ALASKA MARITIME NATIONAL WILDLIFE REFUGE

Homer, Alaska

ANNUAL NARRATIVE REPORT

Calendar Year 1983

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

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

Personnel

1. John L. Martin, Refuge Manager, GS-13, EOD 12-21-81,PFT
2. Tom J. Early, Assistant Refuge Manager, GS-11, EOD 08-23-81, PFT
3. Edgar P. Bailey, Refuge Biologist, GS-11, EOD 10-01-81 PFT
4. Carol M. Hagglund, Budget Assistant, GS-7, EOD 08-21-83 PFT
5. Trina B. Fellows, Clerk-Typist, GS-3, EOD 11-28-83, PFT
6. Leigh A. McDougal, Biological Technician, GS-5 EOD 05-01-83, Terminated 09-02-83.
7. Peter J. Stortz, Biological Technician, GS-5, EOD 05-01-83, Terminated 11-26-83
8. Dave McCargo, Volunteer, FT, 5-5-83/8-22-83
9. Nina Faust, Volunteer, FT, 7-1-83/8-07-83
10. Gary Lyons, Volunteer, PT, 12-19-83
11. Ed Murphy, Volunteer, FT, 7-1-83/8-25-83
12. Robert Day, Volunteer, FT, 7-1-83/8-25-83

Review and Approvals

John L. Martin 2C 4/10

Submitted By Date Regional Office Date

US FISH & WILDLIFE SERVICE--ALASKA
3 4982 00020967 5

John L. Martin, Refuge Manager

Tom J. Early, Assistant Refuge Manager

Edgar Bailey, Refuge Biologist

Carol Hagglund, Budget Assistant

Trina Fellows, Clerk-Typist

Peter Stortz, Biological Technician

Leigh McDougal, Biological Technician

Dave McCargo, Volunteer

HOMER OFFICE
Alaska Maritime National Wildlife Refuge

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A. HIGHLIGHTS

The decision to close the Homer office late last year was reversed in March. Now we can get back to work.

The 1983 vessel charter was again successful and lasted 110 days.

Refuge Manager Martin was detailed to Fairbanks from July through September as Acting Manager of the Arctic NWR.

The Homer Office moved into a new and bigger leased building in October. We now have the office and the storage area in one unit.

D. PLANNING

1. Master Plan

The Alaska National Interest Lands Conservation Act (ANILCA) requires us to prepare a Comprehensive Plan for the refuge. This plan is to serve as the station master plan and will be initiated by a special planning team from the Regional Office beginning in 1984. The primary objectives of the Comprehensive Plans are to (a) inventory and describe the resources and values, (b) specify management programs for conserving fish and wildlife resources and/or values, (c) specify other compatible uses, and (d) specify opportunities for fish and wildlife oriented recreation, research, etc.

5. Research and Investigations

Use of Red Foxes as a Biological Control Agent against Introduced Arctic Fox (74500-01).

This project is being handled from the Homer Office because the concept was originated by E. B. Bailey and he is continuing to follow through with the investigation. Moreover, logistics of working this project in the eastern Aleutians is actually easier from Homer than Adak.

Both arctic and red foxes were first introduced to Alaskan islands around 1836, and fox farming reached a peak in the 1920's and 1930's when they were released on nearly all islands with no indigenous mammalian predators. The widespread introduction of foxes to islands caused the near extinction of the Aleutian Canada Goose and the decimation of many seabird colonies. In fact, Adugak, the island chosen to test the hypothesis that red foxes will eliminate arctic fox on the same small island, formerly had a huge colony of Cassin's Auklets prior to the release of arctic fox in 1925.

The interactions between arctic and red foxes and between other closely related canids in North America elude to the potential for using sterile red fox pairs or only males as biological control agents against arctic fox. The evidence for the competitive exclusion of arctic fox by red fox when both are on the same island is strong. Of the more than 100 islands on which foxes presently exist, both species are sympatric only on huge Nunivak, an island which permits foxes to move to and from the mainland via ice during winter. There were roughly 400 fox farms formerly in Alaska, and red and arctic foxes apparently were kept segregated according to extensive review of historical records. Furthermore arctic foxes have been inadvertently eradicated from several islands after later releases of red foxes.

Accounts of agonistic behavior between red and arctic fox are widespread and have been documented by many authorities. North American canids appear intolerant of canid species smaller than themselves. Unknown mechanisms are involved in the suppression of small canids by larger ones, and the tolerance between canids is least between those of similar size.

In June, three male red foxes trapped near Nikolski Village on Umnak Island, were released on nearby 150-acre Adugak Island to test the validity of the hypothesis that introduced non-reproducing red foxes will eradicate arctic foxes. Considerable trouble was experienced in retaining foxes in the cages at Nikolski earlier in the year. Several foxes escaped by tearing a hole in heavy stucco netting, and one even climbed to the top of a cage and ripped open a hole while clinging to the side of the pen. No problems were encountered in translocating the three foxes to Adugak via a chartered fishing boat. When the three red foxes were released in June, there appeared to be 6-8 arctic fox on the island. No observations on interactions were possible because we had to leave soon after the release of the red foxes. In September we revisited Adugak via helicopter and spent about three hours walking around the island. Although at least four arctic foxes were still present and two of the three red foxes we had released three months earlier were sighted, a marked change in the distribution and behavior of the arctic foxes was detected. On previous visits in May and June arctic foxes were noted barking and running on the island, but in September all but one were confined to the rocky east end of the island. They appeared more wary and subdued than before and did not bark, except when trapped among boulders below us.

The Red Fox pen near the Village of Nikolski held fox until we picked them up with the vessel in July.

Tommy Merculief and Sergie Ermeloff of Nikolski Village aboard "Western Pacific". These two trapped Red Fox for us on Unimak Island for release on Adugak Island approximately 15 miles away.
M. McCone

Volunteer McCargo releasing Red Fox on Adugak Island.
E. Bailey

If arctic foxes are eliminatd by the introduced reds because of exploitation of the same resources and/or direct interference, it is not likely that it would occur during summer when food is abundant and energy demands are the least. The critical period for competition of the two species should be in winter, especially in February during the breeding period when males should be especially aggressive and territorial. During the breeding period sterile pairs would probably be more territorial than males alone and would be more apt to evict arctic foxes from their dens. We will visit Adugak Island again via helicopter in April 1984 to see whether both species of foxes still remain. Also, up to five pairs of red foxes will be trapped at Nikolski and released on Uliaga Island in the Islands of Four Mountains. Vasectomies will be performed on the males prior to release.

E. Administration

1. Personnel

The year started with morale fairly low due to the threatened closure of the Homer Office. The primary reason indicated for the closure was because plans were scratched to acquire the

112' vessel confiscated in the Gulf of Mexico several years ago. In April rumors gave way to reality that the office was to remain intact. There was a great deal of support by the local community and by Senator Stevens in the end. We were told the office situation would be re-analyzed in two years taking into account any new prospects for the purchase of a vessel. The entire situation gave us a better sense of the community and State-wide support for the AMNWR as a refuge not managed separately by several scattered refuges.

Some major changes were made in personnel. Carol Hagglund transferred from the Aleutian Islands Unit headquarters in Adak to the refuge headquarters in Homer. Also, for the first time since we opened, a PFT clerk was assigned to the office. Trina Fellows was brought on as temporary and then was selected to fill the PFT position.

4. Volunteer Program

We hired several volunteers for the field season working both from the vessel and in remote field camps. Nina Faust and Dave McCargo had been volunteers previously in FWS work projects and again assisted greatly in work projects. Dr. Ed Murphy and Bob Day worked as volunteers in the Bluff area of the Bering Sea Unit. Their project is described in Section d. 5 of the Bering Sea Unit.

5. Funding

Funding for the AMNWR is through the Homer headquarters. The funds are then internally distributed between Adak and Homer. The funding for Aleutian Islands Unit is discussed in that unit's section. All other unit funds are distributed from the Homer Office. The total refuge funding is:

	Wildlife Resource	Endangered Species	Total
FY-82	346,000	75,000	421,000
FY-83	730,000	250,000	980,000
FY-84	1,124,000	245,000	1,369,000

In FY82 the vessel charter costs came out of the Regional Office budget. Since then, all charter costs have come from the refuge budget. Funds in 1994 quarters deduction were not included since all 1994 funds are now being retained in the Regional Office for distribution on a "need" basis. Previously, all 1994 funds were spent on the station that received rent. The large increase in FY84 Wildlife Resources funds is deceiving. ARMM projects accounted for $580,000 of the FY84 1260 funding advance. Since these funds are for specific projects (many of them contracts) and can not be used for permanent salaries it could well be argued we only received $544,000 of "discretionary" funding as compared to $730,000 the year before.

A comparison of FY82 to FY84 Homer (not entire refuge) funding levels are:

	Wildlife Resources	Endangered Species	Total
FY82	230,000	31,000	261,000 *
FY83	462.200	155,400	617,600
FY84	502,500	140,000	642,500

* Does not include vessel charter costs (vessel chartered by Regional Office, not field).

Lease of office space in the Bearfoot Building on Pioneer Avenue in Homer was terminated on September 30, 1983. The lease fee was $1.00 per square foot or $725 per month. Janitorial services were conducted once per week at the rate of $10-$15 per week. Electrical service average $48 per month. Rental storage space at a local boat yard costing $76.60 per month was terminated on November 30.

On October 1, 1983, 2300 square feet of office/storage space in the Ross Duncan Building on 202 Pioneer Avenue in Homer was leased at the rate of $2,760 per month. This building is well suited for our office and associated interpretive display area. Design and remodeling of office space at the new location cost $3,745. All utilities are furnished by the lessor. Janitorial service is conducted once a week averaging about $25 per week. A new Tie-308 telephone system was purchased at a cost of $3,451. Monthly telephone bills averaged $471 in 1983.

View of our present Homer Office on the town's main street. We anticipate more public use by locals and tourists after our office sign is installed. T. Early

Other major expenditures during the year included: "WordStar" word processing program-$495, Context MBA data base management system-$700, and Color Graphic Card and Seattle Expansion board-$703, all for the IBM Personal Computer; boat motors-$6,836; Model SG-715 portable SSB radios-$6,971; a 13 foot Zodiac-$2,298; Avon work boat with accessories-$4,856; file safe (for imprest fund)-$1,781; M-44 supplies-$1,325; fox traps-$450; exposure suits-$500; weatherport-$1,776; office furniture $2,317; slide file cabinet-$1,428.

The charter vessel "Western Pacific", an 86' commercial fishing boat, was contracted for the period 5 May 1983 through 21 August 1983. The vessel transported government personnel, equipment, and supplies from Homer, through various locations in the central and western Aleutian Islands to St. Matthew Island vicinity and return. It supported the seabird and marine mammal surveys, endangered Aleutian Canada goose spring surveys, goose nesting surveys, goose transplants, goose releases, fox control work on selected islands, and pelagic transects. Moreover, the Anchorage office of Endangered Species, Research, and Wildlife Assistance, all from the Regional Office made use of the vessel in conjunction with our activities.

Vessel support work within the Alaska Maritime National Wildlife Refuge (AMNWR), is both very necessary and very expensive. A total of $192,872.97 was paid for the charter, including fuel costs, for 1983 field season. Major endangered species recovery tasks (trap and transplant, surveys and fox control) can proceed only if a suitable vessel is available. At years end, work was proceeding on a preliminary design and cost estimate for constructing a new vessel for the refuge.

FWS Research personnel, Anchorage, prepare specimens aboard the charter vessel. The boat provides an excellent base for pelagic seabird research on offshore food analysis.

After more than 100 days at sea, things tend to go downhill for the charter crew. Even though the cook occasionally "freaked out" she continued a tradition of serving excellent food. B. Marble

6. Safety

No accidents were reported during the period from the Homer Office. Safety meetings are held monthly to discuss items applicable to both on the job safety and safety in the non-working environment. A regular schedule of meeting and topics to be discussed was initiated in November by Safety Officer Early.

We purchased several new Mustang work/floatation coveralls as used by the USCG for work in cold weather from boats. These coveralls are warm and, if one falls overboard allows several hours of survival in the cold water. Several Emergency Position Indicating Radio Beacons (EPIRB) were purchased for use in the Zodiacs and Avons. These transmit signals on both civilian and military distress frequencies when properly keyed.

H. Public Use

1. General

Limited Public Use activity occurred during the year. Until October our office was located in the basement and in back of a business building which was not at all visible to the public. When we moved in October to our new office we immediately began seeing an increase in people coming by the office. A fairly large and open area exists in the building which is very suitable for displays and interpretive exhibits.

In April ARD Riffe talked to a packed Homer Chamber of Commerce meeting about Alaskan Refuges but also answered many questions on the Homer Office.

7. Other Interpretive Programs

In April ARM Early conducted a beach walk with a preschool group in Homer. Several requests were made for programs during "Sea Week" in May but all available personnel were in the field.

ARM Early also accompanied the Principal of Paul Banks Elementary School in Homer to China Poot Bay to assess the wildlife and ecology interpretive program given to several grade levels by the Center for Coastal Studies. This is a very professional non-profit educational and research organization just starting in Homer. They operate in China Poot and Peterson Bay across Kachemak Bay from Homer where there is phenomenal intertidal and shallow water sea life.

17. Law Enforcement

ARM Early is the only individual on the Homer staff with law enforcement authority. Practically all cases are turned over to the FWS agent in Soldotna with excellent results as they occur off-Refuge. We do respond directly to animal pick up with species under our jurisdiction.

I. Equipment and Supplies

4. Equipment Utilization and Replacement

We are presently using a Chevrolet Suburban 4X4 pickup. This was transferred to our station in 1981 from the Anchorage YACC program.

J. Other Items

2. Items of Interest

RM Martin is assigned to the Regional Wilderness Committee Task Force which is presently very active. Martin also resigned as leader of the Aleutian Canada Goose Recovery Team and Fred Zeillemaker, RM AIU, Adak is presently serving as team leader.

RM Martin was assigned to the Arctic NWR as Acting Refuge Manager from July through September until a new manager for that station could be selected. During the period, ARM Early was Acting Manager of the AMNWR.

Along with providing impetus for the Homer station to remain intact, Senator Stevens had appropriated $100,000 for a feasibility study and preliminary design for a vessel for the AMNWR. The staff is delighted on both counts.

The staff of the Homer Office is actively involved in the community. RM Martin is an active member of the Homer Yacht Club and on the Board of the Kachemak Bay Ski Club. ARM Early is on the Board of the Homer Society of Natural History (Pratt Museum) and active with the Winter Carnival Committee. RB Bailey is on the Citizens Advisory Board for the Kachemak Bay State Park and on the Board for the Kachemak Bay Conservation Society. Clerk-Typist Fellows is active with the High School Booster Club and on the Homer Winter Carnival Committee.

