material beginning 16 June, the first egg was seen on 17 June, and the first chick was observed on 20 July.

Population counts on plots were the second highest ever recorded, and a boat survey of the entire colony was the highest ever recorded. Nesting success was very high, for an Alaskan colony with 0.684 chicks per nest being observed on study plots.

Red-legged kittiwakes have generally had even poorer success than black-legged kittiwakes in the Pribilofs. In 1987 they failed to fledge any young from the nests we monitored, and a similar result was found at St. George except for one area (High Bluffs). At High Bluff nearly one in three nests was successful, but the overall success for all areas at St. George was estimated to be less than 15 percent. There was little chick mortality, but many pairs failed to hatch eggs. With the exception of 1986, red-legged kittiwakes have failed to exceed two young produced per 10 nest starts since 1980. Before 1980 productivity usually exceeded three young per 10 nests. Counts of red-legged kittiwakes on monitoring plots were similar to 1986 totals at St. Paul and St. George. Nevertheless, the overall trend since 1976 is down. If the magnitude of the declines on plots is similar to that in the overall population,

there may be reason for concern about this species. This is especially true since most of the world's population nests in the Pribilof Islands.

Murres. Information gathered on common murres at Bluff indicated that 0.5 chicks fledge per first egg laid. There were also a number of relaid eggs by murres that lost their first egg. Population counts showed common murre numbers to be the highest since the population counts were started in 1979. Common murres apparently had slightly above average success in the Pribilofs in 1987 with overall reproductive success of 0.61 fledglings per egg at St. Paul and 0.75 fledglings per egg at St. George. Little chick mortality was recorded, at least partially due to the lack of severe storms during the chick-rearing period.

Thick-billed murres had about average success in the Pribilofs in 1987: 0.49 fledglings per egg at St. Paul and 0.65 fledglings per egg at St. George.

At St. Paul, counts of common murres declined substantially between 1976 and 1982. The species has remained relatively stable since. The opposite trend occurred at St. George between 1976 and 1982 with a substantial increase during the period. Since 1982, counts have steadily declined until 1987 when an increase was recorded. Overall patterns suggest a decline at St. Paul, but no obvious trend is seen at St. George.

Thick-billed murre populations since 1976 have all been lower than in that year. Substantial drops occurred between 1976 and 1982 on both St. Paul and St. George, but fluctuated thereafter. Numbers have remained relatively stable at both islands since 1984.

Auklets. Although data have not yet been analyzed, it appears that average counts of least auklets on plots at St. Paul were slightly higher than in the past three years. Much remains to be learned about how to interpret counts of auklets on the surface of talus nesting areas. Ian Jones' research (Section D.5) will help us develop better techniques to monitor this species.

Boulder beach habitat on St. Paul Island is used by nesting least auklets. (6/87-283, ALS).

High cliffs on St. Paul Island. Most seabird species nest on the cliff face. (6/87-188, ALS).

14. Scientific Collections

Dr. Eric Hoberg, a parasitologist at Oregon State University, has been doing research on intestinal parasites in alcids using the species assembledges to make inferences about the evolutionary history of alcids. He requested specimens of least, crested, and parakeet auklets from the Pribilofs. A total of at least seven parakeet and nine crested auklets were taken and sent to him. Once the parasites are removed, specimens will go to museums and food found in their stomach will go to the University of Alaska to await analysis if funds are available.

Hunt collected thick-billed murres, five common murres and three black-legged kittiwakes. These samples were studied for food mass, type, quality, and to help evaluate bioacoustic surveys done during radial transects by ship around the Pribilof Islands.

The refuge collected three least auklets, one thick-billed murre, and a horned puffin (beach found). These specimens will be freeze-dried for display in the Homer office as part of our expanding interpretive program.

Dr. David Parmalee of the University of Minnesota collected one red-faced cormorant, two rock sandpipers, two parakeet auklets and one rosy finch. He also collected the following eggs: four red-faced cormorant, one black-legged kittiwake, one parakeet auklet, one least auklet and six rosy finch.

H. PUBLIC USE

1. General

British Broadcasting Company visited St. Paul to film seabirds and another producer visited both St. Paul and St. George in preparation for filming another documentary.

M.P. Meyers, Vice President of National Audubon Society for Science and Sanctuaries, visited the Pribilofs to familiarize himself with our programs and the value of the refuge subunit as a sanctuary.

John Hawker, a professor from St. Louis College, was in the Pribilofs researching a book on animal behavior. He was interested in our studies, and filmed our field work.

Byrd was interviewed by film makers, The Flying Tomatoes, who are producing a documentary on wildlife of the Pribilof Islands. He was asked to explain the refuge monitoring program and status of seabirds in the islands.

7. Other Interpretive Programs

At the request of tour guides for Holiday Explorations Tours, Byrd put together a slide presentation to give to visitors at St. Paul. Byrd, Baggot, and Maule took turns giving the show to visitors, and the tour guides also presented the talk. The presentations were given three times a week during June, July, and August.

12. Wildlife Observation

From June through August 1987, Exploration Holiday Tours had about 1000 people visit the refuge at St. Paul for two to three days. The visitation was spread out evenly throughout the summer.

At St. George, the Tanaq Village Corporation ran four-day nature tours primarily in July and August. They had about 50 people participate in 1987.

I. EQUIPMENT AND FACILITIES

1. New Construction

The Pribilof "Terms and Conditions", an agreement signed by the Native Corporation and the Secretary of Interior, indicate corporations are to provide buildings for the refuge on one-acre leased administrative sites on each island. The refuge received preliminary drawings from realty on bunkhouse designs for St. George and St. Paul islands of the Pribilofs.

In July of 1987, the Service contacted Tanaq and Tanadgusix Corporations and submitted to them a preliminary design for a building that would meet our needs. Both corporations informed the Service that there are existing buildings on the islands that could be made available to us. It is now up to us to examine these buildings and determine whether or not they will suffice, and if so, what modifications will have to be made.

4. Equipment Utilization and Replacement

See Homer office section.

6. Computer Systems

In 1987 we used portable Corona computers in the Pribilofs for data storage and analysis. The machines and our "workhorse program" Dbase II, again performed admirably.

J. OTHER ITEMS

3. Items of Interest

See Homer office section.

4. Credits

The report was written by Byrd and Sowls, edited by Martin, Early, Hagglund, and Nysewander. Honsowetz typed the report.

Maintenance and upgrade of seismic telemetry stations.
U.S. Geological Survey, Adak Seismological Observatory. Personnel from the observatory (U.S. Navy and U.S. Geological Survey) visited Great Sitkin, Bobrof, Kanaga, Tanaga, Umnak, Kagalaska and Adak islands to maintain and upgrade seismic telemetry stations on each of the islands in support of continuing earthquake prediction studies.

6. Other

Refuge Manager Zeillemaker continued as the leader of the Aleutian Canada Goose Recovery Team until his transfer to Region 1 in May. The appointment of a new team leader would be delayed until next year as recovery was progressing satisfactorily and it was proposed that the goose be downgraded to threatened status. Items under consideration were discussed by telephone or handled by mail.

E. ADMINISTRATION

1. Personnel

1a. Michael F. Boylan, Refuge Manager, GS-12, PFT (EOD 1/3/88)
1b. C. Fred Zeillemaker, Refuge Manager, GS-12, PFT (Transferred 5/10/87)
2. Evan V. Klett, Assistant Refuge Manager, GS-11, PFT
3. Fredric G. Deines, Wildlife Biologist, GS-11, PFT (Transferred 5/24/87)
4. Thomas R. Edgerton, Outdoor Recreation Planner, GS-9, PFT
5. Donna A. Dewhurst, Assistant Refuge Manager-Amchitka Island, GS-9, PFT (EOD 6/7/87)
6. Sonja M. Boss, Clerk-Typist, GS-4, PFT
7. Cynthia L. Malcolm, Clerk-Typist, GS-3, PFT, (Resigned 6/14/87)
8. Robert P. Schulmeister, Maintenance Worker, WG-8, PFT
9. Greg T. McClellan, Biological Technician, GS-5, TFT Local Hire
10a. Marc A. Straub, Laborer, WG-2, Intermittent (EOD 8/3/87)
10b. Johnnie J. Curcuru, Laborer, WG-2, Intermittent (Resigned 6/13/87)
11. Kris Curran, SCA Naturalist Aid (1/16/87 - 4/10/87)
12. Kevin V. Reyor, SCA Biological Aid (1/16/87 - 12/22/87)
13. Peggy (NMN) Wood, SCA Biological Aid (1/16/87 - 4/10/87)
14. Daniel K. Niven, SCA Biological Aid (5/7/87 - 8/20/87)
15. Douglas R. Swartout, SCA Naturalist Aid (5/7/87 - 8/7/87)
16. James P. Fuller, SCA Biological Aid (5/21/87 - Present)
17. Martha H. Gillham, SCA Biological Aid (5/21/87 - 8/20/87)
18. Amy L. Snyder, SCA Biological Aid (5/21/87 - 9/4/87)
19. William L. Penning, SCA Biological Aid (6/10/87 - 10/1/87)
20. William D. Watson, SCA Biological Aid (6/25/87- 9/4/87)

Another permanent full time position was added to the AIU Staff

in 1987 with the addition of an ARM for Amchitka. This position is funded through the Navy and will be in effect for the two year construction period of the radar system on Amchitka. Donna Dewhurst, ARM, Mason Neck NWR, VA., was selected to fill the position and arrived in June.

Permanent Personnel: 9, 1b, 2, 3, 7, 4, 8, 10b.
#088601, GTM.

Table 4. AIU staffing, FY-1981 to FY-1987

Year	Permanent full time	Permanent part time	Temporary all categories	Total FTE's	Volunteers SCA	Volunteers Other***
FY-87	8	0	2*	8.6	10	5
FY-86	7	0	2*	7.1	4	3
FY-85	7	0	5**	10.8	4	3
FY-84	7	0	7**	10.5	3	5
FY-83	6	2	5**	11.0	4	5
FY-82	5	1	1	7.0	0	0
FY-81	7	1	1	9.0	0	0

* 1 local hire, 1 intermittent
** 1 local hire, 1 intermittent, 3-5 seasonal bio-techs
*** long term, multiple hours

Permanent Personnel: 10a.
#028702, EVK.

Permanent Personnel: 6. #088603, GTM.

Seasonal Personnel: 13, 12, 11, #098701, GTM

Seasonal Personnel: 16, 17, 14, 12, 18, 19, 20.
#098702, GTM.

Besides the addition of the ARM position for Amchitka, numerous other changes occurred with the permanent staff. After five plus years on Adak both RM Zeillemaker and WB Deines transferred to other positions. RM Zeillemaker transferred to the Portland Regional Office and WB Deines transferred to Yukon Flats NWR and became their new FMO. ARM Klett was acting Refuge Manager until Mike Boylan transferred from the Kenai NWR to become the new Refuge Manager in January 1988. WB Vern Byrd, from the Homer Office, is scheduled to fill the vacant Wildlife Biologist position sometime during May 1988. The GS-3 clerk/typist position remained vacant through the end of 1987.

4. Volunteer Programs

During 1987, we again selected volunteer workers from outside Adak through the Student Conservation Association (SCA). SCA provided AIU with eight biologists and two interpretive naturalists. The dedicated efforts of these people contributed many hours to the Kiska field study, goose transplant and survey work, contaminant sampling, Adak wildlife surveys, a variety of environmental education and interpretive programs, Fish and Wildlife Center operation, and other refuge programs. Two persons became refuge volunteers when their SCA contracts ran out. They worked for several months during a period when we had a shortage of permanent staff and were instrumental in maintaining refuge management programs.

On the local level, a renewed effort was made to recruit and train refuge volunteers from the Adak community. ORP Edgerton designed a simple, attractive name tag (color coded to indicate hours of service) and assembled a training package of refuge and FWS materials. Only five people volunteered and most contributed few hours due to changing work schedules and other commitments. These volunteers assisted with the refuge public use program but cumulatively worked less than 150 hours during the year.

5. Funding

Funding for the AIU is included in the AMNWR budget. AIU funding was received from wildlife resources (1260), endangered species (1113), and Accelerated Refuge Maintenance Management (ARMM) in 1987 (Table 5). Funding in 1987 was adequate due to the expeditious use of volunteers and SCA resource assistants.

Table 5. AIU funding, FY-1981 to FY-1987 (in thousands of dollars)

Year	Discretnry MB (1260+)	Discretnry SE (1113)	Discre. ARMM	Discre. total	Contr. ARMM	Grand total
FY-87	326.5	275	0	601.5	95	696.5
FY-86	177.4	219	0	396.4	205	601.4
FY-85	435	105	95	635	54	689
FY-84	326.5	105	200	631.5	176	807.5
FY-83	384.1	89.6	N/A	473.7	N/A	473.7
FY-82	346	75	N/A	421	N/A	421
FY-81	225	140	N/A	365	N/A	365

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6. Safety

Refuge Biological Technician McClellan served as station safety officer 1 January through 31 October, Refuge volunteer Kevin Reyor assumed safety officer duties on 1 November.

Safety meetings were held monthly with 11 movies shown. Topics included use of seat belts, safe driving tactics, office safety, fire safety and general work safety. The movies "Room to Live Parts I and II" produced the liveliest discussions.

A variety of safety training was received by refuge personnel during the year. Eight permanent, seasonal and volunteer employees were certified for CPR. A week long spring training session for field personnel included viewing of U.S. Coast Guard cold weather/cold water training films, use of personal floatation devices and survival suits, the care and use of outboard motors and inflatable boats, radio operation and communication procedures,, and the operation and maintenance of the "Kittiwake", a 26 ft Boston Whaler used around Adak. All field personnel had a safety tour of the new refuge vessel "Tiglax, shown the location of all safety and survival equipment and its use discussed or demonstrated. All personnel practiced a fire drill and an abandoned ship drill.

Safety-related purchases included 3 new ELT's, 6 new batteries for old ELT's, 3 new batteries for 3 E.P.I.R.B.'s, several compasses and numerous pocket survival kits containing 2 flares, a dye marker, a fire starter kit and a signaling mirror.

Before his departure in May, Refuge Manager Zeillemaker again prepared an annual list of Alaska FWS permanent and temporary radio stations, frequencies and radio check times for most refuges and other field offices/stations for the 1987 field season. Copies were provided to all participants. The effort provides information to the field camps for reference during

possible emergencies. A multifrequency antenna and HF radio were installed in Assistant Manager Kletts quarters to allow 24 hour emergency monitoring of AIU field camps and other Alaska camps. Two radios were taken to each AIU field camp in 1987. One served as the primary communication unit and the other served as a backup in the event of failure by the primary unit. Multifrequency whip antennas (5907.5, 3215.0, 4125.0 and 2182.4) also were used in all field camps. They performed very will and eliminated use of cumbersome inverted V "hotstick" antennas. Two of the multifrequency antennas were loaned to Yukon Flats NWR, Fairbanks, AK, for use in their summer field camps. They were experimenting with improving the coverage of their radio net.

SCA biotechs receiving training in inflatable boat operations. #098703, GTM.

F. HABITAT MANAGEMENT

1. General

The AIU contains at least 200 named islands totalling 2.7 million acres. These islands stretch over 1,100 mi from the tip of the Alaska Peninsula to within 500 mi of the Soviet Union's Kamchatka Peninsula. Commonly refered to as "The Chain", all but portions of the seven larger eastern islands are included in the refuge unit. Due to their close proximity to the Alaska Peninsula, Unimak (1.0 Million ac.) and Amak islands are administered by the

Izembek National Wildlife Refuge, headquartered at Cold Bay, Alaska. The Sanak Islands south of the Alaska Peninsula are managed from AMNWR headquarters at Homer, Alaska. Except for the Aleut village at Atka, the Navy base at Adak, the U.S. Air Force base at Shemya, the U.S. Coast Guard LORAN Station at Attu, and the Navy base under construction on Amchitka, the only signs of recent human activity on the refuge unit are the unhealed scars and debris remaining from World War II.

2. Wetlands

Many of the islands have numerous freshwater "potholes", some superficially resembling the prairie pothole country of the Midwest. A few areas at lower elevations produce aquatic growth and support modest waterfowl populations, especially Amchitka, Kanaga and Agattu islands. Current management efforts include orienting military development away from lowland wetlands and lagoons. The AIU staff monitors construction projects on military installations at Adak and Attu and provides recommendations on proposed activities by Native corporations on the refuge as well. The military, especially at Adak, was quite cooperative and sensitive to our suggestions throughout the year. Coordination increased at Shemya (U.S. Air Force) this year as they initiated a series of 16 construction projects. The USAF agreed to seek FWS input in the upcoming master plan for Shemya AFB.

Glaciated lakes on Amchitka. Prairie potholes in the Aleutians! #087701, RPS.

This year the refuge assisted in several activities that involved wetlands, primarily the continued planning for the U.S. Navy's $92 million Relocatable Over The Horizon Radar facility at Amchitka Island. This effort was facilitated with the assignment of ARM Dewhurst as the FWS liaison officer between the U.S. Navy and their contractor.

Other assistance included the inspection and recommendation on areas for disposal of excess soil from a construction project at Naval Security Group Activity (NSGA), Adak; review of the Adak Naval Air Station (NAS) Master Plan (year 2000); discussions with U.S. Navy and U.S. Department of Agriculture, Soil Conservation Service personnel regarding development of a long range natural resource (soil & vegetation) management plan for the Adak NAS; and providing input for the protection of natural resources during the construction of a new sanitary landfill on Adak and Amchitka.

Refuge Manager John Martin visited Amchitka in August to attend meetings on U.S. Army Corp of Engineers environmental permits. Also present were representatives from the Corp of Engineers, U.S. Navy, and the Navy's Silverdale Permitting office.

7. Grazing

For the first time in six years, we had all three grazing operations under Special Use Permits. The policy of charging a $100.00 administrative fee worked well for everyone. The permittees felt they could afford this fee and the Service resolved the problem of obtaining payment. As the year ended, two of the three operations renewed their permits for FY88. The Chaluka Native Corporation is negotiating the sale of their livestock and had not responded to our billing.

9. Fire Management

For the third year in a row, a tundra fire occurred at the NAS Adak rifle range. The fire occurred on 23 April 1987, the exact day and in the same area where a fire occurred in 1986. Like last year, the local Marine Corps detachment had gunnery practice at the time and a tracer round ignited the dry vegetation. The fire started at 1000 with the NAS Fire detachment arriving quickly at 1012. The fire was declared out at 2000 after having burned 40 acres. Due to the location (within a gunnery range), no significant impacts occurred to any wildlife species. The area fully greened-up by August. Tundra fires are an unusual event in the Aleutians, as the perpetually wet tundra usually will not burn. However, as the past three years have shown, with the right ignition source (white phosphorous) and climatic conditions, the tundra will burn.

A stray tracer round in the unusually dry tundra initiated this 40 acre fire. #098704, GTM.

A small fire occurred in one of the preserved quonset huts on Amchitka Island on 30 August. The fire was concentrated in the entrance doorway and underlying floorboards. The construction company fire truck was dispatched to the scene and had the fire out after one hour. Damage was restricted to the floor and underlying wood frame.

12. Wilderness and Special Areas

The Alaska National Interest Lands Conservation Act (ANILCA) designated approximately 1.3 million ac. of the Aleutian Islands Unit as Wilderness. Notable areas of the refuge unit excluded from the designation include 127,870 ac. on Shemya, Attu, Adak, Amchitka and Ugamak islands for military and lighthouse purposes or World War II debris and approximately 200,000 ac. selected by Native corporations under the Alaska Native Claims Settlement Act (ANCSA).

Other special designations which occur on the AIU are as follows:

AREA	DESIGNATION
Aleutian Islands Unit	Biosphere Reserve
Agattu Island	Research Natural Area
Buldir Island	Research Natural Area
Kiska Island Occupation Site	National Register of Historic Landmarks
Attu Island Battlefield	National Register of Historic Landmarks
P-38 G Lightning Aircraft, Attu Island	National Register of Historic Landmarks
B-24 D Liberator Bomber Aircraft, Atka Island	National Register of Historic Places

On a rare, sunny winter day distant islands (these are 25 miles east of Adak) appear to be in your backyard. #048701, TRE.

G. WILDLIFE

1. Wildlife Diversity

Birdlife of the central and western Aleutian Islands has been adversely impacted through the introduction of arctic and red foxes beginning in 1836 and continuing through the 1920's for fur farming purposes. The once abundant Aleutian Canada goose was dangerously close to extinction during the 1960's due to fox predation and hunting on its California wintering grounds. As a

result of fox eradication success, the ACG is gradually being reintroduced to islands near two remaining traditional nesting grounds at Buldir and Chagulak islands. Continuing fox removal efforts are leading toward restoration of the endangered goose and benefiting numerous other tundra and burrow nesting bird species. Nesting seabirds have already begun to increase on Agattu, Alaid, Nizki, Amchitka and Amukta islands which are once again free of foxes. Another endangered bird species, the short-tailed albatross, is a migrant through Aleutian waters. It has suffered from human impacts and introduced rats on its nesting island near Japan. With increased protection, the species is now being recorded in Aleutian waters with regularity once again.

Over the past years, Clam Lagoon has produced most of the species of waterfowl and shorebirds recorded on Adak. #048702, TRE.

In separating the North Pacific Ocean from the Bering Sea and bridging North America to Asia, the Aleutian Islands offer refuge to an international variety of birds. Migrants converge from all points of the compass. Nearly 100 Asiatic species have been observed in the Aleutians, primarily from Adak to Attu. Several have been reported nowhere else in North America and observations of new species occur almost annually. Asiatics include whooper swan, bean goose, the Asian form of green-winged teal, common pochard, tufted duck, smew, white-tailed eagle, common greenshank, wood sandpiper, Far Eastern curlew, common sandpiper, long-toed stint, eye-browed thrush, olive tree-pipit and rustic bunting. A large variety of seabirds nest on island cliffs,

talus slopes and tundra covered slopes in dense, noisy colonies. Their rookeries vary in size and composition, but some of the more numerous species include northern fulmar, fork-tailed and leach's storm-petrels, red-faced and pelagic cormorants, glaucous-winged gull, black-legged kittiwake, thick-billed and common murres, pigeon guillemot, ancient murrelet, least and crested auklets and horned and tufted puffins.

2. Endangered and/or Threatened Species

Endangered species work within the AIU once again concentrated on the Aleutian Canada goose (ACG). Projects included winter surveys of Kiska Island in accordance with the Experimental Use Permit; documenting the fox-free status of Kiska; Buldir to Amchitka goose transplant and a survey of Agattu for ACG. In addition to the goose work, surveys were once again conducted at Adak for the potentially threatened or endangered Aleutian shield-fern (*Polystichum aleuticum*). The effort was successful as a group of seven plants was found on Mt. Reed, the first time since 1975 the Aleutian shield-fern has been seen.

Wildlife surveys were conducted on Kiska Island in March and July 1987 as part of a project to benefit the endangered Aleutian Canada goose. This work was part of the bird and mammal survey and monitoring efforts supporting an EPA Compound 1080 Experimental Use Permit (6704-EUP-28). A detailed description of the results of this effort is contained in Section G. 15.

The 1987 Aleutian Canada goose capture, banding and transplant operation was conducted from 31 July to 10 August. The M/V "Tiglax" provided transport and logistical support throughout the operation.

Based on previous experience, the Buldir Island goose search and capture efforts were conducted by having all personnel walk 33 to 99 ft abreast through the upper edge of the lowland tall plant association. When a bird was sighted, everyone converged on that area as additional geese are normally found in the same area. Geese were then captured using large, long handled dip nets. After capture, the geese were then placed in a welded wire backpack cage covered with burlap to act as a visual barrier. The inside of the cages were lined with fresh vegetation pulled at the site. The vegetation seemed to help calm the birds and also provided extra padding. Three cages were attached to a backpack frame. Either two goslings or two adults were put into each cage to allow plenty of room for the birds. Adults were not put in cages with goslings to prevent trampling of goslings by the larger adults. Unnecessary walking with birds in the pack was avoided. If one particular area was worked for a time, loaded packs were set down so that crew members could chase other geese and the packed geese would not be subjected to considerable jostling. Hiking back to camp was completed without unnecessary

delays or rough treatment of the birds.

Upon return to the main camp at North Marsh, the backpacks were placed near the holding pen to await processing. Banding materials, tubing supplies (for forced feeding) and other equipment necessary to process the birds were then quickly gathered. Processing of the geese began with each person responsible for a specific task in an assembly line operation. The age and sex of each bird were determined then a metal FWS band applied followed by a yellow leg band. The colored band was placed on the right leg of males and left leg of females. All information, including capture date and location, was recorded. All geese were tube fed with a 15cc protein mixture with feeding continued once daily including the day of transplant. The birds were also tube fed just prior to release on Amchitka. The tube feeding helps reduce the shock of handling and increases the chances of survival.

ARM Donna Dewhurst and Amy Snyder tube feed an Aleutian Canada goose before release. #998702, LL.

After processing, the birds were released into a 5 X 15 m enclosure of metal fence posts and poultry wire, including a poultry wire roof. Burlap on the sides of the enclosure provided a visual barrier for the birds. Burlap sacks placed over one end of the pen provided protection from rain. The area within the enclosure provided natural food and cover. The band numbers of any birds which appeared to be suffering from

paralytic shock syndrome were recorded at that time and at each subsequent tube feeding with those birds attended to more closely.

Bean Goose Lake, Glissade Valley, Tip Valley, Extra Plateau and the Kittiwake Lake area were all searched for geese. Extra Plateau proved to be a stupendous area this year with 95 geese captured there in two days. Approximately 70% of the geese were captured in the Extra Plateau area. Kittiwake Lake again proved to be a very sumptuous, but frustrating, capture area. Over 200 geese could be seen swimming in the middle of the fog-shrouded lake, but we were completely unsuccessful in spooking the geese off the lake. The Bean Goose Lake, Glissade Valley and Tip Valley areas provided the other 31 geese for a total capture of 136 geese.

Just prior to transport to Amchitka Island, the birds were removed from the holding pen and tube fed. They were then placed in wooden crates covered with burlap and lined with Elymus mollis. Adults and goslings were put into separate crates to eliminate potential trampling mortality. The number of birds placed into the wooden crates was limited to six adults or six goslings. Once the geese were placed in the crates, they were taken to the vessel via inflatable boat. The goose crates were put indoors in the wet lab on the M/V "Tiglax". This provided weather protection as the door to the wet lab opens to the stern of the boat under the helipad. The door was kept open except in rough seas so the room stayed cool.

Three transplant runs to Amchitka were completed with the second and third runs operating smoothly. On the first run the vessel met 16 foot seas on the south side of Amchitka at the release site and was unable to off-load the geese but took shelter in Constantine Harbor. The next day was too rough to allow a release by inflatable boat, so the geese were hauled overland by vehicle to the release site. The crates were hand-carried into the valley where the release pen was built. On this first release, an improvised holding pen was constructed of goose crates. First goslings then adults were released into the circle of crates. The geese were released after a half-hour in the pen due to the escape of several adults and our desire to keep possible family groups together. The second and third release, using inflatable boats, went smoothly with the geese in the holding pen for 2 hours to reform family groups and calm down. After this waiting period, the geese made a slow, smooth exit from the pen.

A total of 136 ACG (76 goslings and 60 adults) were captured on Buldir including 42 male goslings, 34 female goslings, 22 male adults and 38 female adults. The average age of the goslings was 34.6 days. Four birds died during the transplant--one during transport, one in the holding pen at Amchitka and two suspected

eagle kills. Two of the dead birds were goslings, one an adult and one an unknown aged bird whose remains consisted of only feathers and bones found below an active eagle nest. The birds that died represented a three percent mortality rate for all birds captured.

Aleutian Canada geese in a temporary holding pen prior to release on Amchitka. #998701, LL.

Seven of the transplanted birds were recaptures. One adult female and one adult male were banded in California at the wintering grounds. The adult male was banded as a SY bird in 1980, an old bird! The next four recaptured birds were banded on Buldir and transplanted to Agattu in 1982, 1983 and 1984. Three of the four birds were banded on Buldir as adults while the fourth Agattu bird was a local female when banded in 1982. The seventh bird was an adult female when banded on Buldir and transplanted to Amchitka in 1985.

Although every effort was made to minimize the impact of capture and handling, some geese still exhibited signs of paralytic shock syndrome when released into the holding pens at Buldir or Amchitka. In total, 6 geese were positively identified as exhibiting some degree of paralysis. Although there was an 80% decrease in the number of birds affected by paralysis in 1987 compared to 1985, 2 of the 3 dead birds had paralysis when released. Some reasons for the lower incidence of paralysis in 1987 may be attributed to concentration on close capture areas, new and larger cages on the backpacks giving the geese more room,

and the improved speed of the "Tiglax". Compared to 1985, the transport time was cut by 5 hours.

On Agattu Island, five biologists searched the area along the coast from Aga Cove to Donny Pond above Cape Sabak on 18 July. The area from Aga Cove to Cape Sabak was thoroughly searched in June 1985 by 6 biologists over a three week period to document the return of banded and unbanded geese and the extent of the nesting goose population. Eleven ACG nests, one brood pair and 52 to 84 individual ACG were observed in 1985. Although only one day in July was spent searching the area, the crew observed 14 individual adult geese, three broods (7, 5 and 4 goslings) and one nest (7 eggs). Although not a large number of geese or broods, these observations indicate that the ACG population on Agattu is still reproducing and hopefully increasing in number. A more thorough investigation is planned for June, 1988.

Several ACG were sighted in areas away from their known breeding islands in 1987. The sightings started off with a bang when a flock of 50 ACG were observed flying over Clam Lagoon, Adak, on 4/25. A single unbanded goose was observed at Lake Andy, Adak, from 4/28 through 5/4. The final sightings at Adak occurred on 5/21 when a flock of 14 was observed at Clam Lagoon and a single ACG was seen flying over the refuge office. For the second summer in a row, ACG were observed on Kiska Island as six were observed at Kiska Harbor near Trout Lagoon on 7/16. A single unbanded small Canada goose (subspecies not determined) spent 31 days on Amchitka around the landfill of the main camp. It appeared tame and became a popular mascot with the construction workers who named it "Vitus" after the Russian explorer, Vitus Bering. The goose was the right size for an ACG, but missing the distinctive white neck collar although it may have been a gosling. Vitus departed Amchitka on 11/7.

Dr. David Smith, University of Tennessee, and Nancy Felix, botanist from Arctic NWR, Fairbanks, were on Adak for 10 days in August to search for the Aleutian shield-fern which had eluded FWS personnel for the past 3 years. Dr. Smith was the last person to locate a live specimen in 1975 on Mt. Reed, Adak. Dr. Smith was again successful as he and a refuge volunteer located a population of seven plants on the east face of the north arm of Mt. Reed at 1600 feet elevation! This is only the third time a population has been discovered. A population was first discovered on Atka in 1932. The other previous population was found by Dr. Smith in 1975, again on Mt. Reed, but at a different location. The documentation of a population on Adak should help get the Aleutian shield-fern listed as an endangered species.

An investigation by Dr. Gerald Shield, UAF, and Mike Amaral, FWE-ANC, was conducted on Amak Island to determine the status of the Amak Island song sparrow (*Melospiza melodia amaka*) and Amak vole (*Microtus oeconomus amakensis*), two candidate species under the

Endangered Species Act. Due to the shortness of the trip (two days rather than the 7-10 days planned) a shortened survey was conducted. Some 25 song sparrows were estimated on the sections of the island covered. Only one song sparrow was collected for mt DNA analysis. Two adult and two immature voles were caught in traps. This was the first documented occurrence of the vole on Amak since 12 were collected in 1968. Red fox are on the island and appear to be the primary predator on the vole; however, the voles seem to have adapted to this predation and it doesn't appear a threat to their existence. Although both Amak sparrows and voles are rare, Amaral reported that, "the habitats available to both species are undisturbed and do not require special management, other than preservation in their present condition".

The Aleutian shield-fern has been located on Adak, only twice in the past six years. #188701, AS.

3. Waterfowl

Two species of swans, six species of geese and 33 species of ducks have been recorded in the Aleutian Islands. Of those, the whooper swan, bean goose and 10 duck species are of Asiatic origin. Details for unusual North American and Asiatic species observed in the Aleutians this year follow:

Tundra Swan - A single bird was observed on Haven Lake, Adak, 02-03 May furnishing the island's third record for this species.

Whooper Swan - Nineteen were observed at Kiska on 27 and 28 March. Three were on Lake Andy, Adak, from 22 to 31 December.

Emperor Goose - A single adult was observed at Clam Lagoon, Adak, on 12 June. Three neck banded birds, with a group of 464, were observed at Clam Lagoon, on 12 December. Biologists were able to read the bands on two of the three geese, with those two still present at the end of December.

Canvasback - One was at Lake Shirley on 09 October setting a new month record for Adak. Three were observed at Clam Lagoon, Adak, on 12 December and 5 were observed at Clam Lagoon on 13 and 17 December.

Ring-necked Duck - A male was observed on Amchitka from 01-10, and 23 October by ARM Dewhurst setting the first site record for Amchitka.

Tufted Duck - A total of 141 sightings were recorded during various surveys throughout the north half of Adak.

Lesser Scaup - A male was observed by refuge personnel swimming alongside a male greater scaup on 25 November in Sweeper Cove, Adak. This is the third Aleutian record. The second record was recorded 26 April, 1986 on Adak and the first was recorded on Amchitka in 1977.

Steller's Eider- A male and a female were observed off Clam Lagoon Seawall, Adak on 18 February.

White-winged Scoter - Four individuals were observed at Kiska 27 and 28 March setting a new month record for the island. Twelve were at Kuluk Beach, Adak, on 01 February, 3 at Clam Lagoon Seawall, Adak , on 13 May. One was observed off the Clam Lagoon Seawall in October which set a new month record for Adak. Three were observed in November, two at Clam Lagoon Seawall and 1 on a nearshore boat survey.

Smew - A female plumaged bird was at Andrew Lake, Adak, from 25 April until 17 May. One was observed at Amchitka Island from 1-10 and 13 October.

Common Merganser - A brood of 5 was observed on Amchitka Island by ARM Dewhurst in August. This was the first documented record of common mergansers nesting on Amchitka. Four females were observed at Finger Bay, Adak, on 25 November setting a new month record for Adak.

Adak wildlife surveys consist of vehicle, beach walk and nearshore boat routes conducted throughout the year to provide seasonal bird and mammal population and distribution information. The vehicle survey is conducted along a prescribed route with

designated stops over the roaded portion of the northeastern quarter of the island.

The beach survey is composed of foot routes covering 5 separate beaches on the northeastern portion of Adak. The nearshore boat survey uses a 25-foot Boston Whaler and follows a prescribed route along the shore of Kuluk Bay and adjoining open waters. All surveys follow procedures in the draft Wildlife Inventory Plan. Vehicle and beach surveys are conducted twice a month and the nearshore boat survey once a month. Nineteen vehicle, 10 boat and 21 beach surveys were conducted throughout 1987.

Nineteen waterfowl species were observed during the general Adak Wildlife Surveys (Tables 6 and 7). The harlequin duck was the most numerous species observed with an average of 214 observations during each vehicle survey and an average of 98 observations during each beach survey. Even though the harlequin duck is not known to nest on Adak (or anywhere else in the Aleutians), it is the most common duck species observed year round.

Aleutian green-winged teal are the predominate nesting ducks on Adak. #048703, TRE.

Other common year round nesting species include the Aleutian green-winged teal, mallard, greater scaup and red-breasted merganser. Both the northern pintail and common eider also nest

Table 6. Waterfowl observed during the Adak general wildlife surveys 1987.

VEHCILE SURVEY

Waterfowl Species	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOTAL
Emperor Goose	-	489	223	56	-	-	-	-	-	-	-	136	904
Green-winged Teal (NA)	-	-	-	3	-	-	-	-	-	-	-	-	3
Green-winged Teal (EUR)	-	105	94	261	169	193	121	29	117	31	-	-	1120
Mallard	-	163	98	55	59	49	26	13	12	56	6	8	545
Northern Pintail	-	314	207	277	25	4	-	-	126	212	11	29	1205
Eurasian Wigeon	-	6	2	12	45	-	-	-	-	31	15	23	134
Canvasback	-	1	-	-	-	-	-	-	-	1	-	-	2
Tufted Duck	-	-	2	14	27	4	1	-	-	4	11	-	63
Greater Scaup	-	113	208	174	223	77	41	14	42	72	211	-	1175
Lesser Scaup	-	-	-	-	-	-	-	-	-	-	1	-	1
Common Eider	-	10	25	-	-	-	-	9	-	-	1	-	45
Steller's Eider	-	2	-	-	-	-	-	-	-	-	-	-	2
Harlequin Duck	-	556	394	694	395	149	175	14	72	592	755	269	4065
Oldsquaw	-	107	53	118	1	-	-	-	-	-	38	49	366
Black Scoter	-	37	15	11	7	-	-	-	-	12	18	-	100
White-winged Scoter	-	-	-	-	3	-	-	-	-	-	2	-	5
Common Goldeneye	-	233	171	295	41	-	-	-	-	-	290	186	1216
Bufflehead	-	56	62	74	23	-	-	-	3	19	55	45	337
Red-breasted Merganser	-	172	73	99	83	17	12	14	14	85	93	29	691
	(0)*	(2)	(1)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(1)	

BEACH SURVEY

Emperor Goose	230	181	21	-	-	-	-	-	-	-	-	-	432
Green-winged Teal (EUR)	-	-	-	-	3	1	1	-	1	-	-	-	6
Mallard	-	-	-	-	2	-	5	1	-	-	-	-	8
Northern Pintail	-	-	-	-	-	-	-	-	1	20	-	-	21
Greater Scaup	-	-	-	-	-	-	-	-	11	2	-	-	13
Common Eider	-	57	-	-	-	-	13	15	-	11	-	-	96
Harlequin Duck	154	187	66	234	206	84	2	3	216	389	518	-	2059
Oldsquaw	17	4	4	-	-	1	-	-	-	-	1	-	27
Black Scoter	5	-	-	-	7	-	-	-	1	-	51	-	64
Common Goldeneye	1	-	-	-	-	-	-	-	-	-	33	-	34
Red-breasted Merganser	11	7	3	15	46	-	2	-	16	52	42	-	194
	(1)*	(2)	(1)	(2)	(3)	(2)	(2)	(2)	(3)	(2)	(2)	(0)	

* indicates number of surveys conducted each month

Table 7. Waterfowl observed during the Adak general wildlife surveys 1987.