3. Credit

Sections A,B,C,D. 1-4 E. 1-4, E. 6-8, F, 7-13, F. 14, H, I, and J, were written by Early. Sections D. 5, F. 1, 3, 6, and G. 1-13 were written by Bailey, Section E. 5 was written by

Hagglund. Martin, Early and Bailey edited the report. The typing was accomplished by Clerk-Typist Fellows.

K. Feedback

1. FTE's

As the refuge grows and we begin to assume mandated responsibilities, there is a growing need for more personnel at this station. The present staff cannot properly accomplish the objectives of the refuge without more professionals.

It was our understanding that ARMM monies would be an "add-on" and would not affect our normal level of funding. This certainly was not the case. If one takes our ARMM funding away, we have less funding than in FY83. What happens when the ARMM "well" runs dry?

ALASKA PENINSULA UNIT

ALASKA MARITIME NATIONAL WILDLIFE REFUGE

Homer, Alaska

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Refer to the Homer Office Section

Review and Approvals

Submitted By Date

Regional Office Date

ALASKA PENINSULA UNIT
Alaska Maritime National Wildlife Refuge

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A. Highlights

Cattle removal was finally initiated on Simeonof Island in late summer after several false starts.

Islands surveyed on the Sanak and Shumagin Islands during early period of vessel charter filled gaps in wildlife data and created questions on control of unauthorized grazing.

B. Climatic Conditions

Listed below is the data from the National Weather Service, Cold Bay, Alaska for January through October. This is the only permanent reporting station in the Alaska Peninsula Unit.

	Temperature Average	Precipitation	Wind Speed Average	Peak (1 min.)
Jan.	24.6	1.58	16.2	41
Feb.	31.5	0.66	14.5	49
Mar.	33.5	0.88	15.2	44
Apr.	36.8	3.53	17.4	55
May	41.7	1.59	15.3	36
Jun.	48.4	1.31	11.6	25
Jul.	51.6	2.71	15.0	41
Aug.	52.2	4.06	14.7	37
Sept.	47.3	4.41	15.8	72
Oct.	39.7	4.82	16.4	46

D. Planning

1. Master Plan

Refer to the Homer Office Section.

E. Administration

1. Personnel

Refer to the Homer Office Section.

5. Funding

Refer to the Homer Office Section.

6. Safety

Refer to the Homer Office Section.

8. Other Items

Two separate Special Use Permits were issued to ARCO Alaska to conduct surficial geology on Chiachi, Jacob, Paul, Egg, Unavikshak, Chankluit, Kumlik, Sutwik, and Nakchamik Islands this summer. None of these areas were designated Wilderness and helicopter access was authorized except within one mile of seabird colonies.

A permit request was received from the 17th Coast Guard District, Juneau, to construct and maintain flashing light navigation aids on Korovin, Deer, and Jude Islands. After surveys in May, 1983, with the charter vessel it was decided that the aid on Jude Island would not be permitted due to the presence of substantial numbers of nocturnal seabirds. A permit was issued for the other two islands.

The Bureau of Indian Affairs was issued a permit to conduct field investigations of Native historical and cemetery sites on East and West Amatuli, Ushagat, Sutwik, and the Semidi Islands. Do to Wilderness classification, no helicopter access was permitted above mean high tide on the Semidi Islands. Helicopter access was also granted to the Lamont-Doherty Geological Observatory of Columbia University (NY) to conduct seismotectonic studies on several of the Shumagin Islands. This work was conducted under OCSEAP contract NOAA-03-5-022-70 during the summer months.

F. Habitat Management

1. General

Moist and wet coastal tundra dominates most of the islands south of the Alaska Peninsula. Unlike most refuge islands which are delineated by mean high tide, two areas in this unit, Semidi Islands and Simeonof Island, also include offshore waters. Islands in the area range in size from 160 square mile Unga Island to hundreds of rocks, sea stacks, reefs and islets. Since most of the rugged, remote islands and mainland cliffs are either designated or de facto wilderness, no habitat manipulation is practiced or contemplated; nevertheless, the habitat and fauna of many islands has been altered because of introduced ungulates, rodents, and predators.

Introduced foxes gradually will be removed from islands to restore former avifauna and associated flora; and grazing will be eliminted or reduced wherever possible to allow recovery of vegetation and minimize soil erosion.

2. Wetlands

Outstanding coastal marshes exist on several islands, such as on Simeonof, Wosnesenski, and Caton, but cattle have caused serious damage, particularly around lakes and streams and along many beaches. Thus, the islands with the best wetlands were selected for cattle or sheep introductions and subsequently sustained overgrazing. Destruction of nesting cover combined with marauding foxes devastated waterfowl nesting populations on Simeonof and other islands, such as Sanak, one of the largest islands south of the Alaska Peninsula and now owned by Natives. Since incredibly high densities of relict waterfowl populations exist on islets near islands with disturbed wetlands like Simeonof, repopulation of such islands by nesting waterfowl, shorebirds, and Larids should occur following removal of cattle and foxes. It will be practically impossible to remove introduced voles, ground squirrels, and other introduced rodents which also adversely affect insular vegetation. The only undisturbed island off the Alaska Peninsula with outstanding marsh habitat is Sutwik.

6. Other habitats

Nearly all of the numerous islands consist mainly of alpine or coastal tundra. Most areas are remote and relatively undisturbed, and no manipulation of habitat occurs. On islands off the Alaska Peninsula, grasses and sedges predominate at lower elevations. Along the coast, cow parsnip, hemlock parsley, beach lovage, *Angelica*, and other umbellifers prevail, especially on islands having burrow and surface nesting seabirds due to added nutrients. Wet tundra exists in poorly drained areas on certain larger islands; many grasses, sedges, and herbs dominate such areas. Large islands often have dense stands of alders, principally on interior slopes and in riparian areas; alders yield to willows along some streams. Crowberry associations cover alpine zones. Beach rye, beach pea, *Mertensia maritima*, and *Honckenya peploides* line most beaches.

7. Grazing

Grazing is probably one of the hottest issues presently on the AMNWR . Between attempting to impose fair market grazing fees on permittees, dealing with various Native Corporations on grazing lands selected by them, and attempting to eliminate grazing on several islands we actually own, we have our hands full.

There are about 30,000 acres within the unit that are presently grazed. We are attempting to remove cattle from Simeonof and Caton Islands totaling about 15,000 acres. Grazing was initiated on Simeonof Island in 1894 and the operation was in conjunction with a fox farming lease.

Simeonof Island NWR was established in 1958 and in 1961 BLM issued a 20 year lease for grazing. The island was designated a Wilderness in 1976. Also that year the FWS assumed grazing responsibilities on the island. In 1977 the permittee was first informed that his lease for grazing would not be renewed in 1981 due to incompatibility with refuge objectives. After many legal delays, the Government finally impounded and confiscated the cattle in late 1982 and in February, 1983, GSA sold the estimated 620 head to Mr. Loyd Mothershead of Dutch Harbor, Alaska, for $100.00 per head. The cattle were to be removed by April 30, 1983, and after several extensions he defaulted in June 1983, paying $10,140 in liquidation damages.

In September, 1983, Mr. Keith Roylance of Washington State bought all the cattle for a total of $15,000. Before bad weather stopped removal efforts in late October, 310 live animals were moved to Akun Island in three barge trips using the 60 foot boat the "Flying D". A total of 18 head were lost in shipment. Roylance left two horses and a man on the island through the fall with plans to complete removal in the spring of 1984.

On November 8 an aerial count of animals on all islands in the Shumagins was made by ARM Early. During the same date Early met Mr. Roylance at Simeonof and discussed the removal efforts past and future. Roylance was interested in continuing the removal on both Simeonof and Caton Islands when calmer spring weather occurs. Presently CGS will honor that request if the cattle are still there in the spring.

We are administratively running the cattle removal efforts on Caton Island similar to the Simeonof removal. A permit for grazing Caton was first issued by the FWS in 1959. The permittee was informed of plans to eliminate grazing on the island in 1981 with removal deadline by June 1, 1982. A delay was granted until September 30, 1982, and finally, after no efforts were made to remove the cattle, they were impounded and confiscated in December, 1982. In February, 1983, GSA sold the estimated 130 head to Mr. Ralph Doyle of Chugiak, Alaska, for $62.00 per head. He was to remove the cattle by April, 1983, but was granted an extension for a short period and finally defaulted in July 1983 after failing to remove the cattle. He paid $1,448.00 in liquidation damages.

The 20 year BLM grazing lease on Chernabura Island expired on December 31, 1983. The BLM grazing rates were $120.00 per year for the entire island, while ours, which go into effect in 1984, are $2.40 per AUM. The permittee was informed of this change several years ago and has indicated he no longer wishes to graze the island. We will not continue the permit and will therefore remove the cattle as soon as possible.

Summary of Grazing Activities on Alaska Peninsula Unit, AMNWR

Island	No. Acres	No. Animals 11/8/83	Max. No. Allowed
Caton	4,000	127	100
Chernabura	7,250	98	200
Simeonof	10,450	306	275
Wosnesenski	7,893	87	75
Popof (Mostly conveyed)		33 (Bison)	--

In May, the island reconnaissance work in the Sanak Islands revealed cattle from Sanak Island crossing short water passes to FWS islets offshore. Sanak Island has been conveyed but we own most small offshore islets surrounding it. We observed cattle and signs of heavy grazing on Long, Clifford, Finny, and Rabbit Islets. Cattle cross shallow water areas or even swim short distances to graze on these offshore islets. According to Alaska land laws, it is our responsibility to exclude the cattle from our areas and presently we forsee no ready and feasible solution.

12. Wilderness and Special Areas

There are approximately 285,800 acres of Wilderness included within the Alaska Peninsula Unit. A break down follows:

Location	Acreage	Date Designated
Tuxedni	5,548*	10/23/70
Semidi Group	250,000	12/02/80 (ANILCA)
Caton	4,414	12/02/80 (ANILCA)
Simeonof	25,855*	1/19/76

* Small portions of islands excluded from Wilderness designation although acreage shown is amount designated as wilderness. Figures for Semidis and Simeonof include surrounding tidelands.

G. Wildlife

1. Wildlife Diversity

The diversity of species is greater in the Alaska Peninsula region than in any other parts of the refuge except the Aleutians.

2. Endangered and/or Threatened Species

Besides in the Aleutians, where the Aleutian Canada Goose nests, a similar race is found in low numbers on tiny

Kaliktagik Island in the Semidi Islands. Whether this population represents a relict of a former continuum of "Aleutian" Canada Geese which once may have extended as far east as the Geese Islands off Kodiak, whether this is a separate subspecies, or whether the population is comprised simply of an intermediate race between Aleutian and Taverner's Canada Geese is still undetermined.

3. Waterfowl

At least one species of swan and goose, and ten species of ducks nest in the unit, but densities of nesting waterfowl are generally low. Most of the islands with the best waterfowl habitat have been despoiled by introductions of cattle and/or foxes.

The refuge's islands and ambient waters are much more important for waterfowl during migration and winter. Large numbers of Emperor Geese, Brant, scoters, eiders, Harlequins, Oldsquaws, and other ducks winter in the Shumigan Islands, Sandman Reefs, and other areas south of the Alaska Peninsula.

With the exception of an annual aerial spring Emperor Goose survey of the Alaska Peninsula and some offshore islands, no inventories of waterfowl populations are conducted. The only records are incidental observations made during seabird surveys in summer. As foxes are gradually annihilated on islands and cattle are removed, numbers of breeding waterfowl should markedly increase.

4. Marsh and Water Birds

All four North American loons occur off the Alaska Peninsula, most commonly in winter. Red-throated, and less frequently, Common Loons nest on lakes on some of the larger islands. Red-necked and Horned grebes winter off refuge islands. The former species probably also nests on a few islands. Sandhill Cranes stop on some islands during migration and a few may nest; nonbreeders occasionally spend time on larger islands in summer, and a few may nest.

5. Shorebirds

Excluding the families Stercorariidae, Laridae, and Alcidi, which are discussed in the later section on "seabirds", the islands south of the Peninsula are principally used in migration by numerous shorebirds. Thousands congregate along beaches of large islands. At least six species of shorebirds nest the area. American Black Oystercatchers are the most widespread and abundant nesters. Semipalmated Plovers, Rock Sandpipers, and Red-necked Phalaropes also are locally common breeders. No less than 16 species of shorebirds use various islands and capes during some time of the year, but the only records available are those incidentally obtained doing reconnaissance work at seabird colonies.

6. Raptors

Unlike seabirds, Bald Eagles are nesting in early May. In the Pavlofs eagles nested on all islands visited, save Wosnesenski and Goli. A total of 37 eagles was sighted and four of the seven nests were on Ukolnoi. Eighteen eagles and eight nests were recorded in the Sanak Islands. We have documented nearly 100 Bald Eagle nests south of the Alaska Peninsula; highest densities occur on the islands in Wide Bay. Nests often are in the proximity of seabird colonies.

Peregrine Falcon eyries outside the Aleutians are not as common. Thus far about a dozen Peregrine eyries have been located; eyries often are near colonies of small alcids and procellariids. Though no Peregine Falcon eyries were discovered in the Sanak or Pavlof Islands, individual birds were sighted at three islands. One Gyrfalcon eyrie exists in Wide Bay; scattered pairs of Rough-legged Hawks nest south of the Alaska Peninsula, particularly in the Shumagins. Other raptors observed include Osprey, Northern Harrier, Sharp-shinned Hawk, and Merlin. Greatest use of the refuge for most species is during migration. Short-eared Owls seen on Jude Island; Rough-legged Hawks nested on Caton.

7. Other Migratory Birds

Seabirds-Insular Surveys

Roughly 30,000,000 seabirds, 70% of the state's total, nest in the refuge as a whole. At least 32 of the known 37 species of true seabirds which breed in Alaska use parts of the overall Maritime Refuge. Greatest diversity and numbers occur in the Aleutian Islands and south of the Alaska Peninsula.

In a continuing effort to assess marine bird and mammal populations on all areas included in the refuge by ANILCA, personnel from the headquarters office in Homer visited three areas with which nobody on the staff had adequate familiarity.

Pavlof-Sanak Islands. In early May most of the Pavlof and Sanak Islands were surveyed enroute to Amukta Island in the Aleutians. The only previous survey of seabirds in the Pavlof Islands was in 1973 when cursory observations were made from the "R/V Aleutian Tern". No previous comprehensive reconnaissance of the Sanak Islands was undertaken. According to Murie who visited the Sanak area in 1937, these islands once teemed with nesting seabirds, especially Cassin's Auklets, Ancient Murrelets, and other nocturnals. After foxes were released on virtually all of the islands of any size most birds were exterminated. Since our visit to the islands occurred before nesting of most birds began, one of our primary objectives was to ascertain which islands still had foxes. Though comparatively few birds were present and some species like Horned Puffins had not yet arrived at colonies,

we generally were able to determine what species were present from burrows used in previous years.