BOAT SURVEY

Waterfowl Species	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOTAL
Emperor Goose	-	-	-	-	-	2	-	-	-	-	-	6	8
Green-winged Teal (EUR)	-	-	-	-	5	6	-	-	-	24	18	40	93
Mallard	-	-	-	4	-	-	-	-	-	2	7	48	61
Northern Pintail	-	-	-	-	-	-	-	-	1	-	-	-	1
Common Eider	-	-	-	-	-	-	-	7	-	-	-	-	7
Harlequin Duck	-	-	-	163	12	19	6	12	54	204	362	122	954
Oldsquaw	-	-	-	-	-	-	-	-	-	-	16	4	20
White-winged Scoter	-	-	-	-	-	-	-	-	-	-	1	-	1
Common Goldeneye	-	-	-	2	-	-	-	-	-	-	-	-	2
Bufflehead	-	-	-	18	-	-	-	-	-	1	1	10	30
Red-breasted Merganser	-	-	-	6	5	7	6	-	8	-	3	3	38
	(0)*	(0)	(0)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(2)	(1)	

* indicated number of surveys conducted each month.

on Adak. Wintering waterfowl populations include the emperor goose, oldsquaw, black scoter, common goldeneye and bufflehead. Emperor geese were first observed in October this year, with large numbers occurring in December. The early arrival of geese and higher numbers earlier in the year may be due to the fact that there hasn't been a hunting season on this species for the past two years. Approximately 4,030 geese were observed throughout the year (sightings not individual birds). For the past five winters a single male or pair of Steller's eiders has been observed off the Clam Lagooon Seawall with large numbers of harlequin ducks. These are the only Steller's eiders ever observed on Adak and always in the same area.

4. Marsh and Waterbirds

Five species of loons, three species of grebes, three species of albatrosses, nine species of smaller tubenoses, three species of cormorants, three species of herons and the sandhill crane have been recorded in the Aleutian Islands. Of those, the arctic loon, short-tailed albatross, gray heron and Chinese egret are from Asia. The short-tailed albatross is an endangered species. The Chinese egret, also an endangered species, has occurred only once (in 1974). The gray heron appeared at Attu for the first North American record in the spring of 1986. Several of the tube-noses are "wintering" birds from the southern hemisphere. The following list includes information only for unusual species or sightings:

Red-throated Loon - One was observed off Kuluk Beach, Adak, on 16 June. Three birds were observed in and around upland lakes at Agattu on 17 and 18 July.

Pacific Loon - One observed in Sweeper Cove, Adak, on 18 February and 4 were observed in Sweeper Cove on 23 February; one at Clam Lagoon, Adak, on 8 March; two in Sweeper Cove on 22 April; one observed off Clam Lagoon Seawall, Adak, on 6 November and one observed off Lake Andy Seawall, Adak, on 19 November.

Yellow-billed Loon - One observed off Kuluk Beach, Adak, on 15 June and one observed at Finger Bay, Adak, on 4 December.

Sooty Shearwater - One bird was observed off each of the following islands: Kiska, Amchitka and Kanaga on 19 July. This species had not previously been recorded near any of these three islands.

Leach's Storm-petrel - One was observed on a pelagic transect off Kiska on 19 July, the species had not previously been recorded there.

A description of general Adak wildlife surveys is presented in Section G. 3. Four of the five species of loons and two grebe

species were observed during Adak wildlife surveys in 1987. Loons and grebes are not observed on the Adak surveys in large numbers except for the wintering horned grebe (Table 8).

An average of 2.5 horned grebes was observed during each beach survey and an average of 2.6 was observed during each vehicle survey. The common loon is the only member of its family known to nest on Adak. It is usually observed in low numbers in the summer (6 sightings from May-August), although it can be observed occasionally year round (4 sightings in April). The red-throated loon, pacific loon and red-necked grebe are normally winter visitors to Adak.

5. Shorebirds, Gulls, Terns and Allied Species

Seven species of plovers, 46 species of sandpipers, three species of jaegers, a skua, 13 species of gulls, four species of terns and 15 species of alcids have been recorded in the Aleutian Islands. Five species of plovers, 26 species of sandpipers, five species of gulls and two species of terns are Asiatic in origin. The rock sandpiper and the glaucous-winged gull are year round residents. The following listing includes occurrence information for unusual North American and Asiatic species:

Black-bellied Plover - One observed at Amchitka by refuge volunteers on 09 September making the sighting a third record for the island. Two were on Mt. Moffett, Adak, on 12 September and two at Lake Andy seawall, Adak, on 18 September.

Semipalmated Plover - Two observed at Lake Andrew, Adak, on 25 May, two observed at Kuluk Beach, Adak, on 27 May, one observed at Lake Andrew on 03 June and 04 July and two observed at Lake Andrew on 05 July.

Common Greenshank - One at Clam Lagoon, Adak, from 22-23 May, first Adak sight record. One at Clam Lagoon on 02 September, a new month record.

Greater Yellowlegs - One observed by ARM Dewhurst on Amchitka from 1-10 October and on 23 October. This is the first record for that species on Amchitka.

Wandering Tattler - Six observed on Adak in May, 5 at Kuluk Beach and one at Lake Andrew. One observed at Sweeper Cove, Adak, on 05 June, two at Finger Bay, Adak, on 12 September, 1 at NAVFAC Beach, Adak, on 14 September and 1 at Shagak Bay, Adak, on 23 September.

Whimbrel - Two at Adak in September, one at Lake Andrew on the 2nd and one at NAVFAC Beach on the 4th.

Table 8. Marsh and waterbirds observed on the Adak general wildlife surveys, 1987.

Marsh and Waterbirds	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOTAL
VEHICLE SURVEY													
Pacific Loon	-	5	-	2	3	-	-	-	-	-	1	-	11
Common Loon	-	-	-	-	-	-	1	-	-	-	-	-	1
Yellow-billed Loon	-	-	-	-	-	-	-	-	-	-	-	1	1
Loon species	-	-	-	-	1	-	-	-	-	-	-	-	1
Horned Grebe	-	5	3	10	2	-	-	-	-	9	22	1	52
	(0)*	(2)	(1)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(1)	
BEACH SURVEY													
Yellow-billed Loon	-	-	-	-	-	1	-	-	-	-	-	-	1
Loon species	-	-	-	-	4	-	-	-	-	-	-	-	4
Horned Grebe	19	9	-	12	-	-	-	-	-	-	15	-	55
	(1)*	(2)	(1)	(2)	(3)	(2)	(2)	(2)	(3)	(2)	(2)	(0)	
BOAT SURVEY													
Loon species	-	-	-	-	-	-	-	-	-	1	-	-	1
Horned Grebe	-	-	-	1	-	-	-	-	-	-	-	-	1
	(0)*	(0)	(0)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(2)	(1)	

* indicates number of surveys conducted each month.

Bristle-thighed Curlew - One at Adak's Kuluk Beach from 16-21 May.

A few bristle-thighed curlews are observed in the Aleutians each year. #048705, TRE.

Bar-tailed Godwit - One observed at Clam Lagoon, Adak, from 10-21 May and one observed at Kuluk Beach, Adak, from 03-06 June.

Western Sandpiper - One observed at Clam Lagoon, Adak, on 21 May.

Rufous-necked Stint - One observed at Clam Lagoon, Adak, on 23 May giving the island its 4th site record. One was at NAVFAC Beach, Adak, 02-05 September, giving Adak its 5th site record and a new month record for this species.

Temminck's Stint- One observed at Lake Andrew, from 03-04 June, first record for Adak.

Pectoral Sandpiper - Thirteen observed at NAVFAC Beach, Adak, 05 to 15 September, six observed at Clam Lagoon, Adak, on 12 September and one at Shagak Bay, Adak, on 23 September.

Sharp-tailed Sandpiper - One observed on Amchitka 09 September giving Amchitka its 4th record of this species.

East (pectoral sandpiper) and West (rufous-necked stint) meet on Adak. #048703, TRE.

Dunlin - Three observed at Clam Lagoon, Adak, on 02 February and two at Clam Lagoon on 18 February. Three observed Clam Lagoon 21 May for new month record and one at Clam Lagoon on 06 June also a new month record.

Red Phalarope - Five observed on a pelagic transect 15 miles off Adak on 07 July and 21 observed at Hidden Bay, Adak, on 21 July.

Pomarine Jaeger - One observed on a pelagic transect off Buldir on 17 July.

Long-tailed Jaeger - One observed on a pelagic transect off Kiska on 19 July, this species not previously recorded near Kiska.

Common Black-headed Gull - One observed at Kuluk Beach, Adak on 28 May. Two observed at NAVFAC Beach, Adak, on 17 June, two at Clam Lagoon, Adak, on 11 and 18 June and one at Sweeper Cove, Adak, from 20-27 June. Two observed Clam Lagoon on 3 July.

Mew Gull - Two observed at Clam Lagoon, Adak, on 11 April. One observed Kuluk Beach, Adak, on 23 May.

Black-legged Kittiwake - One observed Scabbard Bay, Adak, on 01 December, a new month record.

Red-legged Kittiwake - One observed off Amchitka during a pelagic survey on 19 July for island's first site record.

Common Tern (Asiatic subspecies) - One at Clam Lagoon, Adak, on 20 June for Adak's 4th site record.

Marbled Murrelet - A total of 472 observed on Clam Lagoon, Adak, on 09 July.

Crested Auklet - Three observed on Adak boat survey 28 September setting a new month record.

A description of Adak general wildlife surveys is in section G. 3. Twenty-nine species of shorebirds, gulls, terns and allied species were observed during the 1987 wildlife surveys (Tables 9, 10 and 11). The glaucous-winged gull was the most numerous species with an average of 321 observations during each vehicle survey, an average of 115 observations during each beach survey and an average of 54 observations on each boat survey. The high gull population is due to human habitation of the island and subsequent garbage. Nesting colonies of glaucous-winged gulls are found around Adak. Other year-round residents include the pelagic cormorant, red-faced cormorant, black oystercatcher, rock sandpiper and pigeon guillemot. The first documented nesting of pigeon guillemots in Sweeper Cove, Adak, was recorded in June and July. Four eggs were observed in July between wooden pier pilings. Seabirds which visit Adak waters but nest on offshore rocks or other nearby islands, include the black-legged kittiwake, common murre, thick-billed murre, marbled murrelet (may nest on Adak), ancient murrelet, tufted puffin (may nest on Adak) and horned puffin.

Aleutian and arctic terns nest near Clam Lagoon. Parasitic jaegers nest in small numbers nearby and steal food, eggs and hatchlings from the nesting terns. The red-necked phalarope nests on Adak in small numbers. The sanderling is a numerous winter visitor on Adak.

Aleutian and arctic tern nesting surveys were established in 1986 at two locations on Adak in compliance with draft AIU wildlife inventory plans. The survey was again conducted this year. The main Aleutian tern colony is located in the flats southwest of Clam Lagoon and the second colony is located northwest of Clam Lagoon behind the Naval Security Group Activity (NSGA) complex. The arctic tern colony is located on a ridge 80 meters west of the main Aleutian tern colony. Surveys were conducted 1-28 June on the Aleutian terns and only three days on the arctic terns, 7 June and 8 and 10 July.

Table 9. Shorebirds, gulls, terns and other allied species observed during Adak vehicle surveys, 1987.

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOTAL
Petrel species	-	-	-	-	-	-	-	-	100	-	-	-	100
Pelagic Cormorant	-	57	19	24	17	26	34	-	-	-	-	-	177
Cormorant species	-	21	52	69	94	21	34	14	12	19	233	77	646
Black-bellied Plover	-	-	-	-	-	-	-	-	2	-	-	-	2
Lesser Golden Plover	-	-	-	1	-	-	-	-	1	1	-	-	3
Black Oystercatcher	-	2	-	2	9	6	-	1	-	-	-	-	20
Bar-tailed Godwit	-	-	-	-	1	-	-	-	-	-	-	-	1
Ruddy Turnstone	-	-	-	-	-	-	-	51	-	1	-	-	52
Sanderling	-	40	-	50	-	-	-	-	17	-	-	-	107
Pectoral Sandpiper	-	-	-	-	-	-	-	-	1	-	-	-	1
Rock Sandpiper	-	73	-	87	2	1	-	-	-	60	-	-	223
Dunlin	-	2	-	-	-	-	-	-	-	-	-	-	2
Red-necked Phalarope	-	-	-	-	-	20	25	-	-	-	-	-	45
Parasitic Jaeger	-	-	-	-	22	25	29	32	4	-	-	-	112
Common Black-headed Gull	-	-	-	-	-	1	2	-	-	-	-	-	3
Glaucous-winged Gull	-	159	398	301	566	639	811	927	1955	471	153	44	6424
Black-legged Kittiwake	-	-	-	-	-	21	95	1	20	5	-	-	142
Arctic Tern	-	-	-	-	2	27	11	39	-	-	-	-	79
Aleutian Tern	-	-	-	-	-	106	7	3	-	-	-	-	116
Tern species	-	-	-	-	80	-	2	2	-	-	-	-	84
Common Murre	-	-	-	1	-	-	-	-	-	-	-	-	1
Thick-billed Murre	-	-	3	2	5	-	-	-	-	-	-	-	10
Murre species	-	4	3	1	3	2	1	-	-	-	-	-	14
Pigeon Guillemot	-	44	20	83	71	83	81	164	15	23	41	2	627
Marbled Murrelet	-	7	-	3	31	112	513	-	-	-	-	-	666
Kittlitz's Murrelet	-	-	-	1	-	9	-	-	-	-	-	-	10
Ancient Murrelet	-	-	-	4	68	123	19	2	3	24	-	-	243
Murrelet species	-	-	-	3	7	16	21	14	3	3	-	-	67
Tufted Puffin	-	-	-	1	-	59	78	28	25	-	-	-	189
Horned Puffin	-	-	-	-	3	11	41	47	27	-	-	-	129
	(0)*	(2)	(1)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(1)	

* indicates number of surveys conducted each month.

Table 10. Shorebirds, gulls, terns and other allied species observed during Adak beach surveys, 1987.

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOTAL
Petrel species	-	-	-	-	-	-	-	-	20	-	-	-	20
Pelagic Cormorant	1	6	-	-	-	-	-	-	-	-	-	-	7
Cormorant species	9	15	3	1	12	1	7	10	9	11	25	-	103
Black Oystercatcher	1	-	2	4	4	9	7	15	16	-	8	-	66
Whimbrel	-	-	-	-	-	-	-	-	1	-	-	-	1
Ruddy Turnstone	-	-	-	-	-	-	32	12	53	3	-	-	100
Sanderling	45	-	45	57	-	-	-	26	36	23	-	-	232
Rufous-necked Stint	-	-	-	-	-	-	-	-	1	-	-	-	1
Pectoral Sandpiper	-	-	-	-	-	-	-	-	2	-	-	-	2
Rock Sandpiper	-	6	-	1	3	-	3	10	14	33	14	-	84
Red-necked Phalarope	-	-	-	-	2	2	-	-	-	-	-	-	4
Parasitic Jaeger	-	-	-	-	2	11	2	-	2	-	-	-	17
Common Black-headed Gull	-	-	-	-	1	-	-	-	-	-	-	-	1
Glaucous-winged Gull	24	62	52	110	222	145	308	372	551	334	232	-	2412
Black-legged Kittiwake	-	-	-	-	-	1	-	-	-	-	-	-	1
Arctic Tern	-	-	-	-	20	9	15	-	-	-	-	-	44
Aleutian Tern	-	-	-	-	17	14	9	-	-	-	-	-	30
Tern species	-	-	-	-	23	3	5	-	-	-	-	-	33
Murre species	-	-	-	-	-	-	-	-	1	-	-	-	1
Pigeon Guillemot	-	-	-	3	26	17	22	19	8	1	1	-	97
Marbled Murrelet	-	-	-	-	-	-	-	-	1	-	-	-	1
Ancient Murrelet	-	-	-	-	14	-	-	-	-	-	-	-	14
Murrelet species	-	-	-	-	4	-	-	3	-	-	-	-	7
Tufted Puffin	-	-	-	-	-	6	42	32	13	-	-	-	93
Horned Puffin	-	-	-	-	1	35	13	29	25	-	-	-	103
	(1)*	(2)	(1)	(2)	(3)	(2)	(2)	(2)	(3)	(2)	(2)	(0)	

* indicates number of surveys conducted each month.

Table 11. Shorebirds, gulls, terns and other allied species observed during Adak nearshore boat surveys, 1987.

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOTAL
Pelagic Cormorant	-	-	-	3	12	2	17	-	-	-	-	-	34
Red-faced Cormorant	-	-	-	2	1	-	1	-	-	-	-	-	4
Cormorant species	-	-	-	66	26	46	12	49	78	24	133	70	504
Red-necked Phalarope	-	-	-	-	-	-	-	2	-	-	-	-	2
Parasitic Jaeger	-	-	-	-	1	2	-	-	-	-	-	-	3
Glaucous-winged Gull	-	-	-	50	60	116	106	43	28	38	58	42	541
Black-legged Kittiwake	-	-	-	-	-	-	1	-	6	-	-	1	8
Arctic Tern	-	-	-	-	1	-	-	-	-	-	-	-	1
Tern species	-	-	-	-	2	-	-	-	-	-	-	-	2
Common Murre	-	-	-	6	5	-	15	19	4	-	9	1	59
Thick-billed Murre	-	-	-	48	13	6	8	3	-	-	-	-	78
Murre species	-	-	-	-	22	13	19	19	8	12	14	1	108
Pigeon Guillemot	-	-	-	76	95	58	69	104	59	62	33	32	588
Marbled Murrelet	-	-	-	24	37	2	21	-	-	1	-	-	85
Ancient Murrelet	-	-	-	51	61	47	190	1	3	-	-	6	359
Murrelet species	-	-	-	2	21	6	44	4	4	-	3	-	84
Least Auklet	-	-	-	-	-	-	-	1	1	-	2	-	4
Crested Auklet	-	-	-	-	-	-	-	5	3	-	-	-	8
Auklet species	-	-	-	-	-	-	-	6	-	-	1	-	7
Tufted Puffin	-	-	-	-	45	33	114	74	-	-	-	-	266
Horned Puffin	-	-	-	-	83	69	90	100	-	-	-	-	342
	(0)*	(0)	(0)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(2)	(1)	

* indicates number of surveys conducted each month

The objectives of the survey were to: 1) delineate colony boundaries, 2) determine colony population size, 3) determine activity periods and nesting phenology, 4) develop methods that can be repeated in future years and 5) record all abnormal disturbances. Surveys were conducted from 0600 to 2300. Counts of all terns flying over or standing in the colony were made every 15 minutes using both the unaided eye and 10 x 40 binoculars. Observations were made from a vehicle to minimize disturbance.

Due to the low number of terns observed during the survey, insufficient data was gathered to determine peak activity periods in either the Aleutian or arctic tern colonies.

Tern nesting occurs in late June and early July, with fledging in late July and early August. Both arctic and Aleutian tern nests were found this year. Two arctic tern nests were found during July, one on the 1st and the other on the 8th, each with one egg. Revisited on the 10th of July, the first nest was missing its egg and the second contained a hatchling. The hatchling was banded and photographed and was still in the nest when the colony was revisited on 27 July.

Seven Aleutian tern nests were found in the two colonies. Two nests were found in colony A (in the flats) and the others at colony B near the NSGA complex. These nests had a total of 8 eggs but none hatched. Two were eaten by parasitic jaegers and six were missing from their nests. No shell fragments were found in any of the nests.

Glaucous-winged gull nesting survey plots were established in 1985 at two locations on Adak as possible monitoring sites in the central Aleutians. One plot is at Gull Island in Clam Lagoon. The other consists of four islets in Lake Betty. The surveys were conducted on 11 and 24 June at Lake Betty and on 22 June at Gull Island, per methods described in the AIU draft wildlife inventory plans. Twenty-one adult glaucous-winged gulls were observed while approaching the two northern most islets in Lake Betty. Many depressions were found on these islets and two contained eggs with one having two eggs and the other one egg. A broken egg was also found. On 24 June when the northern islets were revisited, 14 adult glaucous-winged gulls were observed, but the biologists could not find the three eggs that were present on 11 June. The peak hatching period for glaucous-winged gulls is 20 June to 01 July.

Twenty-one adult glaucous-winged gulls were observed on 22 June by biologists during the survey of Gull Island. Only one depression was found and it did not contain an egg. Gull Island has had an active eagle nest for the past three years. In 1986, one eaglet was found in the nest and in 1987, two eaglets were

seen. One eaglet remained alive and in good condition while the second was found dead.

Adak pigeon guillemot surveys were established on the north side of Sweeper Cove per draft AIU wildlife inventory plans in July, 1986 with objectives to check for nesting beneath the piers and tally birds in the cove. Guillemots were found nesting beneath the two wooden piers in Sweeper Cove. On 01 July a single egg was found resting on bare wood in a cubbyhole under pier #3. Revisited a week later, the egg was gone; no evidence of a hatching or chick was found. On 10 July volunteers checked under pier #9 for further nesting and found three eggs as under pier #3. One of the chicks had started to pip. Revisted 11 July, two adult guillemots flushed from two of the eggs, still unhatched. The first chick had hatched but all that was found was egg shell. No further visits were made.

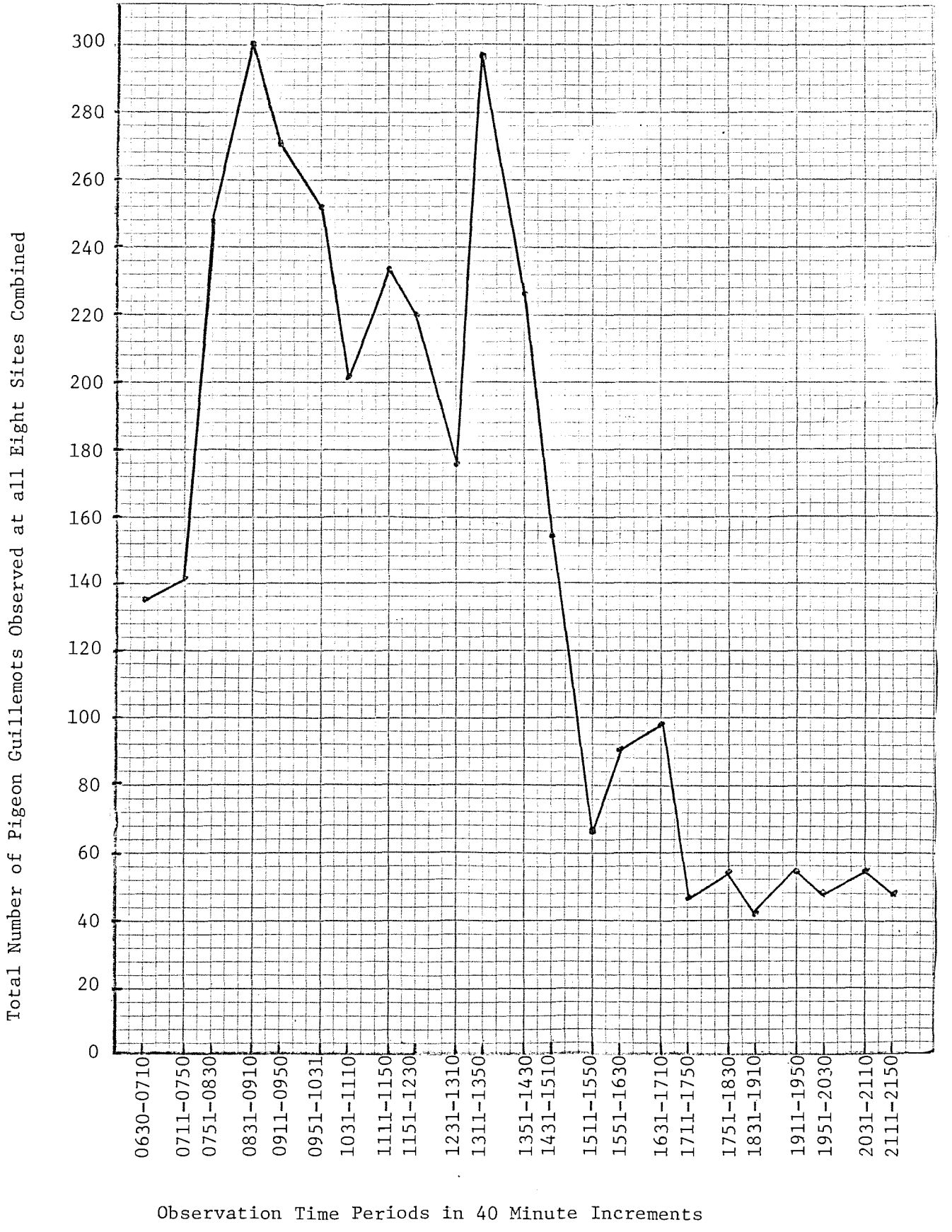
Twenty-three days of guillemot surveys were conducted on the southwest and north side of Sweeper Cove, Adak, from 01 June to 01 July by SCA volunteers. Surveys began daily between 0632 and 0959 and ended between 1530 and 1715. Three evening surveys were conducted on 15, 17 and 18 June, starting between 1653 and 1934 and ended between 2114 and 2140. Observations were from the shoreline using a combination of 8x40 or 10x40 binoculars, and a 25x spotting scope. Guillemots observed at eight points were recorded. Survey times required 25 to 45 minutes with the cycle then repeated. Pigeon guillemots observed were a low of 59 sightings on 04 June to a high of 430 sightings on 13 June. The mean number of sightings for the 23 days was 155.9. The highest number of sightings were recorded at survey points 2 and 6, with means of 50.87 and 38.87, respectively. Survey point 1 had the lowest number of guillemot sightings (5.22). As shown in figure 1, the number of guillemot sightings each morning increased between 0831 to 0910 when 301 sightings were recorded. The mean number of sightings after that period generally declined except for another peak between 1311 and 1350 when 297 sightings were recorded. The lowest number of sightings was 1831 to 1910 (41 sightings). The 1987 survey will aid future guillemot studies on nesting and behavioral patterns.

6. Raptors

The osprey, four eagle species, ten hawk species and three owl species have been recorded in the Aleutian Islands. Two of the eagles, three of the hawks and one of the owls are of Asiatic origin. The following information covers unusual North American and all Asiatic species recorded during the year:

Snowy Owl - One observed at Mt. Moffett, Adak, on 01 February by refuge personnel. Three observed by refuge personnel at Agattu Island 13 to 22 July. One observed in downtown Adak 07 December by a resident.

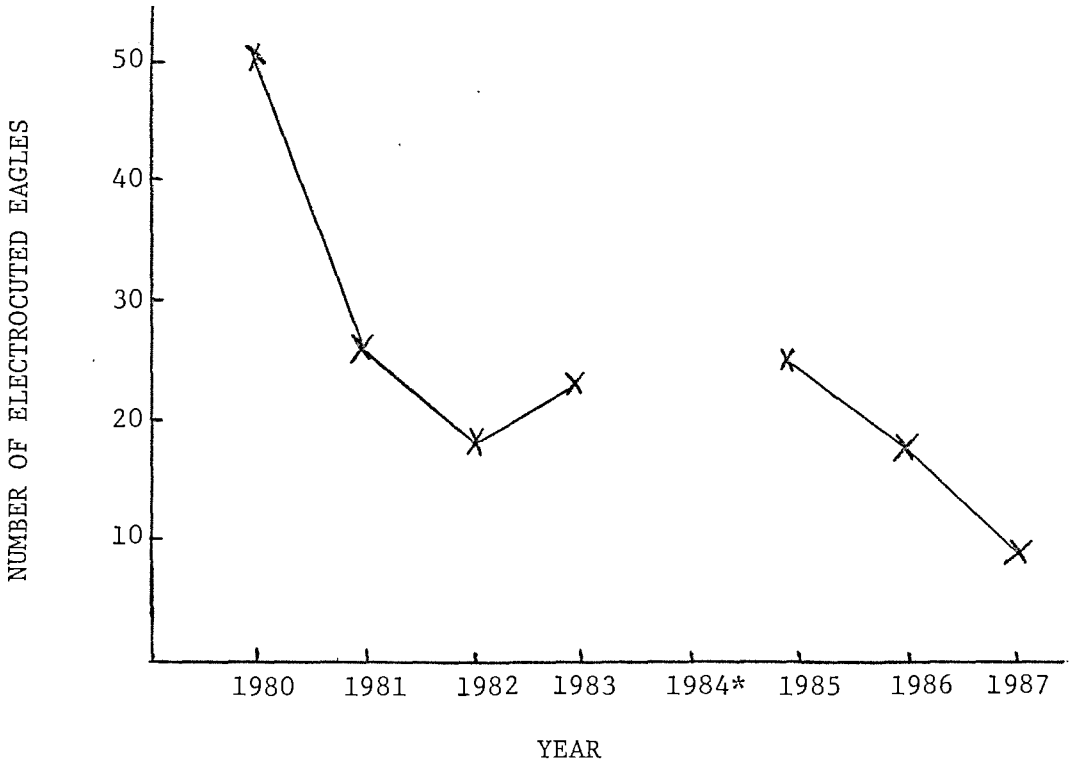
FIGURE 1. Total number of pigeon guillemots observed at all 8 survey points by observation period in Sweeper Cove, Adak, Alaska, June 1987.



Short-eared Owl - One observed Clam Lagoon, Adak, on 09 January. A carcass was found near Traffic Circle, Adak, on 16 September, possibly hit by a car.

It was another rough year for Adak bald eagles with 22 carcasses retrieved including nine electrocuted, 11 dead from unknown causes and two dead from collisions (one with a car and one flying into a window). The 22 deaths in 1987 compares to 20 in 1986 and 36 in 1985. Three electrocutions took place near the Baler Building compared to six in 1986 and 18 in 1985. This decline is releated to changes made to the power lines in the area in 1986 and burial of power lines around the Baler Building early in 1987. This should almost eliminate the problem of electrocuted eagles at that site. Eagles congregate at the Baler Building where garbage is compressed and baled before taken to the landfill. As shown in figure , the incidence of electrocuted eagles has improved considerably since 1980.

Figure 2. Number of eagle electrocutions per year on Naval Air Station, Adak 1980-1987.



* incomplete data was recorded in 1984.

Of the 22 carcasses, 19 were immatures, one an adult and two too badly decomposed to identify. Six were males and two females. Four carcasses could not be positively sexed and 10 were not sexed. Tail and wing feathers were shipped to Anchorage LE for eventual distribution to native Americans through the feather bank in Pocatello. Idaho.

The bald eagle and peregrine falcon are normally observed during the Adak wildlife surveys (Table 12). An average of 11 adult and 12 immature bald eagles were observed on vehicle surveys, and an average of 5 adults and 3 immatures on beach surveys and an average of 5 adults and 2 immatures on each boat survey. The vehicle, beach and boat surveys cover only a small portion of the northeast quarter of Adak. Several of the adult bald eagle observations were recorded at the same location on each survey while the birds were on nests. Numbers recorded represent trends throughout the year for a small portion of the Adak population. Peregrine falcons also nest on Adak.

The peregrine falcon, very common in the Aleutians, is rarely seen - especially up close. 038701, FGD.

7. Other Migratory Birds

The only true nonmigratory bird in the Aleutians west of Unimak

Table 12. Raptors observed during Adak general wildlife surveys, 1987.

VEHICLE SURVEY

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOTAL
Bald Eagle (Adult)	-	12	13	23	28	27	20	20	37	13	21	5	219
Bald Eagle (Imm.)	-	16	16	8	13	28	25	19	42	25	24	16	232
Peregrine Falcon	-	-	-	-	-	-	-	1	2	2	-	1	6
	(0)*	(2)	(1)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(1)	

BEACH SURVEY

Bald Eagle (Adult)	5	12	5	11	12	14	16	6	5	6	12	-	104
Bald Eagle (Imm.)	2	1	6	3	3	12	14	10	1	3	4	-	59
Peregrine Falcon	-	-	-	-	-	-	-	3	-	-	1	-	4
	(1)*	(2)	(1)	(2)	(3)	(2)	(2)	(2)	(3)	(2)	(2)	(0)	

BOAT SURVEY

Bald Eagle (Adult)	-	-	-	3	5	6	7	6	6	8	6	7	54
Bald Eagle (Imm.)	-	-	-	3	3	-	5	3	2	1	1	2	20
Peregrine Falcon	-	-	-	-	-	-	-	1	1	-	-	1	3
	(0)*	(0)	(0)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(2)	(1)	

* indicates number of surveys conducted each month.

Pass is the rock ptarmigan although several "migratory" species don't leave the chain. Excluding species covered in other sections of this report, species not leaving their breeding islands include the common raven, winter wren, song sparrow, snow bunting and rosy finch. That leaves 83 "other" migratory species for this section. Many of these species have been recorded as they pass through the Aleutians between wintering grounds (North America, Asia, Hawaii, Japan, or elsewhere in the Pacific) and breeding grounds (mainland Alaska or eastern Russia). The apparent exceptions are American dipper, water pipit, savannah sparrow and lapland longspur, which remain through the summer to nest on the islands. Aleutian redpolls have been sporadically recorded all months of the year and have occasionally nested on some islands. Of species in this section at least 46 are Asiatic in origin. What follows covers unusual North American and all Asiatic species recorded during the year:

Barn Swallow - One observed at Secret Ponds, Adak, on 11 June, a first sight record for Adak.

Black-backed Wagtail - One observed at NAVFAC Beach, Adak, 02 September.

Water Pipit - One observed at Clam Lagoon seawall, Adak, on 21 May, a new month record. A high count of 100 observed NAVFAC Beach, Adak, from 01-15 September.

Northern Shrike - One observed Adak National Forest on 11 December.

Brambling - A female observed at a refuge bird feeder on 25 May and a male observed at Lake Andrew, Adak, on 03 June setting Adak's 4th and 5th site records, respectively.

Hawfinch - A female observed at a refuge bird feeder from 19-22 June, second site record and a new month record for Adak.

The fifth annual Adak Breeding Bird Survey conducted 27 June by Biological Technician Greg McClellan and SCA Volunteers Amy Synder and Dan Niven was performed in conjunction with the Office of Migratory Bird Management program. The 29 species observed included a common black-headed gull and Kittlitz's murrelet. A total of 806 birds were tallied during the 50 stop, 25 mile route (Table 13).

The 29th annual Adak Christmas Bird Count (CBC) was held 01 January, 1988 after being postponed through December due to bad weather. Eighteen participants recorded 34 species and 3,649 individual birds (Table 14). The 844 emperor geese seen was a record for that species (207 in 1986 and 4 in 1985). Two species seen previously but missing in 1986 and 1987, were the common eider and winter wren.

Table 13. Adak Breeding Bird Survey, 06 June 1987, compared to the 05 June 1986 and 20 June 1985 counts.

	1987		1986		1985	
Species	Number	Stops	Number	Stops	Number	Stop
Pelagic Cormorant	17	4	3	2	6	4
Green-winged (EUR) Teal	87	9	74	12	76	11
Mallard	31	7	26	6	12	8
Northern Pintail	3	7	4	2	5	2
Tufted Duck*	1	1	-	-	-	-
Greater Scaup	41	5	54	3	26	6
Harlequin Duck	10	3	5	3	9	4
Red-breasted Merganser	10	5	4	2	14	6
Bald Eagle	6	5	10	7	18	14
Rock Ptarmigan	5	5	10	6	20	12
Black Oystercatcher	-	-	2	1	3	1
Rock Sandpiper	9	5	2	2	-	-
Red-necked Phalarope	5	3	5	2	10	4
Parasitic Jaeger	4	4	10	4	13	5
Common Black-headed Gull	1	1	-	-	-	-
Glaucous-winged Gull	114	18	92	18	90	20
Black-legged Kittiwake	83	9	-	-	2	1
Common Tern (Asiatic)*	-	-	1	1	-	-
Arctic Tern	26	6	9	3	12	2
Aleutian Tern	24	7	40	2	29	6
Pigeon Guillemot	2	2	-	-	-	-
Marbled Murrelet	51	5	32	4	2	2
Kittlitz's Murrelet	4	2	-	-	-	-
Tufted Puffin	5	1	20	1	10	1
Horned Puffin	2	1	11	1	29	1
Common Raven	5	3	10	4	6	5
Winter Wren	2	2	-	-	-	-
Song Sparrow	11	8	19	11	13	8
Lapland Longspur	216	44	309	48	230	48
Snow Bunting	8	3	8	5	6	5
Rosy Finch	23	9	7	6	13	9

* Not known to nest in Aleutians

8. Game Animals

Caribou were introduced to Adak in 1958 and 1959 by the military. The herd grew rapidly due to mild winters, lush vegetation and lack of disease, predators and biting insects. Within 10 years many islanders were hunting caribou and the world's heaviest bull (over 700 pounds) was taken at Adak in 1968. The management goal of a cooperative agreement between FWS, Alaska Department of Fish and Game and the Navy, is a postseason population of 150-250 animals. Since no natural predators or disease exist on the island, population control is accomplished through sport hunting. U.S. Navy support in the form of boat transportation for military hunters and refuge monitors is essential for proper management.

Table 14. Adak Christmas Bird Count, 01 January 1988.

Species	No.	Species	No.
Red-throated Loon	1	Common Merganser	2
Pacific Loon	1	Red-breasted Merganser	133
Loon species	1	Bald Eagle	160
Horned Grebe	8	Peregrine Falcon	1
Red-necked Grebe	8	Rock Ptarmigan	2
Pelagic Cormorant	150	Black Oystercatcher	5
Red-faced Cormorant	-	Sanderling	45
Cormorant species	23	Rock Sandpiper	41
Whooper Swan	3	Mew Gull	-
Emperor Goose	844	Glaucous-winged Gull	242
Green-winged Teal (Eur)	5	Thick-billed Murre	1
Mallard	23	Pigeon Guillemot	22
Northern Pintail	1	Marbled Murrelet	1
Eurasian Wigeon	-	Ancient Murrelet	1
Greater Scaup	64	Least Auklet	-
Steller's Eider	-	Alcid, species	-
Harlequin Duck	826	Snowy Owl	-
Oldsquaw	168	Common Raven	304
Black Scoter	24	Song Sparrow	32
White-winged Scoter	-	Snow Bunting	35
Scoter species	45	Rosy Finch	132
Common Goldeneye	237	Common Redpoll	4
Bufflehead	54		

Total 34 species, 3649 individuals

With limited personnel and higher priorities, no caribou management efforts were attempted in 1987. The annual pre-harvest aerial caribou survey could not even be conducted. Herd management concentrated on working with the registration hunt permit system and maintaining harvest statistics. Seventy-eight caribou were reported harvested from 01 September to 31 December 1987, compared to 101 in 1986, 116 in 1985 and 119 in 1984. A main reason for the lower harvest was the lack of Navy boat support. Normally, the Navy boats provide free transportation for military personnel to the south side of Adak where the majority of caribou are found and over 65 percent of the harvest occurs. Bad weather, boat malfunctions and budget cuts prevented most hunters getting to the south end of the island. A charter boat available through the Naval Security Group Activity (NSGA) Recreation Department transported hunters for $350.00 round trip. The crew of the "Kuluk Clipper" did an excellent job of delivering hunters to the south end of the island to hunt caribou.

Last season's final harvest (01 September 1986 - 31 March 1987) of 134 animals compared to the 1985-1986 season total of 153. The current goal is a harvest of 170 to 270 animals by 31 March 1988 to achieve management objectives, but it is clear this

objective will not be met.

9. Marine Mammals

Three whale strandings occurred on Adak in 1987 and were investigated by refuge staff. The first occurred at Kuluk Bay on 4 June and involved a sperm whale (Physter macrocephalus). The carcass was in poor shape and in an advanced stage of decomposition. The whale was approximately 10 meters long. Refuge staff collected the lower jaw and teeth. After the lower jaw and teeth are cleaned, the teeth will be glued back into the lower jaw and it will be used as a display item. The upper skull, after being cleaned for several months by the surf and scavengers, was also collected and will be displayed outside the visitor center. The other two whale strandings were of Pacific (Stejneger's) beaked whales (Mesoplodon stejnegeri) with the first stranding discovered on 18 August. The whale was lodged between two rocks in Sweeper Cove and was towed by the refuge Boston Whaler to a beach area where staff took measurements and samples. It was a female, approximately 5 meters long. The whale had been dead for some time as the outer skin was decomposing. Various internal samples and the skull were collected and shipped to the Smithsonian Institution. The second Stejneger's beaked whale was discoverd at the north end of Clam Lagoon on 25 November. The carcass appeared fresh and in good shape except for a small area around the right eye and top of the beak. No external injuries were observed. This one was also a female, approximately 5 meters long. Various internal tissue samples and the skull were collected, plus a fetus approximately 1.1 meters long. All samples were again shipped to the Smithsonian. The two strandings of the Stejneger's beaked whales allowed refuge staff an excellent opportunity to gather valuable information on a little known species.

Marine mammal surveys were conducted on Kiska Island in March and June as part of the bird and mammal surveys there in conjunction with the Compound 1080 project. A detailed synopsis of the results of the surveys is contained in section G. 15. A brief description of the general wildlife surveys conducted on Adak, can be found in section G. 3. Five different species of marine mammals were observed during the general Adak wildlife surveys (Table 15). The sea otter was the most numerous species observed with averages of 124 and 28 and 62 observed on each vehicle, beach and boat survey, respectively. Averages of 21, 7 and 5 harbor seals were observed in 1987 during vehicle, beach and boat surveys, respectively. Harbor seals are the second most abundant marine mammal observed around Adak.

Whales are fortuitously observed throughout the year at Adak, primarily in Sweeper Cove and Kuluk Bay. Single minke whales were observed on 4/21, 5/4, 5/19 and 9/5. Killer whale

Table 15. Marine mammals observed during Adak general wildlife surveys, 1987.

VEHICLE SURVEY

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOTAL
Sea Otter (Adult)	-	214	82	201	299	208	319	216	397	266	217	59	2478
Sea Otter (pup)	-	9	3	5	2	-	1	2	4	12	16	3	57
Harbor Seal	-	6	-	47	31	22	31	64	118	29	29	-	377
Minke Whale	-	-	-	-	1	-	-	-	-	-	-	-	1
Whale species	-	-	-	-	-	-	-	1	-	-	-	-	1
	(0)*	(2)	(1)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(1)	

BEACH SURVEY

Sea Otter (Adult)	26	26	9	23	68	49	90	76	98	81	45	-	591
Sea Otter (pup)	1	-	1	5	-	-	-	-	-	2	13	-	22
Harbor Seal (Adult)	1	1	1	9	26	5	3	1	31	37	2	-	117
Harbor Seal (pup)	-	-	-	-	-	-	-	-	-	-	1	-	1
Minke Whale	-	-	-	-	-	-	-	-	1	-	-	-	1
Northern Sea Lion	-	-	-	-	-	-	-	-	-	-	3	-	3
	(1)*	(2)	(1)	(2)	(2)	(2)	(2)	(2)	(3)	(2)	(2)	(0)	

BOAT SURVEY

Sea Otter (Adult)	-	-	-	66	72	67	96	73	61	55	84	45	619
Sea Otter (pup)	-	-	-	3	-	2	1	-	4	9	11	9	39
Harbor Seal (Adult)	-	-	-	1	1	1	1	19	5	3	17	3	51
Harbor Seal (pup)	-	-	-	-	-	-	1	-	-	-	-	-	1
Northern Sea Lion	-	-	-	-	-	-	-	-	-	-	3	-	3
Harbor Porpoise	-	-	-	-	9	-	-	-	-	-	-	3	12
	(0)*	(0)	(0)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(2)	(1)	

* indicates number of surveys conducted each month.

observations were concentrated in the fall with two observed on 9/15, 1 on 9/29, a pod of 10 on 10/23 and a pod of five from 11/3 to 11/5. The pod of five killer whales in November included a large male and a small juvenile. In several instances, the pod swam within 15 yards of shore allowing refuge staff and the general public excellent viewing opportunities. Other whale sightings throughout the Chain included a pod of 10 killer whales between Amchitka and Semisopochnoi islands which swam alongside the charter vessel "Maritime Maid" for 20 minutes, a pod of 5 killer whales observed west of Amchitka, and three probable sperm whales observed east of Amchitka with one whale swimming on the surface just in front of the refuge vessel "Tiglax" for approximately 15 minutes. Several observations of Dall porpoises were recorded throughout the Chain from Agattu to Adak.

A rare sighting of a sperm whale occured off Amchitka Island in Mid-August. #098705, GTM.

The National Marine Fisheries Service conducted an aerial spring survey of sea lions throughout the Aleutians from Unimak to Attu Island with approximately 20,000 sea lions counted.

10. Other Resident Wildlife

The rock ptarmigan is the only resident bird species present in the Aleutian Islands west of Unimak Island. Permanent ptarmigan transects were established at Adak in 1981, but were not monitored this year due to other obligations. Judging from the

number of ptarmigan bagged by hunters, however, it appears that the birds had another productive year.

11. Fisheries Resources

Pink salmon are the most numerous and heavily harvested of the four anadromous fish species utilizing Adak streams. Dolly Varden and small kokanee salmon are harvested to a lesser extent, while halibut is available to "salty dogs". Reasonable red and silver salmon runs also occur at Adak, althouth the numbers have always been less in odd years than in even years for any salmon species. No specific salmon spawning counts were completed this year due to higher priority work.

14. Scientific Collections

Dr. Norman French, Institute of Arctic and Alpine Research, University of Colorado, conducted a study on Amchitka to document the nesting success of Aleutian rosy finches during their first breeding/nesting season following the removal of WWII buildings by the U.S. Army Corps of Engineers under the DERA Program. Fifteen rosy finches were collected for karyotype and electrophoretic analysis comparison with North American and Asiatic species.

Dr. Edward H. Miller, British Columbia Provincial Museum, collected 20 rock sandpipers on Amchitka as part of a study to investigate the microevolutionary integration in the sandpiper tribe Calidridini in western Alaska and western Canada.

Dr. Gerald Shields, University of Alaska, Fairbanks, collected a single song sparrow on Amak Island which is a possible candidate under the Endangered Species Act. Dr. Shields also collected a single song sparrow on Adak to compare to the one collected on Amak.

Dr. David Smith, University of Tennessee collected a single specimen of the proposed endangered plant species, Aleutian shield-fern on Mt. Reed, Adak. The specimen was deposited at the National Herbarium, Smithsonian Institution.

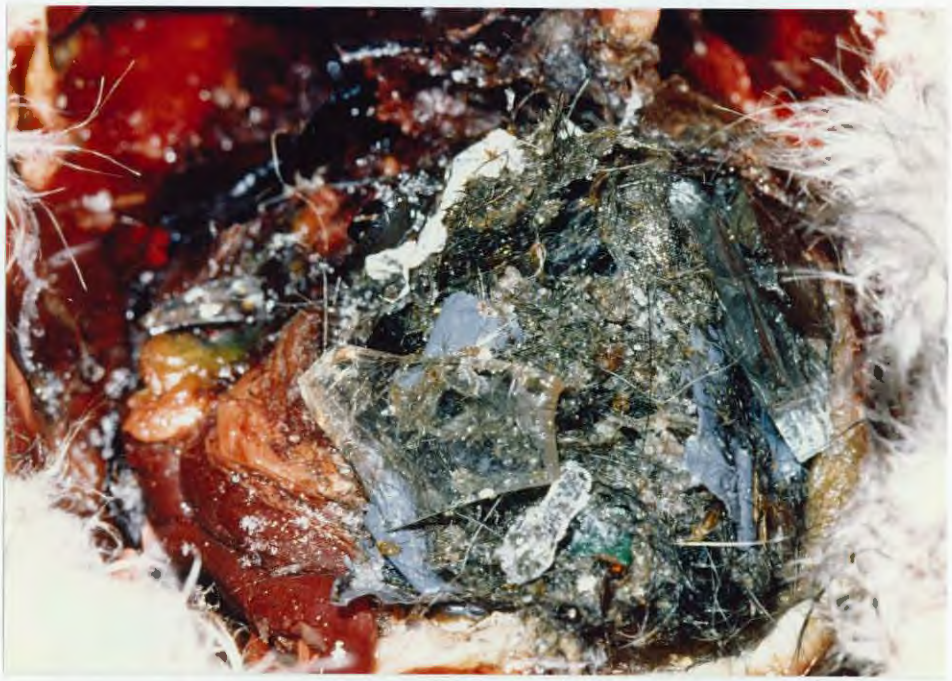
Fish were collected on Agattu, Kiska, Adak and Great Sitkin by personnel from FWE-ANC and refuge staff as part of a contaminant sampling at Defense Environmental Restoration Program clean-up sites.

The two Aleutian Canada goose carcasses from the Buldir/Amchitka transplant operation were shipped to Mike Amaral, FWE-ANC, for eventual shipment to the National Health Lab in Madison, Wisconsin.

Four pelagic and two red-faced cormorants were collected by

refuge staff in Kiska Harbor for Dr. Charles Simenstad, University of Washington for tissue sampling/carbon isotope analysis.

Twenty-two bald eagle carcasses were retrieved on Adak in 1987 (section G. 6), measured and sex determined. Primary tail and wing feathers were shipped to Law Enforcement personnel in Anchorage and subsequent processing at Pocatello, Idaho, for native Americans. No other scientific collections were made on the unit except for the salvage of occasional dead specimens which included: 16 sea otters, 5 common ravens, 2 fork-tailed storm petrels, 1 short-eared owl, 1 harbor seal pup and various parts from 3 whale carcasses.



A necropsy of an electrocuted bald eagle found this stomach full of broken glass and plastic. #098706, GTM.

15. Animal Control

An Experimental Use permit (EUP) was granted in November 1985 by the U.S. Environmental Protection Agency (EPA) to benefit the endangered Aleutian Canada goose. The permit allowed the FWS to evaluate the effectiveness of Compound 1080 for eliminating introduced arctic fox from Kiska Island. The ultimate goal is registration of the Compound for use elsewhere in the Aleutians. Specifically, the EUP allows up to 50,000 baits per year to be distributed by air for two years (1986 and 1987). The result is expected to be the eradication of fox from Kiska. Eradication

cannot be economically accomplished through conventional mechanical means (traps, snares, guns, etc.) because the island is too large (69,598 acres) and rugged. It would require years of effort by numerous personnel using conventional means to even approach success. The island also has an excellent food source for the fox in the form of the largest known crested and least auklet colony in the world (1.4 million birds) and extensive high quality scavenging beaches. If the eradication effort on Kiska is successful, authorization of Compound 1080 on other Aleutian islands to benefit the endangered Aleutian Canada goose and other migratory birds will be sought.

As part of the EUP, a pre- and post-fox eradication inventory of wildlife populations at Kiska Island is required. The surveys are to allow evaluation of treatment effects on the target species (arctic fox), monitor the impact of the treatment on non-target wildlife species (in particular raptors and avian scavengers), and evaluate and document the recolonization and population trends of other avian species whose breeding populations have been suppressed or eliminated by the foxes. Initial pre-eradication wildlife surveys were conducted at Kiska in June 1985 and March and June 1986. March follow-up work consisted of aerial pre- and post- Compound 1080 baiting surveys for arctic fox, bald eagles and northern sea lions, and the placement of over 48,000 single dose baits (SDB's) of Compound 1080. June work consisted of a replication and slight expansion of wildlife surveys established the previous summer. Budget restrictions limited the June survey work to one half of the time planned (two weeks vs. four) and eliminated all other animal control and field work scheduled for the summer. Work conducted in 1987 included a repeat of the aerial surveys conducted in March 1986, resulting in the declaration of the fox-free status of Kiska! Wildlife surveys were also planned for June 1987; but due to the late arrival of the new refuge vessel, this summer work was cancelled except for two days in July.

Four refuge unit biologists and one U.S. Department of Agriculture animal damage control specialist were on Kiska from 25 March to 02 April 1987. As was the case last year, the charter vessel "Maritime Maid" provided lodging and meals for personnel at the island and transported personnel from Adak to Kiska and return. The vessel also provided fuel storage for the helicopter. The Bell 412 helicopter was flown from Anchorage to Kiska (with stops at Cold Bay, Dutch Harbor and Adak enroute). While on island the large accessory fuel tanks used for the flight from Anchorage were removed from the helicopter and seats were installed for wildlife surveys. The helicopter provided an excellent platform for all March Kiska surveys.

Winter wildlife surveys were conducted on Kiska Island from 27 March 1987 to 30 March 1987. The surveys concentrated on arctic fox, bald eagle and northern sea lions.

The weather proved a challenging adversary in attempting to duplicate the wildlife surveys established in March 1986. It began with cold temperatures and icing conditions which caused some minor problems on the charter vessel. Icing conditions and an electrical problem delayed departure from Adak until 23 March. The weather on Kiska was worse than normal winter weather. While intense winter storms with gale force winds and rain or snow are common in the Aleutians, there is usually some good weather between these storms. This spring, storms came right after one another with no breaks. Work on Kiska was completed just ahead of the second worst storm ever recorded in the Aleutians (930 mb barometer reading) which delayed return of the charter vessel to Adak by almost 2 days.

One benefit of the intense stormy weather was fresh snows which occurred prior to surveys and allowed a thorough search for fox tracks. Three fox surveys were flown during the early evenings (1700 to 1900) using the methods and the eight transects established in 1986 (Figure 3). All arctic fox transects were

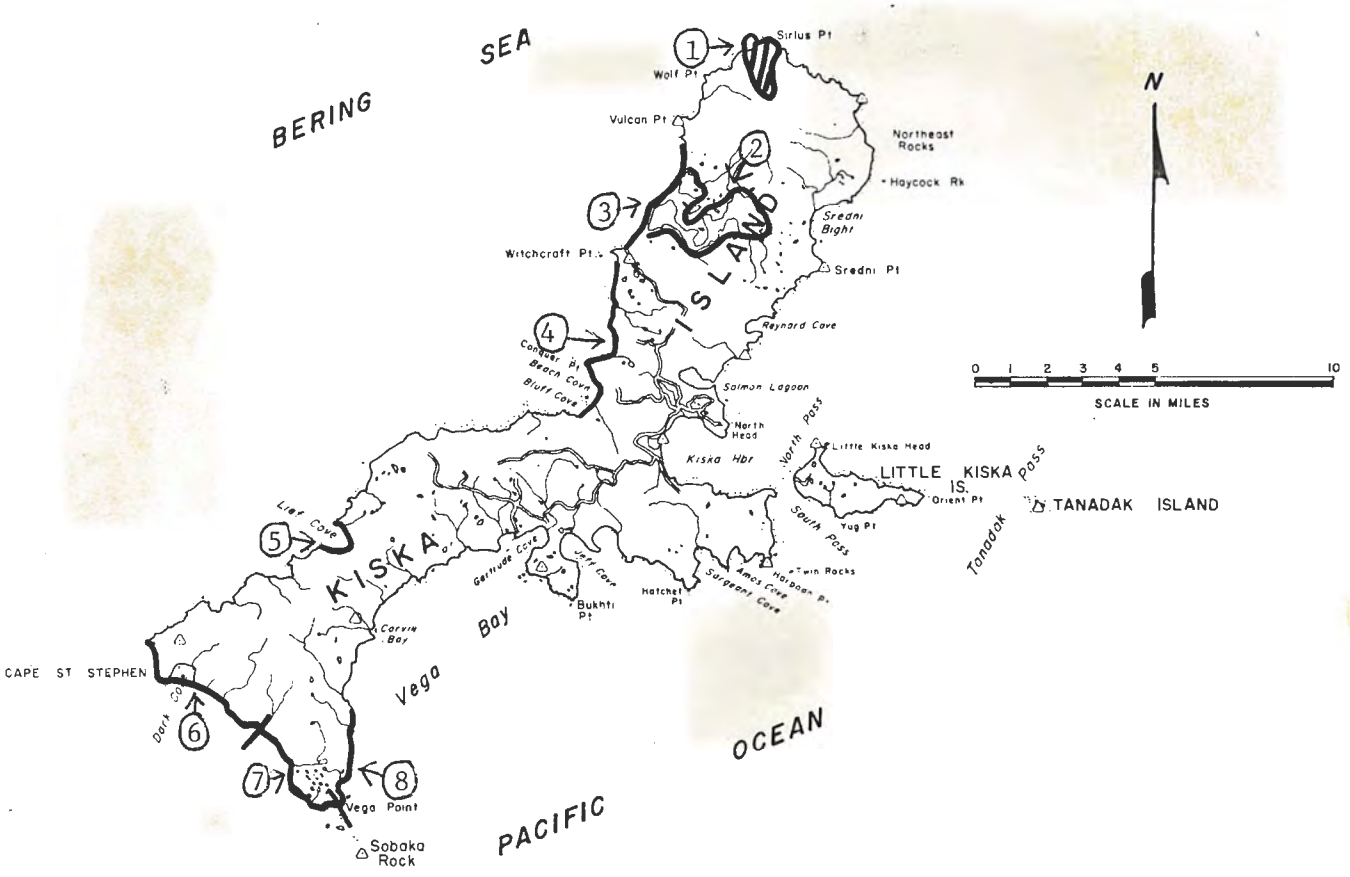


Figure 3. Location of arctic fox survey transects established on Kiska Island, March 1986.

conducted from the helicopter. Four primary observers were used. Two sat in the passenger area with one looking forward and the other rearward. A third observer sat amidship between the pilot and copilot looking forward. The pilot or copilot, whoever was not flying was the fourth observer. All observers and the pilots functioned as a team and visually searched all habitat for fox during the survey. All fox survey flights started from Kiska Harbor and proceeded north to the auklet colony. The colony was the first transect conducted and was followed by the Kiska Lakes and Boulder Beach transects. The survey then continued with the Witchcraft Point transect and proceeded counterclockwise around the island.

The arctic fox surveys were conducted on the 27th, 28th and 29th of March 1987. No arctic fox or fox sign were observed on these surveys! This compares with the 1986 results of an average of 101 arctic fox observed on pre-baiting surveys and 1.5 or 3.3 fox observed on post-baiting surveys depending on how the results were computed. In addition to the actual arctic fox transect surveys, landings were made in four areas which had high fox densities in 1986. These areas were Kiska Harbor, Lief Cove, Cape St. Stephen and Vega Point. The sandy beach of Kiska Harbor provides excellent scavaging habitat for arctic fox, but no fresh sign or fox were found. In 1986, Lief Cove was the sight of a dead sperm whale and a high of 30 arctic fox were observed there on one occasion. This year the whale was gone and so were the fox. No fresh fox sign was observed at Lief Cove either. Cape St. Stephen and Vega Point have areas where northern sea lion's haul out on shore. Arctic fox were concentrated in these areas in 1986, but no fresh sign or fox were observed there in March 1987.

In addition to the absence of arctic fox or fresh fox sign in the four landing areas, an abundance of rat signs were observed this year. Fresh rat burrows, trails, scat and evidence of feeding in the kelp along the beach were noted at all locations in 1987. A few rat burrows were even noted in old fox trails. The abundance of rat sign in 1987 was vastly different from 1986 when such sign was not as prevalent. The rat sign in these areas is in itself positive evidence that arctic fox are no longer on Kiska Island.

Finally, while conducting island-wide bald eagle surveys and northern sea lion surveys, incidental searches were made for arctic fox or fresh fox sign. On two morning bald eagle surveys conducted on 27 and 28 March 1987, there was fresh snow all the way down to the beach. If there were any live fox remaining on Kiska, their tracks would have been easily observed in the fresh snow. No arctic fox tracks or sign were observed on those two surveys with fresh snow or on any other wildlife surveys. Based on the facts that no arctic fox were observed on the fox transects, no arctic fox or fresh sign were observed in thorough

ground searches in four areas of previous high fox densities, the abundance of rat sign in these four areas, and the absence of arctic fox or fresh sign on other wildlife surveys (especially the two bald eagle surveys with fresh snow), it was felt that the baiting of Kiska Island with approximately 48,000 Compound 1080 SDB's in March 1986 has been successful in eradicating, fox from the island! Such results were far beyond anyones belief when the experimental study was initiated in the summer of 1985!

Bald eagle surveys established in 1986 on Kiska and Little Kiska Islands were replicated in 1987 and flown in a manner similar to the fox surveys except at an elevation of 300 to 500 ft. All aeries were plotted on scale maps and the number of adult and juvenile birds recorded. Bald eagle surveys were conducted in the late morning or early afternoon and covered the shoreline of the island, lasting about 2 hours. As the locations of each aerie were plotted, care was taken in later flights to minimize disturbance to the birds. The same number of observers and seating arrangements used on the arctic fox surveys were used on the bald eagle surveys.

The total bald eagles observed per day on Kiska during the surveys ranged from 38 to 49 (Table 16). In 1986, the total bald eagles observed ranged from 43 to 50. An average of 37 adult and 6 immature bald eagles were observed in 1987 which compares closely with the 1986 helicopter surveys when an average of 38 adult, 7 immature and 2 unknown age bald eagles were observed. The adult bald eagle observations in 1987 were very consistent with 37, 38 and 38 birds being observed on the three surveys respectively. The adult observations in 1986 were also consistent. The immature bald eagle observations were variable during both years, but this is expected as they are difficult to observe due to their dark color, lack of territoriality and tendency not to flush easily from their perches. Also, if disturbed, immatures may fly to nearby islands. The results from the 1987 survey compares favorably to the 33 adult and 1 immature bald eagles observed in June 1986 and 34 adults and 8 immature bald eagles observed in June 1985.

Table 16. Results from island-wide raptor surveys conducted on Kiska Island, March 1987.

		Bald Eagle			Peregrine
Date	Observer	Adults	Immature	Total	Falcon
3-27	Everyone	38	11	49	5
3-28	Everyone	37	1	38	7
3-30	Everyone	38	6	44	8
Mean		37.6	6	43.6	6.6

The total number of bald eagles observed per day on Little Kiska during the 1987 helicopter surveys averaged six adults and four immatures, (Table 17) which compares closely with the average of

seven adults and one immature observed during the 1986 helicopter surveys.

Table 17. Results from island-wide raptor surveys conducted on Litle Kiska Island, March 1987.

		Bald Eagle			Peregrine
Date	Observers	Adults	Immature	Total	Falcon
3-27	Everyone	7	2	9	4
3-28	Everyone	4	6	10	1
3-30	Everyone	7	4	11	0
Mean		6	4	10	1.6

A total of 15 active bald eagle aeries were located on Kiska Island during the March 1987 surveys compared to 19 located in March 1986. Although four fewer active aeries were observed in March 1987, it was felt that the nesting phenology of the bald eagles had been delayed by the cold temperatures and snow cover. Of the four aeries active in 1986 but not active in 1987, adult bald eagles were active around three of the nest sites. The 15 aeries located in March 1987 compares to the 15 aeries located in June 1986, 16 aeries located in June 1985 and the 17 aeries located in 1978. In addition, two bald eagle aeries were located on Little Kiska Island in March 1987 which is comparable to the three aeries observed on Little Kiska in March 1986 and two in 1978.

Only three aeries with eggs were observed in March 1987 compared to nine aeries with eggs observed in March 1986. This is a further indication that nesting was delayed in 1987. The raptor surveys on Kiska in 1987 and 1986, however, were both conducted prior to the peak of egg laying on Adak which normally occurs in mid-April.

Efforts were made during surveys to flush as few birds as possible; thus the observers were not provided an opportunity to see into every nest. Again this year, the eagles seemed to become acclimated to the helicopter and appeared to flush less often during later surveys. Also birds flushed during later surveys did not appear to fly as recklessly or as far as they did on the first surveys. As the parents invest more time in the reproduction effort, the less likely they are to flush or fly very far from the nest.

Surveys of the northern sea lion population of Kiska Island were accomplished in March 1987 with three specific sea lion surveys conducted. The surveys were flown at 1200+ feet to minimize disturbance to the sea lions. Two observers made separate counts using 10x40 binoculars. The two counts were averaged to get a mean count for each group of sea lions observed. The totals of the 3 days of counts ranged from 1,595 to 1,952 with a total mean of 1,765 (Table 18). This is an increase over last years total

of 1,347 on one survey. The sea lions were concentrated in two areas with 65 percent of the sea lion observations recorded between Lief Cove and Bluff Cove and 33 percent at Cape St. Stephen and Sabaka Rock. Bob Day also found the highest sea lion concentrations north of Lief Cove and at Cape St. Stephen in 1978. The sea lion estimate made in March 1986 during the orientation flight also recorded large sea lion concentrations north of Lief Cove (est. 2000) and at Cape St. Stephen (est. 700). Although the total number of northern sea lions was higher in 1987 than 1986, there was also some change in use areas. Two areas with large numbers of sea lions observed in March 1986, but not March 1987, included NW of Vega Point and the north end of Kiska. New locations of sea lion observations recorded in 1987 but not 1986 included Bukhti Pt., Sargeant Cove and Twin Rocks.

Table 18. Results from northern sea lion surveys conducted on Kiska and Tanadak Islands, 28-30 March 1987.

Date-	28 March	29 March	30 March	
Time-Start	1505	1457	1642	
-End	1614	1614	1752	
Location	# Obs.	# Obs.	# Obs.	Mean
NW of Northeast Rocks	18	12	14	15
Sirius Point	2	0	1	1
Wolf Point	5	4	0	3
East of Gray Hill	151	135	128	138
Gray Hill to Lief Cove	995	1103	916	1005
Cape St. Stephen	452	455	434	447
Sabaka Rock	113	197	89	133
Bukhti Point	0	32	3	12
Sargeant Cove	0	1	0	0
Twin Rocks	11	13	10	11
Totals	1747	1952	1595	1765
Tanadak Island	336	333	334	334

Three sea lion surveys of Tanadak Island, which is east of Little Kiska Island, were also conducted in March 1987. The totals for the 3 days of counts were consistent and ranged from 333 to 336 with a mean of 334 (Table 18). Tanadak Island was not surveyed in 1986 due to a lack of time, but Bob Day recorded 670 sea lions on Tanadak Island during surveys in 1978.

Three bait weathering stations were established on Kiska in March 1986 to document the effect of weather and time on the baits. Each station contained 24 Compound 1080 single dose baits (SDB's). One station was placed in a sandy *Elymus*-grass habitat

about 20 meters above the outflow of the stream at the north end of Kiska Harbor. The other two stations were placed about 60m west and northwest of the northwest corner of the World War II "Rusty Arch" quonset hut used during the 1985 and 1986 summer work. Each station was constructed of wood and 1/2" welded wire and anchored to the ground with 1/4" polyrope and trap stakes.

Sea lions are one of the three species counted during post Compound 1080 baiting surveys on Kiska Island. #098707, GTM.

Twelve SDB's were taken from each weathering station in 1987. Six were taken from each station in March and six in July. The baits were shipped to the Denver Wildlife Research Center for analysis. The analysis showed mixed results with the baits from the two stations located NW of the "Rusty Arch" breaking down and losing their toxicity. The baits from the station located at the north end of Kiska Harbor actually showed an increase in Compound 1080 values; however, these baits were submerged in sea water which may have affected the results. Also, no baits from the bait dispersal in March 1986 were found during the ground searches in March 1986 nor during the short visit in July 1987.

Two refuge volunteers were on Amchitka for seven days investigating a rumor that ARM Dewhurst had received from construction personnel about a possible arctic fox sighting on fox-free Amchitka. The volunteers set six traps and several scent stations in the area where the fox was reported to have been observed. The volunteers observed no fox sign around the

trap sets or scent stations nor found any sign while investigating the cove. It was felt that the reported fox sighting was false.

16. Marking and Banding

The major AIU banding effort resulted in the marking of 127 ACG with metal bands and 128 ACG with yellow bands on Buldir Island. The extra color band was placed on the adult male previously banded in California in 1980. He had a very worn metal band but no plastic band.

Three birds were incidentally banded on Adak. An injured red-necked phalarope and a young Aleutian green-winged teal were both banded with metal bands when released. A nestling arctic tern was banded with a metal band.

H. PUBLIC USE

1. General

Most of the people living in the Aleutian Islands are active duty military personnel, their dependents, civilian military employees, and their dependents. A Naval Air Station and other Navy commands are located on Adak Island where approximately 5,000 people reside. Shemya Air Force Base, a U.S. Coast Guard LORAN Station on Attu Island, and a growing Navy population on Amchitka Island add some 1,300 military personnel to the population of the Chain. Tours-of-duty range from six months to two years, providing the refuge staff with a unique opportunity to contact a continually changing population with information, environmental education and interpretive programs. Native villages on Atka, Umnak, Unalaska, and Akutan islands and a fishing community at Dutch Harbor account for another 1500-2000 individuals. The AIU staff attempts to visit Shemya, Attu and each of the Native villages at least annually, although weather and logistical problems often interfere. Only Attu, Nikolski and Unalaska were visited during 1987.

Visitation to the Adak Fish and Wildlife Center increased by 82% over 1986 as 10,239 persons attended programs, viewed displays, purchased ANHA items, and gathered information. This increase was caused by a number of factors: an expanded awareness of the center by Adak's residents, the four-week military exercise "Fortress Gale," an extended stay by the subtender U.S.S. McKee, and the fact that the center was again included on the NAS bus route. The center was open 8 a.m. to 5 p.m. Monday thru Friday and 1 p.m. to 9 p.m. on Sunday. Each Sunday, nature films were shown at 1, 4, and 7 p.m. to give Adak residents an opportunity to learn more about Alaska's natural resources. This year, 54 different films were shown to 2,451 people. On special request, "Chain of Life", "Report From the Aleutians" and other wildlife

films were presented 155 times to 715 people. Twenty NAS "Blue Card" classes brought in an additional 739 visitors. Refuge personnel also handled 1,056 public inquiries. Adak public use surveys recorded an estimated 17,448 recreational visits. Consumptive use totaled 23,880 activity hours and nonconsumptive use was estimated at 16,096 activity hours.

An aerial view of "Downtown" Adak. #218701, JHK.

Adak's Navy Broadcasting Service (NBS) detachment is extremely supportive of our public education efforts. Throughout the year, NBS aired regular television and radio spots about refuge programs. In the spring, NBS "disc jockeys" made a 60-second commercial on the services available at the Fish and Wildlife Center. The spot aired for almost two months and made a noticeable difference in the support by island residents. On New Year's Eve, ORP Edgerton and other island representatives announced the "Top 20" songs of 1987 for a special holiday program. Only on Adak would a refuge staffer follow his radio Christmas greeting with "Shake Your Love" by Debbie Gibson.

NBS television reporters checked-in weekly for news information. Twenty stories were taped with refuge staff on topics such as field work on Kiska, fishing and hunting regulations, the "Tiglax", the SCA volunteer program, protection of migratory birds, the Fish and Wildlife Center, a beached whale in Sweeper Cove, the Christmas Bird Count, National Wildlife Week, and the problem with feeding bald eagles. A television crew also

accompanied RM Martin and other Service personnel to Great Sitkin Island to film a story on WWII toxic waste sites. United Press International became aware of Adak's eagle feeding problem and distributed an article ("Hungry Eagles Find Danger at Navy Base in Alaska") nationwide. ORP Edgerton was interviewed by representatives from state and national news media about the caribou management program and Adak's bald eagles. The reporters were on Adak to cover a major military exercise in mid-November.

For the second year in a row, very little refuge information was passed to the community through the "Eagle's Call", Adak's weekly newspaper. It did publish weekly notices on our Sunday films, but less than 10 refuge news releases were printed. Topics included refuge management, the "Tiglax", local volunteer needs, and the proposed endangered shield fern.

RM Zeillemaker and ARM Klett attended approximately 30 Navy staff meetings during the year. These meetings keep commands informed of refuge operations and keeps the refuge staff abreast of Adak Navy activities.

2. Outdoor Classrooms - Students

A one-credit environmental education workshop held in October, 1986 continues to reap benefits for the FWS and Adak's students. In April the elementary school teachers organized and conducted a highly successful "Sea Week" Celebration. This first time effort lasted not one but 2 full weeks and involved presentations by numerous community "experts" including boaters, fishermen, Navy divers and a seafood cook. ORP Edgerton gave slide presentations and "hands on" nature talks about Adak birdlife to 9 classes involving more than 225 children. The entire school took part in field trips to Clam Lagoon and Kuluk Beach to view and talk about wildlife. Students at every grade level participated in arts and crafts projects that filled the corridors and classrooms with an assortment of ocean scenes, beach treasures, and wildlife ranging from suspended schools of fish and pods of whales to rock communities of mollusks and crustaceans. On the last Friday of the celebration, the school had an assembly at which virtually every class presented a sea-oriented program which they had prepared during "Sea Week." There were puppet shows, skits, dances and lots of singing. The celebration was an excellent example of why the Service's environmental education mandate to teach the teachers is really the most effective.

As in 1986, the AIU summer education program was scaled down somewhat from what we would have liked to offer. One SCA volunteer Naturalist organized and planned a series of activities in conjunction with the NAS Recreational Services Department's Summer Fun and Day Camp programs and the Boy Scouts. Some 195 students were involved in the program's activities which included three tours of the refuge headquarters, six slide/tape programs,

six nature films and eight field trips which focused on seashores, birds, plants, salmon and people's affect on these natural resources.

ORP Edgerton assisted with the planning and implementation of a 4-hour field trip to Clam Lagoon for 36 high school students. With two teachers, Edgerton supervised the students in conducting beach transects and wildlife surveys to collect data used in the classroom for wildlife classification activities.

Refuge personnel conducted programs on bird biology and identification for two high school and two University of Alaska classes. ORP Edgerton presented a 90-minute program on refuge and Aleutian history to 12 other university students and gave two 45-minute slide programs on the WWII battle over Kiska to 19 elementary age youths in two summer school classes. He also served as a judge for the annual science fair at the elementary school. Finally, a one-hour program on predators was presented to 21 fourth graders.

3. Outdoor Classrooms - Teachers

In February, 36 National Wildlife Week packets were sent to teachers at Adak, and Atka, Nikolski, and Akutan villages. ANROE Newsletters, the Alaskan update for class project materials, refuge thank you letters (acknowledging the excellent work done with students), and Project Wild pins were distributed to all participants of the October 86 Environmental Education workshop.

In August, ORP Edgerton presented a 30-minute orientation about the refuge and its educational services to 40 Adak teachers and support personnel. Although there wasn't adequate staff to conduct an environmental education workshop in the Fall, a number of teachers borrowed films, photographs, books, pelts, and other items to use in their classrooms during the year.

We also wrote up a one-page flyer on the types of educational assistance available to island teachers and group leaders and for publication in a NAS Family Service newsletter.

6. Interpretive Exhibits/Demonstrations

In October, 1985, work began on an ARMM-funded project to design new, permanent displays for the Adak Fish and Wildlife Center. In January, 1987, the contractor finally completed the work and submitted final products. Unfortunately, the Public Use Management Plan, the specifications book and the engineering drawings had a number of mistakes which we corrected in-house rather than delay a contract already 11 months late. In June, the design package went to contracting and in September, a fabrication contract was awarded to the Condit Co. of Denver, Colorado.

In the spring a contract was let to a Fairbanks, Alaska, firm to design structural changes to the Adak Fish and Wildlife Center as called for in the display design package. Their work was completed by summer and in September, a construction contract was awarded to Dar Con Corporation of Anchorage.

By year's end, work was progressing on both of the building contracts to renovate the refuge visitor center. Structural changes should be completed by March 1988. By June, $100,000 of professional, interactive wildlife and history-oriented displays will transform the building into a first-class visitor center.

Due to the continued delays in the completion of the ARMM project, a couple of significant improvements were made in temporary displays. The majority of text and graphic work was completed for a refuge history exhibit and a bird identification activity sheet was designed to be used with a photographic display on Adak birdlife.

7. Other Interpretive Programs

In March the refuge sponsored its annual activities in observance of National Wildlife Week. On 15 and 21 March we offered a total of 13 programs (4 films, 2 children's nature/art activities, 2 nature excursions, and 4 slide shows) attended by 311 people. Refreshments, door prizes, and an art activity area for children were part of the special open-house offerings. During the week, 12 classes (284 students and teachers) from the elementary school, and 6 groups (76 children and teachers) from the Adak Child Care Center visited the center for special programs, talks, and new experiences with our "hands-on" exhibit table. We also sponsored a NWW poster contest for the elementary school, with 2/3 of the student body (276 Kids) participating. All 276 posters were displayed in the center. ORP Edgerton and RM Zeillemaker announced the winners at a school assembly and a formal awards presentation was held at the refuge on March 21. Two classes (44 students) also viewed a film just prior to its showing for NWW.

ORP Edgerton presented seven programs on the refuge, fishing and hunting regulations, and Adak's wildlife-oriented recreational opportunities to 538 Navy personnel as part of NAS newcomer orientation and command training activities. He also presented a one-hour slide show on the natural resources of Adak Island to 33 members of the Officer's Wives Club. ARM Klett presented a 30-minute program to members of the Adak Sportsman Association on the history of Adak's caribou herd. Three videotapes from the refuge film library were borrowed and viewed by 45 people. "Chain of Life" was shown four times through video systems on board ships visiting Adak and was seen by approximately 1,100 sailors.

Kris Curran conducting an environmental education program with a group of pre-schoolers. #028703, EVK.