Despite being too early to accurately enumerate breeding birds, we detected the presense of species and made some guesses on minimal breeding populations based on numbers of adults present for gulls and rough estimates of burrow numbers (Table 2). Judging from burrows, storm-petrels nested on at least seven of the Sanak Islands; it is generally not possible to distinguish Fork-tailed from Leach's Storm-Petrel burrows from size or configuration. Both species were heard on Peterson and Lida islands. No storm-petrels appear to nest in the Pavlof Islands because of foxes.

Both Red-faced and Pelagic cormorants probably nest on the east and south side of Poperechnoi in the Pavlofs, the island with the highest cliffs in the area. No such habitat is available in the low-lying Sanak Islands, but Double-crested cormorants may nest on two of these islands.

Glaucous-winged Gulls evidently were about to begin nesting on seven of the Sanak Islands and on one of the Pavlofs. One colony of Black-legged Kittiwakes, consisting of about 500 pairs was found on an island south of Sanak.

Ancient Murrelets, once especially abundant in the Sanak Islands prior to fox introductions, have recolonized three islands where foxes have vanished and nest on three additional islands which supposedly never had fox. Cassin's Auklets, also once numerous in the Sanak Islands, evidently nest only on Petterson Island. As in the adjoining Sandman Reefs, Cassin's auklets seem to be the slowest seabirds to recolonize islands.

We noticed Tufed Puffin burrows on all islands without foxes except one. Although Horned Puffins had not arrived in the area at the time of our visit, they do nest on some of the Sanak Islands, as they were discovered using burrows on the Trinity Islands in 1978.

8. Game Mammals

A few caribou, moose, wolves and wolverines straggle onto Seal Cape. Caribou also swim to a few islands off the Alaska Peninsula. Brown bears roam many of the islands in search of colonial nesting seabirds and carrion on beaches. River otters inhabit some islands in the Alaska Peninsula Unit. Both red and arctic foxes are common on many different islands; they were introduced to many for fur farming. Except for localized egging and hunting of seabirds near some villages, hunting and trapping are light. A small herd of introduced bison continues to thrive on Popof Island in the Shumagins.

9. Marine Mammals

The worldwide center of abundance of sea lions is the northwestern Gulf of Alaska. Some of the larger refuge rookeries, include Chowiet (Semidis), Atkins Island (Shumagins), and Pinnacle and Clubbing rocks in the Sandman Reefs. Sea lions are enumerated while conducting seabird surveys, but no rookeries are yet regularly monitored to determine long term population trends. Nevertheless, if adequate personnel and funds allow us to follow our recently written marine mammal inventory plan, we will attempt to document population dynamics at key colonies.

A majority of the State's estimated 150,000 sea otters occupy waters surrounding refuge islands. Outside the Aleutians, which have the largest populations, most otters are found off the Alaska Peninsula, primarily around the Shumagins and Sandman Reefs. Sea otters so far have been recorded concomitantly with seabirds. Periodic inventories of major or concentrations of sea otters should be undertaken; such surveys can most reliably be conducted from the air. Sea otters occurred around eight islands and totalled over 600; we saw about 500 off the north end of Poperechnoi. Steller's sea lions totalled approximately 2500; most were hauled out on rocks south of Sanak.

Thousands of harbor seals haul out on numerous beaches on refuge islands, and pupping occurs on many, especially in the Shumagins. We have no present plans to census seals, which like sea lions and cetaceans are managed by National Marine Fisheries. Walrus and fur seals occasionally haul out on islands south of the Alaska Peninsula.

10. Other resident wildlife

Voles, probably tundra voles (*Microtus oeconomus*) were found on all of the Pavlof Islands, except Inner Iliasik, and on 12 of the 19 islands visited around Sanak (Table 1). Vole populations on some small islands, such as Jude and Gunboat, were amazingly high, amounting to several burrows per square meter. On many islands they had consumed nearly all of the standing dead plant material, causing localized erosion. Voles probably were introduced to these islands to augment birds as a food supply for foxes.

Introduced foxes are still present on six of the seven largest islands in the Pavlofs. Red foxes remain on five of the islands, while arctic or blue foxes are present on Wosnesenski. No foxes appear to be on Goloi, though arctics formerly were there. We found arctic foxes still surviving on seven of the Sanak Islands; some were only 80 acres in size! Sanak itself reportedly had reds which subsequently were removed; a cattleman reintroduced blue foxes in the early 1970's from nearby Elma Island. Arctic foxes have disappeared from six islands which had records of introductions over 50

years ago. Only five islands in the Sanak group escaped fox introductions.

Table 1. Status of Introduced Mammals on Pavlof Islands and Sanak Reefs.

Island *	Voles	Arctic Fox	Red Fox	Cattle
<u>Pavlofs Islands</u>				
Poperechnoi	X		X	
Ukolnoi	X		X	
Wosnesenski	X	X		X
Goloi	X	F		
Jude	X			
Dolgoi	Probable		X (Murie)	X
Inner Iliasik			X	
<u>Sanak Islands</u>				
Peterson		F		
Dora				
Sisters		F		
Telemitz		F		
Lida				
Unnamed				X
Mary	X			
Clifford	X	X		X
Umla	X	F		
Gunboat	X	F		
Inikla	X	X		
Elma	X	X		
Finneys	X	X		X
Wanda	X	X		X
Caton	X	F		X
Rabbit	X			X
Long	X	X		X
Sanak	X	X		X
Totals (25 islands	18	8	4	10

X = present F = formerly present
* Not surveyed (8) : Olga, Entrance, Omega, Kennoys, Clay, Trinity, Outer Iliasik, Dolgoi.

Rock Ptarmigan abound on many of the larger islands; Willow Ptarmigan occur on a few of the largest ones with ample alder and willow cover. Ptarmigan have been sharply reduced and even extirpated on a few by introduced foxes. Populations have burgeoned on islands where foxes have disappeared.

Table 2. Distribution of breeding seabird populations in the Pavlof Islands and Sanak Reefs, Alaska.

Species	Jude	Poperechnoi	Ukolnoi	Wosnesenski	Inner Iliasik	Petersen	Dora	Sisters	Telemitz	Lida	Mary	Umla	Gunboat	Pauloff Harbor (Unnamed)	East of Haystack Rock (Unnamed)
[illegible]rk-tailed Storm-Petrel						P	P	P	P	P	P	P	X		
[illegible] Storm-Petrel	X					>2000				P		X			
[illegible]-crested Cormorant						X						X			
[illegible]-Cormorant		P		X											
[illegible]d-faced Cormorant		P													
[illegible]lack Oystercatcher	P	P				P	P	P	P	P		P	P	P	
[illegible]laucous-winged Gull					50	3000	300	1000	X	250		6000	200	200	
[illegible]lack-legged Kittiwake															500
[illegible]igeon Guillemot		P			P									P	
[illegible]ncient Murrelet	>1000					>1000	>100	>1000	>100	P	P				
[illegible]sorn's Auklet						X									
[illegible]arakeet Auklet														X	
[illegible]ufted Puffin	P	X				2000	700	1000	4000	400	P	P	>200	P	

P = Present X = Probable nesters

Of the approximately 45 species of passerine birds which probably at least intermittently are present, only about a third of these are breeders, and even fewer are residents. Rosy Finches, Snow Buntings, Winter Wrens, Song Sparrows, and Common Ravens are the most ubiquitous permanent residents.

11. Fishery Resources

Streams used by four of the five species of Pacific salmon exist on a few of the largest islands, such as Sutwik; Dolly Varden are in many additional creeks, even on some small islands.

Although we do not have the time or personnel to integrate data on commercial fish stocks, yield, and catch per unit effort with the status of seabird populations, such efforts are badly needed, as the most insidious threat to the long term welfare of seabirds is overexpolitation of fish depended upon by seabirds.

15. Animal Control

No efforts to remove introduced foxes occurred outside the Aleutians.

H. Public Use

1. General

Very little public use activity is conducted in this unit. ARM Early talked to several residents of Sand Point informally in November while conducting aerial surveys in the Shumagin Islands. Until increased staff support is available, no formal Interpretation and Recreation activities are planned.

17. Law Enforcement

ARM Early is the only individual on the Homer staff with law enforcement authority. No LE activity has been done on this unit due to logistics, manpower and limited activity on our lands.

J. Other Items

3. Credits

Refer to the Homer Office Section.

K. Feedback

Refer to the Homer Office Section.

ALEUTIAN ISLANDS UNIT
ALASKA MARITIME NATIONAL WILDLIFE REFUGE

ADAK, ALASKA

ANNUAL NARRATIVE REPORT

Calendar Year 1983

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

PERSONNEL

Permanent

1. C. Fred Zeillemaker, Refuge Manager, GS-12, PFT.
2. Evan V. Klett, Assistant Refuge Manager, GS-11, PFT.
3. Fredric G. Deines, Wildlife Biologist, GS-11, PFT.
4. Tom Edgerton, Outdoor Recreation Planner, GS-7, PFT (EOD 7/10/83).
5. Carol Hagglund, Administrative Officer, GS-7, PFT (Transferred to Homer 8/23/83).

6a. Deborah J. Pape, Clerk-Typist, GS-3, PFT (EOD 9/4/83).
6b. Joy Tadewaldt, Clerk-Typist, GS-3, PFT (EOD 2/7/83, resigned 9/21/83).
7a. Robert Schulmeister, Maintenance Worker, WG-8, PFT (EOD 9/19/83).
7b. Ronny D. Bowers, Maintenance Mechanic, WG-10, PFT (EOD 6/28/81, transferred to Kodiak NWR 4/3/83).
8a. Mark Wilkins, Laborer, WG-2, PFT (EOD 7/10/83).
8b. J. B. Parker, Laborer, WG-2, PFT (EOD 2/7/83, resigned 4/29/83).

Temporaries, Volunteers and OJT Students

9. Donald Dragoo, Biological Technician, GS-5, TFT (EOD 4/17/83) and Volunteer TFT (1/1/83 - 4/17/83).
10. Chris Ambroz, Biological Technician, GS-5, TFT (EOD 5/15/83) and Volunteer TFT (1/1/83 - 5/15/83).
11. Natasha Kline, Biological Technician, GS-5, TFT (EOD 5/15/83) and Volunteer TFT (1/1/83 - 5/15/83).
12. Leslie Slater, Biological Technician, GS-5, TFT (EOD 5/15/83) and Volunteer TFT (1/1/83 - 5/15/83).
13. Susan Steinacher, Biological Technician, GS-5, TFT (EOD 5/29/83).
14. Darnell Owens, OJT Student, TPT (EOD 9/20/83).
15. Brad Elmore, OJT Student, TPT (EOD 9/20/83).
16. Tim Walker, SCA Aide, TFT (EOD 5/28/83, resigned 8/10/83).
17. Jane Halbeison, SCA Aide, TFT (EOD 5/18/83, resigned 8/10/83).
18. Brenda Becker, SCA Aide, TFT (EOD 6/2/83, resigned 11/21/83).
19. Kathy Pomeroy, SCA Aide, TFT (EOD 5/6/83, resigned 8/5/83).
20. Rod Poole, Volunteer TFT (EOD 3/15/83, resigned 12/31/83).
21. Harry Hale, Volunteer TFT (EOD 3/15/83, resigned 12/31/83).
22. Jessie Klett, Volunteer TFT (EOD 6/26/83, resigned 7/14/83).
23. Jay Hamernick, Volunteer TFT (EOD 5/21/83, resigned 6/9/83).
24. Merlin Eltzroth, Volunteer TFT (EOD 5/21/83, resigned 6/9/83).

Review and Approvals

Fred Zeillemaker 2/27/84

Submitted by Date

Regional Office Review Date

Aleutian Islands Unit
Alaska Maritime NWR
Station

Date

Fred Żeillemaker

Tom Edgerton

Van and Jessie Klett

Fred Deines

Brenda Becker

Mark Wilkins

Tim Walker

Cathy Pomeroy

Chris Ambroz

Deborah Pape

Leslie Slater

Natasha Kline

Susan Steinacher

Don Dragoo

No pictures are available for the remaining Staff members: Robert Schulmeister, and Jane Halbeisen.

INTRODUCTION

The Aleutian Islands Unit
Alaska Maritime National Wildlife Refuge

The Aleutian Islands National Wildlife Refuge was established in 1913 by Exeuctive Order of President Taft. Today the Refuge is called the Aleutian Islands Unit of the Alaska Maritime National Wildlife Refuge. It is part of a network of over 420 Refuges in the United States. The Refuge Unit contains nearly 200 islands stretching over 1100 miles from just west of Unimak Island to Attu and totals approximately 1.7 million acres. Most of the islands are designated as wilderness. Exceptions are military reservation lands or islands, old military sites, and lands or islands selected by the Native Corporations under the Alaska Native Claims Settlement Act.

The Aleutian Island Chain is divided into six named island groups extending from east to west: the Fox, Islands of the Four Mountains, Andreanof, Delarof, Rat, and Near Island groups.

The AIU has completed an island-by-island inventory of the Chain, surveying the biological, botanical, and physical features of the Aleutians. Present Refuge management objectives call for maintaining the islands in a state as nearly approaching the natural condition as possible. Specific management goals include the eventual elimination of arctic foxes from the islands, the restoration of the Aleutian Canada goose to other islands within its former breeding range, periodic wildlife inventories on each island, ongoing research studies of various wildlife populations, and control of human access and activities on uninhabited islands.

The Aleutians are the emergent peaks of a submarine mountain range and are believed to have appeared as islands as early as 8,000 years ago when the surrounding seas rose at the end of the last ice age. Most of the islands are mountainous and the larger ones are dotted with lakes and cut by streams. Irregular shorelines have boulder or sand beaches, rocky cliffs, and offshore islets and reefs.

The climate of the Aleutian Islands is maritime and is characterized by fog and persistently overcast skies, frequent, often violent cyclonic storms, and high winds. Weather is very local, with conditons of fog, low ceilings, precipitation, and clear weather all encountered within a distance of a few miles.

The Aleutians are treeless, except for a few spruce introduced by the Russians in 1805 and by Americans during WWII. The islands support a dwarfed flora of willow and alder, alpine heaths, and meadows. Shorelines are marked by stands of beach rye, while the inshore waters support dense beds of kelp.

The Aleutian Islands are rich in wildlife. A total of 239 species of birds have been recorded from the islands and adjacent waters, and 21 species of mammals occur here regularly. Species composition and density vary significantly from island to island, depending on its size and 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 Asian continents. Olaus J. Murie aptly described the Aleutians as a "melting pot for faunal elements from two continents not yet reaching an equilibrium."