Twice during the year, refuge staffers set up and manned a refuge information booth in the lobby of the Adak Navy Exchange complex. They set up displays, ran video and slide/tape programs, distributed flyers and brochures, answered questions and sold a few ANHA items. Both events were successful and convinced us to repeat the effort in the future.

On very short notice, we arranged for tours of the M/V Tiglax by the Adak community on the evening of 14 August. Despite coverage on both the local radio and television stations, attendance was disappointing with only 19 people taking advantage of the opportunity to see how their taxes are being spent.

The videotape checkout service begun through the Navy Exchange in 1986 ended when the tapes were no longer advertised or checked out. In addition, when the tapes were returned to the station six of the nine had been lost and one had been erased. With a new shipment of tapes on six different subjects the checkout service will operate from the Fish and Wildlife Center in early 1988.

Refuge publications, audiovisual programs and ANHA items were

given to the Tiglax for use onboard and in community outreach programs on its travels and were sent to Amchitka for use by ARM Dewhurst. The U.S. Department of Energy also donated two videotapes entitled "Testing Nuclear Weapons" and "Cannikin Test" to be used for programs on Amchitka. ARM Dewhurst presented these programs and "Chain of Life" six times to a total of 127 people at the contractors camp. She also conducted a waterfowl identification workshop in November. Thirty-one construction workers attended to watch "Ducks on the Wing" and "The Duck Stamp Story" and examine museum specimens from the Adak collection. Finally, temporary refuge displays were constructed in the recreation room of the Amchitka construction camp.

In March the new Adak Map and Recreation Guide, now in its fourth printing, was received. Changes in restricted areas and depletion of existing stock prompted the new printing. The new refuge brochure was also completed in the spring. The brochure features a photographic collage and graphic relief map of the Chain on one side that can be used as a poster. Along with The Aleutian Sound newspaper, brochures are distributed in the Navy's welcome aboard packets. Mid-summer brought the publication of a very attractive and informative Adak bird checklist. The list is definitely helping to make residents more aware of the island's rich birdlife. ORP Edgerton also updated the refuge section of the NSGA "Welcome Aboard" packet which was reprinted in the fall.

8. Hunting

The refuge is closed to hunting except for Attu, Shemya, Adak, Great Sitkin, Atka, Umnak, Unalaska, Akutan, Akun, Tigalda, and Sanak islands. Only waterfowl and ptarmigan hunting are authorized on Attu, Shemya, and Great Sitkin. The command at Shemya does not allow any hunting and the command at Attu allows waterfowl hunting only. Table 19 provides a breakdown of consumptive use on Adak. The waterfowl season opened on 8 October and for the second year in a row, hunting pressure seemed quite spread out through the season. As the only upland game bird on Adak, ptarmigan receive pressure throughout the season. Caribou hunting ended on 31 March with a total 1986-87 harvest of 134 animals, again short of our preseason goal. The season began again on 1 September and 327 hunters had received registration hunt permits from the refuge office by the end of the year. The registration system was again streamlined so that hunters did not have to renew permits during the year. Naval Air Station Adak normally provides tug service to the public use cabins on the south half of Adak for active duty military personnel during the caribou hunting season except for December and January. The NSGA Recreation Division charter vessel "Kuluk Clipper" also provides logistical support to hunters. Without this assistance, we could not effectively manage Adak's caribou herd. Caribou hunting is considered to be quite good on Adak and is extremely popular.

Table 19. Adak consumptive use

	Visits		Activity hours	
	1986	1987	1986	1987
Hunting				
Caribou	871	891	10,768	11,336
Ptarmigan	919	918	3,527	3,244
Waterfowl	265	295	878	969
Total	2,055	2,104	15,173	15,549
Fishing	5,317	4,515	10,074	8,331
Total	7,372	6,619	25,247	23,880

9. Fishing

Fishing is the most popular consumptive activity on the refuge (Table 19). Saltwater enthusiasts angle for halibut and set crab pots in nearby waters. Stream and lake fishermen concentrate on pink, red and silver salmon, and Dolly Varden. The 1987 pink salmon run was unusually late and short, although once it began there were good numbers of fish and fishermen crowded the most readily accessible streams. Finger Bay Stream has been designated "fly fishing only" by Naval Air Station directive to control fishing pressure in that popular spot. High quality wilderness fishing is also available for those interested in hiking. NSGA's "Kuluk Clipper" ran daily halibut fishing trips for up to six fishermen, one of whom must win a reservation through the lottery system. Demand for the trips is always high and many people put in for the monthly drawing. In June, an Adak resident caught an eight-foot 383 lb. halibut, an island record.

All NSGA land, including Clam Lagoon (the island's clamming "hotspot"), remained closed to clamming this year due to the uncertainty of the existence of red tide and the possibility of Paralytic Shellfish Poisoning (PSP).

10. Trapping

Trapping for arctic fox is allowed year round on Adak. Free refuge permits were issued to 25 trappers during the year. Much of the trapping is at sites near personal or organizational cabins on the north (Navy) portion of the island. Thirty-one fox were reported taken during the year.

11. Wildlife Observation

Landscape wildflower and wildlife observers and photographers enjoy many opportunities available on Adak. Bald eagles and sea

otters are common and are favorite subjects. Caribou and puffins, although a bit more difficult to see, are also highly sought with camera and binoculars (Table 20). Birdwatching is an activity that is becoming more popular on the island.

13. Camping

The entire AIU (except Buldir, Chagulak and Bogoslof islands) is open to camping. Most use, however, occurs on Adak where five FWS backcountry cabins are available on the south portion of the island on a first come, first served, reservation basis. As in past years, the cabins received moderate to heavy use by backpackers, fishermen and caribou hunters.

16. Other Non-Wildlife Oriented Recreation

Cross-country skiing, sledding, tubing and snowshoeing are extremely popular winter activities on Adak when snow conditions are adequate. Hiking and beachcombing are popular throughout the year and berry picking is enjoyed by many during the fall.

Beachcombing is a popular recreational activity on Adak. #048706, TRE

Table 20. Adak selected nonconsumptive uses

	Visits		Activity hours	
	1986	1987	1986	1987
Hiking	4,444	3,861	15,524	9,128
Land Vehicle	4,938	5,265	4,938	5,265
Photography	1,657	1,703	1,657	1,703
Total	11,309	10,829	22,119	16,096

17. Law Enforcement

ARM Klett and ORP Edgerton attended the 40 hour Refuge Law Enforcement Officer refresher training session in Anchorage in January. Their "practical" exercise turned into the real thing as refuge officers assisted in the conclusion of an 18 month "Operation Mammal" sting investigation involving the seizure of 17 polar bear hides, several hundred pounds of walrus ivory, mounted owls and assorted bald eagle parts. At present, most refuge enforcement work occurs on Adak Island. The lack of logistical support makes enforcement on other islands virtually impossible. Station policy dictates all violations involving military personnel on the Adak Naval Reservation lands are turned over to the appropriate Navy command for prosecution. Military personnel who violate regulations off the Naval Reservation and all civilians are issued FWS citations.

This year, the Naval Natural Resources Management Division (NRMD) of the Security Department was very active. The NRMD provides qualified volunteers to check sportsmen on the Naval Reservation for compliance with state and federal fishing and hunting regulations. NRMD volunteers have authority to issue citations for game law violations, since all state and federal laws are covered under Navy regulations. The refuge retained control of fish and wildlife management activities when the Naval Reservation was established in 1959. ARM Klett and ORP Edgerton conducted several training sessions with the Navy volunteers and several Adak NAS Security personnel on fishing and hunting regulations and served as liaison officers with NRMD personnel. We are happy to report that the Navy's NRMD volunteer "wardens" did an excellent job monitoring fishing activity at problem areas on the military reservation. In the past, persons reported fishing violations (i.e. snagging salmon in fresh water, keeping too many fish, or taking fish with illegal gear) to us. We often responded but usually found no evidence of a violation or could not locate the alleged violator. Several undercover investigations were conducted with negative results. Our small staff does not have the time to do extensive patrols and keep

Adak's 1,000 or so "sportsmen" in compliance. The activities of the NRMD personnel have almost eliminated this type of call.

NMFS Agent John Cook, Kodiak, Alaska, was on Adak the 16th and 17th interviewing people involved with the illegal sale of fish reported last year. Several involved persons have transferred to California since the initiation of the case and still have to be interviewed before any recommendations are made regarding prosecution. In May, we received word that the NMFS agents had decided to file charges on one of the two suspects in state court. The suspect pleaded guilty and was fined $500.00.

18. Cooperating Associations

Adak's income during 1987 far exceeded our most optimistic hopes. The outlet brought in $29,704.40, an increase of more than 105% over 1986. This growth was a result of dramatically increased visitation to the Fish and Wildlife Center, a wider variety of items for sale including several Adak/Aleutian resources produced by a local photographer, expanded hours of operation for the center, and the production of an extremely popular set of 10 postcards. In sales the outlet ranked sixth of 22 outlets in Alaska. Adak continues to sell more memberships than any other outlet in the state. During 1987, 114 persons joined ANHA.

As in the past, refuge personnel manned FWS information/ANHA sales booths at the annual Adak "Spring Fling" and "Fall Festival". These arts and crafts fairs are very helpful in introducing the FWS, refuge programs and ANHA to the general island population. Annual involvement is an important part of our public use and information program.

Several new items were sold this year and most proved to be quite popular. New publications included The Forgotten War, Whales Zoobook and The Capture of Attu. The following list of new visual aids were also sold: a set of eight Adak notecards, two different calendars, double-matted Adak wildlife and scenery prints, a puffin notecard, a second color of the refuge T-shirt, an award-winning refuge seabird poster, Larry Beck's Adak poster, a variety of lapel pins, and a set of 10 refuge postcards. Although the postcards were not received until June, by the end of September we had sold more than 10,000 cards! Each provides an interesting "nature note" about some aspect of the refuge and its flora and fauna. They are sold at 25 cents each or the set of all 10 for $2.00. Visual aids accounted for approximatley 60% of the year's income.

Association aid to the refuge during 1987 came in many forms. ANHA funds made possible the completion of the set of wildlife and scenery postcards and an attractive refuge lapel pin featuring a volcano, two seabirds and an otter with the words "Alaska Maritime Nationsl Wildlife Refuge-Adak" around the

perimeter. Along with a matching state grant, ANHA also funded the publication of a four-page interpretive newspaper, "The Aleutian Sound". The newspaper was written for Aleutian residents and visitors with information about the refuge and its management, and to invoke a positive feeling for the uniqueness of these islands. It is distributed in every Aleutian community, at interagency visitor-centers at Tok, Fairbanks, and Anchorage and at other locations throughout Alaska. The paper is included in the military "welcome aboard" packets sent to personnel deployed to Adak. It was originally carried on commercial airlines servicing the islands unti a problem developed with the ink rubbing off onto the planes' upholstery, which required the airlines to distribute the newspaper at ticket counters. Finally, "The Aleutian Sound" was sent to a number of individuals/groups that had specially requested it for educational, professional and personal use. The publication proved very popular. We went through the first printing of 15,000 copies in 2 months. When the second printing is exhausted, we plan to add a few more articles and change to a non-newspaper format. Other sales proceeds supported volunteer workers, teacher workshops and refuge special events, purchase a cash register, a program announcement board, a wide variety of environmental education materials, interpretive supplies, a life membership to the National Wildlife Refuge Association, and obtain graphic items for new visitor center displays.

The Adak branch of the Alaska Natural History Association is expected to continue to grow because of increased public awareness and support for the outlet. Beginning in early 1988, the Adak Fish and Wildlife Center will undergo a major renovation that will involve new building construction, the installation of nearly $100,000.00 worth of new displays, and an expanded and much more professional looking sales area. ANHA, the residents of Adak and the USFWS should reap many benefits as a result of this exciting project.

I. EQUIPMENTS AND FACILITIES

1. New Construction

Regional Office engineers visited Adak to conduct a site inspection for a new bunkhouse and to review and discuss changes made in construction plans for the office visitor center. Modifications of the visitor center began in October with the pouring of a concrete pad for a new visitor entryway. The remainder of the entryway and the visitor center work will be completed in February of 1988.

An arctic entrance was built on one of the headquarters shop doors to prevent water damage during frequent SW gale force winds. The water was soaking sheetrock on the interior walls adjacent to the doors.

A 10'x16' metal storage building acquired from the Navy heat shop was installed on the concrete storage pad on the north side of the refuge headquarters building. The building provides dry storage for barrels of oil and solvents, fuel tanks, pipe fittings and miscellaneous building materials.

2. Rehabilitation

Sheetrock repair and painting of walls in the refuge headquarters building and housing facilities required a lot of time during the year. Repairs were necessary because of earthquake damage caused by the physical movement of buildings and breaking of water lines plus water damage from window, door, and roof leakage during frequent storms with driving rain.

Rock and gravel fill had to be added to the backfill area against the dock to prevent our boat equipment storage shed from falling into a hole. The erosion was initiated by earthquake ground movement and subsequent storm wave action. The shed had to be lifted and releveled.

Shelves and projector stands were added to the audiovisual room . A glass window was replaced with a sheet of plywood with holes that allowed the projection of slides and films. This allowed the projectors to be installed inside the audiovisual room reducing noise from the equipment.

Galvanized, 1/2 inch mesh hardware cloth was attached to the base of the wood siding around three of the refuge houses. The mesh was buried 16 inches below the ground surface to keep rats from burrowing under the units. Each fall, rats appear looking for warm shelter and burrowing under buildings wherever they can. This fencing has prevented rat entry.

Both refuge maintenance workers and the Amchitka assistant manager conducted rehabilitation and maintenance work on the refuge housing on Amchitka. New fuel oil furnances were installed in the house and bathhouse. A new water pump and numerous plumbing repairs were made on the water system. Construction personnel on Amchitka also did repair work on one of the electric heating units and installed a freshwater holding tank.

3. Major Maintenance

Repairs and regular maintenance of furnaces are a constant workload due to year long use of heating systems. Compressor starter controls had to be replaced on the pneumnatic temperature controlling system of the headquarters heating unit. A circulating pump motor and a compressor motor had to be replaced on the same system. Controllers and ignition transformers were

replaced on oil fired heating systems at various FWS housing units.

Standard preventive maintenance, scheduled tune-ups, and lubrication were accomplished on all vehicles, boats and boat motors. Due to the continual use of boats and motors in a salt water environment considerable extra time must be spent keeping them in safe working condition. One 30 HP engine was burned up by personnel from AK F&W Research Center (AFWRC) during sea otter research. They have ordered a replacement. The radar unit on the 25' Whaler had to be removed, cleaned and adjusted for accuracy.

The 1979 Chevrolet Suburban used as a snowplow vehicle had a transmission failure while on loan to a contract botanist from the University of Tennessee. The vehicle is scheduled for survey when an already ordered replacement vehicle arrives. A new one ton pickup has been ordered for a snow plow truck. The snow plow system has been temporarily installed on the remaining 1979 Chevrolet Suburban.

New ring and spider gears had to be put into the rear differential of one of the 1981 Dodge pickups. Broken teeth on the old gears locked up the rear axles.

Time was spent during the summer helping obtain equipment for repair work on the FWS vessel Tiglax. Navy ground electronics personnel were also involved in repairs to the vessel radar system.

Electrical system repairs were made on the Erickson Front End Loader along with electrical repairs and wiper motor replacement on the 1985 Chevy Blazer.

In addition to maintenance work completed for the refuge at Adak and Amchitka, the maintenance worker spent a total of 12 weeks working at the AMNWR headquarters in Homer, Alaska. Work consisted of repair, tune-up and preventive maintenance on outboard motors and boats for both the refuge headquarters and the FWS vessel Tiglax. Other projects included building shelf units, computer stands, work benches, outboard motor stands, automotive repairs and radio installations.

4. Equipment Utilization and Replacement

As previously mentioned, a new one ton pickup was ordered to replace the 1979 Chevy Suburban that is used for snow plowing. A new van is on its way, ordered over a year ago, to replace the Chevy Suburban with the inoperative transmission. A new 30 HP outboard motor has been ordered by AFWRC as replacement for the one burned-up during sea otter research work this summer.

J. OTHER ITEMS

1. Cooperative programs

An official request was received from the Japanese Consul-General in Anchorage, Ak, in November, 1985, to construct a memorial to World War II dead in the North Pacific Ocean Region. They wished to construct the memorial on Attu Island, the most western island in the AIU.

The preliminary work, i.e. site visit/approval, delivery of construction material and initial visits/communications regarding permits and agreements was accomplished during 1986. Actual construction was initiated in May 1986 and the memorial was ready for formal dedication on 30 June 1987.

This Peace Memorial was erected on Attu Island by the Japanese Government. #228701, JM.

DARD Joe Mazzoni, WR, Anchorage and ARM Klett represented the FWS and the AIU at the dedication. DARD Mazzoni had the honor of presenting the floral wreath from President Reagan and words of condolence from the U.S. Government/ U.S. Fish & Wildlife Service.

Approximately 60 people attended the ceremony, including

representatives from the Japanese Council - General Office, Japanese Ministry of Health and Welfare, U.S. Immigration and Naturalization Service, U.S. Customs, U.S. Senator Murkowski's Washington, D.C. Office, U.S. Coast Guard, U.S. Air Force, Alaska Air National Guard and state-wide radio/TV stations and newspapers.

A close up of the dedication plaque on the Memorial. #028704, EVK.

During the month of June, NAS Adak was invaded by approximately 5,000 members of the U.S. Army. The Sixth Army and the Ohio National Guard were involved, along with portions of the Navys Pacific Fleet, with operation "Fortress Gale". The purpose of the exercise was to test the readiness of the military forces for defense of the Aleutian Islands. Needless to say, the airport received more traffic than it had seen in years and the road system supported a large variety of strange looking camouflaged vehicles.

ARM Klett and ORP Edgerton made several inspection trips of the "occupied" sites with representatives of the military units to insure compliance with guidelines set up for the protection of the natural resources. Several reports from Adak residents indicated that tracked vehicles were being driven wildly across the tundra - in most cases these reports were false. In the two instances where this did occur, the military units were required to repair the damage prior to leaving Adak.

In mid-November, the fleet was conducting exercises off the islands once again. This time they invited about 30 representatives from state and national news media to view the proceedings. Several reporters visited the refuge office gathering information on our caribou management program and Adak's bald eagles.

While "Fortress Gale" was under way, Adak was visited by the subtender "U.S.S. McKee". It was in port for a week. On 24 June, a 1,500-2,000 gallon oil spill occurred in its vicinity. The use of the refuge Boston Whaler was requested to help install the containment boom. Crews from the McKee worked all day mopping up the floating oil. No apparent resource damage occurred.

A film crew from the Cousteau Society, working from their new wind-assisted vessel "Alcyone", was here in June and July to film Aleutian wildlife as part of a television show that would eventually be shown on WTBS. This summers work would be part of a 5 year, around-the-world expedition, "Rediscovery of the World".

The Cousteau Societies air turbine powered vessel, Alcyone, visited Adak in June. #168701, JPF.

Three commercial audio-visual production permits were issued by the regional office for photo documentation of summer field work conducted by FWS employees. John Andrews, Kenai, AK was on the M/V Tiglax most of the summer doing videotape and still photography for use in environmental education/information programs of Alaska Maritime NWR. Professional photographer Lon Lauber went to Buldir Island to photograph the Aleutian Canada goose transplant for the refuge as well as possible magazine publication.

3. Items of Interest

Construction crews started arriving on Amchitka Island on 13 May to begin building a Relocatable Over The Horizon Radar (ROTHR) facility for the Navy. The installation will have a transmitter facility separated from the receiver facility by 25-30 miles. Signals will be bounced off the ionosphere to "see" targets out of sight over the horizon. The ROTHR system will be a major addition to the military early warning defense system in Alaska. A part of the Memorandum of Understanding between the Navy & FWS covers the cost involved with housing an Assistant Refuge Manager stationed at Amchitka throughout the two year construction period and serving as a FWS liaison officer for the AIU Refuge Manager and conducting various wildlife surveys. Donna Dewhurst, ARM, Mason Neck NWR, VA., was selected to fill this position and has been doing a fine job on all fronts.

ARM Klett attended the formal commissioning ceremony for the new FWS M/V Tiglax in Homer, AK on 2 July and assisted in the open house held aboard afterwards. The ceremony was attended by several hundred people, despite the rain and a delay caused by the late arrival of U.S. Senator Ted Stevens, the main speaker. Mrs. Stevens, wife of Senator Stevens, broke the customary champagne bottle over the bow to formally christen the Tiglax.

U.S. Air Force representative John Grafrath of Tinker Air Force Base, Oklahoma, visited Amchitka Island from September 4-7. Mr. Grafrath conducted a site investigation for possible future installation of two Digital Ionospheric Sounding Systems. The system would consist of one 80-ft high transmitter and seven receiver antennas in an array scheduled for construction in FY 88. A tentative site was chosen along Engineer's Road approximately 1 mile west of South Bight. Mr. Grafrath also visited Shemya as another site alternative. No additional word has been received regarding this facility.

RM Zeillemaker visited Juneau, Alaska, at the end of March to attend sessions of the Alaska Bird Conference/Workshop and present a slide program on the Kiska Island fox project to the Juneau Audubon Society on 03 April.

A Korean fish processing vessel, the "Tae Woong No. 603" went

aground on Uliaga Island, Islands of Four Mountain Group, on 6 May. Forty-eight crewmen and a National Marine Fisheries Service observer were evacuated from the vessel the next day by the U.S. Coast Guard. In the grounding, one 16,000 gallon tank ruptured and lost its load of diesel fuel into the sea. Luckily, strong SE winds and high seas took the fuel away from the island group which supports the third largest population of diurnal nesting seabirds in the Chain, primarily thick-billed murres. The vessel still contained 100,000 gallons of fuel. The owners were contacted the same day, 7 May, by the Coast Guard and informed of the imminent environmental damage. The owner immediately contacted a salvage company in Dutch Harbor regarding the removal of the fuel. High winds and seas prevented the salvage, so the decision was made to burn the fuel on site. Explosive charges were set, detonated and successfully ignited the fuel; burning approximately 95% of it. The remainder was dissipated by the high, rough seas.

Between 23-30 June, an oilspill of approximately 100-1000 gallons of diesel fuel occurred on Amchitka Island. Investigation indicated that construction personnel were attempting to burn "diesel sludge" in the sanitary landfill. The resulting black smoke violated their burn permit, so the fire was put out. The diesel was then dumped onto the ground. Diesel had also been sprayed on trash to facilitate burning prior to burial. This repeated spraying plus the dumping caused diesel to leach into a nearby spring that flowed into a small stream that eventually ran into the ocean. A walk along the stream revealed dead fish, vegetation and a large quantity of creamy looking diesel "malt". Clean-up operations involved digging a trench between the spill site and the spring and using absorbent pads to remove trapped diesel, setting absorbent booms in the stream below the spring and constructing a pipe dam where the stream entered the ocean. Absorbent pads were used to remove fuel from each of these sites and dead vegetation was raked from the stream. An incinerator was built to burn absorbent pads, waste diesel, and contaminated vegetation and soil. Periodic clean-up continued for two months. A light fuel sheen could be seen on the stream into September.

4. <u>Credits</u>

The 1987 Narrative Report was authored by the following:

Introduction - Fred Zeillemaker
A. Highlights - Mike Boylan
B. Climatic Conditions - Jim Fuller
C. Land Acquisition - Van Klett
D. Planning - 1 Van Klett, 5 Greg McClellan, 6 Van Klett
E. Administration - 1 Greg M., 4 Tom Edgerton, 5 Van K., 6 Greg M.
F. Habitat Management - 1-2, 7 Van K., 9 Greg M., 12 Van K.
G. Wildlife - 1-2 Greg M., 3-8 Jim F., 9-11, 14-16 Greg M.

H. Public Use - 1-16 Tom Edgerton, 17 Van K., 18 Tom E.
I. Equipment & Facilities - Bob Schulmeister
J. Other Items - 1, 3-4 Van K.
K. Feedback - Van Klett and Mike Boylan
L. Bird and Mammal Lists - Fred Zeillemaker

Word processing, computer entry, photo placement and collection was accomplished by Greg McClellan. Final editing was provided by Mike Boylan.

The End. It was a very long year - now we can relax, enjoy the view and hope next year is better. #048707, TRE.

K. FEEDBACK

How can field stations carry on productive work under a three month continuing resolution? As much as a third of the FY is over before you know how much money you have to complete the year's projects, that is if Gramm/Rudman leaves you alone. Meaningful plans to carry out the year's work have to be made in the hope that 1) your budget is the same as last FY with a separate contingency plan if 2) your budget goes up or 3) goes down (3 plans). We could always change the beginning of the FY to 1 January so we can start with a known dollar amount but if so would Congress then postpone a budget until March?

Not only is planning hurt by a reduced budget, staffing also suffers. Many field stations are forced to use volunteers (SCA or local) rather than hired biological technicians. Not only does the experience level and amount of committment vary from volunteer to paid employee but it benefits the station to know the person will be there long enough to follow a project to completion. At times a station ends up using lesser grade/experienced employees to complete refuge programs, i.e. a GS-5 biotech or volunteer doing the work of a GS-11 biologist or volunteers doing GS-3/4 clerical or GS-7/9 ORP duties.

On another matter, this station has several competent, dedicated employees who find themselves unsuccessful in their repeated efforts to compete for jobs in the lower 48 after years of service in Alaska. FWS employees at remote stations seem to face inordinate problems in returning to lower 48 refuges when opportunities present themselves and one can't help but conclude that the spectre of moving costs is a major factor. Such discrimination not only hinders an employee's career development but in time may create morale problems. A colleague from the National Park Service reports he transferred with relative ease to the lower 48 and that NPS affords consideration to Alaska employees. As with some other areas where FWS has built on the NPS experience e.g. seasonal law enforcemnt, uniforms, perhaps we should examine how our sister agency is dealing with this issue.

Birds of the Aleutian Islands Unit
Alaska Maritime National Wildlife Refuge

The Aleutian Islands Unit of the Alaska Maritime National Wildlife Refuge contains over 200 named islands, islets and rocks totalling more than two million acres and stretching over 1770 kilometers (1100 miles) from the tip of the Alaska Peninsula on the east to within 805 kilometers (500 miles) of the Soviet Union's Kamchatka Peninsula on the west. Commonly referred to as "The Chain", the Aleutian Islands are the emergent peaks of a submarine mountain range called the Aleutian Ridge. All but portions of seven of the larger eastern Aleutian islands are included in the refuge. Due to their close proximity to the Alaska Peninsula, Unimak and Amak islands are administered by the Izembek National Wildlife Refuge headquarters at Cold Bay, Alaska. The Sanak Islands south of the Alaska Peninsula are managed from the Alaska Maritime National Wildlife Refuge headquarters at Homer, Alaska. Except for the Aleut village of Atka, the U. S. Navy station at Adak, the U. S. Air Force base at Shemya, and the U. S. Coast Guard LORAN station at Attu, the only signs of recent human activities on the refuge unit are the unhealed scars and debris remaining from World War II activities throughout the chain. Public access to the Aleutians is generally limited to Dutch Harbor and Unalaska in the eastern Aleutian islands. The communities are on private lands on Amaknak and Unalaska islands, respectively. Dutch Harbor is served daily by commercial airlines out of Anchorage, Alaska. Both communities have a motel. Retaurants and vehicle rentals are also available.

Birdlife on the central and western Aleutian islands has been adversely impacted through the introduction of arctic and red foxes from 1836 through the 1920's for fur farming purposes. The once abundant Aleutian Canada goose was dangerously close to extinction during the 1960's due to fox predation. Through fox removal efforts, the goose is slowly being reintroduced to islands near the remaining traditional nesting grounds on Buldir and Chagulak islands. Continuing fox removal efforts are allowing restoration of the endangered goose and benefiting numerous other tundra- and burrow-nesting bird species. Several nesting seabirds have already begun to increase on Agattu, Alaid, Nizki, Amchitka, and Amukta which are once again free of foxes. A second endangered bird species frequenting the Aleutian Islands area is the short-tailed albatross. This offshore migrant from the western Pacific has suffered from human impacts and introduced rats on its nesting island south of Japan.

In separating the North Pacific Ocean from the Bering Sea and bridging North America to Asia, the Aleutian Islands offer refuge to an international variety of birds. Migrants converge from all points of the compass. Over 90 Asiatic species have been found in the Aleutians, particularly from Adak west. Several have been reported nowhere else in North America and some, including whooper swan, bean goose, an Asian form of green-winged teal, common pochard, tufted duck, smew, white-tailed eagle, common greenshank,

wood sandpiper, Far Eastern curlew, common sandpiper, long-toed stint, eye-browed thrush, olive tree-pipit and rustic bunting, occur annually or nearly annually. A large variety of seabirds nest on island cliffs, talus slopes and tundra covered slopes in dense, noisy colonies. Their rookeries vary in size and composition, but some of the more numerous species include northern fulmar, fork-tailed and Leach's storm-petrel, red-faced and pelagic cormorant, glaucous-winged gull, black-legged kittiwake, thick-billed and common murre, pigeon guillemot, ancient murrelet, least and crested auklet, and horned and tufted puffin.

The following list of birds observed in the Aleutian Islands includes those 255 species recorded west of Unimak Island. Unimak Island, Amak Island and the Sanak Islands, although components of the Aluetian Islands Unit of the Alaska Maritime National Wildlife Refuge, have avifaunas more similar to the Alaska Peninsula and are managed through other U. S. Fish and Wildlife Service offices. Bird records for those units are not kept at Adak. Although some Aleutian records date from the late 1800's, most status determinations in this list are based on observations made since the mid-1960's. Habitat preferences, months of occurrence, seasons of occurrence, nesting status and estimations of abundance are indicated in the check list as follow:

M - Marine waters and seashores
E - Estuaries
W - Fresh water wetlands
T - Lowland tundra (including alterations such as buildings)
A - Alpine tundra and rocks

1-12 - Months of recorded occurrence
* - Species nests (or has nested) in Aleutians
S - Spring (March-May/3-5)
s - Summer (June-August/6-8)
F - Fall (September-November/9-11)
W - Winter (December-February/12-2)

a - Abundant (very numerous species)
c - Common (certain to be seen in suitable habitat)
u - Uncommon (present, but not certain to be seen)
r - Rare (seen only a few times during the season)
o - Occasional (seen only a few times during the season over a two to five year period)
x - Accidental (has been recorded once or twice during the season since 1880's).

Brackets ([]) indicate species which are considered hypothetical by some ornithologists. Slashes (/) separate periods or seasons of occurrence. The years of occurrence for accidental species are shown in parentheses.

31 December 1984, revised 12 May 1986
C.F.Zeillemaker, Box 5251 NAS Adak, FPO Seattle, WA 98791

BIRDS OF THE ALEUTIAN ISLANDS, ALASKA

	S	s	F	W
Red-throated Loon MEW 1-12 *	u	u	u	r
Arctic Loon MEW 5/9	o		o	
Pacific Loon MEW 9-5	u		r	u
Common Loon MEW 1-12 *	u	u	u	u
Yellow-billed Loon MEW 2-6/7-11	r	o	o	r
Horned Grebe MEW 9-7	u	o	r	u
Red-necked Grebe 8-7	u	x	u	u
Western Grebe ME 12 (1980)				x
Short-tailed Albatross M 5-10	o	o	o	
Black-footed Albatross M 5-11	o	u	c	
Laysan Albatross M 2-11	u	u	u	u
Northern Fulmar M 4-11 *	c	c	c	
Mottled Petrel M 5-10	o	r	r	
Cook's Petrel M 6/8 (1933,75)		x	x	
Pink-footed Shearwater M 5-6/9	x	x	x	
Flesh-footed Shearwater M 5/7-9	x	x	o	
Sooty Shearwater M 4-10	r	a	a	
Short-tailed Shearwater M 4-10	u	a	a	
Fork-tailed Storm-Petrel M4-11 *	a	a	a	
Leach's Strom-Petrel M 5-11 *	c	c	c	
Double-crested Cormorant MEW 4-12 *	u	u	u	o
Pelagic Cormorant M 1-12 *	c	c	c	c
Red-faced Cormorant M 1-12 *	a	a	a	u
Chinese Egret W 6 (1974)		x		
Black-crowned Night-Heron W 4	x			
Whooper Swan MEW 10-5	r		r	u
Bean Goose MEW 5-6/10	r	o	x	
Grtr. White-fronted Goose EWT 5/9-2	x		o	x
Snow Goose MEWT 5/7-10	o	x	x	
Emperor Goose MEW 9-7	u	x	c	a
Brant ME 9-7	r	x	r	o
Canada Goose MEWT 4-11 *	u	u	u	
Green-winged Teal EWT 1-12 *	a	a	a	a
[Baikal Teal ME 6 (1971,83)]		x		
Falcated Teal WT 5-6/10-2	o	x	x	x
Mallard EWT 1-12 *	c	c	c	c
Spot-billed Duck EW 1-12	o	x	o	x
Northern Pintail EWT 1-12 *	u	u	u	c
Garganey WT 5-7/8-11	r	o	r	
Blue-winged Teal EW 7/10 (1968,79)		x	x	
Northern Shoveler EWT 1-12	u	o	u	o
Gadwall MEW 10-6	u	o	r	r
Eurasian Wigeon EWT 8-7	u	o	u	r
American Wigeon EWT 9-6	r	o		r
Common Pochard EW 4-6/10-12	u	x	x	
Canvasback MEW 10-7	o	o	o	r
Ring-necked Duck EW 4 (1977,85)	x			
Tufted Duck EW 1-12	u	o	u	r
Greater Scaup MEW 1-12 *	c	r	u	c
Common Eider ME 1-12 *	a	a	a	a
King Eider MEWT 11-6	o		x	o
Steller's Eider ME 10-6	r	x	r	r
Harlequin Duck ME 1-12	a	u	c	a
Oldsquaw MEWT 8-7	a	o	c	a
Black Scoter ME 9-7	c	r	c	c
Surf Scoter MEW 1-12	r		o	o
White-winged Scoter MEW 1-12	c	r	u	c

BIRDS OF THE ALEUTIAN ISLANDS, ALASKA

	S	s	F	W
Common Goldeneye MEWT 10-7	c	o	u	a
Barrow's Goldeneye MEW 5-7/11	o	x	x	
Bufflehead MEW 10-6	u	o	u	c
Smew EW 2-7/9-12	r	o	r	r
Hooded Merganser MEW 3-5/11-12	o		x	x
Common Merganser MEW 1-12 *	u	o	u	u
Red-breasted Merganser MEWT 1-12 *	c	u	u	c
Osprey WT 5/10 (1957,70,85)	x		x	
Bald Eagle MEWTA 1-12 *	c	c	c	c
White-tailed Eagle MEWT 5-10 *	r	r	r	
Steller's Sea-Eagle MET 4-6	o	x		
Northern Harrier EWT 1-7/9-11	o	o	o	o
Northern Goshawk ET 8 (1946)		x		
[Eurasian Sparrowhawk T 8 (1983)]		x		
[Common Buzzard T 5 (1983)]	x			
Rough-legged Hawk T 5-12 *	o	o	o	x
Golden Eagle T 6-8		o		
Eurasian Kestrel ET 1-5/9-10	o	o	o	
Merlin MEWT 1-6/10-12	x	o	o	
Northern Hobby MEWT 5/10 (83,84)	x		x	
Peregrine Falcon MEWTA 1-12 *	u	u	u	u
Gyrfalcon WT 1-12	r	r	r	r
Rock Ptarmigan TA 1-12 *	a	a	a	a
Sandhill Crane MEWT 5-6/7-11	u	o	o	
Oriental Pratincole M 5 (1985)	x			
Black-bellied Plover ME 5-7/8-10	o	o	o	
Lesser Golden Plover MEWT 4-6/7-11	u	o	c	
Mongolian Plover MEW 5-9	r	o	o	
Common Ringed Plover E 5/8	o	x	x	
Eurasian Dotterel WT 9-10			o	
Semipalmated Plover MEW 5-9 *	r	r	x	
Little Ringed Plover E 6 (1974)		x		
Black Oystercatcher ME 1-12 *	c	c	c	c
Common Greenshank EW 5-6/7-9	r		o	
Greater Yellowlegs MEW 5/10	x		o	
Green Sandpiper E 5-6/8	o	o		
Lesser Yellowlegs MEW 5-6/7-10	o	o	o	
Marsh Sandpiper E 9 (1974)			x	
Spotted Redshank E 5/8-10	o	r	r	
Wood Sandpiper EW 5-9 *	u	r	r	
Wandering Tattler MEW 5-10	u	r	u	
Gray-tailed Tattler ME 5-6/7-10	r	r	r	
Common Sandpiper EW 5-9 *	r	o	r	
Terek Sandpiper ME 5-6/8-9	r	o	o	
Whimbrel MEWT 5-6/7-9	r	o	o	
Bristle-thighed Curlew E 5-6	o	x		
Far Eastern Curlew E 5-7	o	r		
Black-tailed Godwit E 5-6	r	x		
Bar-tailed Godwit ET 5-6/9-11	u	r	o	
Ruddy Turnstone MEW 4-6/7-10	c	o	a	
Great Knot E 5-6 (1971,76,82)	x	x		
Red Knot E 5-6/7-10	o	o	o	
Sanderling ME 8-5	u		u	u
Semipalmated Sandpiper EW 9 (77,80)			x	
Western Sandpiper EWT 5-6/7-12	x	o	o	x
Rufous-necked Stint E 5-6/7-9	r	x	r	
Little Stint EW 5-6/8-9	x	x	o	

BIRDS OF THE ALEUTIAN ISLANDS, ALASKA

	S	s	F	W
Temminck's Stint E 5-6/7-9	r	o	o	
Long-toed Stint EW 5-6/7-9	u	o	r	
Least Sandpiper EWT 4-8 *	r	r		
Baird's Sandpiper MEW 4-5/8-10	o	o	r	
Pectoral Sandpiper EW 5-6/7-11	o	o	r	
Sharp-tailed Sandpiper EW 5/9-11	x		r	
Rock Sandpiper MET 1-12 *	c	c	c	c
Dunlin MEWT 8-6	o	x	o	o
Curlew Sandpiper E 5/9 (1977,82)	x	x	x	
Spoonbill Sandpiper E 6 (1977)		x		
Broad-billed Sandpiper E 8-9 (77,78)		x	x	
Buff-breasted Sandpiper E 9			o	
Ruff E 5-6/8-10	r	o	r	
Long-billed Dowitcher MEW 6/9	x		o	
[Jack Snipe W 5 (1981)]	x			
Common Snipe EW 5-10 *	u	r	r	
Pin-tailed Snipe W 5 (1984)	x			
Red-necked Phalarope MEW 5-10 *	c	c	c	
Red Phalarope MEW 5-6/7-10	r	c	r	
Pomarine Jaeger M 5-9	o	u	x	
Parasitic Jaeger MEWT 4-9 *	u	u	u	
Long-tailed Jaeger ME 5-6/8-9	o	o	o	
South Polar Skua MTA 7 (1969)		x		
Common Black-headed Gull ME 4-10	r	o	r	
Bonaparte's Gull MEWT 5/8-10	x	o	x	
Black-tailed Gull ME 5-6 (1980,83)	x	x		
Mew Gull MEWT 8-5	r	x	r	r
Ring-billed Gull E 6 (1982)		x		
Herring Gull MEWT 2-6/9-11	o	o	o	o
Slaty-backed Gull ME 2-6/8-10	r	o	o	
Glaucous-winged Gull MEWT 1-12 *	a	a	a	a
Glaucous Gull MEWT 11-6	r	o	o	r
Black-legged Kittiwake MEW 1-12 *	c	c	c	o
Red-legged Kittiwake M 5-10 *	u	u	u	
Ross' Gull M 5 (1983)	x			
Sabine's Gull MEWT 5/7-10	x	x	o	
Common Tern ME 5-6/7-8	o	o		
Arctic Tern MEWT 5-10 *	c	c	o	
Aleutian Tern MEWT 5-8 *	u	u		
White-winged Tern E 7 (1976)		x		
Dovekie M 7 (1980)		x		
Common Murre M 1-12 *	a	a	u	o
Thick-billed Murre M 1-12 *	a	a	u	c
Pigeon Guillemot M 1-12 *	c	c	u	u
Marbled Murrelet MET 1-12 *	u	c	u	u
Kittlitz's Murrelet MET 1-12 *	u	c	u	o
Ancient Murrelet MT 1-12 *	c	c	u	o
Cassin's Auklet M 1-12 *	u	u	u	u
Parakeet Auklet M 1-11 *	u	c	u	u
Least Auklet M 3-12 *	u	a	a	o
Whiskered Auklet M 2-11 *	u	u	r	o
Crested Auklet M 1-12 *	c	a	r	r
Rhinoceros Auklet M 6-10 *		r	r	
Tufted Puffin MT 1-12 *	a	a	a	o
Horned Puffin M 1-12 *	c	c	u	o
Common Cuckoo T 5-7	o	x		
Oriental Cuckoo T 6 (1937)		x		

BIRDS OF THE ALEUTIAN ISLANDS, ALASKA

	S	s	F	W
Oriental Scops-Owl T 6 (1977,79)		x		
Snowy Owl ETA 1-12 *	r	r	r	r
Short-eared Owl ET 5-6/8-10 *	o	r	o	
Jungle Nightjar T 5 (1977)	x			
White-throated Needletail T 5	o			
Fork-tailed Swift T 5-6/9	x	x	o	
Rufous Hummingbird T 6 (1936)		x		
Belted Kingfisher EW 6/7-9		o	x	
Great Spotted WoodpeckerT4/10(85,86)	x		x	
Northern Flicker T 11 (1984)			x	
Eurasian Skylark T 4-6/7-10	o	o	o	
Horned Lark ET 9 (1978)			x	
Tree Swallow EWT 6/7-11		o	o	
Violet-green Swallow EW 9-10			o	
Bank Swallow EW 5-6/9	o	o	o	
Cliff Swallow EW 6		o		
Barn Swallow EWT 5-6/7-9	x	o	x	
Common Raven MEWTA 1-12 *	c	c	c	c
Winter Wren ET 1-12 *	c	c	c	c
American Dipper W 1-12 *	u	u	u	u
Middendorff Grasshopper Warbl T 6-9		o	o	
Lanceolated Warbler T 6-7 (1984)		x		
[Pallas' Willow Warbler T 6 (1985)]		x		
Wood Warbler T 10 (1978)			x	
Dusky Warbler T 9 (1978,83)			x	
Arctic Warbler T 5-6/9-10	x	o	r	
[Pale-legged Willow Warbl T 6 (85)]		x		
[Mugimaki Flycatcher T 5 (1985)]	x			
Red-breasted Flycatcher T 5-6	o	o		
Siberian Flycatcher T 9 (1977)			x	
Gray-spotted Flycatcher T 5-6	o	o		
Asian Brown Flycatcher T 5 (1985)	x			
Siberian Rubythroat T 5-10 *	r	r	o	
Bluethroat T 9-11 (1984,1985)			x	
Siberian Blue Robin T 5 (1985)	x			
Red-flanked Bluetail T 6 (1982)		x		
Northern Wheatear TA 8-11		x	o	
[Stonechat T 6 (1982)]		x		
Gray-cheeked Thrush T 9 (1978,83)			x	
Eye-browed Thrush T 5-6/8-10	u	r		
Dusky Thrush T 5-6/10	o	x	x	
American Robin T 5 (1977)	x			
Siberian Accenter T 9 (1978)			x	
Yellow Wagtail MEW 5-10 *	u	r	u	
Gray Wagtail T 5-6/10	o	o	x	
Black-backed Wagtail ET 5-9 *	r	r	r	
Olive Tree-Pipit T 5-6/9	r	o	o	
Pechora Pipit T 5-6	x	o		
Red-throated Pipit ET 5-7/8-10	r	o	o	
Water Pipit EWT 2-12 *	r	r	r	o
Bohemian Waxwing T 5-6/10	x	x	o	
Brown Shrike T 6/9-10 (1978,84)		x	x	
Northern Shrike ET 7/10-3	x	x	x	o
Yellow Warbler T 9 (1984)			x	
Yellow-rumped Warbler T 5/10 (80,84)	x		x	
Townsend's Warbler T 10 (1977)			x	
Savannah Sparrow T 5-9 *	u	u	r	

BIRDS OF THE ALEUTIAN ISLANDS, ALASKA

	S	s	F	W
Fox Sparrow T 6/9 (1894,1944,84)		x	x	
Song Sparrow EWT 1-12 *	c	c	c	c
Golden-crowned Sparrow T 3/9-11	x		o	
White-crowned Sparrow T 9 (1984)			x	
Dark-eyed Junco T 1-4/11	x		x	o
Lapland Longspur EWT 4-12 *	a	a	a	o
Pine Bunting T 11 (1985)			x	
Little Bunting T 5 (1977,83,84)	x		x	
Rustic Bunting T 5-6/9-10	r	r	r	
Gray Bunting T 5 (1977,80)	x			
[Pallas' Reed-Bunting T 5 (1980)]	x			
Common Reed-Bunting T 5-6	o	x		
Snow Bunting EWTA 1-12 *	c	c	c	c
McKay's Bunting T 1-3 (1889,1975)	x			x
Brambling T 5 5-6/9-10	r	o	r	
Rosy Finch ET 1-12 *	a	a	a	a
Pine Grosbeak T 5 (1983)	x			
Common Rosefinch WT 5-6/8-9	o	o	x	
Red Crossbill T 10 (1899)			x	
White-winged Crossbill T 7 (1983)		x		
Common Redpoll T 1-12 *	r	r	o	r
Hoary Redpoll T 4-7/9-1 *	o	o	o	o
[Eurasian Siskin T 6 (1978)]		x		
Pine Siskin T 3 (1977)	x			
Oriental Greenfinch T 5-6/8-9	o	o	o	
Eurasian Bullfinch T 5/9 (1977,78)	x		x	
Hawfinch T 5-6	o	o		

23 September 1984, revised 12 May 1986

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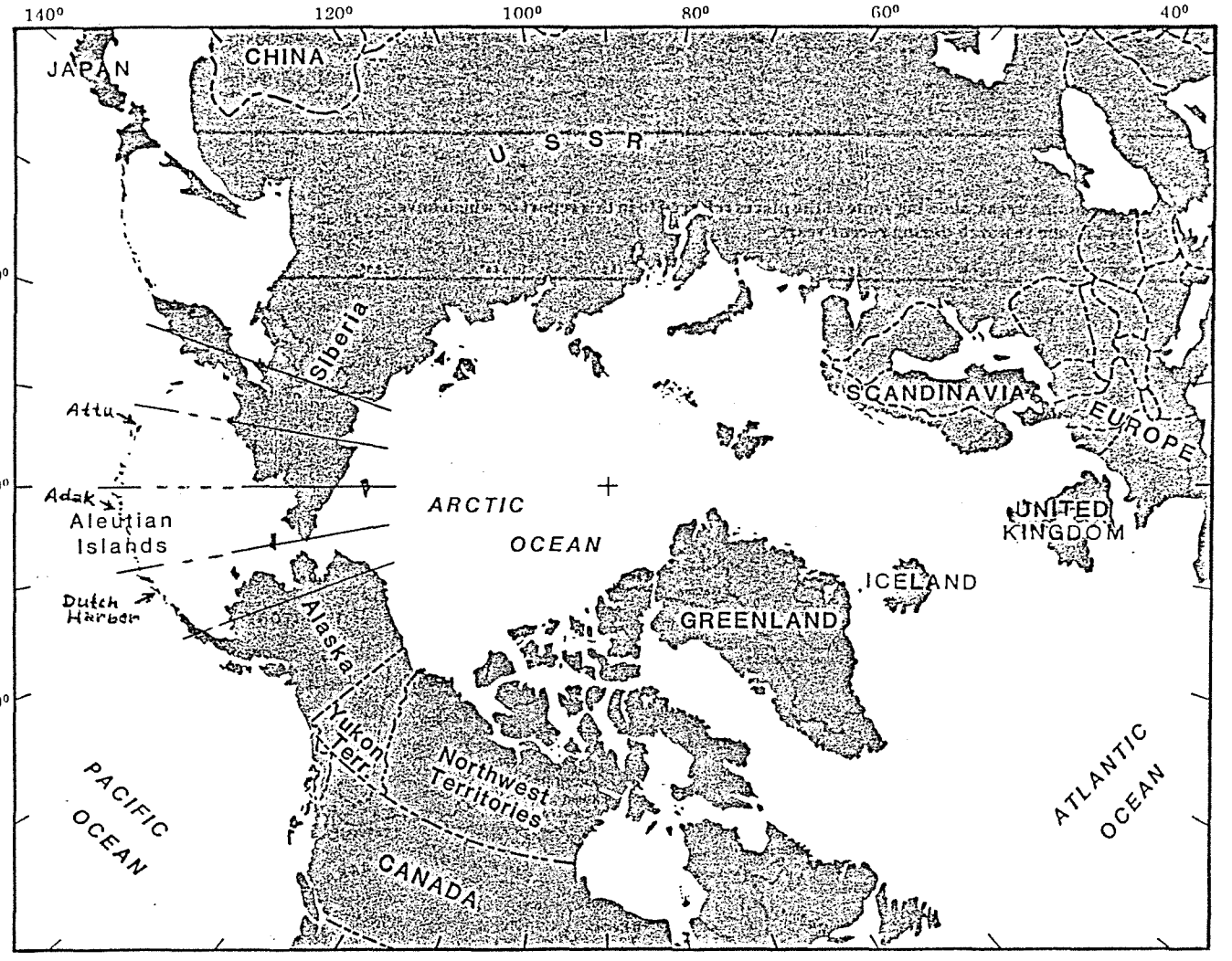
YF-1B AIUBIRDS.2


140°
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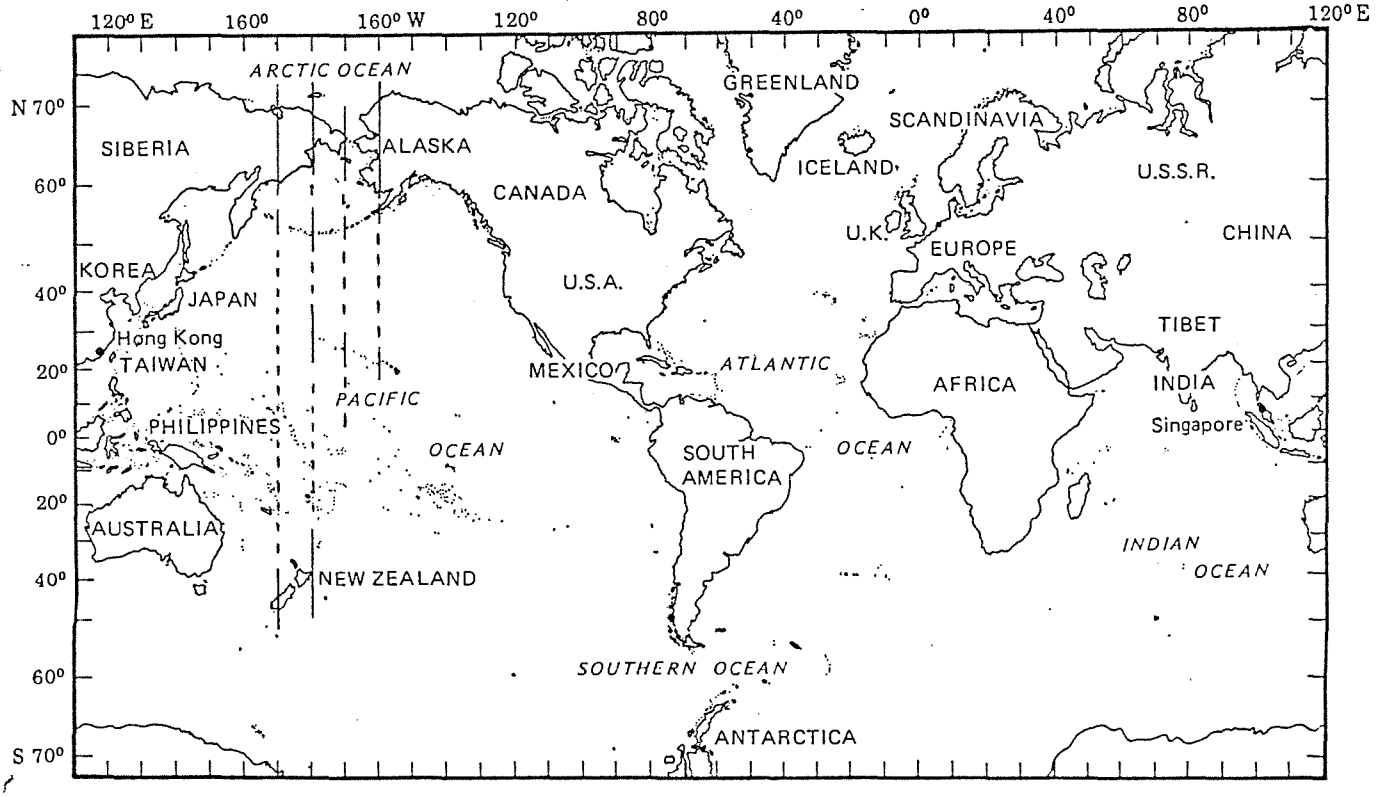
160°
JAPAN
CHINA
U S S R
Siberia
Attu
Adak
Aleutian Islands
Dutch Harbor
ARCTIC OCEAN
SCANDINAVIA
EUROPE
UNITED KINGDOM
ICELAND
GREENLAND
Alaska
Yukon Terr.
Northwest Territories
CANADA
PACIFIC OCEAN
ATLANTIC OCEAN


120° E
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160° W
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ARCTIC OCEAN
GREENLAND
SCANDINAVIA
SIBERIA
ALASKA
ICELAND
U.S.S.R.
CANADA
U.K.
CHINA
EUROPE
KOREA
JAPAN
U.S.A.
Hong Kong
TAIWAN
TIBET
MEXICO
ATLANTIC
AFRICA
INDIA
PACIFIC
PHILIPPINES
Singapore
OCEAN
SOUTH AMERICA
OCEAN
AUSTRALIA
INDIAN OCEAN
NEW ZEALAND
SOUTHERN OCEAN
ANTARCTICA

Mammal Distribution of the Aleutian Islands Unit,
Alaska Maritime Nation Wildlife Refuge

Species	Range
Arctic Ground Squirrel	Inroduced to Amaknak, Unalaska, Umnak and Kavalga
Tundra Vole	Fox Island Group (west to Umnak)
Greenland Collared Lemming	Introduced to Unalaska and Umnak
Norway Rat	Introduced to Akutan, Amaknak, Unalaska, Umnak, Atka, Kagalaska, Adak, Amchitka (incl. Makarius, Bat, Chapel Cove, Bird Rock), Rat, Kiska, Shemya and Attu
Killer Whale (Orca)	All salt water areas
Northern Harbor Porpoise	All salt water areas
Dall Porpoise	All offshore salt water
Sperm Whale	Offshore salt water areas
Baird's Beaked (Giant Bottle-nosed) Whale	Offshore salt water areas
Goosebeaked (Cuvier's Beaked) Whale	Offshore salt water areas
Pacific (Stejneger's) Beaked Whale	Offshore salt water areas
Gray Whale	Migrant through eastern island passes as far west as Unalaska
Minke Whale	All salt water areas
Sei Whale	Salt water between Akutan and Delarof Island Group
Fin Whale	Offshore salt water areas
Blue Whale	Salt water between Akutan and Buldir
Humpback Whale	Offshore salt water areas
Right Whale	Offshore salt water areas
Red Fox	Fox Island Group (west to Umnak), introduced to Chuginadak
Arctic Fox	Indigenous to Tigalda and Rootok. Introduced to Ugamak, Uliaga, Kagamil, Carlisle, Herbert, Yunaska, Seguam, Amlia, Atka, Kasatochi, Tagalak, Chugul, Igitkin, Great Sitkin, Tagadak, Umak, Little Tanaga, Kagalaska, Adak and islets, Kanaga, Bobrof, Tanaga, Gareloi, Ulak(W), Amatignak, Semisopochnoi, Rat, Little Sitkin, Segula, Kiska, Shemya and Attu. Died off of Aiktak, Kaligagan, Sagchudak, Salt, Kanu, Tanaklak, Asuksak, Aziak, Ilak, Kavalga, Unalga and Little Kiska. Removed from Amukta, Tag, Skagul, Ogliuga, Amchitka, Nizki, Alaid and Agattu
Sea Otter	Salt water and shores around most islands
Northern (Steller's) Sea Lion	All salt water areas, haul out sites throughout islands
Northern Fur Seal	Bogoslof islands, migrant through eastern island passes west to Islands of Four Mountains
Walrus	Unalaska (once, 1985)
Harbor (Common) Seal	All salt water areas, haul out sites throughout islands
Northern Elephant Seal	Ugamak(twice,1977-78) and Unalaska(once,1977)
Caribou/Reindeer	Introduced to Umnak, Atka and Adak

31 Dec 1984, rev. 12 Sep 1985, C.F.Zeillemaker

ALEUTIAN ISLANDS UNIT
ALASKA MARITIME NATIONAL WILDLIFE REFUGE

Adak, Alaska

ANNUAL NARRATIVE REPORT

Calendar Year 1987

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

REVIEW AND APPROVALS

ALEUTIAN ISLANDS UNIT
ALASKA MARITIME NATIONAL WILDLIFE REFUGE

Adak, Alaska

ANNUAL NARRATIVE REPORT

Calendar Year 1987

Mike Boyle	5/5/88
Refuge Manager, Adak	Date
Refuge Manager, Homer	Date
Refuge Supervisor, Review	Date
Regional Office Approval	Date

INTRODUCTION

The Aleutian Islands Unit
Alaska Maritime National Wildlife Refuge

The Aleutian Islands National Wildlife Refuge was established in 1913 by Executive Order of President Taft. Today the refuge is called the Aleutian Islands Unit (AIU) of the Alaska Maritime National Wildlife Refuge (AMNWR). The AIU includes at least 200 islands stretching over 1,100 mi from Amak Island to Attu and totalling approximately 2.7 million acres. Most of the islands are designated wilderness. Exceptions are military reservation lands or islands, former military sites, and lands or islands selected by Native Corporations under the Alaska Native Claims Settlement Act. Unimak and Amak islands adjacent to the Alaska Peninsula, are managed by the Izembek NWR at Cold Bay. The Sanak Islands, south of the Alaska Peninsula, are managed by the AMNWR headquarters at Homer.

The Aleutian Island Chain is divided into six island groups: the Near Islands, the Rat Islands, The Delarof Islands, the Andreanof Islands, the Islands of the Four Mountains, and the Fox Islands. Present refuge management objectives call for maintaining the islands in as near a natural condition as possible. Specific management goals include the eventual elimination of introduced arctic fox from most islands, the restoration of the endangered Aleutian Canada goose to islands within its former breeding range, periodic wildlife inventories on selected islands, encourage studies of refuge wildlife populations, and control of human access to and activities on currently uninhabited islands.

The Aleutians are the emergent peaks of a submarine mountain range believed to have appeared as islands about 8,000 years ago when the surrounding seas rose at the end of the last ice age. Most of the islands are mountainous. The larger islands are dotted with lakes and cut by streams. Irregular shorelines include boulder beaches, sand beaches, rocky cliffs, and numerous offshore islets, spires and reefs. The maritime climate of the Aleutian Islands is characterized by persistent fog or overcast skies; frequent, often violent, cyclonic storms; and high winds. Weather is very local and fog, low ceilings, precipitation, and clear weather can all occur within a distance of a few miles or even within a span of a few minutes at one location.

The Aleutians are treeless except for a few spruce introduced to some of the islands by the Russians in 1805 and by Americans during World War II. The islands support a dwarfed flora of willow and alder, alpine heaths, and meadows of forbes and grasses. Shorelines are bordered with stands of beach wildrye. The shallow nearshore waters support dense beds of kelp.

The Aleutian Islands are rich in wildlife. A total of 260 species of birds have been recorded on the AIU and adjacent waters west of Unimak Island. At least 21 species of mammals,

mostly cetaceans, occur regularly. New species of birds primarily Asiatic migrants, are added to the AIU list almost annually. Bird species composition and density vary significantly from island to island, depending on the island's size, the presence of introduced predators, and the island's location within the Chain. One of the most interesting features of the Aleutian Islands is the unique combination of plant and animal species from both the North American and the Asian continents. Olaus J. Murie aptly described the Aleutians as a "melting pot for faunal elements from two continents not yet reaching an equililbrium."

The sea otter is very much at home in the Chain, reaching its greatest population density from Adak to Kiska. Once highly valued for its fur, the otter was almost exterminated by overhunting. Now under strict protection, its population in the Aleutian Islands has increased to over 100,000. Other common sea mammals are the northern (or Steller's) sea lion and the harbor seal. Caribou have been introduced to Adak. Atka supports a thriving herd of feral reindeer. Fourteen species of cetaceans have been recorded in Aleutian waters. The arctic fox is native to Rootok Island in the far eastern Aleutians. The species was also found on Attu by the earliest explorers, but it was most likely introduced there. The red fox is native to several islands from Umnak eastward. Beginning in the 19th century, but increasing in the 1920's, arctic and red fox were introducedto most islands in the Chain. The introductions were necessary to allow development of a commercial fur farming enterprise wherein the fox utilized the abundant island wildlife for food. The Aleutian fur farming industry collapsed during World War II. Fox pelts continue to have little commercial value and complete removal of the introduced animal is necessary to allow restoration of native bird life to former dense levels. the introduction of Norway rats occurred chiefly during World War II and both foxes and rats have seriously affected nesting birds. Arctic ground squirrels and Greenland collared lemmings, introduced to a few islands, complete the list of nonnative mammalian species.

Huge numbers of sea birds are the most striking feature of many islands. Millions of fulmars, storm-petrels, cormorants, kittiwakes, gulls, guillemots, murres, murrelets, auklets, and puffins congregate in vast nesting colonies. Great numbers of waterfowl winter in the Aleutians and ducks nest throughout the chain. The endangered Aleutian Canada goose, currently increasing to a population in excess of 5,000 birds, nests in numbers only on tiny Buldir and Chagulak islands, with a small breeding population becoming established on once again fox free Agattu Island. Bald eagles, peregrine falcons, gyrfalcons, and other raptors are also found, along with numerous resident and migrant shorebirds and passerine species. Winter wrens, rosy finches, song sparrows, snow buntings, and lapland longspurs are among the most common of the small passerines. All but the latter are permanent residents in the Chain. Adjacent waters

contain large fish populations which are harvested primarily by the fishing fleets of Japan, Russia and South Korea. Island streams support several species of salmon and the Dolly Varden.

The Aleutians were once home to about 10,000 Aleuts. Their numbers were severely decimated following Russian discovery of the islands in 1741. Today, only four small native villages exist in the Aleutian Chain west of Unimak Island. The communities are Atka, Nikolski (on Umnak Island), Unalaska and Akutan. Village populations range from 30 inhabitants at Nikolski to about 1500 at Unalaska. A fishing port exists at Dutch Harbor on Amaknak Island adjacent to Unalaska Village. A U.S. Navy complex is located at Adak (site of the AIU headquarters), U.S. Air Force personnel occupy Shemya Island, and a small U.S. Coast Guard staff mans a navigational station near the east end of Attu Island. Perhaps the greatest benefit the Aleutian Islands Unit offers our nation is its potential as an outdoor laboratory for scientists conducting maritime ecosystem studies under natural, near pristine conditions. Outdoor writer Michael Frome issued a challenge to our generation when he referred to the Aleutians as "a great oceanic crossroads, a natural treasure which this nation must now properly acknowledge and safeguard for the future."

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A. HIGHLIGHTS

Several major earthquakes and volcanic activity rattle Aleutians (Section B).

Draft Comprehensive Conservation Plan (CCP) completed for Alaska Maritime NWR including the Aleutian Islands Unit following public meetings in Atka, Nikolski, Unalaska/Dutch Harbor and Homer (Section D. 1,3).

A Public Use Management Plan was completed in connection with exhibit design for remodeled Adak Fish & Wildlife Center (Section D. 2).

A veteran manager departs and two new managers come aboard at Adak and Amchitka respectively (Section E. 1).

Ten Student Conservation Association volunteers as well as local volunteers sustain refuge biology and public use programs (Section E. 4).

For the first time since 1975, the endangered Aleutian shield fern (Polystichum aleuticum) was rediscovered on Adak (Section G. 2).

132 endangered Aleutian Canada geese were transplanted from Buldir to Amchitka Island (Section G. 2)

The first brood of Aleutian Canada geese ever observed on Nizki Island was reported (Section G. 2).

Contracts were awarded for modifications to the Adak Fish & Wildlife Center and fabrication of interpretive exhibits (Sections H. 6 and I. 2).

The annual refuge officers' law enforcement refresher training became part of a nationwide "sting" operation (Section H. 17).

Major repairs and improvements were made in the historic building now used as a residence/office by the ARM Amchitka (Section I. 2).

Representatives of FWS and the Aleutian Islands Unit attended the solemn dedication of a War Memorial on Attu (Section I. 3).

B. CLIMATIC CONDITIONS

The complex, highly irregular Aleutian weather is a frequent subject of discussion in and away from the islands. Conditions vary greatly from year to year, month to month, day to day, hour to hour and even minute to minute. Individual islands have their unique micro-climates based upon storm tracks and topography. Weather data for 1987 was available from Attu, Shemya and Adak.

Comparisons of weather for 1986 and 1987 at Attu indicate that spring (May - June) weather between the two years was very similar (Table 1). Attu was slightly drier in 1986, resulting in an earlier than normal snow melt, which allowed Asiatic migrant landbirds to disperse more widely over the island than is normally the case (a bother for late May- early June birders). The 1987 average spring temperatures were slightly warmer. Summer (July - August) weather was slightly cooler and wetter than 1986. Comparable data for fall and winter weather was not available.

Due to the lack of nearby mountains to snag passing clouds, Shemya receives considerable less precipitation than other Aleutian weather stations. Unlike Attu, Shemya's weather was quite different between 1986 and 1987 (Table 2). There was 7.5 more inches of rain and 87 more inches of snow in 1987. Winter 1987 averaged 1.3 degrees warmer while spring 1986 weather was 1 degree warmer. Precipitation was 4.86 inches greater in 1987 even though there were approximately 68 fewer days with measurable precipitation. Summer weather continued to bring above normal precipitation levels and near average temperatures. Fall (September - November) 1987 brought Shemya drier but slightly cooler weather. December 1987 found Shemya with more than twice as much snow as in 1986, but with near average temperatures.

Adak weather data indicates that winter 1987 was more than four inches drier than winter 1986 (Table 3). January through April snowfall in 1987 was 31.7 inches greater than in 1986 and 13.2 inches greater than "normal". Winter temperatures averaged very close to "normal" with February having the greatest variance of 1.9 degrees. Spring was 0.9 inches wetter and 4 degrees cooler in 1987 than in 1986. Summer continued the wet and cool trend by having almost four times as much rain and being 3.5 degrees cooler on the average as in 1986. Fall was 7.7 inches drier than in 1986 and 5.7 inches drier than "normal". Fall snowfall was below "normal" for the third consecutive year. Fall temperatures were just slightly cooler than average but considerably cooler than 1986. December moisture was considerably less (6 inches) in 1987 than "normal" though the average temperature varied only 0.1 degrees from the "norm". Overall, the average temperature

Table 1. 1987 Attu, Alaska, weather summary with comparisons to 1986 data.

	Inches of precipitation		Inches of snow		Days of measurable precipitation		Degrees fahrenheit					
							Maximum		Minimum		Average	
	1987	1986	1987	1986	1987	1986	1987	1986	1987	1986	1987	1986
JAN	6.95	6.29	54.0	23.6	19	25	39	32	9	16	23.5*	31.6
FEB	2.50	3.29	25.0	9.2	13	17	37	38	12	10	26.7*	29.1
MAR	NVD	6.74	NVD	42.9	21	24	38	43	25	15	33.4*	31.3
APR	NVD	5.33	NVD	4.0	4	17	45	47	20	25	34.6*	35.3
MAY	2.14	2.25	T	T	5	10	47	55	27	27	38.7*	39.0
JUN	2.55	2.37	0	0	7	10	62	64	35	32	46.4*	42.5
JUL	4.10	3.96	0	0	9	8	58	64	41	26	46.5*	52.6
AUG	3.12	3.20	0	0	4	5	57	62	37	35	47.0*	54.8
SEP	3.99*	11.20	0	0	10	18	56	60	39	25	47.0	46.9
OCT	10.71	7.62	0.1	0	23	19	50	59	30	30	39.1*	47.1
NOV	N.C.	10.30	N.C.	4.1	N.C.	18	N.C.	54	N.C.	24	N.C.	36.1
DEC	N.C.	10.10	N.C.	30.7	N.C.	25	N.C.	42	N.C.	10	N.C.	36.1
Total:	36.06*	73.57	79.1*	114.5	115*	196						
Extremes:							62	64	9	10		
Averages:											*	40.2
Dates:							6/21	7/?	1/15	2/14		

* INCOMPLETE DATA
NVD NO VALID DATA AVAILABLE
N.C. NOT CERTIFIED, NO WEATHER DATA ACCUMULATED

Table 2. 1987 Shemya, Alaska, weather summary with comparisons to 1986 data.

	Inches of precipitation		Inches of snow		Days of measurable precipitation		Degrees fahrenheit					
							Maximum		Minimum		Average	
	1987	1986	1987	1986	1987	1986	1987	1986	1987	1986	1987	1986
JAN	5.63	2.72	57.0	24.4	15	20	38	36	21	24	29.2	30.9
FEB	2.66	1.37	25.3	11.6	7	22	36	38	21	20	30.5	32.1
MAR	2.42	2.48	17.4	8.0	8	23	43	38	25	25	34.3	33.7
APR	1.50	1.72	11.3	2.1	7	14	42	42	27	31	35.2	36.8
MAY	0.87	1.18	0.1	T	2	13	46	48	33	31	38.8	39.2
JUN	2.54	1.29	T	0	5	16	50	50	36	36	42.3	43.3
JUL	3.75	4.18	0	0	17	16	50	54	41	40	45.6	48.5
AUG	6.34	0.74	0	0	19	12	53	61	43	46	46.0	52.8
SEP	1.71	2.29	0	0	15	17	53	58	38	42	46.7	51.0
OCT	2.32	2.57	2.5	T	21	24	52	52	34	36	42.7	40.1
NOV	2.20	4.47	7.1	9.1	24	29	43	45	27	27	35.8	38.2
DEC	5.55	4.97	39.8	17.9	NVD	29	40	40	20	24	30.8	32.8
Totals:	37.49	29.95	160.5	73.1	140*	235						
Extremes:							53	61	20	20		
Averages:											38.2	40.0
Dates:							8/4	8/19	12/?	2/2		

* INCOMPLETE DATA
NVD NO VALID DATA AVAILABLE

Table 3. 1987 Adak, Alaska, weather summary with comparisons to 1986 and normal data.

	Inches of precipitation			Inches of snow			Days of measurable precipitation		Degrees fahrenheit						
									Maximum		Minimum		Average		
	1987	1986	NORM	1987	1986	NORM	1987	1986	1987	1986	1987	1986	1987	1986	NORM
JAN	4.10	3.38	6.11	21.7	25.7	17.5	28	24	43	43	17	10	32.0	30.0	33
FEB	1.15	3.04	4.75	28.3	12.9	19.2	23	23	42	45	17	15	31.0	34.1	33
MAR	5.11	4.42	5.85	13.6	7.4	20.1	27	27	43	47	22	27	36.0	37.0	35
APR	2.38	6.00	4.50	16.5	2.4	9.9	24	20	56	49	28	26	38.0	38.7	37
MAY	1.79	3.60	4.10	1.1	T	2.1	19	23	51	53	31	33	41.0	41.9	41
JUN	4.88	2.14	3.17	0	T	T	11	19	55	57	39	34	45.4	44.8	44
JUL	4/69	0.71	2.98	0	0	0	21	12	57	71	39	41	49.0	51.5	49
AUG	3.31	1.35	4.15	0	0	T	19	15	67	64	39	40	51.0	52.0	51
SEP	3.81	5.03	5.36	0	0	0.1	22	20	57	58	34	38	48.0	50.0	48
OCT	7.37	8.39	6.61	.05	0	1.9	29	24	60	52	28	28	42.0	45.0	43
NOV	3.40	8.84	8.17	11.8	3.7	12.4	26	22	47	50	23	23	37.0	39.0	37
DEC	1.47	7.43	7.33	32.9	23.1	20.1	29	29	46	45	13	24	34.0	36.0	34
Totals:	43.46	54.33	63.08	125.9	75.2	103.3	278	258							
Extremes:									67	71	13	10			
Averages:													40.4	41.7	40.4
Dates:									8/22	7/18	12/6	1/13			

for the year varied only 0.1 degrees from the average temperature (40.4 and 40.5 degrees respectively) though Adak was considerably drier in 1987 than average (20.4 inches).

Storm Condition One, 60-70 knot winds. Any wind above 40 knots lifts the tops of the waves. Note yellow carsonite post. #028701, EVK

Weather data for Dutch Harbor/Unalaska and Akutan was not available for compiling at the time of this report.

Adak and the surrounding Aleutian Islands observed a lot of geologic disturbance this past year. Besides the fairly common earthquakes (over 30 felt on Adak), four volcanic eruptions were also reported.

On 5 January, a 6.4 earthquake centered 60 miles south of Nikolski, Umnak Island, resulted in a small eruption within the Okmak caldera on the northeast part of the island. Ash and debris were observed by a Peninsula Airways pilot enroute to Adak. On 17 February, Adak had a strong 5.7 earthquake centered approximately 125 miles south of the island. A 6.9 earthquake occurred 60 miles south of Unalaska Island on 26 February, only minor damage was recorded. On 19 March, the volcano on Atka "let off a little steam". Adak was rocked by two major earthquakes on 21 March. The first occurred at 12:42 a.m. and measured 6.2 while the second occurred at 4:49 p.m. and measured 5.8. Adak's next major earthquake occurred on 4 July, 5.3 and again on the 5th, 5.7. On 28 August, the volcano on Amukta blew its top

spewing ash debris 35,000 feet into the air. The plume was observed by Reeve airline pilots enroute to Adak. Adak was shook by its final major earthquake for the year on 9 September with a 5.5 quake centered 70 miles southeast of Adak. The Kiska volcano was reported to have vented a large head of steam on 28 November. The report came from construction personnel stationed on Amchitka Island. The report could not be verified due to heavy snow that fell on the 29th, blocking the roads on the island.

C. LAND ACQUISITIONS

3. Other

After five years, the proposed FWS/Ounalashka Corporation land exhange was completed. Following inhouse trading between the Ounalashka and Akutan Native Corporations, the FWS was able to exhange the subsurface rights to 195 acres on Amaknak Island, adjacent to the expanding fishing community of Dutch Harbor, for about 365 acres of important offshore seabird islands and islets.

D. PLANNING

1. Master Plan

Numerous public meetings were held in towns and Native villages throughout the AMNWR in January, February and March to involve residents in the planning of the Comprehensive Conservation Plan (CCP) for the refuge. ARM Klett attended meetings on the AIU in Atka, Nikolski and Unalaska/Dutch Harbor. At each meeting, refuge objectives and programs were explained and the management alternatives described. Residents were asked how they would like to see the refuge managed; which objectives should be emphasized and what problems in the local area should be considered.

After the public meetings, Refuge Manager Zeillemaker attended planning sessions in Homer developing new alternatives for some islands, quantified wilderness values for several islands and altered the CCP management options.

In April, AIU staff rewrote sections of the CCP, specifically: scenerios, special values and wilderness review.

During late October and November, the draft CCP was received for agency review and comments with the public review scheduled for the spring, 1988.

2. Management Plan

The refuge received a Public Use Management Plan (PUMP) as part of the ARMM contract issued to Inside/Outside of Austin, TX in 1985. Their contract covered design of a display package for the

complete rehabilitation of the refuge visitor center. Input was received from a random survey of 100 naval personnel and all of the school teachers (40).

5. Research and Investigations

Aleutian Canada goose investigations: U.S. Environmental Protection Agency (EPA) Experimental Compound 1080 use permit G704-EUP-28, USFWS, AIU-AMNWR.
The continuing Aleutian Canada goose (ACG) Compound 1080 program consisted of aerial surveys of Kiska Island in March after which the island was declared fox-free. A short visit was made in July to confirm the fox-free status. Detailed discussions are contained in section G. 15.

Environmental contaminants sampling at Defense Environmental Restoration Program (DERP) cleanup sites, USFWS, Wayne Crayton FWE-ANC, AMNWR.
Personnel conducted pre-cleanup sampling at Agattu, Kiska, Great Sitkin, and Adak islands to determine what contaminants may have entered the environment from abandoned military installations. DERP is a Department of Defense program administered by the Army Corps of Engineers to identify and cleanup hazardous waste sites on abandoned military bases and restore the areas to near-original state.

Sea otter study in the central and western Aleutians.
James A. Estes, USFWS (Santa Cruz, California) and Charles A. Simenstad, University of Washington, continued studies of sea otters and their habitat composition and food/habitat requirements at Adak, Amchitka, Shemya and Attu islands throughout the summer. Also, specific bird species were collected for diet composition and tissue sampling/carbon isotope analysis.