The sea otter makes its principle home in the area, reaching its greatest densities in the central part of the Chain, from Adak to Kiska. Once highly valued for its fur, it was almost exterminated by overhunting. Now under strict protection, its population in the Aleutian Islands has increased to nearly 100,000. Among other common sea mammals are the sea lion and harbor seal. Caribou have been introduced to Adak. Atka supports a thriving herd of introduced reindeer.

The arctic fox was originally found only on Attu, while the red fox inhabitated the islands from Umnak eastward. During the period 1915-1925 and later, arctic foxes were introduced on most islands of the Chain. This was done for the purpose of developing a commercial fur farming enterprise, utilizing the islands' abundant wildlife for food. Fox pelts now have little commercial value, and complete removal of the introduced foxes is necessary to restore the native bird life. The introduction of Norway rats occurred chiefly during WWII, and both foxes and rats have seriously affected nesting birds.

Huge numbers of colonial sea birds are the most striking feature of many of the islands. Millions of fulmars, petrels, cormorants, kittiwakes, gulls, guillemots, murres, murrelets, auklets, and puffins congregate in vast nesting colonies. Great numbers of waterfowl winter on the Refuge, and ducks nest throughout the Chain. The endangered Aleutian Canada goose, with a remnant population of about 3500 birds, nests only on tiny Buldir and Chagulak Islands. Bald eagles, peregrine falcons, gyrfalcons, and other raptors occur here, along with numerous resident and migrant shorebirds. Winter wrens, rosy finches, song sparrows, snow buntings, and lapland longspurs are among the more common of the small land birds.

Adjacent waters also contain large populations of food fish which are harvested primarily by the foreign fishing fleets of Japan, Russia, and South Korea.

The Aleutians were once home for about 10,000 Aleuts, but their numbers were severely decimated following the Russian discovery of the islands in 1741. Today, only six native villages exist in the Aleutian Chain; Atka, Nikolski, Unalaska, Akutan and Umnak.

Perhaps the greatest benefit to be derived from the Aleutian Islands is their potential as outdoor laboratories where scientists of various disciplines may conduct studies under natural 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

- Record snowfall and hard cold winter in the Aleutians. (Section A)
- Preparation of revised bird checklist for Adak Island. (Section G.1)
- A spring survey of Agattu and Alaid/Nizki Islands in May found returning transplanted Aleutian Canada geese. Behavior indicated they may have been nesting. (Section G.2)
- Arctic fox eradication begins on Amukta Island to benefit endangered Aleutian Canada Goose. (Section G.2)
- Short spring survey of returning Aleutian Canada goose on Chagulak Island. (Section G.2)
- Population estimate of arctic fox on Kiska. (Section G.2)
- Trapping, banding, and transplanting of record numbers of Aleutian Canada geese from Buldir to Agattu Island to reestablish an additional nesting population. (Section G.2)
- El Nino in 1983 impacts the Aleutians. (Section G.5)
- A 150 to 600% increase in seabird populations since removal of arctic fox on Nizki Island. (Section G.5)
- Continuation of bald eagle study on Adak. (Section G.6)
- Continuation of caribou productivity and range study on Adak. (Section G.8)
- Survey of Northern fur seals documents population on Bogoslof Island. (Section G.9)

B. CLIMATIC CONDITIONS

Adak, and most of the other Aleutian Islands, experienced the greatest total amount of snowfall and greatest depth of snow on the ground on record during the winter of 1982-1983 (Tables 1-4). All fresh water wetlands at Adak were completely frozen over by the beginning of the year and remained that way until mid-April. Adak's total sea level winter snowfall (October 1982 through May 1983) was 153.5 inches, 30 percent above the 107.3 inch record established during the "great winter of 1974-1975". An average of three feet of snow was on the ground through February. Drifts were several feet deeper. Even the margins of Clam Lagoon and most of Finger Bay were ice coated much of the time. The latest snowfall recorded at sea level was on 27 May at Nizki Island. Summer temperatures were near normal, but rainfall was considerably less than normal. Adak's fall weather was warmer than normal, with a high of 71 degrees F. on 5 August. Fall rains were near normal. One inch of snow was recorded on Adak at sea level in October, 15.3 inches in November, but only 8.6 inches in December. Several Adak fresh water ponds and lakes froze over temporarily in November, but opened up, at least periodically, in December. Shemya lakes were eighty percent ice covered on 25 November. All Adak fresh water areas except Andrew Lake were completely frozen over as the year ended.

Snow covered the ground down to sea level from mid-December through March. This is not normal for the Aleutians. (F.Z. 1983)

TABLE 1. 1983 ADAK, ALASKA, WEATHER SUMMARY WITH COMPARISONS TO 1982 AND NORMAL** DATA.

	1983 Pcpt* (")	1982 Pcpt* (")	NORM Pcpt* (")	1983 SNOW (")	1982 SNOW (")	NORM SNOW (")	1983 Days Meas. Pcpt*	1982 Days Meas. Pcpt*	1983 Max. F	1982 Max. F	1983 Min. F	1982 Min. F	1983 Ave. F	1982 Ave. F	NORM Ave. F
JAN	3.83	9.67	6.43	36.6	16.8	17.0	26	26	46	47	8	16	29.6	35.5	34.0
FEB	4.88	5.93	4.77	42.3	2.1	19.3	24	18	47	54	15	8	32.2	37.3	33.0
MAR	3.18	7.33	5.97	22.0	11.0	20.2	28	26	42	57	13	24	33.7	39.9	34.2
APR	3.47	1.58	4.58	7.8	3.6	10.1	28	19	52	51	26	31	37.4	39.7	37.2
MAY	1.47	3.14	4.30	0.3	0.7	2.1	23	23	50	52	33	28	40.7	41.4	40.6
JUN	1.95	3.82	3.17	0	0	T	19	28	56	57	35	37	45.2	43.9	44.6
JUL	2.28	5.06	5.07	0	0	0	18	14	61	62	41	27	48.6	47.1	51.0
AUG	3.56	4.63	4.18	0	0	0	22	22	71	66	43	41	53.4	50.0	51.0
SEP	4.52	7.71	4.74	0	0	.01	15	27	61	58	32	33	48.1	48.0	48.2
OCT	8.09	4.49	5.85	1.0	1.0	2.0	28	21	55	53	31	34	44.2	44.0	45.1
NOV	8.60	8.36	8.07	15.3	15.2	11.7	27	27	46	55	22	25	36.5	38.5	37.0
DEC	6.62	4.64	7.25	8.6	28.3	22.1	25	26	46	44	21	17	36.4	33.1	34.0
Totals:									Extr:				Ave:		
	52.72	66.36	64.38	133.9	78.7	104.5	283	277	71	66	8	16	41.5		40.8

*Includes rain and melted snow.
**Average of most recent past ten years data.

TABLE 2. 1983 ATTU, ALASKA, WEATHER SUMMARY WITH COMPARISONS TO 1982 AND NORMAL DATA.

	1983 Pcpt. (")	1982 Pcpt. (")	NORM Pcpt. (")	1983 SNOW (")	1982 SNOW (")	1983 DAYS Meas. Pcpt.	1982 DAYS Meas. Pcpt.	1983 Max. F	1982 Max. F	1983 Min. F	1982 Min. F	1983 Ave. F	1982 Ave. F	NORM Ave. F
JAN	M*	4.15	UNK	M	M	M	13**	M	42	M	29	M	34.5	UNK
FEB	M	1.72	UNK	M	2**	M	4**	43	51	22	17	M	36.8	UNK
MAR	M	M	UNK	M	M	M	M	M	M	M	M	M	M	UNK
APR	5.00**	M	UNK	M	M	11**	M	49	M	10	M	M	M	UNK
MAY	M	M	UNK	M	M	M	M	M	M	M	M	M	M	UNK
JUN	M	3.74	UNK	M	T	M	11	M	60	M	33	M	44.5	UNK
JUL	M	1.31	UNK	M	T	M	10	M	65	M	41	M	49.6	UNK
AUG	21.16	M	UNK	0	M	22	M	70	M	38	M	49.3	M	UNK
SEP	M	M	UNK	M	M	M	M	M	M	M	M	M	M	UNK
OCT	9.73	M	UNK	0	M	20	M	54	M	29	M	41.3	M	UNK
NOV & DEC DATA NOT AVAILABLE.														
TOTALS:								EXTR.:				AVE.:		
	35.89**	10.92	UNK	UNK	2.0**	53**	38**	70**	65**	10**	17**	UNK	41.3**	UNK

*Missing data.
**Incomplete data.

TABLE 3. 1983 SHEMYA, ALASKA, WEATHER SUMMARY WITH COMPARISONS TO 1982 AND NORMAL DATA.

	1983 Pcpt. (")	1982 Pcpt. (")	NORM Pcpt. (")	1983 SNOW (")	1982 SNOW (")	1983 DAYS Meas. Pcpt.	1982 DAYS Meas. Pcpt.	1983 Max. F	1982 Max. F	1983 Min. F	1982 Min. F	1983 Ave. F	1982 Ave. F	NORM Ave. F
JAN	1.35	3.64	2.31	11.5	32.9	19	27	40	40	13	17	30.0	31.2	31.3
FEB	1.10	M*	1.85	8.5	M	21	M	37	M	20	M	31.0	M	30.2
MAR	1.19	3.47	1.82	9.7	16.9	24	30	39	40	22	22	33.2	34.0	31.7
APR	2.27	2.38	1.82	5.2	4.1	25	22	40	44	25	24	35.2	36.5	34.6
MAY	1.77	1.87	1.73	T	0.2	16	22	44	47	33	34	38.2	40.1	38.3
JUN	1.07	2.94	1.65	0	0	15	17	47	50	37	38	42.1	42.3	42.3
JUL	1.60	0.82	2.68	0	0	17	14	56	56	42	38	46.8	46.5	46.0
AUG	2.49	M	3.64	T	M	20	M	59	M	45	M	49.9	M	48.9
SEP	2.84	M	3.16	T	M	17	M	54	M	39	M	47.4	M	47.5
OCT	6.22	M	4.03	T	M	26	M	54	M	32	M	44.0	M	41.3
NOV & DEC DATA NOT AVAILABLE.														
TOTALS:								EXTR.:				AVE.:		
	21.90	15.12**	24.69	3.40	54.1**	200	132**	59	56**	3	17**	39.78	37.9**	39.2

*Missing data.
**Incomplete data.

TABLE 4. 1983 UNALASKA/DUTCH HARBOR, ALASKA WEATHER SUMMARY WITH COMPARISON TO 1982 AND NORMAL DATA.

	1983 Pcpt. (")	1982 Pcpt. (")	NORM Pcpt. (")	1983 SNOW (")	1982 SNOW (")	1983 DAYS Meas. Pcpt.	1982 DAYS Meas. Pcpt.	1983 Max. F	1982 Max. F	1983 Min. F	1982 Min. F	1983 Ave. F	1982 Ave. F	NORM Ave. F
JAN	0.36*	M**	UNK	M	M	2*	M	40	M	10	M	28.0*	M	UNK
FEB	6.90	M	UNK	24.4	M	26	M	41	M	16	M	M	M	UNK
MAR	6.96	M	UNK	6.3	M	24	M	43	M	2	M	32.6	M	UNK
APR	2.71	1.52	UNK	3.5	0*	23	12	54	50	10	23	37.6	35.8	UNK
MAY	4.28	3.34	UNK	0	T	18	17	55	57	26	27	41.9	40.5	UNK
JUN	2.14	2.28	UNK	0	0	16	21	58	59	39	38	47.6	47.2	UNK
JUL	2.38	2.92	UNK	0	0	11	13	65	61	35	41	51.8	49.8	UNK
AUG	3.48	M	UNK	0	0	17	M	74	M	45	M	55.2	M	UNK
SEP	7.07	M	UNK	0	0	21	M	59	M	39	M	49.1	M	UNK
OCT	1.91	M	UNK	0	M	23	M	56	M	26	M	42.0	M	UNK
NOV & DEC DATA NOT AVAILABLE.														
TOTALS:														
	38.19*	10.06*	UNK	34.2*	T*	181*	63*	74	61*	2	23*	42.9*	43.3*	UNK

*Missing data.
**Incomplete data.

C. LAND ACQUISITION

3. Other

Little was accomplished during the year on the proposed land exchange between the Service and the Ounalashka Village Corporation of Unalaska. The Corporation still seeks to acquire the 22G rights to approximately 195 acres on the south side of Amaknak Island. Meetings were held with personnel from the Alaska Maritime NWR, Realty and Wildlife Operations to finalize the decision on which small islets and rocks in the Unalaska Island area would be proposed to the Corporation for exchange. Nine islets with high values for marine birds are involved. The proposal is still under review.

D. PLANNING

3. Public Participation

On August 22, 1983, an aerial survey was conducted for caribou on all major habitat areas of Adak using a U.S. Coast Guard helicopter. This census recorded 177 caribou, a number which was considerably lower than expected. This low population number was due to last year's low post hunting population and the subsequent negative impact that over 12 feet of snow and/or a winter of record had on the herd. It was judged that an estimated 75 to 80% of the Adak caribou herd was observed. The total population was therefore estimated to be 220 to 236 animals. A herd of this size would not be capable of sustaininga normal harvest and still recover from its low population level.

The results of the helicopter census and its management implications were discussed with the various military commands on Adak, the two sportsman's clubs and the general populace. Based on these discussions and in order to conserve the caribou resource, it was recommended to the Alaska Department of Fish and Game that the 1983/84 Adak caribou season be closed before it even opened. After careful consideration of all the facts, this recommendation was accepted and the season subsequently closed. Barring another exceptionally bad winter, sufficient caribou should be available to support a good hunting season next year.

5. Research and Investigations

Investigation of the sea-air exchange of chemical substance.
University of Rhode Island, SEAREX Executive Committee, Dr. Robert A. Duce. This is the second year of a study in the Aleutian Islands as part of a world wide evaluation of the atmospheric concentrations and fluxes to the ocean of a variety of organic and inorganic substances. An air particle monitoring system was established on Shemya Island.

Census of fur seals and Steller's sea lions in the eastern Aleutians
National Marine Fisheries Service, Marine Mammal Laboratory, Seattle, Washington, Dr. Thomas Loughlin. A census of Northern fur seals was made in the Aleutian Islands on Bogoslof Island. A number of individual northern fur seals were tagged.

Revegetation of disturbed tundra
University of Tennessee, Department of Botany, Dr. Cliff Amundsen. Work is continuing on a study to determine which introduced species are suitable for vegetation establishment on areas disturbed by military activities. Thus far, results indicate that introduced species can be maintained only at high cost. The use of native American dunegrass (*Elymus mollis*) shows far more promise as a recovery species.