Effect of nest site removal on Aleutian rosy finch, Amchitka Island.
Dr. Norman French, Institute of Arctic and Alpine Research, University of Colorado. The study measured nesting success and population response of rosy finches to the removal of nesting sites in abandoned WWII buildings on Amchitka. Rosy finches normally nest in secure locations on sea cliffs but readily adapt to artificial structures, including numerous abandoned buildings on Amchitka, resulting in high population densities. In recent years most of the buildings have been removed.

Microevolution of sandpiper sounds: Bioacoustics, anatomy and genetics.
Dr. Edward H. Miller, British Columbia Provincial Museum. The goals are to describe acoustic, morphological and genetic covariation in the sandpiper tribe Calidiridini and to postulate evolutionary mechanisms responsible for pattern of

differentiation. The study will be conducted in the Aleutian Islands, Pribiloff Islands, Western Alaska and the Northwest Territories. Dr. Miller visited Amchitka Island in May to gather data and specimens.

Plastic Beach Surveys, Amchitka Island.
National Marine Fisheries Service. A continuing study to survey beaches on Amchitka Island for derelict fishing gear and other plastic debris as part of an entanglement program. The NMFS has surveyed beaches on Amchitka in 1972, 1974, 1980 and 1982 providing one of the most complete data sets on marine debris anywhere in the world. Preliminary findings indicated a decrease in the plastic debris during this survey.

Seabird census in the Krenitzin Islands (Egg and Baby islands).
LGL Alaska Research Association, Inc. Focus of the research was to test various, non-disruptive procedures for determining population levels and population monitoring of nocturnal seabirds. The five principal species surveyed were Leach's and fork-tailed storm petrels, ancient murrelets and Cassin's and whiskered auklets. Work was also conducted on tufted puffin colonies determining burrow occupancies and monitoring activity.

Investigation of the sea-air exchange (SEAREX) of chemical substances.
Dr. Joseph Prospero, University of Miami, SEAREX Executive Committee. The fifth year of a study in the Aleutian islands that is part of a worldwide evaluation of atmospheric concentrations and fluxes over the ocean for a variety of organic and inorganic substances. An air particle monitoring system was established on Shemya Island in 1982.

Hydrologic monitoring of Amchitka Island.
U.S. Department of Energy (DOE), EPA and DOE Contractors, Las Vegas, Nevada. Personnel collected water, soil and biological samples/specimens as part of an annual hydrologic monitoring program on Amchitka Island.

Geologic mapping of Seguam Island.
James Myers, Associate Professor of Geology, University of Wyoming. A two year study to learn the source and evolution of Aleutian arc magma. Seguam Island is located in a little-studied volcanic center. Study objectives are to geologically map the island and collect rock samples for analytical and paleomagnetic study.

Geologic mapping of Kanaga Island.
James Brophy, Professor of Geology, University of Indiana. A two year study to conduct geologic mapping and sample collection on the northern end of Kanaga Island around the Kanaga Volcano.

ALASKA PENINSULA UNIT

ALASKA MARITIME NATIONAL WILDLIFE REFUGE

Homer, Alaska

ANNUAL NARRATIVE REPORT

Calendar Year 1987

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

REVIEW AND APPROVALS

Alaska Peninsula Unit

ALASKA MARITIME NATIONAL WILDLIFE REFUGE

Homer, Alaska

ANNUAL NARRATIVE REPORT

Calendar Year 1987

_____	_____	_____	_____
Refuge Manager	Date	Refuge Supervisor Review	Date

_____	_____
Regional Office Approval	Date

INTRODUCTION

Alaska Peninsula Unit

Alaska Maritime National Wildlife Refuge

The Alaska Maritime National Wildlife Refuge was created by the Alaska National Interest Lands Conservation Act in 1980. It was established to conserve fish and wildlife populations and habitats in their natural diversity, fulfill international fish and wildlife treaty obligations, provide opportunities for continued subsistence uses by local residents, provide a program of national and international scientific research on marine resources and 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 through most of coastal Alaska and extends from Forrester Island in Southeast Alaska along the Gulf of Alaska to the Aleutian Islands and northward until near Barrow in northwest Alaska. There are over 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 has five units with all former refuges designated subunits.

The Alaska Peninsula Unit is the second largest unit of the Alaska Maritime National Wildlife Refuge. Over 800 islands, totaling 600,000 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 which extend beyond mean high tide.

Except for the Aleutians, the greatest diversity of breeding seabirds is found along the south side of the Alaska Peninsula. Over 6,000,000 seabirds comprised of at least 25 species nest in this region.

Surprisingly, few of the islands remain truly pristine due to past introductions of foxes, rodents, and ungulates. Foxes destroyed fossorial and surface-nesting seabird colonies on numerous islands and left only remnant populations on others. More damaging than foxes on some islands, are the ground squirrels and voles which were released with them as an added food source.

Few people visit refuge islands except in the vicinity of villages, primarily Sand Point, Squaw Harbor, and King Cove; six other villages are located in the region. Egging and

hunting of seabirds is generally negligible in this region where most residents derive their livelihoods from commercial fishing. The first contact between Russians and Alaska Natives occurred in 1741 in the Shumagin Islands. The islands have been little affected by off shore oil exploration and development, but exploration has begun in Shelikof Strait to the north and is planned elsewhere off the Peninsula. Human competition for fish relied upon by marine birds and mammals probably poses the greatest potential threat.

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K. FEEDBACK

A. HIGHLIGHTS

Red fox removal from Big Koniuji Island in 1985-86 in the Shumagins apparently succeeded. (Section G.15).

Monitoring of crested auklets continued at Yukon Harbor. (Section G.5).

Geoarchaeological research project continued in the Shumagins. (Section D.5).

Research staff conducted studies on the food habits of puffins on three different refuge islands south of the Alaska Peninsula and learned that different fish were mainly being utilized at different sites. (Section D.5).

B. CLIMATIC CONDITIONS

Cold Bay provides the only long-term weather records available for the south side of the Alaska Peninsula. Intermittent records are available from Sand Point in the Shumagin Islands and from Chignik, which lies 100 miles to the northeast. Sand Point's annual mean temperature is 37.9° F, and it averages 60.3 inches (four-year record) of precipitation. Chignik, one of the wettest stations in the state, averages 127 inches of precipitation and has an annual mean temperature 38.5° F, based on eight years of data.

According to records at Cold Bay (Table 1), temperatures in the region averaged slightly above normal in 1987. Precipitation was 2.73 inches above average. Though Cold Bay meterological data reflect conditions elsewhere along the eastern end of the Alaska Peninsula, variability is great, and weather along the upper Peninsula and sometimes in the Shumagins more closely reflects records at Kodiak. June was a very stormy month. This is best illustrated by rainfall in Kodiak which was almost 14 inches above normal. With almost 17 inches of rain, June 1987 was the wettest June on record at Kodiak and the second wettest month ever recorded there.

D. PLANNING

1. Master Plan

See Homer office section.

2. Management Plan

See Homer office section.

Table 1. Climatological data for Cold Bay, Alaska, 1987.

	Temperature (F)					Precipitation in inches			
Month	Ave. Max.	Extreme	Ave. Min.	Extreme	Monthly mean	Departure from mean (40 years)	Water equivalent	Snow	Departure from mean
Jan	35.4	44	25.5	12	30.5	+2.2	3.17	12.4	+0.47
Feb	36.2	41	26.1	11	31.2	-3.7	3.15	10.5	+0.88
Mar	39.0	45	33.6	13	28.7	+5.0	3.18	20.3	+0.87
Apr	38.4	47	30.0	23	34.2	+1.2	1.94	1.0	-0.01
May	43.7	50	33.8	25	38.8	-0.7	1.52	1.0	-0.95
Jun	48.9	58	40.0	32	44.5	-0.9	4.00	7	+0.84
Jul	55.5	69	46.3	36	50.9	+0.6	1.80	0	-0.70
Aug	57.7	67	47.9	40	52.8	+1.6	2.50	0	-1.20
Sep	51.0	59	42.7	36	46.9	-0.6	4.25	0.4	+0.48
Oct	46.5	57	35.4	26	41.0	+1.5	5.60	0.7	+1.31
Nov	34.6	46	25.3	13	30.0	-4.3	3.16	7.9	+1.88
Dec	33.5	44	23.1	07	28.3	-1.2	3.69	14.2	+0.84
Totals	43.4	69	33.6	07	38.4	+0.4	37.96	67.6	-0.18

5. Research and Investigations

AKM-06-87 People in a Tectonically Unstable Environment-Vassar College and New York University.

Drs. L. Lewis Johnson and Margaret A. Winslow continued geoarchaeological research in the Shumagin Islands under a grant from the National Geographic Society. Their principal objective is to locate prehistoric Aleut sites and analyze uplifted marine terraces. The team of archaeologists and geologists arrived in the Shumagins in July. They surveyed Nagai Island along with the areas missed in previous years. A total of 20 new prehistoric and 20 historic sites was discovered or confirmed. This brings the total archaeological sites documented in the Shumagins to 69. Three new sites also were investigated on Chowiet Island in the Semidis. Bad weather prevented checking other Semidi Islands.

In 1987 Dr. Johnson located eight sites on Nagai, three on Turner, and one each on Bendel, Spectacle, Bird, and Simeonof islands. One of the archaeological sites found on Turner Island proved to be 4,500 years old according to radioactive carbon dating, making this the oldest site in the Shumagins. Bird Island also has a site which is over 4,000 years old. Though Nagai is the second largest island in the Shumagins, surprisingly few sites were found. Evidently, the outer Shumagins were more populated than the inner Shumagins and nearby Alaska Peninsula. Chernabura Island contains the largest sites, 46 percent of the total estimated site area in the Outer Shumagins. To date, 50 prehistoric sites have been documented on the six outermost islands. The ages of sites divulge a pattern of rapid population growth followed by periods of little or no human activity due to periodic catastrophic earthquakes and tsunamis. Prior to 1984 the Shumagins were archaeologically unknown.

AMNWRF NR87 - Ecology and reproductive success of seabirds in the Semidi Islands and comparison of food habits of puffins at different colonies south of the Alaska Peninsula, Alaska, Fish and Wildlife Research Center, Anchorage.

Personnel of the Alaska Fish and Wildlife Research Center conducted studies of puffin diets on the Semidi Islands for over seven weeks in July and August. Initially, the field party consisted of Scott Hatch (project leader), David Blomstrom (biological technician), and Lisa van Hulsteyn (Service volunteer). The Tiglax provided transportation for personnel and gear to the study site, departing Homer on July 6

and arriving in the Semidis the following day. A base camp was set up at the traditional site on Chowiet Island, and a spike camp was established on Suklik Island, where most of the work was conducted. Hatch left the islands on July 20 by way of Coast Guard helicopter from Kodiak; Blomstrom and van Hulsteyn remained to complete the field work until the camp was evacuated by the Coast Guard cutter Ironwood on September 1.

Methods previously developed for collecting nestling diet samples from tufted and horned puffins (screens placed to temporarily block burrow entrances at feeding time) were applied nearly daily to obtain 314 samples from tufted and 388 samples from horned puffins over the study period. These samples have now been sorted and identified in the laboratory. Data analysis for comparison with earlier results from this three year study is pending.

Other activities conducted during the study included the following: preliminary field trials of several types of instrumentation for monitoring puffin activity (capillary diving depth gauges, electronic flight and dive time records, and "electric-eye" burrow entrance records); Canada goose banding on Kiliktagik Island; and observations on the annual productivity of selected species of seabirds at the Semidis. A total of six geese (four adults and two goslings) was color-and metal-banded during three visits to Kiliktagik during the molting period. All but one of these birds has now been sighted on the wintering grounds near Pacific City, Oregon.

The productivity of seabirds was generally poor on the Semidi Islands in 1987. Tufted and horned puffins both had lower than average numbers of chicks per burrow on Suklik, and kittiwakes failed completely to raise young throughout the islands this year. Northern fulmars had no more than about 25 percent of nests still containing young when Hatch departed on July 20, which compares with a long-term average of about 50 percent.

AMNWR NR-87-Use of red fox as a biological control agent against introduced arctic fox.

This study was initiated in 1983, although the study area is located in the Aleutians. In June of that year three male red fox were captured near Nikolski on Umnak Island and translocated 15 miles to the northwest on 140-acre Adugak Island. In May 1984 five vasectomized male and five female red fox from Umnak Island were released on Uliaga Island, located 32 miles to the northwest in the Islands of Four Mountains. Both islands once were important seabird islands. In 1936 puffins were "countless" on Uliaga according to Murie, but all accessible colonies have since been eliminated. Large numbers

of Cassin's auklets formerly bred on Adugak, and Murie mentioned that they were being eliminated by fox in 1937. No fossorial seabirds survived on Adugak.

After the experimental release of red fox on Adugak and Uliaga, irregular visits were made to these islands. No arctic fox were seen on either island after 1984.

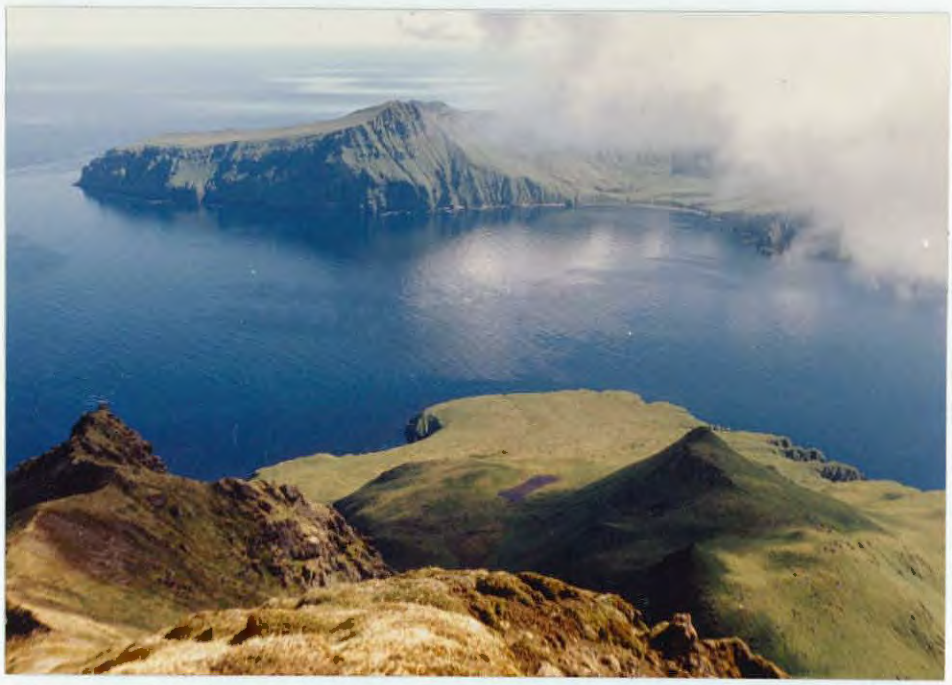
In 1987, five personnel arrived at Uliaga Island on September 9 aboard the Tiglax and remained on the island until September 13. Padded jaw leg-hold traps were set on the eastern part of the island for three nights. In the four days on Uliaga an exhaustive effort was made to locate fox sign.

One small red fox was captured on Uliaga Island in a leg-hold trap with padded jaws. A red fox also was observed from an inflatable boat the previous day about 1/2 mile north of our camp, and a recently active den was located on the island's vegetated lava flat. Traces of red hair were indicative of use by red fox. Several small overgrown holes, probably former arctic fox burrows, were found. Many of the fox trails seemed partly overgrown, and judging from the prevalence of oxidized scats, this area once was used by a much larger fox population.

After spending four days on Uliaga sampling at least part of the island with traps, it appears that no arctic fox remain on this 2,321 acre island. After spending 40 months on Uliaga, the red fox population should have diminished some since at least four year old animals are now there. Arctic fox, on the contrary, even if temporarily suppressed by the added competition could breed, and therefore they would be expected to increase as the introduced reds gradually die out. Evidence that arctic fox have disappeared will be conclusive in a few years when all remaining reds die of old age and no fox sign of any kind can be found.

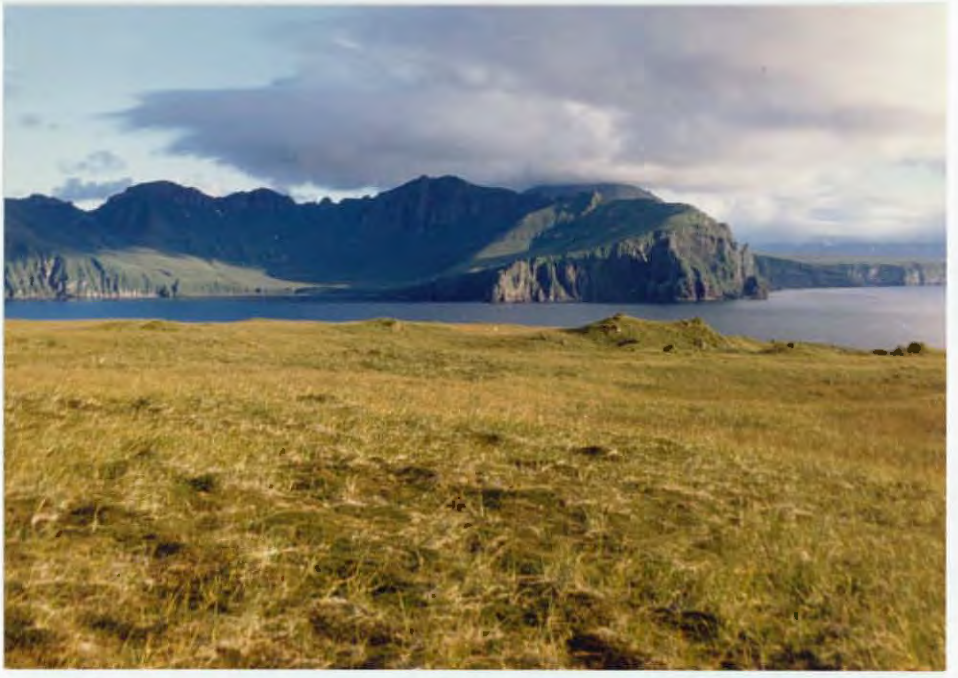
No fox were seen or heard on Adugak in 1987, but two fresh scats were found at beaches on the north and south sides of the island; and recent tracks were evident on a shell beach on the southeast end. Tufts of red fox hair also were discovered. Based on the extensive coverage of so small an island in better than average weather conditions and the failure to trap any fox, is a good indication that only one red fox and no arctic fox persist on this island. In all prior years when this island was visited, even a minimum effort of searching revealed a fox. In contrast, despite repeatedly walking over the parts of the island where fox previously were most frequently seen and despite setting a dozen traps, we failed to find an arctic fox in 1987.

Three male red fox were released on Adugak Island in 1983. No sign of arctic fox was detected in 1987. (9/87, EPB).



The Islands of Four Mountains were visited in September to assess the progress of an experimental release of red fox on Uliaga Island to see if they would eliminate arctic fox introduced in the 1920s. (9/87, EPB).

Uliaga, surmounted by a 3,000 foot extinct volcano, once had thousands of nesting seabirds prior to introduction of fox. (9-87, EPB).



The volcanically formed beach on the south side of Uliaga is crisscrossed with old fox trails. Nearly 200 foxes were trapped on this 2,200 acre island in the early 1930s. (9-87, EPB).

Fox trails were filling in principally with dogwood (Cornus suecica). Apparently, this species is the first invader and may be favored by increased moisture in the trail ruts. (7-87, SA).

On an island as rugged as Uliaga, a pair or two of fox could still remain. (9-87, EPB).

E. ADMINISTRATION

1. Personnel

See Homer office section.

2. Youth Programs

See Homer office section.

4. Volunteer Program

See Homer office section.

5. Funding

See Homer office section.

6. Safety

See Homer office section.

7. Technical Assistance

Wells Stephensen, Animal Damage Control Specialist, Department of Agriculture, provided technical expertise in hunting and trapping foxes. Wells was a tremendous asset to the program during his tenure in the Barren Islands and the Shumagin Islands in June and July.

8. Other

The following special use permits were issued for areas within the Alaska Peninsula Unit:

Permitee	Location	Purpose
Lamont-Doherty Geological Observatory	Shumagin Islands	Seismic station maintenance
U.S. Geological Survey	Shumagin Islands	Earthquake research
Dr. L. Lewis Johnson Vassar College	Shumagin Islands	Archeological research
Chevron, USA	Shumagin Islands	Geological mapping and rock sampling

F. HABITAT MANAGEMENT

7. Grazing

Two cattle grazing permits are in effect on the Alaska Peninsula Unit. Both of the areas are either partially or wholly selected by the Natives or the State. Wosenenski Island numbers dropped from 50 to 15 due to poaching with both the island and animals in good condition.

Chirikof Island has about 800 cattle and a permanent caretaker living on the island. This island has been grazed for many years and shows signs of severe erosion and overgrazing in some areas.

G. WILDLIFE

2. Endangered and/or Threatened Species

As previously mentioned, Aleutian Canada geese were banded and color-marked at Kiliktagik Island in the Semidis and have been seen wintering in Oregon.

3. Waterfowl

Spring waterfowl surveys along the south side of the Alaska Peninsula have been conducted for seven years by Migratory Bird Management personnel to monitor the status of declining populations of emperor geese. A total of 3,549 emperor geese was noted south of the Alaska Peninsula; this represents a large increase over 1986. The overall fall count however, showed a slight decrease from 1986. Only about 7 percent of the total geese seen were located in bays along the south side of the Peninsula. Additional emperor geese undoubtedly were present in the Shumagins and other islands which were not surveyed.

5. Shorebirds, Gulls, Terns, and Allied Species

The only seabird-related activities by refuge personnel in the Alaska Peninsula Unit were associated with fox eradication on Big Koniuji Island in July. After all traps on the island had been activated and rechecked, two Student Conservation Association volunteers and a biological technician monitored the crested auklet colony at Yukon Harbor.

Crested Auklets. The weather cooperated well this year compared to the previous year when counts were possible on only 2 days out of 11. Auklets were counted on plots on 8 days out of 12 this year.

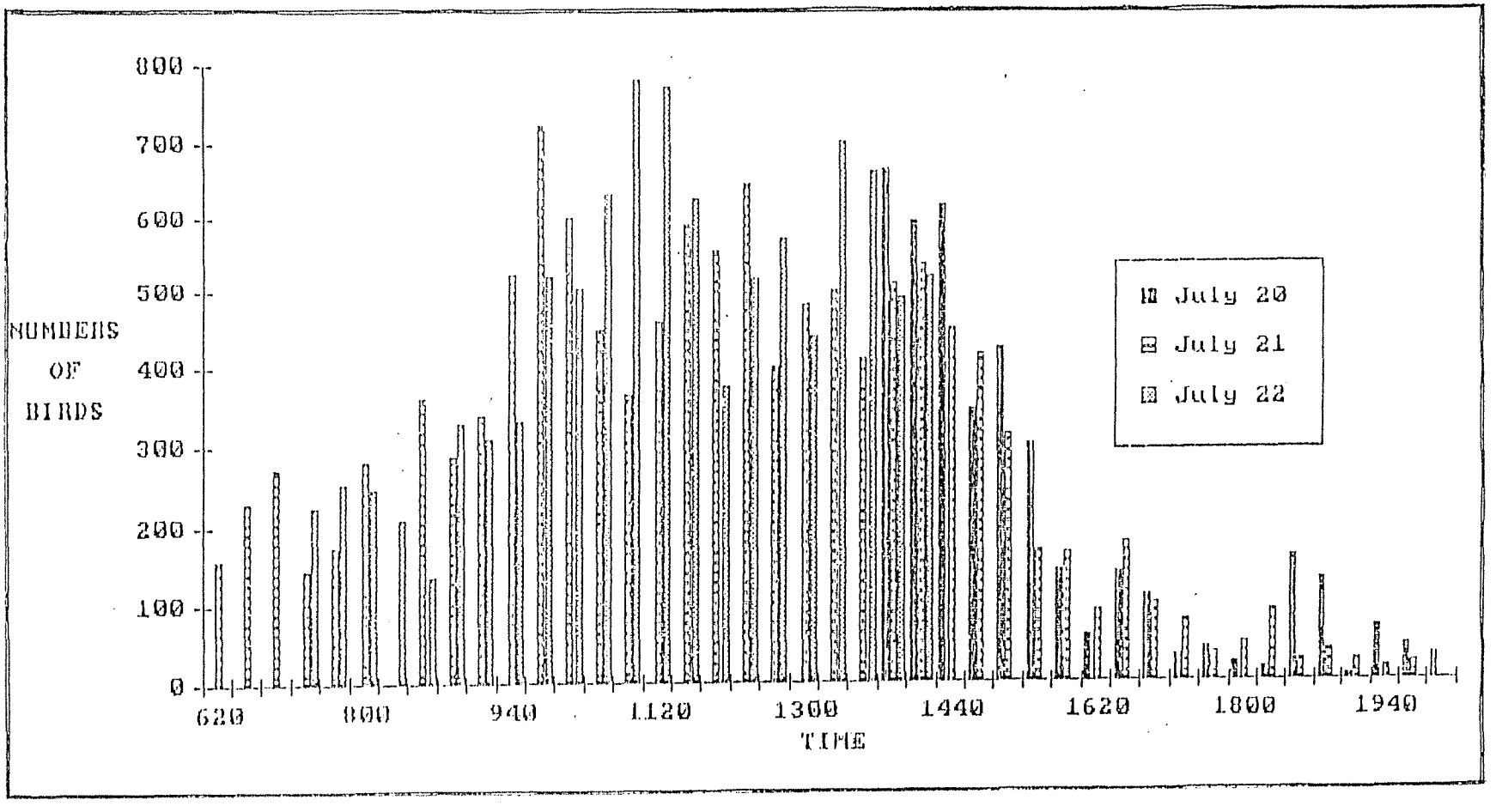
Byrd developed a "net movement" monitoring technique. This method consists of counting arriving birds (landing on a plot) and departing birds (leaving a plot at regular 15 minute intervals during selected activity periods.) The net movement is then calculated by subtracting departures from arrivals. The numbers of birds passing overhead at camp for five minute intervals every twenty minutes was used during ten days at the beach camp.

Daily activity patterns at Yukon Harbor for all five plots in 1987 were similar to other crested auklet colonies in the State. They have a bimodal activity pattern with a broad morning range of activity and a short, sharp evening peak just before dark. Average daily peak attendance of birds on plots varied widely from plot to plot. Plot comparisons suggest the magnitude of inter annual variability reported by other observers. Weather, time of day, predators and human disturbance affect these numbers.

On three days, numbers of birds were counted as they flew down to the harbor. Birds began descending from the colony about 0600 hours, had a broad peak of activity in mid-morning, and tapered off in the afternoon. There was a high of 780 birds per five minute period at 1100 hours and a low of seven birds per five minute period at 1920 hours (Figure 1).

Nesting chronology for the crested auklet colony at Yukon Harbor was first delineated in 1976. In 1976, hatching occurred July 12 to 17 and fledgling occurred August 15 to 20. We estimated the hatching period in 1987 was about July 12 to 18 and fledgling probably occurred August 10 to 15, based on chick vocalizations and the development of two chicks that were found in the colony. During the first visit to the colony on July 18, adults were heard chortling, chick vocalizations were first faintly heard on July 22, and as the days passed, vocalizations became louder. On July 28, two downy chicks were found outside the burrows on the boulders. Food-laden sublingual pouches were also noticed during this period of monitoring, indicating that chicks were being fed.

FIGURE 1. ACTIVITY PATTERNS OF CRESTED AUKLETS AT YUKON HARBOR USING BIRDS FLYING OVERHEAD, JULY 1987.



Predators of crested auklets include ground and aerial predators. Ground predators are introduced red fox and perhaps ground squirrels; aerial predators consist of bald eagles, peregrine falcons and ravens. Red fox predation has been previously discussed. At the colony at Yukon Harbor, ground squirrels are present, but considering the large size of the colony, they probably have little effect.

Based on 1976 research on predation at Big Koniuji, bald eagles ingest a variable amount of seabirds including crested auklets. Remains of crested auklets have been found in pellets and nesting sites, but we never saw actual attacks on auklets. Adult and juvenile bald eagles were often seen soaring above the cliffs and in the harbor. In 1987, two adults and two juveniles were seen soaring above the colony and the harbor. No aerial attacks or scavenging on auklets were ever seen.

Peregrine falcons were very much in evidence in the colony in 1987. In 1976, studies revealed that the peregrine falcon's diet consists entirely of crested auklets. In 1987 a pair of peregrine falcons was seen often in the colony, and on four occasions actual stoops were noted. Five auklet carcasses were found in the colony. The carcasses were picked clean with skeletons intact, typical feeding behavior of falcons.

A family group of five ravens preyed on the colony. Often during monitoring, one or two ravens would land in the colony and hop from rock to rock peering down in between the boulders. One raven was seen taking a live adult auklet while the auklet was standing on a boulder. Having the ravens present in the colony often discouraged auklets from landing.

An unusually marked auklet was present at the colony this year. It had a small white collar around the throat area and a white rump patch. The bird was seen on four days; it probably is a partial albino.

Delineation of plot and colony boundaries revealed a colony similar in nesting density and boundaries to the previous year. Polaroid prints were taken of the plots and the colony and an attempt was made to stratify nesting density. Highest nesting density seems to be in the higher portion of the colony where the plots are located. Lower nesting density occurs in the lower, more vegetation-covered talus slope.

Average daily attendance was similar for 1986 and 1987 (Table 2). Peak numbers of auklets standing in the plots were higher in 1986 than in 1987. These high numbers could be a result of the timing of monitoring. Auklets have a more consistent activity schedule during the incubation period and seem to spend more time standing on the rocks. In 1986 monitoring was done during early July, presumably the incubation period, but

the weather was exceptionally poor that period. In 1987 monitoring was done in late July during the early chick-rearing stage, with the weather often being excellent. When analyzing the net movement method numbers, the periods of activity begin earlier in the morning and extend later into the day. Often the numbers of birds entering a plot (vanishing down the crevices) are much higher than the numbers of birds standing on the surface; in 1986 there were greater extremes in numbers of birds on the plots than 1987 in the same time periods. The morning activity period had more consistent activity in 1987 than in 1986. Several more years of data need to be collected to see if this variability in numbers is of significance for this monitoring technique.

An albino auklet was seen at Granite Cove. Two albino auklets also were noted in 1973.

Table 2. Average daily peak attendance for the crested auklet colony at Yukon Harbor. July 1986 and 1987.

PLOT 1986

NUMBER	7/10	7/11
1	----	9.7
2	----	8.2
3	.06	16.2
4	9.5	17.2

PLOT 1987

NUMBER	7/23	2/25	7/26	7/27	7/28	7/29	7/30
1	6.3	6.4	10.9	5.0	3.6	0	0.2
2	4.5	3.6	5.9	5.6	1.5	0.1	0.3
3	5.1	5.3	12.1	6.5	1.4	3.7	0.3
4	4.2	13.0	21.7	10.6	2.0	3.7	2.5
5	3.0	5.5	14.3	7.9	0.9	2.9	---

Since the auklet colony at Yukon Harbor is nearly 1,000 feet in elevation, poor visibility due to fog and rain usually precludes counts of birds in plots. Only birds which are very close to the observation points are visible under these typical conditions. (7-87, SA).

Unrestricted visibility facilitates counting auklets in the 10 x 10 m plots. (7-87, SA).

An odd-plumaged crested auklet with a white collar and tail was repeatedly observed in one of the plots at Big Koniuji Island. (7-87, SS).

Age differences are apparent in the plumage of crested auklets. The bird in the center, lacking a crest, is a subadult. (7-87, SA)

Gulls. Because of late arrival in the Shumagins and our relatively short stay in 1987, we were unable to census the gull colony at Hall Island due to very high grass and umbelliforms this late in the season. In addition, when we attempted to census this colony on July 23, the chicks were nearly fledged and were away from nests hidden in tall vegetation. Despite several attempts, no counts were made at this gull colony in 1986 because of fog. In 1985 only 39 glaucous-winged gull nests and about 300 adults were counted on the western third of Hall Island. The mew gull colony found on Bendel Island in 1977 was revisited on July 30. Since nesting was over, no attempt was made to count nests or birds.

Kittiwakes. On July 23, we counted 245 black-legged kittiwake nests on the north side of Hall Island, compared to 377 nests a month earlier in 1986. Since this colony is small, all nests on the north side of the island are counted as one plot. Very few chicks were noted. Only 155 nests were counted at Hall Island in 1976. Although we passed by the huge kittiwake colony at Cape Thompson on the north end of Big Koniuji several times, no census was attempted because of the difficulty of making counts at any part of this colony from a boat. In 1984, approximately 7,800 nests were counted here. Sixty kittiwake nests were counted at the new colony near the entrance to Flying Eagle Harbor this summer, compared to 33 nests in 1986. A new colony comprised of 100 pairs of nesting kittiwakes was discovered at Popof Head on the east side of Popof Island while enroute to Sand Point.

Cormorants. The lack of nest site tenacity by cormorants was well exemplified on Big Koniuji this year. In 1986 a large increase in numbers of all three species of cormorants nesting in the Shumagins occurred on the cliffs below the gull colony south of the entrance to Flying Eagle Harbor. This colony burgeoned from 38 nests in 1976 to 370 nests, mainly red-faced cormorants, 10 years later. However, in 1987 no nests were found here, yet the number of gulls rose 70 percent from the previous year. Most of the birds from this colony probably moved to the north side of Hall Island, where we counted about 400 and 55 nests of red-faced and double-crested cormorants, respectively. (Nesting success was high, especially for double-crested cormorants, because most nests had large chicks.) It was not possible to accurately quantify numbers of chicks per nest because some of the higher ones were difficult to see and because some chicks were on ledges away from nests. Curiously neither in 1976 nor in 1986 were any cormorants reported breeding on Hall Island. Unlike past years, no cormorants were observed at Granite Cove on Big Koniuji, site of another expanding gull colony. Albeit no thorough examination of the cliffs north of Cape Thompson were made this summer, no cormorant nests were seen here either. It

appears that virtually all of the cormorants formerly nesting on Big Koniuji relocated to Hall Island in 1987.

Puffins. Several visits were made to the once enormous horned puffin colony south of Yukon Harbor. This colony is only a remnant of the estimated 60,000 birds breeding here more than a decade ago. Because of the elevation and inaccessibility of this colony and the difficulty with ascertaining populations of horned puffins, which have an erratic attendance pattern at colonies, no quadrats have been established. Nevertheless, annual visits should reveal any large increases in puffins which are anticipated following the eradication of fox.

Jaegers. Parasitic jaegers, including one light phase bird, were spotted on Little Koniuji, where they probably nest. Six to eight were seen on Bird Island.

6. Raptors

On June 8 we checked the golden eagle eyrie discovered three years earlier on Bird Island. An adult eagle flew from above the site and two nearly fledged eaglets were present in the nest along with two ground squirrels. One downy chick was initially present in early May 1984, but it vanished from the nest before we left the island at the end of the month. Except for Kodiak Island, this eyrie on Bird Island represents the only insular record for nesting golden eagles south of the Alaska Peninsula. The only record on the Alaska Peninsula is near Cold Bay. No census of bald eagle eyries at Big Koniuji was conducted this year because of our late arrival on the island.

Peregrine falcons appeared more numerous this summer, and a probable new eyrie was located on the east side of Big Koniuji between Yukon and Flying Eagle harbors. Four peregrines and five ravens were seen preying on crested auklets at Yukon Harbor.

7. Other migratory birds

Unlike in all past summers no new species of passerines, waterfowl or other birds were seen in 1987. Pine grosbeaks were again noted in two different parts of Big Koniuji and now appear well established on the island. Willow ptarmigan were numerous compared to past years on Big Koniuji. Only one ptarmigan was encountered on Little Koniuji during three days of exploring the island. The seemingly lower ptarmigan population on Little Koniuji probably is a result of the presence of arctic fox.

9. Marine Mammals

Atkins Island was circumnavigated on July 26 to census Steller's sea lions breeding there. A total of 898 adults and 262 pups was tallied under clear, calm weather conditions. An estimated 4,000 sea lions were here in 1976. Surveys by the Alaska Department of Fish and Game in June 1978 revealed 3,943 adults and 2,750 pups; counts the next year totaled approximately 5,000 adults and 4,538 pups. Obviously this rookery, the largest in the Shumagins, is manifesting the sharp decline witnessed throughout most of the state. The only other rookery in the Shumagins, Chernabura Island, was not visited.

Numerous sea lions slowly suffer and die with fish net or plastic strapping bands around their necks. (7-87, WS).

10. Other resident wildlife

The ground squirrel population on Big Koniuji appeared higher than that seen in 1986. Whether this was a real increase or whether it was mainly a reflection of a warmer spring this year plus our later arrival on the island is unknown.

15. Animal Control

Since a 1972 Executive Order banned the use of strychnine and sodium monofluroacetate (1080), which are the most efficient means of eliminating introduced fox from islands, we have been relegated to the use of only traps and firearms, except for islands in the western Aleutians.

Because Big Koniuji Island is not a known former nesting site for endangered Aleutian Canada geese, we also were unable to employ cyanide projectiles (M-44's or M-50's), which have been again recently used in the Aleutians.

Wells Stephensen, Norvell, Albert, Shawn Stephensen, and Bailey worked in the Shumagin Islands from July 8 to 31. The Tiglax transported them to the area and supported them for two days at the beginning of the field season.

Bird Island. On July 8, Bird Island was examined to ascertain whether fox eradication efforts in 1984 were successful. Much of this 1,740 hectare island was traversed by five people.

Trails nearly everywhere were growing over, and only a few traces of old scats were detected; no tracks were discovered. Though the population of arctic fox in 1984 was extremely low, as manifested by the capture of only 13 animals, it now appears that no fox remain.

The absence of fox was confirmed at the southeast end of the island where a gull colony formerly restricted to an offshore pinnacle has spread onto an adjacent point of Bird Island accessible to fox. A total of 27 glaucous-winged gull nests were found in this new colony. Eight large downy chicks were noted, and a thorough search of rank vegetation would have revealed more nests and chicks. Only one egg was encountered. Old fox trails lead to this colony site from a lengthy ridge above, and it is very doubtful that any nests would have survived if fox persisted on the island.

The only important part of Bird Island not checked for fox sign was the rugged area above Point Welcome and the seabird cliffs on the south side. On so small an island, however, it was not likely that any surviving fox would have overlooked the new gull colony. Annual visits should continue at Bird Island to further substantiate the absence of fox and monitor the response of insular avifauna.

Big Koniuji Island. Work was conducted at different sites between July 9 and 30 to search for sign of any remaining red fox. Flying Eagle Harbor was again used as our base camp on Big Koniuji. All of the approximately 250 coil spring leg-hold

traps set the previous two summers that could be relocated were reset.

Some new traps were used in place of traps too rusty to restore, and to replace sets on beaches lost in winter storms. Both oral and recorded predator calls were employed in certain areas. Primarily, dirt-hole sets along trails and beaches were used with various commercial fox lures and red fox urine. Sets also were used in past areas of regular fox activity. Traps were checked as frequently as possible, but some difficult to reach traps were checked only once. Approximately 150 traps and a few snares were left set around the island upon departure on July 30.

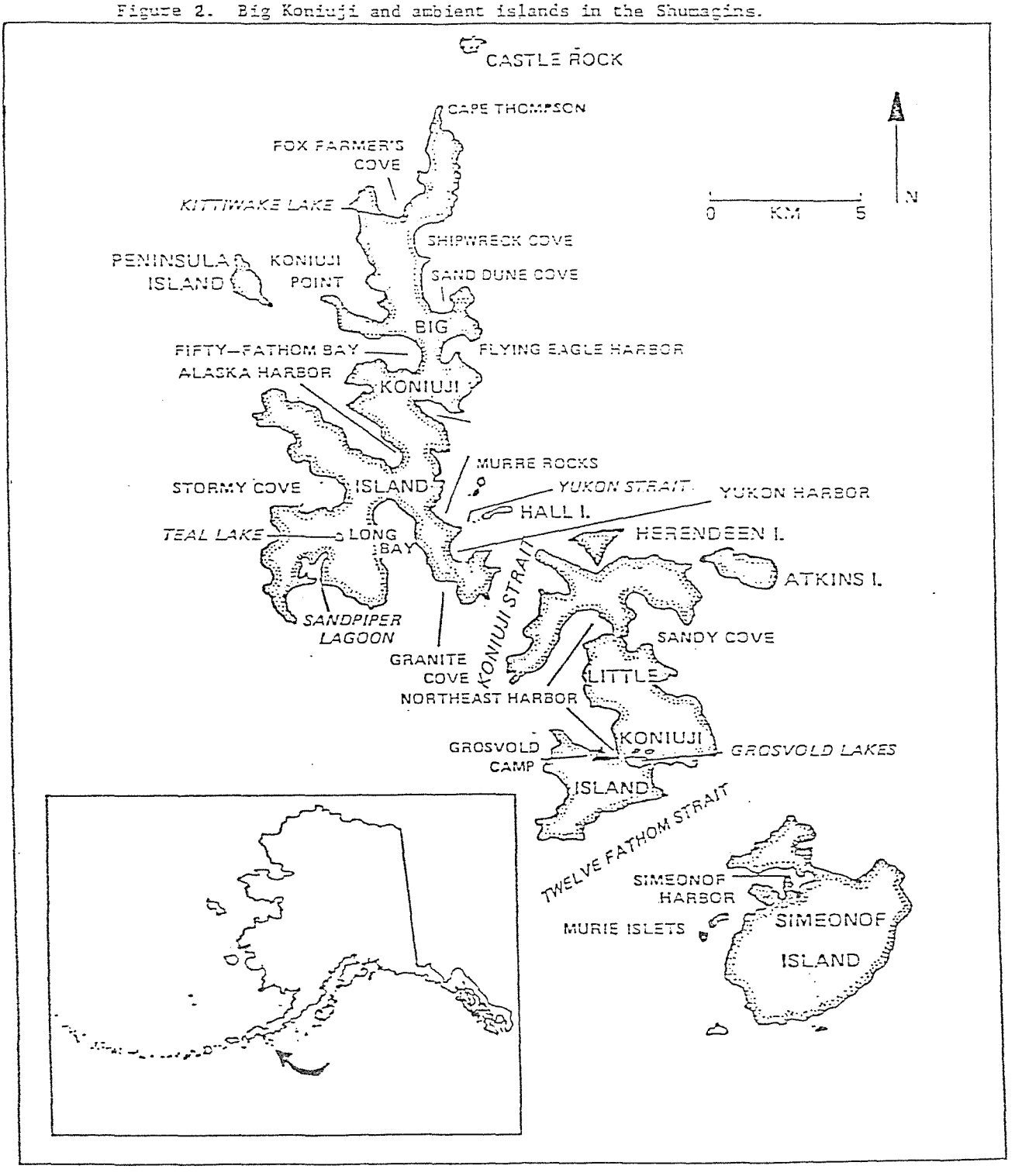
In 1986, the tracks of at least one fox were still present, but despite exhaustive searches over the entire island, no fox tracks or fresh scats were detected this year. Most of the traps set the previous two summers were sprung by ground squirrels or were inoperative because of corrosion.

Nearly every part of Big Koniuji was checked two or more times for fox sign and practically all traps were rechecked after being reset. Particular attention was devoted to Sand Dune, Shipwreck, and Fox Farmer's Cove, Long Bay, Yukon Harbor, and Sandpiper Lagoon (Figure 2) because these were the areas with the most fox activity in the past. No activity was found around two den sites where pups were destroyed in 1986. Except for a stormy week during the middle of our stay, favorable weather facilitated our efforts to discover fox sign.

There are several indicators that no fox remain on Big Koniuji. The ground squirrel population appeared to have erupted. The presence of more ground squirrels may be partly attributed to our being on the island later in the summer; consequently, the abundance of young squirrels and the general activity of these rodents are greater because of warmer weather in July. However, the super-abundance of ground squirrels compared to previous years probably also reflects the removal of 71 adult fox in 1985 and 4 adults in 1986. Examination of scats in previous years revealed that ground squirrels constituted a significant portion of the diet of fox, especially in areas far away from seabird colonies.

Another indicator that fox are absent, or at least nearly so, was the abundance of ptarmigan this summer. During May and June 1985 only eight ptarmigan, mostly rock ptarmigan were recorded; no broods were seen and all ptarmigan were at high elevations. No ptarmigan were seen in June or July 1986, yet in three weeks during July of this summer, 13 broods of willow ptarmigan were encountered, all of which were at or near sea level. Some ptarmigan broods were along beaches which had the

Figure 2. Big Koniuji and ambient islands in the Shumagins.



highest densities of fox in 1985. Ptarmigan populations fluctuate greatly from year to year due to variations in weather and food supply, but ptarmigan populations are much higher on islands free of fox, provided good habitat is available.

Yet another clue suggesting the disappearance of fox on Big Koniuji, was the discovery of an American black oystercatcher chick on the beach outside of the lagoon at the south end of the island. In 1985 six fox were trapped on this short stretch of beach, more than on any comparable section of beach. Surely no oystercatcher nests would survive on this beach with the presence of fox.

Of all the indications of the disappearance of fox on an island, newly expanded colonies of accessible seabirds are the most conclusive. As with the previously mentioned case on Bird Island, gulls also began nesting in areas on Big Koniuji which could be reached by fox. A new glaucous-winged gull colony was first noted south of the entrance to Flying Eagle Harbor in 1986, but since most of the colony was on ledges situated on a headland, it was questionable whether any significant number of birds were accessible to any fox which may have been present. Though a few cormorants were present, no gulls previously reported nested here. In June 1986 approximately 100 pairs were sighted at the Flying Eagle Harbor colony. The estimated number of pairs of gulls was based on a combination of actual nests sighted from the water and evident pairs occupying ledges on the headland.

The breeding of glaucous-winged gulls on Big Koniuji was further corroborated by the discovery of another new colony in 1987. On July 31, 15 nests were noted close to sea level on a point near the entrance to Granite Cove. Several nearly fledged chicks also were present at this easily accessible colony. This colony was an expansion of a small one situated on an offshore pinnacle. With gulls now breeding at two sites accessible to fox, it appears highly doubtful any fox remain on the island. Gulls can be expected to recolonize Cape Thompson from several sea-stacks nearby in the next year or two.

Though difficult to census because they nest in many small colonies scattered in colluvium around Big Koniuji, parakeet auklets appear to be increasing in numbers. Crested auklet activity also seemed greater at the Yukon Harbor and Granite Cove colonies this summer. If any fox did survive on the island, it would seem likely that they would eventually appear at these auklet colonies, which represent the best supply of food during summer, yet no sign of fox was found at these preferred sites despite the continuous presence of observers here for nearly two weeks.

Fox trails on both Bird Island and Big Koniuji were overgrown, indicating little or probably no use. (7-87, SA).

All of the Islands of Four Mountains still have fox. Carlisle (center right) is the next island targeted for fox eradication. These islands are utilized by many whiskered auklets. (9-87, EPB).

H. PUBLIC USE

1. General

See Homer office section.

17. Law Enforcement

See Homer office section.

I. EQUIPMENT AND FACILITIES

4. Equipment Utilization and Replacement

See Homer office section.

J. OTHER ITEMS

3. Items of Interest

See Homer office section.

4. Credits

The report was written and edited by Bailey and Norvell. Early wrote sections on grazing and permits. Martin, Early, and Hagglund edited the report. Fellows and Honsowetz typed the report.

HOMER OFFICE

ALASKA MARITIME NATIONAL WILDLIFE REFUGE

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REVIEW AND APPROVALS

ALASKA MARITIME NATIONAL WILDLIFE REFUGE

Homer, Alaska

ANNUAL NARRATIVE REPORT

Calendar Year 1987

Michael Blendon 4-20-89
Refuge Manager Date

Acting Refuge Supervisor Review 4-28-89
Date

Acting

Regional Office Approval 6-4-89
Date

US FISH & WILDLIFE SERVICE--ALASKA
3 4982 00020964 2

INTRODUCTION

Homer Office

Alaska Maritime National Wildlife Refuge

The 3,500,000 acre Alaska Maritime National Wildlife Refuge (Maritime Refuge) was established in 1980 by the Alaska National Interest Lands Conservation Act (Lands Act). This act added 460,000 acres of additional lands to eleven existing refuges combining practically all coastal refuge areas under one office. There are about 3,000 headlands, islands, islets, and pinnacle rocks within the refuge. These areas are used annually by about 75 million nesting seabirds representing about 80 percent of Alaska's seabird population.

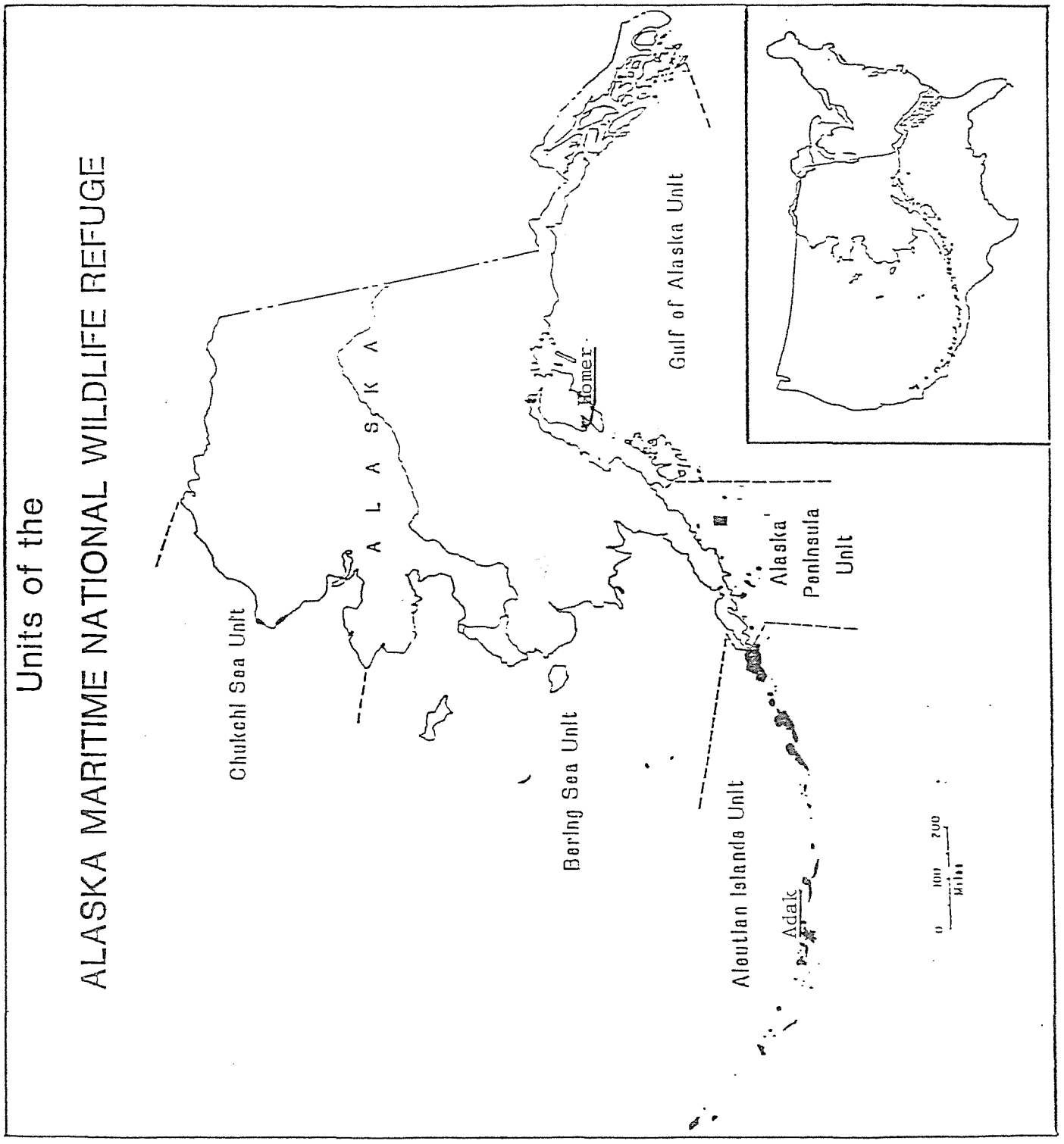
Each of the eleven refuges included in the Maritime Refuge had their own establishing authority and purposes, but the Lands Act supersedes these stating management shall: 1) conserve fish and wildlife populations and habitats in their natural diversity; 2) fulfill the international treaty obligations of the United States with respect to fish and wildlife and their habitats; 3) provide the opportunity for continued subsistence uses by local residents; 4) provide a program of national and international scientific research on marine resources; and 5) ensure, to the maximum extent practicable, water quality and necessary water quantity within the refuge. The Lands Act also established five distinct geographic refuge units: the Chukchi Sea Unit, the Bering Sea Unit, the Aleutian Islands Unit, the Alaska Peninsula Unit, and the Gulf of Alaska Unit (Figure 1).

The five units which comprise the Maritime Refuge have headquarters located in Homer, Alaska. Homer is situated on the south end of the Kenai Peninsula about 220 miles by road from Anchorage. There is a sub-headquarters at Adak which administers the Aleutian Islands Unit.

The sea is common to all refuge areas, but each unit has its own unique features. Lush rain forests dominate much of the precipitous small islands in the Gulf of Alaska Unit; there are mountains rising directly from the sea to over 9,000 feet on the volcanic and treeless Aleutian Islands Unit; and areas of permafrost and high coastal escarpments are found in the Chukchi Sea Unit.

Overall remoteness, bad weather and accompanying rough seas, swift currents, rocky shorelines, poor anchorages, and high cost of transportation make administration of the refuge difficult. Recent interests in the oil-rich areas off Alaska's coast, increased demand for fishery stocks, increased population, and increases in efficient and more comfortable tourist transportation to remote areas are adding to management responsibilities of the refuge.

Figure 1. Location of the units of the Alaska Maritime National Wildlife Refuge



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A. HIGHLIGHTS

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D. PLANNING

1. Master Plan

The Alaska National Interest Lands Conservation Act requires all Alaskan refuges to prepare a Comprehensive Conservation Plan. These plans are to serve as the station master plan and will be initiated by a special planning team from the regional office. The primary objectives of the plan are to: 1) take inventory and describe the resources and values of the refuge; 2) specify management programs for conserving fish and wildlife resources and/or values; 3) specify other compatible uses; and 4) specify opportunities for fish and wildlife oriented recreation, research, etc.

Forty public meetings were held in 37 communities, mostly between January and March 1987, to explain preliminary alternatives and encourage informational public response. The staff made many office visits to talk with village, regional, and native corporation representatives as well as representatives of traditional councils, special interest associations, and other government commissions or agencies. Environmental education programs about the refuge were offered in local schools, whenever possible.

A half hour video tape introducing the Alaska Maritime Refuge was made available to the public on a loan basis in February 1987. This video gives a tour of the refuge and describes current management. It was used during the public meetings and was sent to several communities where meetings could not be held.

Work on the plan slowed during the summer field season because of other commitments of the planning team and field work for refuge staff. In October, the staff biologists spent four days in the regional office working intensively on the draft plan. The regional director was briefed on the draft plan in late October. It was sent to the printers on December 31.

2. Management Plan

Final revisions of the wildlife inventory plans are awaiting completion of the seabird censusing techniques manual. This manual is being written by the research staff in Anchorage with much input by Byrd of our staff.

E. ADMINISTRATION

1. Personnel

Homer office personnel: 7, 3, 8, 2, 4, 6, 1. (4/87,SS).

Tiglax personnel: 10, 23, 11, 19, 13, 9. (7/87, TJE).

Homer office personnel: 12. (2/87, TJE).

Homer office personnel: 16. (2/87, TJE).

Personnel

1. John L. Martin, Refuge Manager, GM-13, entered on duty December 21, 1981, permanent full-time.
2. Tom J. Early, Assistant Refuge Manager, GS-11, entered on duty July 23, 1981, permanent full-time.
3. David R. Nysewander, Wildlife Biologist, GS-11, entered on duty September 28, 1986, permanent full-time.
4. Edgar P. Bailey, Wildlife Biologist, GS-11, entered on duty October 1, 1981, permanent full-time.
5. Michael L. Nishimoto, Wildlife Biologist, GS-11, entered on duty April 15, 1984, permanent full-time.
6. Arthur L. Sowls, Wildlife Biologist, GS-11, entered on duty September 28, 1986, permanent full-time.
7. Carol M. Hagglund, Budget Assistant, GS-7, entered on duty August 21, 1983, permanent full-time.
8. Trina B. Fellows, Clerk-Typist, GS-3, entered on duty November 28, 1983, permanent full-time.
9. Robert E. Archibald, Engineer, WG-10, entered on duty March 23, 1987, permanent full-time.
10. Alvin D. Bayer, Ship Operator, WG-12, entered on duty October 6, 1986, permanent full-time.
11. Kevin D. Bell, Cook/deckhand, WG-8, entered on duty July 8, 1987, permanent intermittent.
12. G. Vernon Byrd, Wildlife Biologist, GS-11, entered on duty April 29, 1984, permanent intermittent.
13. Tom J. Callahan, Ship Operator, WG-11, entered on duty June 8, 1987, permanent intermittent.
14. Colleen M. Baggot, Biological Technician, GS-5, entered on duty May 24, 1987, temporary, terminated September 11, 1987.
15. Don E. Dragoo, Biological Technician, GS-5, entered on duty May 27, 1987, temporary, terminated September 11, 1987.
16. Nancy Norvell, Biological Technician, GS-5, entered on duty June 11, 1987, temporary, terminated September 12, 1987.
17. Wells Stephenson, Animal Damage Control, Department of Agriculture, Cooperator, Jun-Jul, Alaska Peninsula Unit, Gulf of Alaska Unit.
18. Steve K. Albert, Student Conservation Association volunteer, Jun-Aug, Alaska Peninsula Unit.
19. Robert C. Angell, refuge volunteer, Jun-Sep, Tiglax.
20. Elizabeth A. Beringer, Student Conservation Association volunteer, Jun-Sep, Gulf of Alaska Unit.
21. Doug D. Coughenhower, refuge volunteer, Sep, Homer office.
22. Nina H. Faust, refuge volunteer, Jun, Alaska Peninsula Unit.
23. Anne M. Furman, Student Conservation Association volunteer, Jun-Sep, Tiglax.
24. Rebecca J. Gordon, Student Conservation Association volunteer, Jun-Sep, Bering Sea Unit.

Personnel continued.

25. Ron L. Hess, Student Conservation Association volunteer, Jun-Sep, Tiglax.
26. Janet Kelly, Student Conservation Association volunteer, May-Sep, Homer office.
27. Dean Kildaw, refuge volunteer, Jun-Aug, Homer office, Bering Sea Unit.
28. Jessie Klett, refuge volunteer, Jun-Jul, Tiglax.
29. Lisa Leftwich, refuge volunteer, Oct-Dec, Homer office.
30. Mary M. Maule, Student Conservation Association volunteer, Jun-Aug, Bering Sea Unit.
31. William Penning, Student Conservation Association volunteer, Jun-Sep, Bering Sea Unit.
32. David Rosenau, refuge volunteer, Jul-Aug, Chukchi Sea Unit.
33. Jay Schauer, refuge volunteer, Jun-Aug, Bering Sea Unit.
34. Alexander P. Smith, Student Conservation Association volunteer, Jun-Aug, Bering Sea Unit.
35. Terry Spraker, refuge volunteer, Jun-Jul, Bering Sea Unit.
36. Greg B. Snedgren, Student Conservation Association volunteer, Aug-Oct, Tiglax.
37. Shawn W. Stephensen, Student Conservation Association volunteer, Jul-Aug, Alaska Peninsula Unit.
38. Charles T. Unkefer, Student Conservation Association volunteer, Dec, Homer office.
39. Kimberlee D. Honsowetz, Clerk-Typist, GS-3, entered on duty, July 5, 1988, permanent full-time.

Four of the five units of the refuge are supported by personnel located in the Homer office. Personnel for the Aleutian Islands Unit are presented in that section. The staffing pattern for the Homer office is presented in Table 1.

Table 1. Staffing Pattern, 1983 to 1987

	Permanent			Total
	Full-Time	Part-Time	Temporary	FTE
FY87	10	0	0	10.00
FY86	7	0	0	7.00
FY85	7	0	2	6.30
FY84	6	1	0	6.30
FY83	3	0	2	3.80

2. Youth Programs

We hired a Homer High School student, Paul Grubb, for the Youth Conservation Corps program this year. He entered on duty on June 16, 1987 and was terminated on August 20, 1987. Most of his work centered on clerical duties in the Homer office which he thoroughly enjoyed. He was a tremendous asset to the office during the summer.

4. Volunteer Program

The volunteer program is actually the backbone of the summer field program. We have had tremendous success with this program by utilizing Student Conservation Association volunteers and other non-Association/refuge volunteers. We pay $88 per week per student through the Student Conservation Association or $20 per day for a refuge volunteer. Transportation costs are provided for all volunteers recruited from outside the local area.

5. Funding

Alaska Maritime Refuge funding by programs for the last five fiscal years is presented in Table 2. Funding for the entire refuge is through the Homer headquarters office. Funds internally distributed to the Aleutian Islands Unit are discussed in that unit's section.

Table 2. Alaska Maritime Refuge Funding, FY 1983 to FY 1987

	1260*	1400/ 1480/1113	1520	8610	1994/ 1975	Totals **
FY87	1,154,000	346,000	-	-	-	1,500,000
FY86	882,000	476,000	1,975	26,781	-	1,389,136
FY85	1,100,000	239,000	3,010	24,500	-	1,368,010
FY84	858,560	245,000	1,875	7,000	-	1,112,435
FY83	730,000	250,000	-	26,375	-	1,006,375

*Includes 1210, 1220, and 1240 funding for 1983.
**Includes 6850 funds of $2,380 for 1986 and $1,500 for 1985.

The Alaska Maritime National Wildlife Refuge is headquartered in the Ross Duncan building located on Pioneer Avenue in downtown Homer. A total of $59,400 (which includes utilities, snow and refuse removal) is paid for approximately 4,032 square feet of leased office/storage space. An additional 1,400 square feet of storage space was leased, beginning in mid-December.

6. Safety

No lost time accidents were reported for the year. Early is the station safety officer. Monthly safety meetings are held the first Monday of each month.

Following is a list of the monthly safety meetings that were held:

Month		Subject
January	-	General Safety Discussion
February	-	Outdoor Survival and Back Country Safety
March	-	All Terrain Vehicle Safety
April	-	Hypothermia
May	-	Cardiopulminary Resuscitation Session
June	-	Boating Safety/Survival
July	-	Office Safety
August	-	Fire Safety/Wood Stove Safety
September	-	Lifting/Back Problems
October	-	Winter Driving Safety
November	-	Stress Management
December	-	Drugs/Alcohol

H. PUBLIC USE

1. General

The location of the refuge headquarters in Homer affords an ideal opportunity for the refuge to establish a viable interpretive and information contact center. Over 200,000 tourists visit Homer each summer. We presently do not have an outdoor recreation planner on the staff in the Homer office nor adequate space for a visitor center. Volunteers have staffed a small contact station for the past two summers. Approximately 1,000 people visited the Homer office during the 1987 period. Hopefully, with the addition of the above position, and an improved visitor facility, many more contacts can be made in the future.

17. Law Enforcement

Only Early has law enforcement authority on the Homer staff. There were two violation notices issued this year for conducting a commercial enterprise on Chisik Island without a permit. Several other citations were initiated but cancelled after payments for permits were made. All of the above instances involved the spring herring gillnet fishery on the west side of Cook Inlet.

A violation was issued to a permittee working under the authority of the British Broadcasting Company for accessing St. Lazaria Island with a helicopter. This was in direct violation of permit stipulations.

All off-refuge cases were turned over to the agent in Soldotna. Most involved the Kachemak Bay area.

Early qualified as top shooter in Region 7 during law enforcement refresher training. The Homer office proudly displays a plaque observing this first time award for the region.

I. EQUIPMENT AND FACILITIES

1. New Construction

An allocation of $5,904,000 was made in 1985 for the design and construction of a refuge vessel. The 121 foot long vessel was constructed by Moss Point Marine in Mississippi and officially christened Tiglax on July 2, 1987, by Catherine Stevens, wife of Alaska Senator Ted Stevens. Tiglax is the Aleut word for eagle.

The Refuge Manager of the Alaska Maritime Refuge is responsible for the operation and management of the Tiglax, and for the coordination of the Service science program utilizing the vessel. The vessel provides essential support to all aspects of management of this far-flung refuge and enables the Service to collect the information needed to monitor the condition of various marine resources, especially marine birds. It is used to transport personnel, equipment, and supplies between remote work sites. Scientists use the vessel to monitor seabird colonies, survey island habitats, work to re-establish endangered species, identify archaeological and historical resources, and monitor human impacts on wildlife habitats and populations, monitor commercial activities in refuge waters, assess populations and distribution of forage fishes upon which seabirds feed, and respond to oil-spills and other pollution

incidents. The Tiglax provides a sea-going research platform used by refuge personnel and scientists from the Alaska office of fish and wildlife research, other Service offices, and other agencies.

The 121 foot refuge vessel Tiglax was commissioned July 2. She provides logisitical support to the distant units as well as high seas research capabilities. (7/87, TJE).

The galley of the Tiglax provides a comfortable respite from the often inhospitable conditions of her operating area. (7/87, Research).

The wheelhouse of the Tiglax has many modern electronic navigational and scientific aids as well as space for several observers. (7/87, TJE).

The forward crane of the Tiglax is rated at 16,000 pounds, capable of handling vehicles and moderate sized boats. (7/87, TJE).

The laboratory facilities aboard the Tiglax are ideal for seabird research work on specimens, contaminants, and a wide variety of materials. (8/87, Research).

Plankton tows were conducted during seabird research in the Bering Sea. The forward crane is used for these tows. (8/87, Research).

4. Equipment Utilization and Replacement

The Tiglax was accepted by the Service in Seattle, Washington. She sailed from her home port, Homer, Alaska, July 6, 1987, traveling 9,318 nautical miles, as far west as Agattu Island in the western Aleutians and north to St. Lawrence Island in the Bering Sea before returning home September 22. A total of 84 days were spent at sea including 8 days of travel from Seattle to Homer. In addition to refuge personnel, scientists from the regional Fish and Wildlife Enhancement office, the Alaska office of Fish and Wildlife Research, the Kenai Fisheries Assistance office, the Department of Agriculture, and the University of Alaska worked aboard the Tiglax, completing 13,056 hours of scientific and support work. A map of the sailing routes is presented in Figure 2.

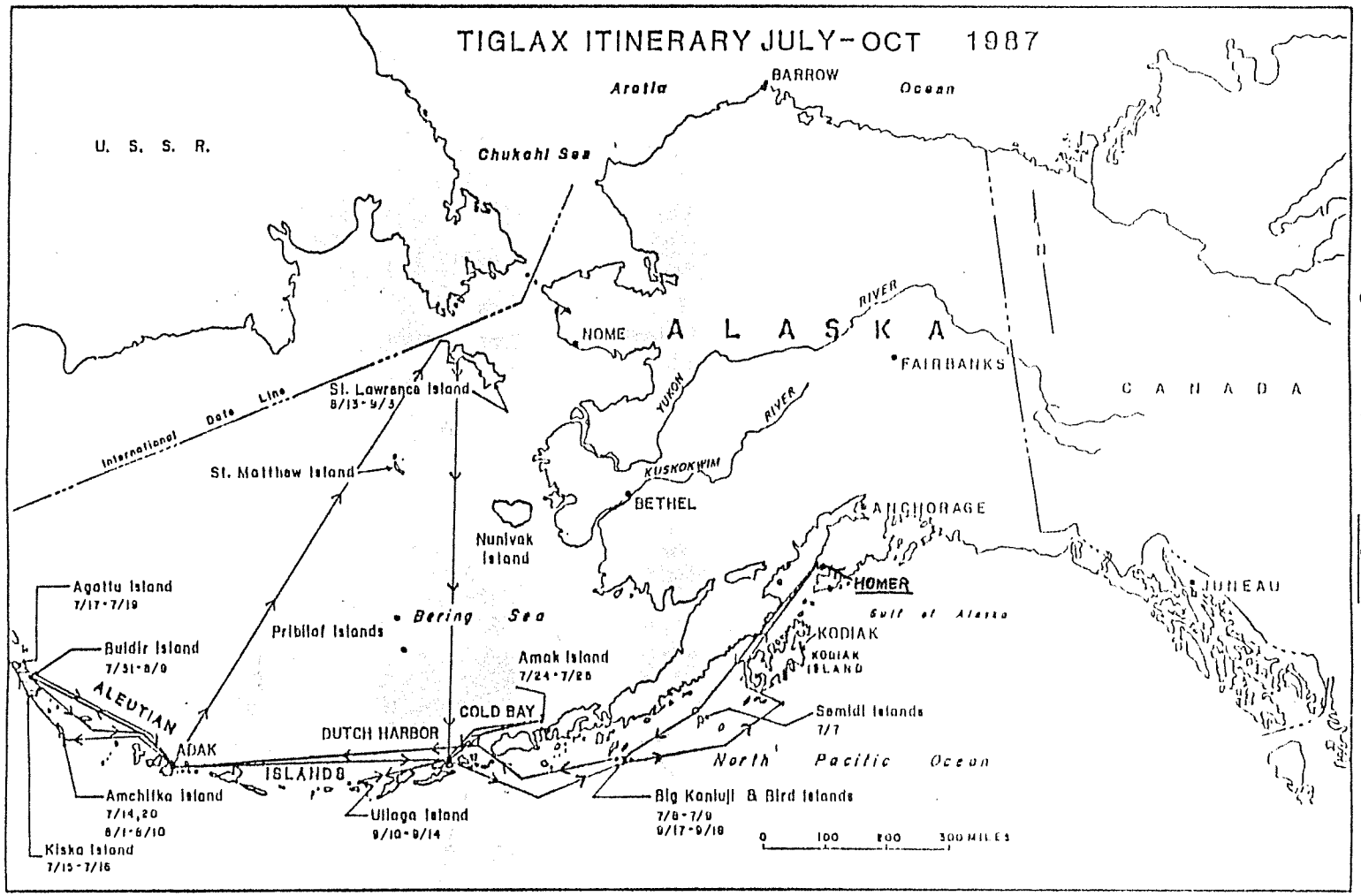


Figure 2. Operating areas for the Tiglax, 1987.

The vessel operated with a permanent crew of four; captain, mate, engineer, and cook/deckhand. All are Alaskans with long maritime experience in the State's coastal waters. They were assisted by several volunteer deckhands. The crew worked a total of 9,250 hours (3,708 hours by volunteers) during the field season. A summary of the schedule is included in Table 3.

In May, a contract for $65,969.55 was awarded to Munson Manufacturing Company of Seattle, Washington to construct a 21 foot aluminum skiff for the Tiglax. This boat is to be used to haul supplies, tow nets and hydroacoustic gear, support dive operations and ferry personnel. The boat was completed in September. It contains a 230 horsepower diesel inboard/outboard with in-line dual props, a heated wheelhouse, depth sounder, VHF radio, radar, and hydraulics.

Table 3. Schedule of the Tiglax, 1987.

Date		Location	Activity
Jul	2	Homer	Commissioning
Jul	8-10	Shumagin Islands	Eradicate introduced foxes
Jul	12-22	Western Aleutians	Contaminants sampling
Jul	24-25	Amak Island	Assess song sparrow & vole populations
Jul	28-Aug 11	Western Aleutians	Transplant Aleutian Canada geese
Aug	18-Sep 7	St. Lawrence Island	Seabird research
Sep	9-16	Shumagin Islands	Range studies
Oct	3-16	Kodiak Island	Sea otter research

5. Communications Systems

New ICOM-MC5 VHF hand-held radios were purchased for the Tiglax use. These marine type radios are water resistant but still sustained water damage in several cases. Waterproof cases for the radios will be ordered and used next year.

J. OTHER ITEMS

3. Items of Interest

Martin is a member of the Kachemak Bay Rotary Club, the Homer Yacht Club, the Kachemak Bay Conservation Society, the Coast Guard Auxiliary, Rescue 21, the Kachemak Gun Club, the Alaska Natural History Association, on the Board of Directors for the Kachemak Bay Ski Club, and a member of the Homer Society of Natural History. Early is a member and on the Board of the Kachemak Bay Rotary Club, a member of the Kachemak Bay Conservation Society and a member of Homer Society of Natural History. Nysewander, Bailey, Nishimoto, Sowls, Hagglund and Fellows are members of the Kachemak Bay Conservation Society and Homer Society of Natural History. Bailey is a Board Member of the Kachemak Bay Conservation Society and serves on the city's Hazardous Wastes Task Force. Fellows is on the Board of Directors for the Kachemak Bay Lioness Club, and a school boarding mother for village children.

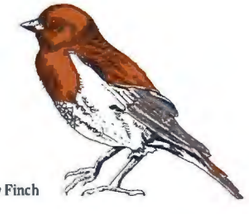
4. Credits

The Homer office section was written and edited by Early, Nysewander, and Hagglund. Fellows and Honsowetz typed the report.

Pigeon Guillemot

	J	F	M	A	M	J	J	A	S	O	N	D
AUKS & PUFFINS												
____ Common Murre on												
____ Thick-billed Murre on												
____ • Pigeon Guillemot n												
____ • Marbled Murrelet on												
____ • Kittlitz's Murrelet on												
____ Ancient Murrelet on												
____ Cassin's Auklet on												
____ Parakeet Auklet on												
____ Least Auklet on												
____ Whiskered Auklet on												
____ Crested Auklet on												
____ • Tufted Puffin on												
____ • Horned Puffin on												
CUCKOOS & OWLS												
____ X Common Cuckoo t												
____ Snowy Owl ta												
____ Short-eared Owl t												
SWALLOWS												
____ Tree Swallow w												
____ Bank Swallow w												
RAVENS & WRENS												
____ • Common Raven nwsta												
____ • Winter Wren s												
THRUSHES												
____ Northern Wheatear ta												
____ X Dusky Thrush t												
WAGTAILS & PIPITS												
____ X Black-backed Wagtail s												
____ Water Pipit t												

	J	F	M	A	M	J	J	A	S	O	N	D
WAXWINGS & SHRIKES												
____ Bohemian Waxwing t												
____ Northern Shrike t												
SPARROWS												
____ Savannah Sparrow t												
____ • Song Sparrow st												
____ • Lapland Longspur t												
____ X Rustic Bunting t												
____ • Snow Bunting bsta												
FINCHES												
____ X Brambling t												
____ • Rosy Finch sta												
____ X Common Rosefinch t												
____ White-winged Crossbill t												
____ Common Redpoll t												
____ Hoary Redpoll t												
____ X Hawfinch t												



Rosy Finch

Take Pride in America
— Public Lands are Your Lands —

Aleutian Islands Unit
Alaska Maritime National Wildlife Refuge
Box 5251 NAS Adak, AK
FPO Seattle, WA 98791-0009
(907) 592-2406

April 1987

Birds of Adak Island

Aleutian Islands Unit

Alaska Maritime National Wildlife Refuge

Bald Eagle

Adak Island is part of the Aleutian Islands Unit of the Alaska Maritime National Wildlife Refuge. It is one of some 200 islands in the Chain important to migratory birds. Adak's nearness to Siberia and Asia presents opportunities to observe birdlife not found elsewhere in North America.

A variety of habitats from barren mudflats to high alpine tundra attract birds to Adak. Birdwatching is best at low tide and during early morning and late evening. Species abundance also varies with the season and weather conditions. Clam Lagoon, especially the southwest portion, is considered the best birding area although Kuluk Bay, Sweeper Cove, Lake Andrew and other areas are also productive.

Birding in the Aleutians is fun and challenging because there is always a chance to see a unique species. Thirty-four of the 155 birds on this checklist are "Asiatic" in origin. In addition, this list is provisional and almost any observer can help fill in missing pieces with data on species range, migration dates and bird behavior.

Good birding!

ABUNDANCE CATEGORIES

- ━━━ — Common.
- ━━━ — Uncommon.
- ─── — Rare. May not be seen every year.
- ┄┄┄ — Casual. Not present every year but records too numerous to show individually.
- • — Accidental record.