Aleutian Canada goose study
Fish and Wildlife Service, Aleutian Islands Unit. The Aleutian Canada goose study continued and consisted of a spring survey on three islands. Arctic fox eradication on Amukta Island, estimate of Arctic fox population on Kiska Island, and trap, band and transplant effort. A detailed discussion of this year's effort is contained in Section G.2.

Caribou productivity and range use on Adak Island
Fish and Wildlife Service, Aleutian Islands Unit. Previously, little was known about the caribou herd introduced in 1958-59 on Adak Island. Initial study of the herd began in 1981 and has continued. A revised study outline was prepared in April 1982. The primary objectives of this study are to develop baseline information on herd productivity and develop as estimate of range carrying capacity on Adak Island. Information will be used for recommending carrying capacity to protect wildlife and other resource values on Adak and other islands in the Aleutian Islands Unit of the Alaska Maritime National Wildlife Refuge where caribou/reindeer grazing now occurs or may in the future. Results are discussed in Section G.8.

Aleutian Arc magmatism in space and time: a geochemical and petrologic study
Cornell University, Department of Geological Science, Dr. R. W. Kay. This study began in 1976 and focuses on the relationship between magmatic activity, up-lift, subduction, and the physical state of the crust and mantle. The origin of the chemical characteristics or arc magmas is also being investigated.

Movement and breeding biology of bald eagles on Adak Island
Fish and Wildlife Service, Aleutian Islands Unit. A large population of bald eagles inhabits Adak Island. In an attempt to collect data on the population dynamics and movements of bald eagles a production study was conducted in a sample area around the Adak Naval Station, and nestlings were banded. Carcasses of electrocuted eagles are measured and necropsied for sex determination. Measurements are statistically analysed in an attempt to find a specific method for sexing live eagles. Results of the production study and all measurement data can be found in section G.6. Statistical analyses on new measurements pend the accumulation of a larger sample size.

Avian migratory system in the Near Islands
George F. Wagner. This is a three year study designed to catalog the migratory birds of the Near Islands, estimate mean migration dates for some species, examine annual fluctuations, study the pre- and post-breeding movements of regularly breeding species, catalog incidentals and propose how the migratory system works in the Near Islands. The data are to be collected on Attu Island.

The breeding avifauna of Attu Island
George F. Wagner. During the next three years the objectives of this study are to catalog the breeding birds of Attu Island, map out suitable breeding areas and habitat on the island, and to determine annual fluctuations and their causes in breeding species and their populations.

White-tailed eagle and fall migration studies on eastern Attu Island
Theodore G. Tobish. This proposal was for a one-time study from early August to late October 1983. Objectives include the gathering of late summer nesting data on white-tailed eagles with special notes on production and fledging. Participants will also determine periods of fall migration and fall populations of all migratory and resident bird species. Accidental species will also be cataloged.

Sea otter populations of Attu Island
University of California, Santa Cruz, James A. Estes. This is part of a continuing study of the expanding sea otter population in the waters around Attu Island. This year otters were counted and the intertidal habitat was monitored.

E. ADMINISTRATION

1. Personnel

The year could be remembered as another year of change. In August the last "old timer" left of the permanent staff, as Carol Haggland, transferred to the Homer Office. She is sorely missed now.

- Maintenance Man Ron Bowers transferred to a similar position at Kodiak NWR in April.

- Refuge Clerk Typist Joy Tadewaldt entered duty in February and resigned in September when her husband got PCS orders to another Naval base.

- Maintenance Helper J. B. Parker joined the staff in January and then resigned in May when his wife got PCS orders to another Naval Base.

Three individuals joined the permanent staff during the year:

Tom Edgerton transferred from the National Park Service to become our Outdoor Recreation Planner; Deborah J. Pape, a local island resident, became Refuge Clerk Typist, and Bob Schulmeister transferred from Selawik NWR to become our Maintenance Worker. Mark Wilkins was also hired as our Maintenance Helper. Our volunteer staff stayed with us throughout the year and their good hard work was rewarded with temporary Biological Technician positions. Their hiring was delayed due to a National hiring freeze. Don Dragoo was the first to be hired in April followed by Leslie Slater, Chris Ambroz and Natasha Kline, all in May. Sue Steinacher was also hired during this period as a temporary Biological Technician but she had not previously worked for us.

Four volunteers were recruited from the Student Conservation Association: Kathy Pomeroy, Tim Walker, Jane Halbeisen and Brenda Becker. Kathy, Tim, and Brenda worked from 12 to 24 weeks and assisted the majority of our field projects. Jane assisted in the station EE program.

TABLE 5. AIU STAFFING, FY-79 TO FY-84.

Year	PERMANENT (Full-Time)	PERMANENT (Part-Time)	TEMPORARY (Seasonal)	TOTAL
FY-79	5	8	9	22
FY-80	7	5	11	23
FY-81	7	1	1	9
FY-82	5	1	1	7
FY-83	6	2	5	13
FY-84	7	1	5	13

3. Other Manpower Programs

An On-The-Job Training program for high school seniors was continued with Bob Reeve High School of Adak. One student was employed by the refuge in the 1982-83 school year for 20 hours per week. The salary of the individual was paid by the school. The student was exposed to a wide variety of refuge tasks including assisting on surveys, neocropsies of eagles and the development of interpretive exhibits for the headquarter's visitor contact area. This program was very successful in past years and will continue to be in the future, but with much more careful screening of applicants.

4. Volunteer Programs

Nine volunteers worked on the AIU during the 1983 field season. Four of the volunteers were selected through an agreement with the Student Conservation Association, Vashon, Washington. The summer field season could not have been successfully completed without their dedicated efforts. The volunteers contributed 3040 hours to a variety of Refuge projects such as Amukta fox eradication, Agattu and Alaid/Nizki spring Aleutian Canada goose surveys, Kiska fox survey, Adak post-calving caribou survey, Adak bald eagle study, Adak general wildlife surveys, Adak caribou vegetation study, Buldir/Agattu Aleutian Canada goose capture, banding and transplant, many Refuge environmental education programs, and the historical evaluation of WWII activities on Kiska Island for its nomination to the National Register of Historic Places.

Our two volunteer historians on the deck of the "Western Pacific". (S.S. 1983)

5. Funding

TABLE 6. AIU FUNDING, FY-79 TO FY-84.

FY	MB 1210/1260	MNB 1220	I & R 1240	Total 1200/1260	End. Spp. 1400/1480	Total AIU	BLHP
79	364,000	51,500	20,000	435,500	307,000	742,500	1,781,000
80	262,000	30,000	21,000	313,000	282,000	595,000	1,403,000
81	144,000	60,000	21,000	225,000	140,000	365,000	-
82	192,000	123,000	31,000	346,000	75,000	421,000	-
83	222,650	125,000	36,450	384,100	89,600	473,700	-
84	619,000	-	-	619,000	110,000	729,000	-

6. Safety

Maintenance Mechanic Bowers served as Safety Officer until he transferred in February. The Refuge Biologist temporarily assumed the duties as Safety Officer until the Maintenance Worker arrived on duty in the middle of September and was assigned these duties.

Safety meetings were held monthly with all station personnel participating. Topics included hypothermia and arctic survival, winter driving, care and cleaning of fireplaces, boating safety, safety clothing, eye protection and proper use and care of hand and power tools, fire safety fire extinguisher types and use, eye protection, safety clothing and a review of basic first aid techniques. Periodic fire safety inspections of the refuge headquarters building were continued by the Navy Fire Department. The refuge headquarters fire alarm is now hooked into the Naval Base system. The Navy Fire Department inspected all FWS housing and all quarters passed with flying colors.

All new personnel received checkouts in survival suits prior to any field season work. All biological staff plus the Outdoor Recreation Planner and Maintenance Helper received CPR refresher training.

Safety related purchases during the year included: Mustang boating suits for field crews, batteries for EPIRB's and two SGC portable single side band field radios.

Two no-lost time traffic accidents occurred during the year. One of our volunteer biologists had two minor accidents within a month. One was backing into a parked vehicle and the other was colliding with a moving vehicle. Both accidents were at least in part due to our worst winter on record causing poor visibility and icy roads.

Safety training scheduled for next year include: Field operation orientation; emergency boat motor repairs; field radio

installation, operation and repair; first aid, CPR, defensive driving, Coast Guard boat handling course and weather forecasting.

F. HABITAT MANAGEMENT

1. General

The Aleutian Islands Unit (AIU) of the Alaska Maritime National Wildlife Refuge (AMNWR) consists of 2,720,400 acres and is composed of about 200 major islands and islets in the Aleutian Chain. The refuge starts at the west end of the Alaska Peninsula (660 air-miles southwest of Anchorage, AK) and extends some 1,100 miles to the west. The headquarters for the AIU, a 3-year old combination office/visitor center, is located on Adak which is 1,100 air-miles from Anchorage. Unimak Island, 998,260 acres, is administered by the Izembek NWR, Cold Bay.

The beauty of the Aleutians can be dramatically rugged as evidenced by this ice cliff on Chagulak Island. (C.A. 1983)

With the exception of military bases on the islands of Adak (5,000 personnel), Shemya (1,100 personnel), and Attu (45 personnel) and small native villages (less than 100 people each) on Atka, Umnak, Unalaska, and Akutan, the islands are uninhabited.

2. Wetlands

Many of the islands have freshwater "potholes" which superficially resemble the prairie pothole country. A few

areas produce aquatic growth which supports limited waterfowl populations. This is especially true of Amchitka, Kanaga, and Agattu Islands. Current management amounts to monitoring construction activities at military installations and attempting to steer development away from wetlands and lagoons. Thus far, the military has been quite sensitive and cooperative to our suggestions.

12. Wilderness and Special Areas

The passage of ANILCA designated approximately 1.3 million acres of the Aleutian Islands Unit as wilderness. Some notable areas of the Unit excluded from the designation are 127,870 acres for military and lighthouse purposes on Shemya, Attu, Adak, Amchitka, and Ugamak Islands and approximately 200,000 acres selected by Native Corporations under the Alaska Native Claims Settlement Act.

Other special areas or designations which occur or are proposed for the Unit are listed below:

ISLAND	DESIGNATION
Aleutian Islands Unit	Biosphere Reserve
Agattu	Research Natural Area
Buldir	Research Natural Area
Kiska	Battlefield nominated to National Register of Historic Places
Attu	Battlefield nominated to National Register of Historic Places
P-38 G Lightning (aircraft) - Attu Is.	National Register of Historic Places
B-24 D Liberator Bomber (aircraft) - Atka Is.	National Register of Historic Places

G. WILDLIFE

1. Wildlife Diversity

Adak, lying near the center of the axis formed by the Alaska Peninsula and the Aleutian/Commander Islands, hosts a mixture of avifauna from North America, the Pacific Islands, and Asia. According to Byrd *et al.* (1974), about 65% of the species recorded at Adak breed in North America and Asia, while an additional 19% breed in Asia only and another 12% breed in North America only.

A revised checklist was prepared in 1983 of the bird species observed on Adak which indicates normal abundance, periods of occurence and breeding status on Adak (Table 7). A total of 145 species have been observed on Adak. Twenty-eight of these species are known to have nested. Thirty-one species are listed as accidentals.

TABLE 7. ADAK BIRD ABUNDANCE IN TWELVE HABITATS AVAILABLE BY VEHICLE, SHORT WALK OR SHORT VESSEL TRIP.

Species	Months	1 Finger Bay	2 Sweeper Cove	3 Naval Station	4 Kuluk Bay	5 Kuluk Beach	6 Clam Lagoon	7 Andrew Bay	8 Lake Andrew	9 Mt. Moffett Slopes	10 Smew Ponds	11 Shagak Bay	12 Offshore Areas
Red-throated Loon	1-12		o										
Arctic Loon	9-6				o		o						
Common Loon •	1-12						u		u				
Yellow-billed Loon	10-7		o		o		o						
Horned Grebe	10-7				u			u				u	
Red-necked Grebe	9-5				u			u					
Western Grebe	12						x						
Black-footed Albatross	5-11												u
Laysan Albatross	5-9												u
Northern Fulmar	4-9												c
Cook's Petrel	8												x
Sooty Shearwater	5-9												c
Short-tailed Shearwater	5-9												c
Fork-tailed Storm-Petrel	5-9			o	u								c
Leach's Storm-Petrel	5-10			o	u								c
Pelagic Cormorant •	1-12	c	c		c		u	c				c	c
Red-faced Cormorant •	4-9							u					c
Whooper Swan	10-4						o		o				
Bean Goose	5		x										
Emperor Goose	9-6	u	u		c		u					u	
Brant	3-5/9-11						o						
Canada Goose	3-5				o		o		o				
Green-winged Teal	1-12	u	u	u			c		u		u	u	
Falcated Teal	2-6/10-11						x		x		x		
Mallard •	1-12	u	u	u	u		c		u		u	u	
Spot-billed Duck	1-12						o				x		
Northern Pintail •	1-12				u		c		u			u	
Garganey	5-6				o		o						
Blue-winged Teal	10						x						
Northern Shoveler	5-6/9-12						u						
Gadwall	10-6						u				u		
Eurasian Wigeon	8-6						u				u		
American Wigeon	10-6						u				u		
Common Pochard	4-6/10						o						
Canvasback	10-6		o				u		u		o		
Ring-necked Duck	4										x		
Tufted Duck	9-7	o	o				o		u		u		
Greater Scaup	1-12	c	u				c		c		u	c	
Common Eider •	1-12				u		o						
King Eider	11-5				o		o						
Steller's Eider	10-6				o		o						
Harlequin Duck	1-12	c	c		c			c				c	
Oldsquaw	8-7	u	c		u		u					c	
Black Scoter	9-7				c			u				u	
Surf Scoter	1-6/11-12				x		x						
White-winged Scoter	1-12				c		u						

c - common (certain to be seen in suitable habitat)
u - uncommon (present, but not certain to be seen)
o - occasional (seen only a few times over a 2-5 year period)
x - accidental (has been observed at least once, but without any pattern of regularity)