• — nests on Adak
X — Asiatic species

HABITATS

o — open ocean
n — near shore ocean waters, bays and estuaries
w — lowland lakes, ponds and streams
b — beaches and mudflats
s — rocky shorelines
t — lowland tundra (includes town areas)
a — alpine tundra and rocky areas

J F M A M J J A S O N D

LOONS

- Red-throated Loon n
- Pacific Loon n
- • Common Loon nw
- Yellow-billed Loon n

GREBES

- Horned Grebe n
- Red-necked Grebe n
- Western Grebe n

TUBENOSES

- Black-footed Albatross o
- Laysan Albatross o
- Northern Fulmar o
- Cook's Petrel o
- Sooty Shearwater o
- Short-tailed Shearwater o
- Fork-tailed Storm-petrel o
- Leach's Storm-petrel o

CORMORANTS

- Double-crested Cormorant n
- • Pelagic Cormorant ons
- • Red-faced Cormorant ons

J F M A M J J A S O N D

SWANS & GEESE

- Tundra Swan nw
- X Whooper Swan nw
- X Bean Goose n
- Greater White-fronted Goose n
- Emperor Goose ons
- Brant n
- Canada Goose (Aleutian) nw

DUCKS

- • Green-winged Teal (Aleutian) nw
- X Falcated Teal nw
- • Mallard nw
- X Spot-billed Duck nw
- • Northern Pintail nw
- X Garganey n
- Blue-winged Teal n
- Northern Shoveler n
- Gadwall nw
- X Eurasian Wigeon nw
- American Wigeon nw
- X Common Pochard nw
- Canvasback nw
- Ring-necked Duck w
- X Tufted Duck nw
- • Greater Scaup nw
- Lesser Scaup w
- • Common Eider n
- King Eider n
- Steller's Eider n
- Harlequin Duck ns

Harlequin Duck

J F M A M J J A S O N D

- Oldsquaw n
- Black Scoter n
- Surf Scoter n
- White-winged Scoter n
- Common Goldeneye n

J F M A M J J A S O N D

- Barrow's Goldeneye n
- Bufflehead nw
- X Smew nw
- Hooded Merganser w
- Common Merganser nw
- • Red-breasted Merganser nw

EAGLES, HAWKS & FALCONS

- • Bald Eagle nwbsta
- Northern Harrier n
- Rough-legged Hawk t
- X Eurasian Kestrel t
- Merlin t
- • Peregrine Falcon nwbsta
- Gyrfalcon wt

Peregrine Falcon

J F M A M J J A S O N D

GAME BIRDS

- • Rock Ptarmigan ta
- Sandhill Crane t

PLOVERS

- Black-bellied Plover b
- Lesser Golden-Plover bt
- X Mongolian Plover b
- X Common Ringed Plover b
- • Semipalmated Plover w

SHOREBIRDS

- • Black Oystercatcher s
- Greater Yellowlegs b
- Lesser Yellowlegs b
- X Spotted Redshank b
- X Wood Sandpiper b
- Wandering Tattler nbs

J F M A M J J A S O N D

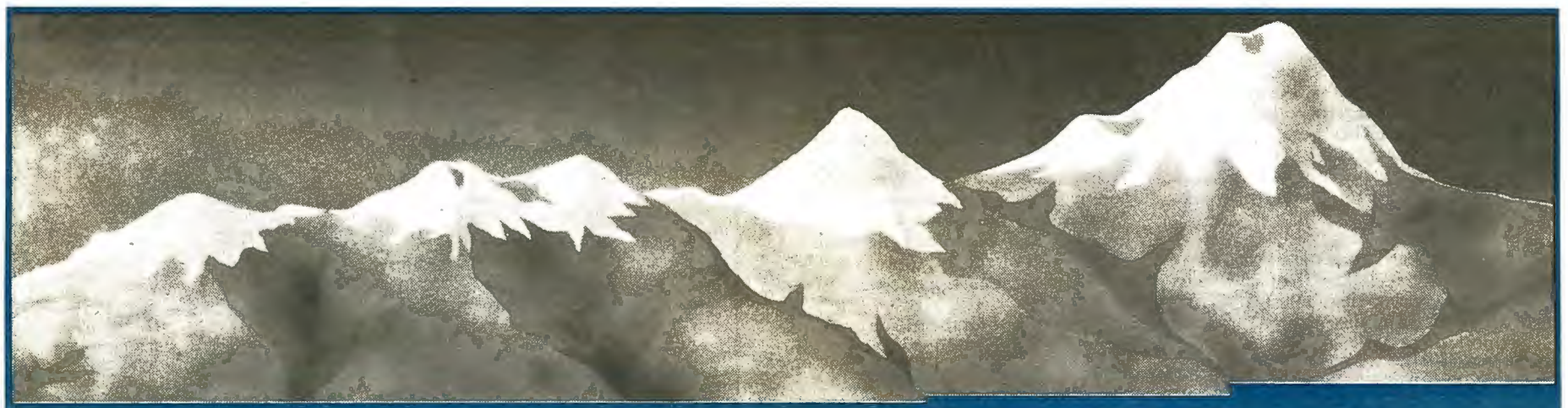
- X Gray-tailed Tattler b
- X Common Sandpiper b
- Whimbrel b
- Bristle-thighed Curlew b
- X Far Eastern Curlew b
- X Black-tailed Godwit b
- Bar-tailed Godwit b
- Ruddy Turnstone bs
- X Great Knot b
- Red Knot b
- Sanderling b
- Western Sandpiper b
- X Rufous-necked Stint b
- X Long-toed Stint b
- Least Sandpiper b
- Baird's Sandpiper b
- Pectoral Sandpiper b
- X Sharp-tailed Sandpiper b
- • Rock Sandpiper bst
- Dunlin b
- X Broad-billed Sandpiper b
- X Ruff b
- Long-billed Dowitcher b
- X Pin-tailed Snipe w
- • Red-necked Phalarope nw
- Red Phalarope n

JAEGERS

- Pomarine Jaeger on
- • Parasitic Jaeger onbt
- Long-tailed Jaeger on

GULLS & TERNS

- X Common Black-headed Gull nb
- Mew Gull nbs
- Herring Gull nb
- • Glaucous-winged Gull onwbst
- Glaucous Gull onb
- Black-legged Kittiwake nw
- Red-legged Kittiwake on
- Sabine's Gull o
- X Common Tern w
- • Arctic Tern nwbt
- • Aleutian Tern nwbt



THE ALEUTIAN SOUND

ALEUTIAN ISLANDS UNIT – ALASKA MARITIME NATIONAL WILDLIFE REFUGE 1987

ISLAND CARETAKERS

Conversations about the Aleutian Islands almost always focus on their adverse weather, isolation, treelessness or volcanic nature. Rarely, if ever, do people refer to the fact that the Chain harbors one of our country's greatest concentrations of wildlife. Yet the Aleutians were set aside as a wildlife preserve more than 70 years ago, primarily to protect and re-establish the once-endangered sea otter. Today they comprise part of the world's longest national wildlife refuge (NWR), a multipurpose area that provides sanctuary for millions of nesting seabirds and hundreds of thousands of marine mammals. Its caretaker is the U.S. Fish and Wildlife Service (USFWS) whose mission is to manage these vast wildlife resources for the continuing benefit of all of us.

History has shown us time and again that whenever man has access to a place, there is a good chance it will be at least partially changed or destroyed. The Aleutian Islands are no exception. They bear the ugly scars of a "forgotten" war. They witnessed the brutal exploitation and overharvest of marine mammals they had sheltered for ages. They heard the cries of thousands of native birds being eaten by marauding foxes, brought here by enterprising fox trappers. They even felt the rumblings of nuclear bombs set off beneath Amchitka Island. Yet despite these invasions of their pristine sanctity, the Aleutians are still an important national treasure. They contain over a million acres of land with high scenic, historic, biological and scientific value. The main job of the USFWS is to preserve these values and restore those which have been lost through past misuse.

The former Aleutian Islands NWR became a unit of the Alaska Maritime NWR when the "Alaska Lands Bill" was passed in 1980. Today, as in the past, refuge personnel face a number of diverse tasks that involve many difficult decisions and tough compromises. Ironically, much of this work is directed toward reversing the damage done to wildlife as a result of refuge objectives in the early years. The Executive order that created the refuge in 1913 mandated, among other things, the promotion of fox farming and reindeer husbandry. These and other activities created havoc with this unique island ecosystem. Lands were overgrazed, seabird populations were reduced and the Aleutian Canada goose became an endangered species.

For over 35 years the USFWS has been striving to eliminate introduced fox from the Aleutians and rebuild the goose population to a healthy level. This work has produced results. Since 1965 the Aleutian Canada goose population has increased from an estimated 300-500 birds to roughly 5000 and eight former nesting islands are now once again fox-free.

Continuing success with this program means that USFWS personnel will, in the future, be able to spend more time and money on other important refuge work such as: studying seabird populations and the impact of man's activities on them; inventorying wildlife populations to provide better baseline data on the health of the Aleutian environment; and monitoring increased commercial, recreational and military activity to ensure minimal disturbance to the land and the wildlife. This is priority work, but does not include what is perhaps the greatest challenge facing the USFWS – increasing public awareness and appreciation of the refuge.

USFWS photo

The Aleutian Islands could be considered the "last frontier" of Alaska. They are still relatively untouched and sparsely populated due to their remoteness and harsh climate, conditions which may inhibit rapid change in the future. This is important because the Aleutian ecosystem is too delicate to endure such change. Conveying that message to all who are interested in the islands is not an easy task, especially with a small refuge staff, limited budget and the fact that the only refuge visitor center is located on Adak Island. That is why THE ALEUTIAN SOUND has been produced. It offers information that should answer many questions and help make your Aleutian experience more rewarding and memorable. Enjoy!

THE GREAT ALEUTIAN ILLUSION

You're going where? The sun never shines and the wind blows all the time! You'll be cold, wet and miserable with nothing to do! There are no trees! Those islands are nothing but barren, lifeless rocks!

Sound familiar? These are but a few of the unfortunate images of the Aleutian Islands tenaciously held by a vast number of people. Yet these impressions are really only illusions in people's minds, crafted from the incomplete bits and pieces of information filtered to them over time. To those who truly know and appreciate the Aleutians, the unpredictable weather is actually a regular source of fascination. They recognize that the conditions which concern and frustrate so many help create and sustain those amenities which make the islands so magnificent – lush, colorful vegetation; scenic beauty; open space; pure, sparkling water and truly unique wildlife. These people are thankful for the rare opportunity to have experienced the changing Aleutians.

Photo by Fred Zeillemaker

Webster defines the word illusion as the "perception of something objectively existing in such a way as to cause misinterpretation of its actual nature." Those who hold such illusions about the Aleutians will have them vanish when they see carpets of wildflowers unveiled from rugged hilltops or witness an Aleutian sun melt into an ocean of fire at day's end. Hillside vistas of steaming volcanoes will feed the hungry minds of those who seek unmatched beauty but did not expect to find it here. And the visitor who wades through waist-high grass to be startled by a burst of rock ptarmigan in hurried flight will experience that which is vanishing elsewhere.

Loren Eisely once said, "Sometimes the rare, the beautiful, can only emerge or survive in isolation." Nowhere is this more true than in the Aleutians. Huge colonies of unique seabirds are found on many islands scattered throughout the Chain. Brightly-colored puffins, penguin-like murres and auklets with their ghostly-looking eyes and strange calls – these and other species delight many a birder each summer. Scores of Asiatic wanderers found nowhere else in North America may also be seen here. All it takes is an awareness, a keen eye and a little time.

A relaxing stroll along an Aleutian shoreline brings other surprises. Curling ocean waves tease numerous shorebirds, licking at the feet of rock sandpipers and sanderlings who explore the water's edge for its delicacies. Closer examination of that "barren" nearshore rock may reveal the brightly painted face of a resting harlequin duck or a black oystercatcher intent on prying open a stubborn mussel. Many are impressed by the twisting-turning flight of the green-winged teal as it whizzes by. Perhaps you'll be lucky enough to witness a bald eagle snatching a salmon from an icy stream – not an uncommon sight since these magnificent raptors are numerous in the Aleutians.

The same islands that can bring strong winds, fog, rain, snow and earthquakes all in a matter of hours can also fill a hungry belly with hand-picked blueberries, provide the wilderness fishing experience of a lifetime or offer a very close encounter with an energetic sea otter. A photographer can embrace with his lens wildflowers of unbelievable vibrance and splendor. Orchids, hard to find elsewhere, are so thick in places that a hiker must be careful to avoid stepping on them.

While the weather may not be Miami beach, it is not quite as poor as it is made out to be. The sun does make appearances and has been known to redden arms and noses. Yet weather, good or bad, should not be the focus of an Aleutian experience because the islands have so much more to offer. Visions of the Aleutians as nothing more than wretched chunks of isolated, boring rock were created by those who did not really know the islands. They are illusions perpetuated by those who do not care to know more.

SURVIVAL OF THE ALEUTS

The sea was their lifeblood. They lived in harmony with nature, the result of a give-and-take arrangement born nearly 10,000 years ago. They were the Aleuts, a gentle and resourceful people who, for many ages, found peace, happiness and a rich livelihood throughout the harsh Aleutian archipelago.

The "Unangan" or "people," as they referred to themselves, numbered some 20,000 individuals less than 250 years ago. Today, fewer than 1,000 Aleuts remain in the Aleutians, an area that once supported the densest Native American population in North America. Where have they all gone? Why do Aleuts no longer live on Adak, Attu and a host of other islands? Like much of history, there is no simple answer and the story is a sad one.

Historians tell us that these natives once crossed the Bering Land Bridge from Asia in a quest that would eventually lead them to the sea on a series of "stepping stones" reaching 1,100 miles to the west—the Aleutian Islands. In this windswept, treeless region where few others could have survived, the hardy Aleuts flourished! The cold, turbulent but nutrient-rich Bering and North Pacific waters teemed with sea otters, seals, sea lions, whales and many varieties of fish that provided the natives with food and materials for clothing. Puffins, cormorants and other seabirds yielded skins that made beautiful, warm parkas. Tidepools and nearshore ocean rocks offered tasty urchins, mollusks and other delicacies for the Aleut dinner table. Sea lion skins, carefully stretched over driftwood frames, provided the Aleut hunters with a swift, lightweight craft called a bidarka, their most valued and prized tool. A man's worth was often measured by his skill at sea and the quality of his bidarka.

The Aleuts wasted nothing taken in the hunt. Tools, waterproof bags, boots and even translucent windows for their subterranean homes were crafted with materials from the animals they harvested. Plants like the chocolate lily and cotton grass supplemented the varied Aleut diet, while others were gathered for medicinal purposes. The beautiful monkshood produced a poison that was applied to the stone-tipped spears used to hunt whales.

Life was good for the Aleuts until 1741 when Vitus Bering discovered the Aleutians. The rich ocean resources were no longer a treasure for the natives alone. Bering's men returned to Russia with nearly 1,000 luxurious otter pelts, an event that brought a rush of greedy outsiders to the islands. Violence and disease raged in the years that followed. The lives of the Aleuts were changed forever.

Ruthless fur barons, or "promyshleniki" as they were called, enslaved the islanders, forcing them to use their bidarkas to kill otters and other marine animals by the thousands. Those who fought enslavement were killed. Their crime: protecting the only life they had ever known. Occasionally an entire village was wiped out. When the smoke of the Russian wrath cleared some 40 years after it began, only 10,000 or so Aleuts remained.

If an Aleut survived the harsh treatment, he or she still ran the risk of death from smallpox, venereal disease or other introduced sicknesses. Other natives perished as they were forced to hunt in deeper, more treacherous waters for the increasingly scarce otters. Fewer marine animals also meant starvation for these gentle people. Famine decimated the village at Adak, which was abandoned in 1831. The broken and beaten natives finally succumbed; by 1834, less than 2,300 Aleuts populated the islands.

Photo by Tom Edgerton

The depletion of Aleutian wildlife continued after Alaska was purchased from Russia in 1867. Not until 1911 did the U.S. government finally put an end to the slaughter. Legislation was passed to protect the otter, whose population had dwindled to around 2,000 animals. Two years later the Chain became a national wildlife refuge, a designation which brought protection and eventual recovery for many wildlife species but not for the Aleuts. Their suffering was not over.

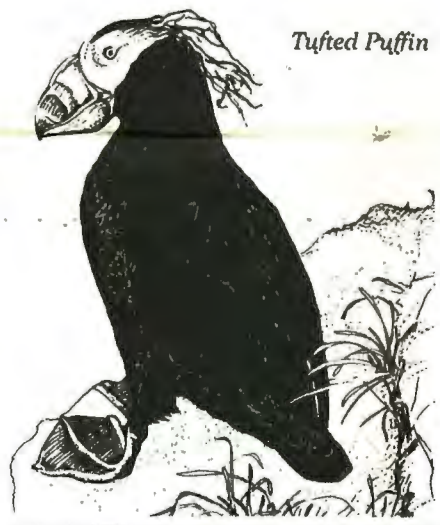
War came to their homeland bringing more death and destruction. In June 1942, Japanese forces invaded Attu. They captured the 43 villagers and imprisoned them in Japan. Natives on other islands were relocated by the American military to southeast Alaska "for their own protection," an injustice which caused additional hardship and stress. For roughly three years the Aleuts lived in damp, cold, abandoned canneries. The wretched conditions, a strange diet, boredom and loneliness took more lives. When they returned after the war, many Aleuts found their homes ransacked or destroyed. Others were not allowed to go home. The 25 Attu natives who returned from Japan were taken to Atka, again "for their own protection."

Somehow the Aleuts survived through it all. The Russian Orthodox religion is one reason. It became well established during the early years of Russian rule and is an important sustaining force for the natives to this day. In addition, the Aleuts are inherently a strong, proud people, a fact that has helped them to live through great adversity in this remote part of the world. Even so, the villages of Atka, Nikolski, Unalaska, Akutan and False Pass are all that remain in the Aleutian Islands. Many traditions have been lost. Those which still exist are passed on from one generation to the next in the hope that the Aleut heritage and lifestyle will endure.

THE PREPOSTEROUS PUFFIN

The opportunity to observe a puffin creates a special feeling of excitement for anyone coming to the Aleutians for the first time. Why? With its absurd, multicolored beak, clown-like behavior and comical appearance, the puffin seems almost fictitious. Sometimes called the "sea parrot" or "fruit-loop bird," it is probably the most sought-after and photographed seabird in Alaska.

Puffins spend summers in the Aleutian Islands raising their young. They dress up for the job, bringing splashes of color to the fog-shrouded islands and dark gray coastal waters. Two of the world's three puffin species can be seen here; both are named for their conspicuous head ornaments—the Tufted for its golden tassels and the Horned for the fleshy projection above each eye. Sociable, but somewhat insecure by nature, these birds find comfort and safety in numbers. Puffins gather in groups that sometimes reach tens of thousands of birds. Within these colonies, the birds reduce competition by selecting different nesting sites. Tufted puffins use their strong beak and feet like a pick and shovel to dig burrows up to six feet long. Horned puffins are less industrious, preferring to settle in rock crevices on inaccessible cliffs. These sites provide the stage for some rather unique behavior; pairs of puffins bow to one another in elaborate courtship rituals in which they may also nibble at each other's bill or present a mouthful of beautiful wildflowers. One or more of these activities usually has its intended effect—a single white egg is laid. Both adults then spend the next three months on the tiring task of parenting.



Tufted Puffin

It is easy to marvel at a puffin in flight because it looks like a bird that shouldn't be able to fly. Indeed, it resembles an airborne torpedo anxiously trying to stay aloft with its short, stubby wings. The puffin has trouble sustaining long flights, hence its ability to hold up to 20 small fish at one time—an important adaptation that limits the number of flights taken from the nest to the rich offshore feeding grounds. Torpedoes, however, belong underwater and that is where these birds come into their own. Their wings become powerful paddles which propel them in hot pursuit of fish, squid and zooplankton. Puffins can "fly" underwater to depths of more than 100 feet, an ability they share with other unique seabirds that are so numerous in the Aleutians.

Puffins are most easily observed from May through August when they venture near shore to nest. During this time they are also easy to recognize with their traditional black and white body suits and those amazing beaks. Seeing a puffin in the winter, you would hardly recognize it as the same bird—a drab, dark gray color without head decorations or the bright bill plates that distinguish the species in the summer. From September to April, puffins and most of their seabird cousins are at sea, often hundreds of miles from the Aleutian Islands. There they pass the time finding food, surviving storms and avoiding fishing nets until once again the time comes to dress up and return to their summer homes.

Horned Puffins

Illustrations courtesy of Alaska Department of Fish and Game.

Photo by Fred Deines

All Nature's wildness tells the same story: the shocks and outbursts of earthquakes, volcanoes, geysers, roaring, thundering waves and floods, the silent uprush of sapling plants, storms of every sort, each and all, are the orderly, beauty-making lovebeats of Nature's heart.

John Muir

GOOD ETHICS BENEFIT WILDLIFE

The Aleutian Islands are set aside as part of a national wildlife refuge primarily for the benefit and enhancement of their varied marine and terrestrial wildlife species. Viewing or photographing unique or special Aleutian wildlife, especially at close range, can bring out feelings of excitement, happiness and satisfaction in all of us. Although wildlife watchers and photographers do not intend to harm wildlife, it is important to remember that these activities, if not done properly, can cause increased stress and even death to wild animals. For that reason, the following guidelines have been established to help protect the valuable wildlife resources found all along the Aleutian Chain.

1. Wild animals need space in order to raise their young, find food and just plain survive. Please allow them that space. Avoid approaching nesting birds too closely. If a bird deserts its nest, calls or exhibits other signs of disturbance, it is probably a signal that you are too close and need to back off. Harassment at nests can result in an attack by one or both parents trying to defend their young.

2. Intentional feeding of wildlife is prohibited except at bird feeders. Feeding wild animals can cause a change in their natural feeding habits and make them more dependent on man. At Adak this is a problem that has resulted in many bald eagles dying by electrocution from powerlines located around the Navy base. It can also make eagles bold enough to attempt to snatch small dogs or cats from residential areas.

3. Photograph wildlife as naturally as possible. Do not attract animals with scents, food or other man-made items. Use a telephoto lens. This will enable you to take pictures from a distance that will be safe for you, eliminate the possibility of unnecessary stress for the animal and prevent you from chasing the animal away. Be patient and take plenty of time to approach your subject. Wear camouflage clothing and move in a way that will help you to blend in with the environment. Do not damage or alter tundra vegetation around photographic subjects.

4. The use of temporary, portable blinds at sites frequented by wildlife is permitted as long as the blinds do not disturb the animal's habitat, nesting, rearing or feeding activities. Your highway vehicle, however, is often your best concealment when approaching wild animals seen next to roads. Remember to pick a safe pullout for parking and stay in your car.

5. Summer is the time when Aleutian residents often find baby animals, especially fuzzy ducklings, that appear to be abandoned. Usually, however, they are not. In most cases the mother is nearby and will soon return to her babies if they are left alone. A baby animal should only be "rescued" if its mother is lying dead nearby and then only by trained wildlife managers.

6. A number of small perching birds (rosy finches, snow buntings, etc.) do not migrate from the Aleutians in the winter. Food is harder for them to find during this time. If you set up a bird feeder at your home to help them out, please be sure that once you begin feeding, you continue to do so throughout the winter because the birds will come to depend on it.

By following these guidelines, you can help ensure the protection of Aleutian wildlife and allow others to enjoy this magnificent resource, both now and in the future.

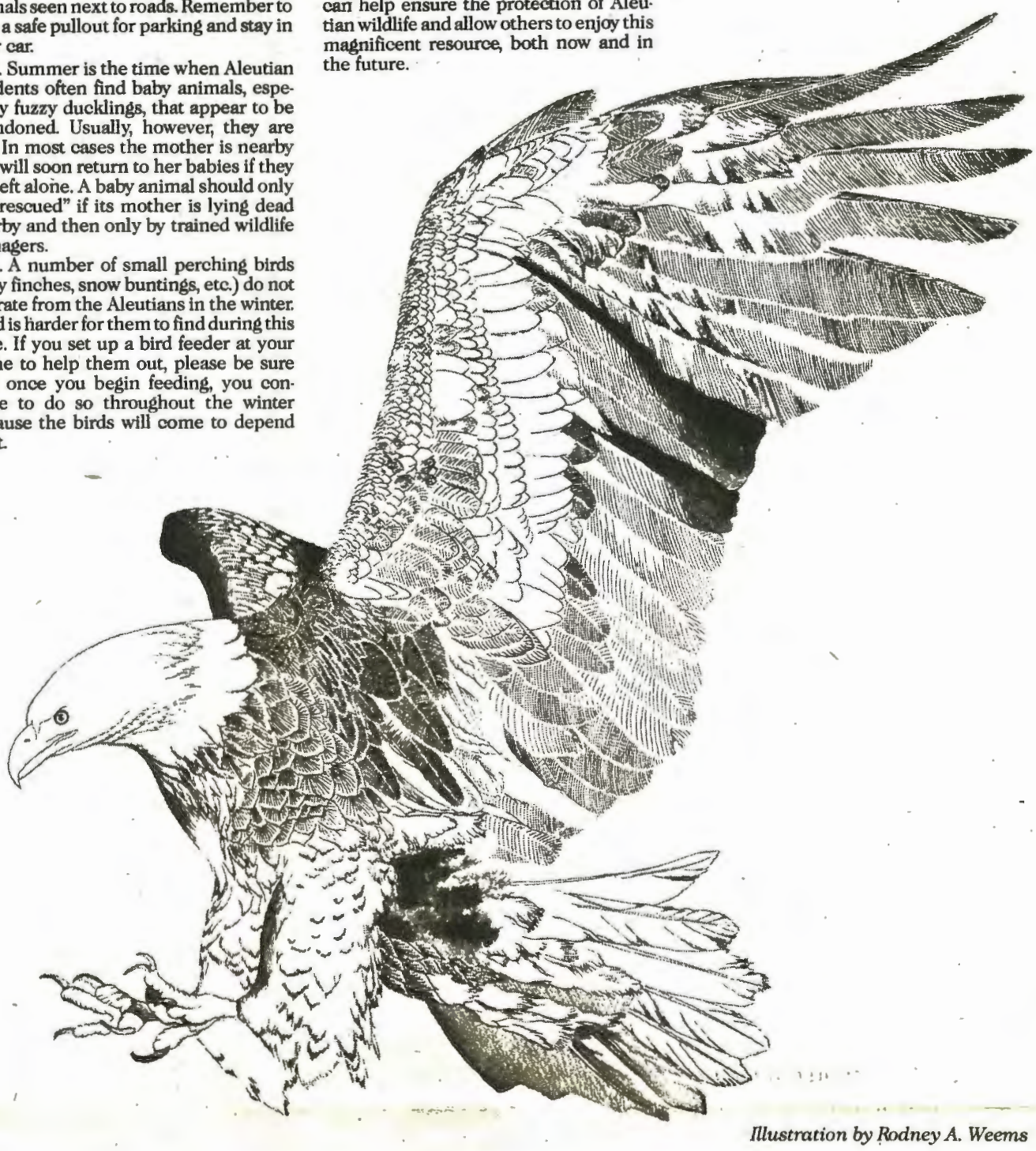


Illustration by Rodney A. Weems

NATURE'S CARPET

Massive herds of caribou need it to survive. Engineers built an 800-mile long pipeline through the heart of it. It occurs in a cold, windy environment and enables you to see for miles. It's called tundra, a puzzling combination of soil, water and plantlife that defies adequate description to those who have not seen it or, better yet, walked on it.

Tundra is normally found in extreme northern latitudes in areas underlain by permafrost, a permanently frozen layer that prevents water drainage. Yet tundra is also found in the Aleutian Islands, an area too warm for permafrost. Here it is called "maritime tundra," an ecosystem somewhat different from "arctic tundra." The far north receives little precipitation, but permafrost keeps the moisture available for thirsty plants. Aleutian tundra, on the other hand, thrives because regular, heavy moisture keeps the vegetation wet and healthy.

Trees are noticeably absent from tundra, but the land is rich with a myriad of elegant wildflowers and other plants superbly adapted to their seemingly inhospitable environment. These plants are midgets; many do not grow higher than the toe of a hiker's boot. But in the Aleutian Islands, there are also a few giants: knee-high chocolate lilies, bush-like lupines that can grow two to three feet tall, and thick "forests" of ryegrass, cow-parsnip and monkshood. These and other surprising plants combine to decorate the so-called "barren" Aleutians and make them one of the world's most intriguing, lush and beautiful places.

THE AWAKENING

Residents of Adak and Shemya often refer to their island homes as "the rock." Their view is an ancient one. It refers to the appearance of the Aleutian Islands when they first broke the surface of the ocean eons ago—lifeless, unvegetated mounds of sedimentary and volcanic rock. Obviously these uplifted plateaus, volcanic mountains and basaltic lava flows have undergone dramatic change. Driving winds, rain and ice pounded the slopes, slowly disintegrating rocks and washing bits of sediment into the valleys. Soil-building lichens and mosses provided extra muscle to complete this long, arduous process.

Finally a thin soil layer developed. A classic story of plant succession was then written in which each of the actors played their part: ferns, grasses, forbs, mushrooms and trees. But hold on a minute—the Aleutians, as we know them, are treeless! Enter another actor into this unfolding drama.

Glaciers moved in and covered the islands until roughly 10-12,000 years ago. They scraped the hillsides bare and carved basins and valleys, forming today's freshwater lakes and streams. Pioneering lichens and the Aleutian climate began, all over again, the rock-breaking work of creating soil.

A RIOT OF COLOR

Aleutian tundra today is generally a varied crowberry-moss-lichen-sedge-grass meadow laced with an assortment of abundant, colorful wildflowers. The specific mix of vegetation depends on such factors as elevation, exposure to wind, underlying moisture and location in the Chain. Plantlife came from both mainland Alaska and Russia. Thus, the western islands are more like the Kamchatka Peninsula while the eastern Aleutians closely resemble the Alaska Peninsula. Tundra vegetation forms a living, intertwining mat that lies upon a layer of dead plants which decay at a snail's pace in the cold Aleutian climate. Persistent rainfall and high humidity soak this covering, making the Chain a sort of "giant sponge." Wind, cold and a high incidence of cloud cover limit plant growth, especially above 1,000 feet. Winds also cause willow trees, which are native to the Aleutians, to spread their branches as vines which hug the ground. They are easy to overlook, especially by those seeking the "real thing." Except for some willow bushes at both ends of the Chain and a few introduced spruce here and there, upright trees are not to be found on these islands. Seeds have been dispersed but isolation, a short growing season, lack of bare soil and the same factors which limit plant growth have combined to prevent natural reforestation.

Although some Aleutian plants bloom as early as March, the lushest growth appears in late June and stays until mid-September. A walk on the tundra during this time can offer an experience almost surrealistic in nature. The soft carpet of heath and lichen produces a springy, invigorating gait. A detour to the base of a steep, sheltered bank dominated by velvet-green mosses may reveal a "quaking bog" where it is possible to bounce and roll as though on a water bed. Pass by a slightly drier meadow and you may find tufts of blonde cotton grass waving in the wind. Farther on you'll be greeted by fields of orchids, geraniums, buttercups, rhododendrons and perhaps even irises. Together they provide an inspiring, colorful, ever-changing pageant of majesty. Berries are there also, free for the taking; it is a nice way to end a hike.

A FOUNDATION FOR LIFE

It is easy to daydream on these island slopes, especially since there are no significant bug populations that are such a nemesis in the arctic. The Aleutian tundra does not support the huge concentrations of waterfowl found farther north and, except for certain eastern islands, you won't find any natural land mammals. Yet it is still an important wildlife habitat providing nesting material, sustenance and ground cover for seabirds, sandpipers, terns, ptarmigan, ducks and other species. Cormorants and kittiwakes remove patches of vegetation to create their cliff-side nests. Lapland longspurs set up and defend territories abundant with dried, hard-shelled seeds—their main diet. One sometimes wonders if the croaking call of the ptarmigan is caused by a crop choked too full of crowberries. Huge bumblebees somehow stay aloft to visit flowers for their rich nectar and pollen. And an endless variety of spiders find refuge among the tundra plants, bringing life to an environment that, at first glance, might not seem as rich as it is.

The tundra is perhaps the most fragile environment on earth. A lichen, for example, may take 30-100 years to regrow after being grazed by caribou. Battle scars remain on the Aleutian landscape more than 40 years after World War II. Even so, open space and undisturbed wilderness, two features becoming increasingly scarce in our world, are still the rule in the Aleutians. They can bring forgotten feelings of freedom and peace back to life in an almost overpowering fashion. It is important for all of us to preserve these amenities and make sure they are never taken for granted. The Aleutian tundra is just too special.

Cotton Grass *USFWS photo by Duane Lawson*

COMMUNITY PROFILES

The Aleutian Islands extend from Unimak, located immediately southwest of the Alaska Peninsula, westward for 1,100 miles to Attu. Approximately 8,000 people reside along the Chain in eight different communities—five Aleut native villages and three military bases. Over three-fourths of the population lives on the military bases. The following is a brief description of each of these communities introducing the people of the Aleutian Islands.

FALSE PASS. This Aleut village has 75 residents and is located on the eastern side of Unimak, largest of the Aleutian Islands. The village has a seafood cannery that provides the foundation for its fishing-based economy.

AKUTAN. An incorporated city of 71 people (60 natives and 11 non-natives), Akutan is located on an island of the same name. Its first church and school were built in 1878. Akutan was a whaling village until about 1939, just three years before the residents were temporarily relocated to southeast Alaska because of the war. The present day economy is based on commercial crabbing, salmon fishing and fish processing. There are no roads, but young and old alike can be seen biking or rollerskating on the town's boardwalk.

UNALASKA/DUTCH HARBOR. Unalaska village is located on Unalaska Island; Dutch Harbor is located on Amaknak Island. The two are connected by a 100-yard long bridge. Once two separate villages, they merged into one community in 1967. Because the local economy centers on fishing and fish processing, the normal population of 1500 jumps to over 3,000 during the busy summer fishing season. Regular airline service and the only commercial lodging in the Aleutians are two amenities provided by the community.

NIKOLSKI. Located on the southwest side of Umnak Island, Nikolski is the site of the earliest documented human habitation in the Aleutian Islands, dating back 8,500 years. Nikolski's residents were also evacuated by the military in 1942, but most returned in 1945. The 30 natives and one non-native work at local businesses or are retired.

Naval Air Station, Adak *Photo by Lon E. Lauber*

ATKA. This native village, centrally located in the Chain, was established in the 1800's. Atka's 92 residents still rely heavily on subsistence hunting and fishing, but they also operate a commercial halibut fishery. During the time the residents were interned in southeast Alaska during World War II, all but two of their houses were burned by the U.S. military to prevent the Japanese from using the buildings if they invaded the island.

ADAK. Occupied by the U.S. military since August 1942, the island population now averages around 5,500 people. The northern half of Adak was designated a naval base in 1959. Employees of the U.S. Fish and Wildlife Service, Adak Region School District and various construction contractors comprise the small non-defense contingent of the community.

SHEMYA. Only one by three miles in size, Shemya is home to nearly 1,000 U.S. Air Force personnel. The U.S. Army Corps of Engineers established a base there in September 1943 which was utilized until 1945. From then until the Air Force took over in 1958, the island was used mainly as a refueling stop for commercial airline flights.

ATTU. Attu was the site of the only land battle fought on North American soil during World War II. The battle in 1943 claimed more than 3,000 American and Japanese lives. Some 2,300 Americans were also injured. Today the battlefield is designated a National Historic Landmark and Attu is the site of a 25-person U.S. Coast Guard LORAN station.

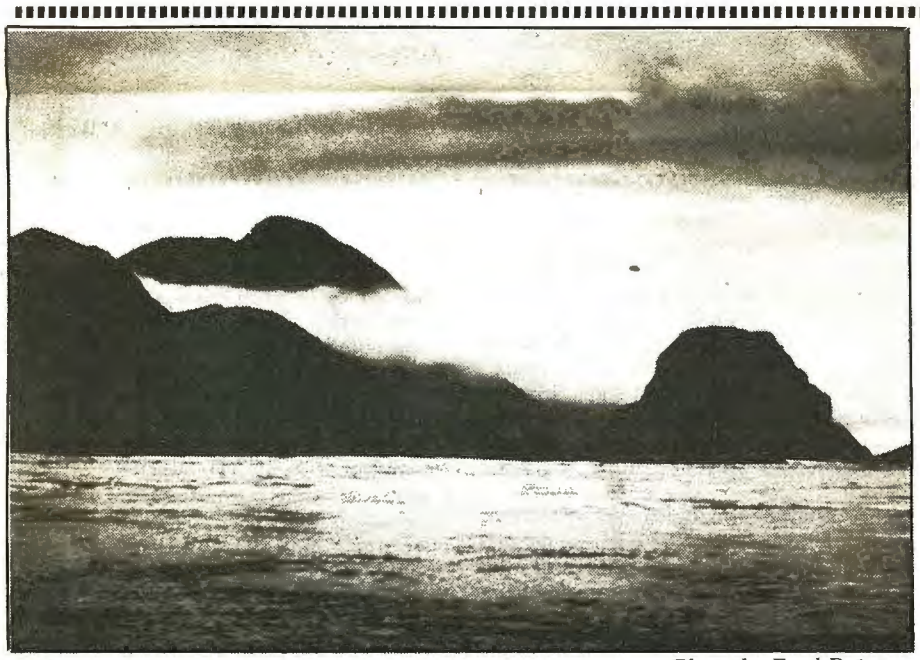


Photo by Fred Deines

WET, WILD AND... WONDERFUL?

Aleutian weather, renowned for its unpredictability, results from the collision of two air masses—one from the warm Japanese current flowing into the North Pacific, the other from the frigid waters of the Bering Sea. The meeting of these fronts spawns fog, rain and strong winds. In the winter, persistent storm systems move through the Chain from the open ocean to the southwest. It is a little known fact that calm days and, occasionally, phenomenally clear skies are sandwiched between these storms. Centrally located in the Chain, Adak's weather, shown in the accompanying chart, is somewhat typical of the islands. Temperatures and precipitation may vary slightly west to Attu and east to Unimak because of differences in terrain, latitude and distance from mainland Alaska.

ADAK'S WEATHER

	TEMPERATURE			PRECIPITATION		WINDS	
	Average Monthly F	Record High F	Record Low F	Average Rain (Inches)	Average Snow (Inches)	Average Speed (MPH)	Peak Gust (MPH)
January	33	50	03	6.11	17.50	12.7	94.3
February	33	54	03	4.75	19.20	13.8	120.8
March	35	57	13	5.85	20.01	15.0	125.4
April	37	56	21	4.50	9.90	13.8	103.5
May	41	65	20	4.10	2.10	12.7	92.0
June	45	67	29	3.10	Trace	11.5	69.0
July	49	72	33	2.98	0.00	10.4	73.6
August	51	75	33	4.15	Trace	11.5	77.1
September	48	66	28	5.36	.10	11.5	112.7
October	43	61	22	6.61	1.90	12.7	109.3
November	37	57	12	8.17	12.40	15.0	116.2
December	34	55	08	7.33	20.10	15.0	89.7

ALASKA NATURAL HISTORY ASSOCIATION

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