TABLE 7. CONTINUED

Species	Months	Finger Bay 1	Sweeper Cove 2	Naval Station 3	Kuluk Bay 4	Kuluk Beach 5	Clam Lagoon 6	Andrew Bay 7	Lake Andrew 8	Mt. Moffett Slopes 9	Smew Ponds 10	Shagak Bay 11	Offshore Areas 12
Common Goldeneye	9-5	u	u		u		c	u				c	
Barrow's Goldeneye	5-6						x						
Bufflehead	10-7						c				u	c	
Smew	10-7						o				o		
Hooded Merganser	11-2										x		
Common Merganser	9-6	o					o				o		
Red-breasted Merganser •	1-12	c			c		c	u	u		u	c	
Bald Eagle •	1-12	c	c	c	u	c	c	u	c	u	c	u	
Northern Harrier	1-4						x						
Rough-legged Hawk	8-10			o									
Eurasian Kestrel	1-2			x									
Merlin	10-12			x									
Peregrine Falcon •	1-12	u	u	u			u	u		u			
Gyrfalcon	9-7			o					o				
Rock Ptarmigan •	1-12	u		u			u		u	c	u	u	
Sandhill Crane	5-7/10-11			o			o						
Lesser Golden Plover	5-6/9-11			u		u	u						
Black-bellied Plover	6/7-10						x						
Mongolian Plover	5-6						x						
Common Ringed Plover	8						x						
Am. Black Oystercatcher •	1-12				u	u							
Greater Yellowlegs	10						x						
Lesser Yellowlegs	6						x						
Spotted Redshank	5						x						
Wood Sandpiper	5-6/8						o		o				
Wandering Tattler	5-6/7-10					u	o		u				
Gray-tailed Tattler	9					x							
Common Sandpiper	5/9					x			x				
Whimbrel (Asiatic)	5-6						o						
Bristle-thighed Curlew	5						x						
Far Eastern Curlew	5-7					o	o						
Black-tailed Godwit	5						x						
Bar-tailed Godwit	5-6/9-11					u	u						
Ruddy Turnstone	5-6/7-10					c	u						
Great Knot	6						x						
Red Knot	5-6/7-10						o						
Sanderling	8-5					u	u						
Western Sandpiper	7-12						x						
Rufous-necked Stint	6/8						x						
Long-toed Stint	5						x						
Least Sandpiper	4						x						
Baird's Sandpiper	8-9					o	o		o			o	
Pectoral Sandpiper	5-6/9-11						u		u				
Sharp-tailed Sandpiper	9-11						o		o				
Rock Sandpiper •	1-12	u	u		u	u	u	u				u	
Dunlin	5-6/8-1						o						
Broad-billed Sandpiper	8						x						
Ruff	5/9						x						
Long-billed Dowitcher	9					x							
Red-necked Phalarope •	5-8								c		u		
Red Phalarope	5-6/7-10		x				x						c

c - common (certain to be seen in suitable habitat)
u - uncommon (present, but not certain to be seen)
o - occasional (seen only a few times over a 2-5 year period)
x - accidental (has been observed at least once, but without any pattern of regularity)

TABLE 7. CONTINUED

Species	Months	Finger Bay 1	Sweeper Cove 2	Naval Station 3	Kuluk Bay 4	Kuluk Beach 5	Clam Lagoon 6	Andrew Bay 7	Lake Andrew 8	Mt. Moffett Slope 9	Smew Ponds 10	Shagak Bay 11	Offshore Areas 12
Pomarine Jaeger	5-7						o	o					o
Parasitic Jaeger o	4-9				u		c	u	u			u	u
Long-tailed Jaeger	7-9	o	o		o								o
C. Black-headed Gull	5-7		o			o	o						
Mew Gull	11-5		u		o		u						
Herring Gull	10-6						o						
Glaucous-winged Gull •	1-12	c	c	c	c	c	c	c	c			c	c
Glaucous Gull	11-6						o	o				o	o
Black-legged Kittiwake	1-12		c		c			c	c				c
Red-laked Kittiwake	9							x					o
Sabine's Gull	7					x							
Common Tern (Asiatic)	7-8						x						
Arctic Tern •	5-9				c		c						
Aleutian Tern •	5-8				c		c		u				
Common Murre	1-12		u		u								c
Thick-billed Murre	1-12		u		u								c
Pigeon Guillemot •	1-12	u	c		c			u				u	c
Marbled Murrelet •	1-12	u	u		u		c	u				u	c
Kittlitz's Murrelet •	1-12				u		u						u
Ancient Murrelet	1-12		u		c								c
Parakeet Auklet	1-7					u							u
Crested Auklet	12-7		o		u								c
Least Auklet	3-12				o								c
Whiskered Auklet	4-5				o								o
Tufted Puffin •	1-12	u	u		c				u				c
Horned Puffin •	1-12	u	u		u				u				c
Common Cuckoo	6						x						
Snowy Owl	8-12			o						o			
Short-eared Owl	9-7			u			u						
Tree Swallow	6/11						x						
Bank Swallow	6										x		
Common Raven •	1-12	c	c	c	c	c	c	c	u	u	c	c	
Winter Wren •	1-12	o			o	o		u				o	
Northern Wheatear	8								x				
Dusky Thrush	10			x									
Water Pipit	9-12						o		o				
Northern Shrike	1											x	
Savannah Sparrow	9								x				
Song Sparrow •	1-12	u	u	u	u	u	u	u	u			u	
Lapland Longspur •	2-12	~~c~~ a	c	~~c~~ a		u	c	u	~~c~~ a	~~c~~ a	~~c~~ a	~~c~~ a	
Rustic Bunting	10						x						
Snow Bunting •	1-12	u	u	u		u	u	u	u	c		u	
Brambling	5-6								x				
Rosy Finch •	1-12	u	u	c		u	u	u	u	c		u	
Common Rosefinch	6								x				
Common Redpoll	5-7/10-3			o			o		o				
Hoary Redpoll	1								o				
Hawfinch	5-6			x									

145 species

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2. Endangered and/or Threatened Species

The Aleutian Canada goose is designated as an Endangered Species. Historically, its breeding range extended from the eastern Aleutians to the Kurile Islands, wintering either in Japan or from British Columbia to California. Geese were common in the western Aleutians until the turn of the century. The reason for their decline is speculative but the introduction of fox to the Aleutians is considered the primary cause. Hunting pressure and loss of wintering habitat are also of importance in the overall picture.

Since the late 1940's refuge personnel have conducted a program to eliminate fox on selected islands. Amchitka was designated fox-free in 1960 and likewise for Alaid and Nizki Islands in 1976. Agattu gained this status in 1982.

Buldir was one of the few islands to escape fox introduction and supported a remnant population of about 300 geese in 1963. Goslings were captured on Buldir in 1963, 1972 and 1975 to initiate a captive breeding program. Propagation facilities were established at Patuxent Wildlife Research Center, Amchitka Island, and Northern Prairie Wildlife Research Center. These hand-reared Aleutian Canada geese either from the Northern Prairie Wildlife Research Center or Patuxent, were transplanted to Agattu or Alaid/Nizki in hopes that they would re-establish a nesting population. This was not successful because the birds had no knowledge of the migration route to the California wintering grounds and they subsequently perished. The next step was to release a combination of hand-reared birds and transplanted wild birds from Buldir Island. It was hoped that the experienced wild adults transplanted from Buldir would serve as "guides" for their goslings that were transplanted with them and the hand-reared birds. The young of the year would then return to the island at which they first became capable of flight and establish a new breeding population. This combination of hand-reared and wild geese was used on Agattu in 1978, 1979, 1980, and 1982. Although many of the wild goslings returned to the island of their release, there was little success with the hand-reared birds. Therefore, 1982 was the last year that attempts were made to include hand-reared birds in the transplant program.

The Aleutian Canada Goose Recovery Team was formed in 1975 and established two main objectives. The first was to maintain a minimum wild breeding population at the 1977 level of 1160 geese. Secondly, self-sustaining populations, i.e. a minimum of 50 breeding pairs, were to be re-established in three former breeding locations.

As part of the continuing effort to meet these objectives the following were completed in the 1983 field season: a survey of Agattu and Alaid/Nizki in the Near Islands for returning Aleutian Canada geese in late May and early June, initial fox eradication efforts on Amukta Island in May and June, cursory survey for returning geese on Chagulak, arctic fox population estimate on Kiska Island and the trapping, banding and transplanting of Aleutian Canada geese from Buldir to Agattu in August. Transporation for field work conducted on remote islands was provided by the charter vessel "Western Pacific" and her fine crew.

The "Western Pacific was our very able charter vessel this season. This 84' boat carried us from one end of the chain to the other. (F.D. 1983)

Surveys for Aleutian Canada geese were conducted from May 23 to June 3 on Agattu and on Alaid/Nizki Islands. On Alaid/Nizki, a three-person team set up a field camp and spent 10 days thoroughly searching the islands for geese. Four banded Aleutian Canada geese and five unbanded geese were observed in the vicinity of the 1981 release site, a cove on the southeast side of Nizki (Table 8). All geese and goose sign that were observed occurred on the eastern portion of Nizki Island.

TABLE 8. BANDED ALEUTIAN CANADA GEESE OBSERVED AT NIZKI ISLAND 23 MAY - 3 JUNE 1983.

Blue Band Number	Release Site	Release Date	Sex	Hatching Year	Source	Winter Obser.
728	Nizki	8/16/81	M	80	Patuxent	None
731	Nizki	8/16/81	M	80	Patuxent	None
734	Nizki	8/16/81	M	80	Patuxent	None
A92	Agattu	7/31/82	F	82	Buldir	20*

*First observed at Colusa, CA, 11 Nov. 1982 and observed for the last time at Cresent City, CA, on 14 April 1983.

On Agattu Island, two refuge personnel utilized the old fox trapper's cabin in Aga Cove as a base camp and searched the southeastern part of the island.

Geese were found in the Goose Creek, Cabin Creek and Cape Sabak areas. Eleven banded Aleutian Canada geese were observed on Agattu (Table 9). Unlike last year, there was no inter-island migration detected between Agattu and Alaid/Nizki during the observation period. The largest single flock encountered on Agattu consisted of 13 geese. It is believed that there were at least two mated pairs of Aleutian Canada geese on Agattu this spring but no nests were found. Hopefully, with a more extended observation period, as planned for 1984, some nests will be located.

TABLE 9. BANDED ALEUTIAN CANADA GEESE OBSERVED ON AGATTU ISLAND 23 MAY - 3 JUNE 1983.

Blue Band Number	Release Site	Release Date	Sex	Hatching Year	Source	Winter Obser.
473	Agattu	8/6/82	M	79	Patuxent	None
726	Nizki	8/16/81	M	80	Patuxent	None
735	Nizki	8/16/82	M	80	Patuxent	None
932	Agattu	8/6/82	M	82	NP*	None
936	Agattu	8/6/82	M	82	NP	None
975	Agattu	8/6/82	M	--	Wild**	None
983	Agattu	8/6/82	F	79	Patuxent	None
A37	Agattu	7/29/82	F	82	Buldir	29
A91	Agattu	7/31/82	M	82	Buldir	28
A97	Agattu	7/31/82	M	82	Buldir	16
C26	Agattu	8/4/82	F	--	Buldir	27

* Northern Prairie Wildlife Research Center
** Caught on Buldir and used in captive rearing program

While surveys were being conducted for returning Aleutian Canada geese in the Near Islands, an additional effort was started to benefit the geese in the eastern half of the Aleutian Chain. With the 1982 discovery of a second wild breeding population of the endangered Aleutian Canada goose on Chagulak Island, it suggested the possibility of natural expansion of geese to neighboring islands if the introduced arctic fox were eliminated. A fox eradication program was begun on Amukta Island, located about four miles southwest of Chagulak Island.

The primary means of removal consisted of leghold traps, sodium cyanide devices (M-44 coyote-getters), rifles, shotguns and a pistol. Diphacinone poison baits were also distributed along fox trails and other areas used by foxes on Amukta at the end of summer. As with all previous fox eradication efforts, this year's attempt proved to be very laborious and time consuming.

Amukta is a dry rugged island with many recent lava flows and an active volcano as evidenced by the steam shown in this picture. (F.D. 1983)

Two field crews consisting of four people each worked on the Amukta fox eradication project for approximately one month each during the period of 17 May to 22 July 1983. A base camp consisting of a Weatherport and two Omnipotents was set up on the southeast shore. Fox eradication began on the east side and was expanded to the south, northeast, west ridge, and north side of the island respectively. Each area was worked as efficiently and quickly as possible using all means of eradication available in an attempt to remove the majority, if not all of the fox, before proceeding to a new area. The northeast, north and west ridge areas were worked from temporary spike camps over periods lasting from two to seven days. A Zodiac provided transportation to and from spike camps, but in most cases the majority of fox removal was done on foot. As with

all projects conducted in the Aleutians, weather was the controlling factor and continually hindered the field operations and in some cases prevented personnel from setting or checking the traplines on schedule.

Forty-nine fox were eradicated from Amukta Island in a nine-week period (35 blue phase and 14 white phase). There appeared to be some color segregation of the fox on Amukta, but the results from trapping were inconclusive. Trapping efforts were concentrated heavily on beaches that were most accessible to fox, while minimal trapping efforts were expended in upland areas that showed moderate to low fox activity. Leghold traps proved to be the most successful method taking 28 fox, followed by M-44's with 17 fox. Four fox were killed with rifles and none were taken with shotgun or pistol.

Great care had to be exercised when setting M-44's on remote Amukta Island. (F.D. 1983)

The various trap and M-44 sets were continually improved as the weeks progressed. Had it been known how to cope with Aleutian weather (high winds and horizontal rain) prior to our efforts, some of the initial sets may have been more effective.

Although the eradication project required much effort, results appear promising. There was limited fox sign noted by the second field crew and all the major fox trails were almost totally re-vegetated by late summer. Flocks of 30-70 glaucous-winged gulls were also observed on the north end of the island in late summer. Although it appears that the majority of fox were eradicated from Amukta in 1983, some areas inaccessible to trappers could still harbor fox. Continued fox eradication on Amukta will be required in 1984. A study to establish baseline population data of the island's avifauna will be conducted in conjuction with the fox eradication project.

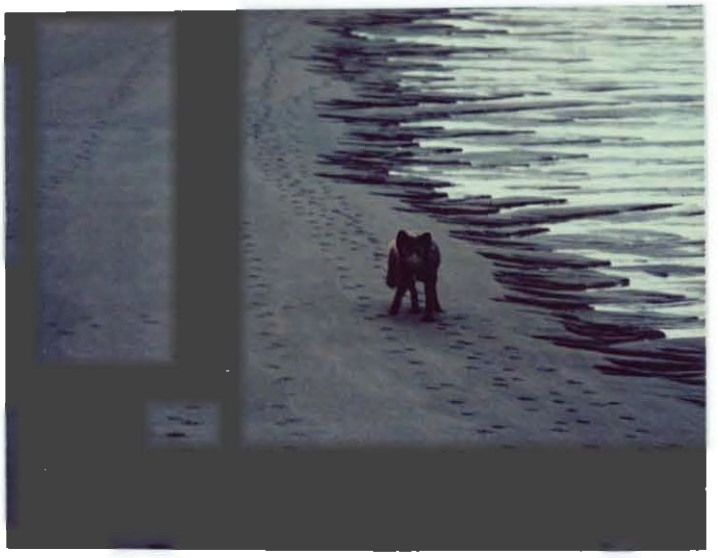
Further documentation of the use of Chagulak Island by Aleutian Canada geese was conducted as a secondary effort to the fox eradication project on Amukta. Chagulak was visited as time and weather permitted, but both proved somewhat limiting. During the first half of the period, several attempts and some successful visits were made to Chagulak. One of these visits involved a two-night spike camp on the island and the others were sorties from the charter vessel "Western Pacific". The island was circumnavigated and major terrain features photographically documented.

A total of 136 observations of Aleutian Canada geese were made on three separate areas of Chagulak Island (SW, SE, and W) on three different dates. The majority of the birds observed were either unbanded or too far away to determine if they were banded. Most of the birds were either paired or in small flocks of ten or less and exhibited some territoriality. It is unknown as to how many duplicate observations were made because of changes in weather, time and location which occured while observing the birds. The birds were seen primarily in the mossy/willow habitat and the upper edge of the Elymus/umbel habitat.

The chances of having a clear day on Chagulak Island are normally slim and none. (F.D. 1983)

The highlight of the goose observations was the sighting of two birds with metal FWS bands and a bird with a red colored leg band. These birds were most likely banded on the wintering grounds in California. This would suggest that the Chagulak geese are not a distinct sub-population as previously suspected, but winter with the Buldir birds.

Another phase of the goose recovery program involved visiting islands that are being considered for future fox eradication to determine the present fox populations and the feasibility of an eradication program. To accomplish this objective, a team of four people spent two and a half weeks on Kiska Island during June and July. Traplines were set on selected beaches to sample the fox population. From these samples it was determined that Kiska has a minimum population of approximately 650 arctic foxes. This is considered to be a very conservative estimate. The large fox population, coupled with the large size of the island, led to the conclusion that it is not feasible to attempt fox eradication on Kiska with the methods presently available.



The beaches are the fox highways in the Aleutians. (E.V.K. 1983)

This year's Aleutian Canada goose capture, banding and transplant work was conducted on Buldir and Agattu Islands from July 28 to August 6. Personnel from the AIU and two biologists from the Endangered Species Office in Anchorage participated in the transplant. One Endangered Species Office representative video taped the entire capture and transplant operation which resulted in a 3 minute edited version on the beginning of the Aleutian Canada goose recovery success story.

All personnel participated in some or all of the capture efforts of wild Aleutian Canada geese on Buldir Island this season. The geese captured on Buldir were transplanted to Agattu via the charter vessel "Western Pacific" on July 31, August 3, and August 5. Birds were transported and released as soon as possible to reduce stress caused by handling and to increase their chances for survival.

Rugged Eccentric Mountain on Buldir Island as viewed from the lush green North Marsh area. (F.Z. 1983)

Searching and capturing efforts for molting geese is based on several years' experience. It basically consisted of personnel walking 10 to 30 m apart through the upper edge of the lowland tall plant association. When a bird was sighted, everyone converged on that area as other geese were generally found in the same area. The geese were either captured by hand or with a large, long handled dip net.

After capture, each goose was banded with a FWS leg band, and its age and sex determined and recorded. The date and location of capture was recorded in a field log, along with the other information specified above. Each goose was then placed in a small burlap bag which had one corner clipped to allow the bird's head and neck to extend outside of the bag. These bags were pre-cut to snugly fit the geese to help prevent injury. The open end of the bag was then tied with a short piece of rope to limit the bird's movement and prevent escape.

The bagged geese were then placed in a burlap-lined, welded wire cage for transport to Main Camp. Three wire cages were attached to a backpack frame. Each compartment could hold 3-5 adult geese or 4-6 goslings. Unnecessary walking with birds in the pack was avoided. Usually if one particular area was worked for a time, the packs were removed while crew members chased other geese. Hiking back to camp was attempted without unnecessary delays or rough treatment to the birds.

Upon return to the Main Camp at North Marsh the geese were taken out of the backpack cages and burlap bags and released into a fenced enclosure. The fenced area was approximately 5 x 30 m and built of poultry wire, hog rings and metal fence posts. It also had a roof made of poultry wire. Burlap was

attached to the sides to make a visual barrier for the birds. A small plywood table was put at the far end of the pen to afford the geese some protection from the elements. The enclosed area provided natural food and cover. Water and corn were also provided. The geese were tube-fed with about 20cc of a nut-rient solution to help maintain their health. Tube feeding began the day after capture and was administered once daily thereafter, including the day of transport. The birds were also tube-fed just prior to their release on Agattu. Any birds in apparent severe shock on the day of capture were also tube-fed.

The uncomfortable goose having someone else try to tell it somthing it already knows. (F.Z. 1983)

Immediately prior to transport to Agattu the birds were taken from the holding pen and temporarily placed in wooden chicken crates. The wooden crates were burlap lined and about 91 x 66 x 41 cm in size. The geese were taken from the crates, tube-fed, banded with a blue plastic leg band and placed in crates lined with Elymus arenaria to await transport to Agattu for release. The blue plastic leg band was placed on the left leg of males and on the right leg of females, and was secured by gluing the plastic edges together. Adults and goslings were put into separate crates to eliminate the potential of the adult birds trampling the goslings during transport. The number of birds put into each wooden crate was limited to four to six adults and six to eight goslings to prevent injury.

Once the geese were loaded into crates, they were taken out to the charter vessel "Western Pacific" and the crates tied to the deck with rope and then covered with a heavy canvas. All efforts were made throughout the handling of the geese to provide maximum protection to the birds.

Geese were transported on the day of capture or the following day as time and weather allowed. The "Western Pacific" departed Buldir late in the night so that the arrival at Agattu occurred early the following morning. The average trip took about eight hours.

The geese were tube-fed while aboard the vessel, then taken ashore via inflatable boat. Crates were carried to the release site in the Goose Creek drainage of Aga Cove. The crates were gently set on edge to make a small holding pen and the doors were opened. This allowed the birds to re-establish or make new family ties prior to release. After a short period of time the birds were then released.

Unlike last year, adults capable of flight were observed throughout the capture effort, suggesting that they had not yet molted. Goslings appeared to be younger overall with fewer "cheek patch" individuals being captured than last year. Comparison of the age of goslings is speculation; however, since they were not specifically aged during the 1982 banding operations. The above observations suggest a late nesting year in 1983. The overall average gosling age was 26 days. It is interesting to note that goslings captured on the south side of the island in the Dip Camp area averaged 10 days older than all other goslings captured (35.8 days as compared to 25.7 days).

The rugged hills of Buldir Island surround Kittiwake Lake. Besides the obvious Kittiwakes there are also 300 geese on the lake. (F.Z. 1983)

Kittiwake Lake on Buldir Island was by far the most productive area for capturing geese this year. Three days of capture effort produced 29, 23 and 4 geese respectively. On the first day an estimated 300 geese were observed on the lake. Soon after the capture team was detected by the geese, most of the

birds escaped out the opposite end of the lake. On each subsequent visit to Kittiwake Lake fewer birds were observed and captured, even though a greater amount of effort was expended by the capture team. On the second visit to Kittiwake Lake, two individuals used whistles and yelled while moving along the shoreline to drive the birds toward the end of the lake where capture personnel were hidden in the tall vegetation. This procedure was repeated three times, with the number of birds captured decreasing each time. On the third visit to Kittiwake Lake only 4 birds were captured. One biologist in a wet suit and raft and three biologists on foot along the shoreline attempted to drive the birds to capture personnel once again hidden in the vegetation, but the birds had been educated during our previous efforts and were extremely wary of the situation. Although this was the least successful capture attempt, it would probably have been considerably more efficient with two people in the water. Such a technique would have been more exciting and successful if used during the first capture attempts. The large number of birds in this area and its close proximity to camp make it an excellent capture area when weather (fog) conditions are favorable.

A total of 117 Aleutian Canada geese were captured on Buldir Island this season. Nine of the captured birds were not transplanted to Agattu for the following reasons: 1) two very young goslings were too small to hold bands and were subsequently released on Buldir, 2) two goslings were banded with FWS metal bands only and released on Buldir because they were too small to tranport safely and they were separated from their parents during the capture, and 3) four goslings and one adult goose died due to injuries sustained during capture. The five birds that died represent a four percent mortality rate for the birds handled. A total of 108 geese were released on Agattu Island, totalling 77 goslings and 31 adults. Again it should be noted that not all these birds represent family groups, although every attempt was made to capture entire families.

All geese captured and banded on Buldir were transplanted to Agattu as quickly as the weather permitted. This was considered an important factor in the low mortality experienced during the transplant operation. Eighty-six individual birds were transplanted to Agattu within 24 hours after capture with the remaining 22 birds moved within 72 hours. The latter were delayed due to weather. Even though nearly all the geese encountered were incapable of flight, they were still able to move quite rapidly over the rough Buldir terrain. The geese were often able to outrun us in open areas, especially if they were headed uphill. On several occasions the capture crew was spotted by wary geese before we saw them. The only view of these birds was of them proceeding out of the area with all expediency. They were impossible to capture with such a head start and our efforts to circle around ahead of them proved fruitless. Although every effort was made to minimize the impact of capture and handling on the geese, some still showed

signs of paralytic shock syndrome when they were released into the holding pens on Buldir and/or Agattu. Generally, however, the affected birds seemed to have recovered within about 24 hours. A few birds sustained some minor abrasions during the handling and transport. These injuries were treated with antiseptic spray.

3. Waterfowl

The estimated waterfowl population use-days on the Aleutian Islands Unit for 1983 is shown in Table 10. Although still an estimate of use, the confidence in these numbers is much greater than before due to a complete literature search of observations made throughout the Chain in the past years. It should be noted, however, that the total number of observations found in the literature is very limited and still represent a rough estimate. As shown in Table 10, total waterfowl use-days was 54,686,445. Common eider had the most use days with 9,116,000 followed by emperor goose with 8,069,100. The two species with the lowest estaimated use-days were greater white fronted goose with 20 and spot-billed duck with ten.

Emperor geese winter throughout the Aleutians. This can sometimes be a rocky road to follow especially last winter with our record snowfall. (R.F. 1983)

TABLE 10. 1982 AND 1983 AIU ESTIMATED WATERFOWL USE-DAYS AND PRODUCTION.

Species	Use Days 1983		82-83 Change	Prod. 1983	82-83 Change
Whooper swan	39,150	+	4,650	0	0
Bean goose	0		0	0	0
Greater white-fronted goose	20	+	20	0	0
Snow goose	0	-	30	0	0
Emperor goose	8,069,100	-	649,800	0	0
Brant	39,981	+	5,181	0	0
Canada goose	396,593	+	31,793	1,005	+ 105
Eurasian green-winged teal	5,795,000	+	383,000	12,000	0
American green-winged teal	199,325	+	75,600	450	0
Baikal teal	30	+	30	0	0
Falcated teal	0	-	90	0	0
Mallard	2,352,750	+	20,250	8,000	0
Spot-billed duck	10	+	10	0	0
Northern pintail	1,157,500	+	26,500	3,000	0
Garganey	91	+	31	0	0
Northern shoveler	4,395	+	45	0	0
Gadwall	17,950	+	5,800	0	0
Eurasian wigeon	18,225	+	1,725	0	0
American wigeon	10,920	+	1,320	0	0
Common pochard	760	+	10	0	0
Canvasback	8,950	+	7,450	0	0
Tufted duck	33,450	-	4,050	0	0
Greater scaup	2,405,500	+	206,500	600	0
Common eider	9,116,000	+	356,000	21,000	0
King eider	578,000	+	53,000	0	0
Steller's eider	1,102,100	+	169,100	0	0
Harlequin duck	5,951,000	+	482,000	0	0
Oldsquaw	4,193,250	+	858,150	0	0
Black scoter	4,314,000	-	36,000	0	0
Surf scoter	36,200	+	27,200	0	0
White-winged scoter	2,836,500	+	331,500	0	0
Common goldeneye	2,823,600	+	258,000	0	0
Bufflehead	1,238,600	+	77,600	0	0
Smew	6,720	-	2,580	0	0
Common merganser	49,275	-	7,725	0	0
Red-breasted merganser	1,891,500	-	85,500	4,500	0
TOTALS	54,686,445		+2,596,450	50,450	+ 105

4. Marsh and Water Birds

The estimated use-days for marsh and water birds, on the Aleutian Islands Unit for 1983 are shown in Table 11. As with waterfowl use-days, confidence in these numbers is greater than before due to a complete literature search of bird observations made throughout the Aleutian Chain in past years. It should be noted, however, that the total number of observations is very limited and these numbers still represent a rough estimate. A total of 693,612,260 marsh and water bird use-days is estimated to have oocurred in 1983. Fork-tailed and Leach's storm-petrel had the highest estimated use-days with 319,699,970 and 248,300,000 respectively. Pink-footed shearwaters and sandhill cranes had the lowest estimated use-days with 20 and 600 respectively.

The picture on the left could best be described as a closeup of an air traffic controller's nightmare. Both show the northern fulmars of Chagulak as they swarm around the island. (F.D. 1983)

TABLE 11. COMPARISON OF 1982 AND 1983 ESTIMATED MARSH AND WATER BIRD USE-DAYS AND PRODUCTION.

Species	Use-Days 1983		82-83 Change	Prod. 1983		82-83 Change
Red-throated loon	365,970	-	30	100		0
Arctic loon	84,780	-	5,820	5	+	5
Common loon	499,530	+	30	700		0
Yellow-billed loon	31,020	-	1,380	0		0
Horned grebe	323,190	+	690	0		0
Red-necked grebe	283,620	-	8,880	0		0
Black-footed albatross	165,000		0	0		0
Laysan albatross	217,530	+	34,530	0		0
Northern fulmar	80,100,030	+	5,015,030	220,000	+	20,000
Pink-footed shearwater	20	+	20	0		0
Sooty shearwater	645,000	+	120,000	0		0
Short-tailed shearwater	2,655,030	+	30	0		0
Fork-tailed storm-petrel	319,699,970	+	496,997	940,000		0
Leach's storm-petrel	248,300,000	+	20,840,000	800,000	+	220,000
Double-crested cormorant	2,265,000	+	120,000	840	+	40
Pelagic cormorant	10,410,000	+	258,000	14,400		0
Red-faced cormorant	27,565,970	-	904,030	56,000	-	4,000
Sandhill crane	600	-	1,750	0		0
TOTALS	693,612,260	+	30,436,410	2,032,045	+	136,045

5. Shorebirds, Gulls, Terns and Allied Species

The estimated use-days for shorebirds, gulls, terns and allied species on the Aleutian Islands Unit are shown in Tables 12 and 13. As with the two previous sections, confidence in these numbers is greater than before due to a complete literature search of bird observations made throughout the Aleutian Chain in past years. It should be noted, however, that the total number of observations found in the literature is limited and that these numbers still represent a rough estimate.

Total use-days for shorebirds was 7,407,075 with rock sandpipers and black oystercatchers leading the list with 5,160,420 and 1,506,570 use days respectively. The lowest number of use-days was 10 shared by the dotterel, spotted redshank and black-tailed godwit.

Total use-days for gulls, terns and allied species was 1,058,896,610 with tufted puffins and least auklets having by far the most use-days with 326,575,030 and 325,500,630 respectively. Ross' and black-tailed gulls had the fewest use-days with 10 each.

TABLE 12. COMPARISON OF 1982 AND 1983 ESTIMATED SHOREBIRD USE-DAYS AND PRODUCTION.

Species	Use-Days 1983	82-83 Change	Prod. 1983	82-83 Change
Black-bellied plover	30	+ 30	0	0
Lesser golden plover	37,470	- 12,030	0	0
Mongolian plover	930	+ 780	0	0
Common ringed plover	10	- 125	5	+ 5
Semipalmated plover	600	+ 600	0	0
Dotterel	10	+ 10	0	0
American black oystercatcher	1,506,570	+270,570	1,600	0
Common greenshank	450	+ 280	0	0
Greater yellowlegs	10	+ 10	0	0
Green sandpiper	10	+ 5	0	0
Black-winged stilt	20	+ 20	0	0
Spotted redshank	10	0	0	0
Wood sandpiper	1,800	- 1,920	0	0
Wandering tattler	1,500	- 20,400	0	0
Gray-tailed tattler	1,800	+ 1,180	0	0
Common sandpiper	1,500	+ 975	3	+ 3
Terek sandpiper	1,350	+ 1,340	0	0
Whimbrel	210	+ 180	0	0
Far eastern curlew	20	+ 10	0	0
Black-tailed godwit	10	- 10	0	0
Bar-tailed godwit	1,350	- 4,980	0	0
Ruddy turnstone	27,600	-647,400	0	0
Great knot	0	- 10	0	0
Red knot	0	- 270	0	0
Sanderling	323,430	+ 900	0	0
Western sandpiper	75	+ 55	0	0
Rufous-necked stint	2,850	+ 2,810	0	0
Little stint	20	+ 20	0	0
Temmnick's stint	30	- 15	0	0
Long-toed stint	20	- 80	0	0
Least sandpiper	3,270	+ 3,270	10	+ 10
Baird's sandpiper	30	+ 30	0	0
Pectoral sandpiper	45,010	-135,190	0	0
Sharp-tailed sandpiper	0	- 22,800	0	0
Rock sandpiper	5,160,420	-309,580	4,000	0
Dunlin	1,650	- 14,850	0	0
Curlew sandpiper	0	- 10	0	0
Ruff	30	+ 10	0	0
Long-billed dowicher	30	0	0	0
Common snipe	450	- 1,050	0	0
Red-necked phalarope	285,000	+ 57,000	1,000	+ 400
Red phalarope	1,500	- 67,500	0	0
TOTALS	7,407,075	-978,105	6,618	+ 418

TABLE 13. COMPARISON OF 1982 AND 1983 ALEUTIAN ISLANDS UNIT GULL, TERN AND ALCID USE-DAYS AND PRODUCTION.

Species	Use-Days 1983		82-83 Change	Prod. 1983	82-83 Change
Pomarine jaeger	600	-	1,000	0	0
Parasitic jaeger	68,970	-	6,030	0	0
Long-tailed jaeger	300	+	270	0	0
Common black-headed gull	300	-	915	0	0
Black-tailed gull	10	+	10	0	0
Mew gull	57,990	+	14,310	0	0
Ring-billed gull	0	-	10	0	0
Herring gull	1,050	-	450	0	0
Slaty-backed gull	120	-	30	0	0
Glaucous-winged gull	30,684,840	-	521,160	23,232	- 11,768
Glaucous gull	55,950	-	14,550	0	0
Black-legged kittiwake	19,410,580	-	6,788,420	20,000	- 26,800
Red-legged kittiwake	2,535,000	-	600,000	3,000	- 3,000
Ross' gull	10	-	40	0	0
Sabine's gull	0	-	20	0	0
Common tern	180	+	140	0	0
Arctic tern	148,680	-	11,520	0	- 500
Aleutian tern	135,420	-	25,330	0	- 500
Common murre	38,400,780	-	19,979,270	0	-116,000
Thick-billed murre	43,650,030	-	40,625,970	0	-190,000
Pigeon guillemot	9,819,870	+	87,870	0	0
Marbled murrelet	249,900	+	150	300	- 100
Kittlitz' murrelet	267,900	+	7,050	330	- 70
Ancient murrelet	5,881,230	+	2,114,430	13,500	- 4,500
Cassin's auklet	16,619,970	+	12,599,970	36,000	+ 28,000
Parakeet auklet	14,099,970	-	1,530,030	37,500	- 12,500
Least auklet	325,500,630	+	25,799,980	930,000	+290,000
Whiskered auklet	6,284,970	-	30	10,500	- 3,500
Crested auklet	191,724,030	+	31,485,960	330,000	+ 53,000
Rhinoceros auklet	6,270	-	1,530	16	- 4
Tufted puffin	326,575,030	+	2,354,503	510,000	- 90,000
Horned puffin	26,226,030	+	45,030	37,650	- 12,550
TOTALS	1,058,896,610	+	63,111,965	1,952,228	-115,292

This black-winged stilt was observed on Nizki Island the last week in May while searching for geese. This is the first recorded sighting in N. Amer. (F.Z.1983)

The effects of the 1983 "El Nino" were severe enough to be felt in the north Pacific Ocean and Bering Sea. A two degree centigrade increase in temperature of the Gulf of Alaska waters and the suspected increase in waters around the Aleutians probably had a significant impact on seabird food resources and seabird populations. Several interesting observations document this impact but its actual severity is unknown.

In the fall of 1983, observers on Adak Island noted unusual concentrations of pelagic seabirds near shore. Normally only small flocks of black-legged kittiwakes are seen on routine nearshore boat surveys. Shearwaters are rarely, if ever, observed. This fall, however, large flocks of both black-legged kittiwakes and shearwaters (mostly short-tailed) were frequently seen near the coast (Table 14).

TABLE 14. FALL CONCENTRATIONS OF PELAGIC SEABIRDS NOTED NEAR ADAK ISLAND, 1983.

Month	Black-legged kittiwake	Shearwater Spp.
September	4933	7659+
October	5046	190

It was also noted that the ratio of adult to immature kittiwakes was extremely skewed in favor of the adults. This could be an indication of poor nesting success. Summer field crews also made incidental observations of late, unsuccessful nesting attempts by seabirds.

There were no major seabird dieoffs noted on the north half of Adak during monthly beach surveys. The only seabird carcasses found were two black-legged kittiwakes and one red-legged kittiwake. The black-legged kittiwakes appeared to have died of starvation. However, the red-legged kittiwake was suspected to be the victim of a peregrine falcon. It should be noted that the red-legged kittiwake is a rare visitor to Adak. Within the AIU it is known to breed only on Buldir and Bogoslof Islands. Several long-tailed jaegers were also observed on Adak; the first members of this species ever recorded here.

A survey of the birds present on Alaid/Nizki Island was conducted in conjunction with the spring Aleutian Canada goose count. Only the Nizki portion of this island complex was thoroughly censused this year.It was found that the removal of arctic foxes from the island in the late 1970s has allowed the nesting birds to stage a dramatic comeback. The last complete survey of the birds on Nizki was done in 1975, prior to eradication of the foxes. When compared to the 1975 figures the 1983 census indicated an apparent 185% increase in the number of nesting birds and a 22% increase in the number of nests for the pelagic cormorant, 534 and 371% increase for red-faced cormorant birds and nests respectively, 600 and 1000+% increases for common eider, 399 and 1000+% increase for glaucous-winged gull and 1000+% increase in the numbers of tufted puffin.

Removal of the introduced artic fox from Nizki Island has allowed seabird populations to again flourish. These red-faced cormorants shown in the two pictures are but one of the species which benefited. (F.Z. 1983)

6. Raptors

The estimated raptor use-days on the Aleutian Islands Unit for 1983 and their comparison to 1982 data, are shown in Table 15. A total of 843,910 use-days are estimated to have occurred in 1983. The northern bald eagle leads the list of species with an estimated 655,920 use-days. The northern harrier, Eurasian kestrel, hobby and common buzzards shared the lowest estimated use with 10 days each.

TABLE 15. COMPARISON OF 1982-1983 RAPTOR USE-DAYS AND PRODUCTION.

Species	Use-Days 1983	82-83 Change	Prod. 1983	82-83 Change
Northern bald eagle	655,920	+ 34,120	660	0
White-tailed eagle	930	+ 250	1	0
Northern harrier	10	0	0	0
Rough-legged hawk	150	- 150	1	0
Golden eagle	600	+ 360	1	0
Eurasian kestrel	10	- 15	0	0
Peale's peregrine falcon	138,030	+ 34,380	140	- 10
American peregrine falcon	4,650	+ 650	0	0
Gyrfalcon	20,400	- 3,000	0	0
Snowy owl	12,030	- 9,270	12	- 18
Short-eared owl	11,220	- 60	20	- 5
Common buzzard	10	+ 10	0	0
Hobby	10	+ 10	0	0

Although the most prominent raptors in the Aleutian Islands are the northern bald eagle and Peale's peregrine falcon, other species such as the short-eared owl, snowy owl, gyrfalcon, and occasionally rough-legged hawks can also be found. Short-eared owls were observed in December this year, later than previously recorded on Adak. Individuals with the commercial birding tour, Attours, which travels to Attu each spring, have regularly reported seeing a pair of white-tailed eagles. This year a nest was found and a single eaglet was known to have fledged.

An immature bald eagle was found caught in a leghold trap that had become entangled in a fence. This eagle was freed from the trap, measured and banded, antiseptic was applied to a few minor cuts, and it was released.

An injured short-eared owl was found on 2 December and turned over to Refuge personnel. X-rays taken at the Naval Station hospital revealed an open fracture at the proximal end of the left humerous. With its large eyes and cooperative manner, the owl became quite a celebrity and two Naval physicians agreed to

attempt to pin the fracture. After consulting an Anchorage veterinarian experienced with injuried raptors, the two doctors and the local vet technician anesthetized the owl and began operating. Two hours later they managed to successfully pin the bone. Unfortunately two days later, after killing and eating two gerbils and seemingly on the road to recovery, the owl died.

Bald eagles were especially abundant on the Adak Naval Station this winter. A record high of 397 eagles (251 adult, 146 immature) were recorded on the 1983 Christmas bird count, with over 300 counted within three miles of the Naval Station. Unfortunately despite the addition of more perches on power poles, the number of electrocuted eagles this winter was correspondingly high (nine eagles from November 1983 to January 1984).

The ongoing study of the bald eagle on Adak Island was continued in 1983. In the winter, some 200-300 eagles reside on the Naval Station taking advantage of the food available. In February and March eagles were baited to the Refuge headquarters with meat scraps donated by the Commissary butcher shop and trapped with padded leghold traps. Unfortunately, rocket netting, which worked so well for us last year (over 80 eagles captured and banded in 1982) was unavailable to us this year due to Navy regulations on the handling/storage of blackpowder. Other trapping methods are being researched for 1984. Only two eagles (one adult and one immature) were captured. These eagles were weighed, measured and banded with both riveting FWS bands and red aluminum numbered bands. The tail of the adult was dyed (Yellow-White-White) with picric acid, according to a color scheme devised in 1981, for future identification.

Approximately 50 eagle pairs nest along Adak's coastline. In the spring and summer months, a bald eagle production survey was conducted in the Kuluk Bay sample area. A nest survey and egg count from 20 April to 12 May found 15 viewable active nests containing a total of 31 eggs, giving an average of 2.07 eggs per active nest. This figure extrapolated to the estimated 50 pairs of breeding eagles on the island gives a total egg production figure of 103.5 for Adak in 1983.

Nestling counts from 8 to 15 July resulted in a total of 13 nestlings from nine nests with nestlings. From this figure of 0.813 nestlings per active nest, the estimated nestling production on the island was 41.

Eleven nestlings and/or fledglings were measured and banded. Colored aluminum bands used on nestlings last year and this year's winter banding proved unsatisfactory as identification marks weathered so much that they were indistinguishable. In current use are 1/8th inch-thick two-ply plastic bands which so far appear to be satisfactory.

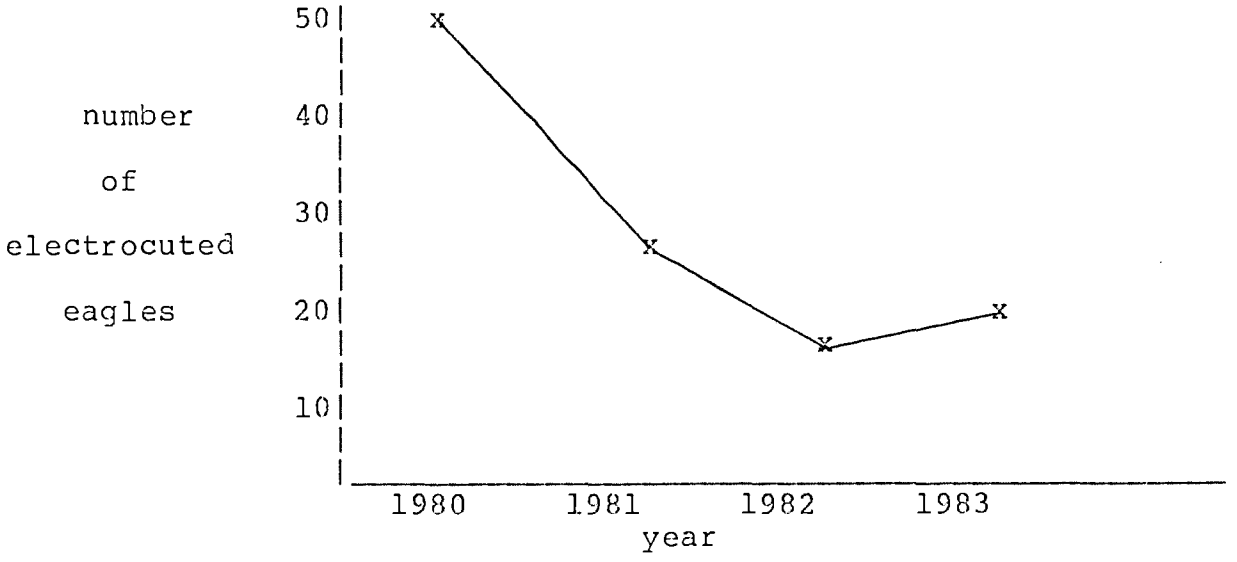
A fledgling count was not completed due to other refuge obligations, but subsequent sightings of seven of the eleven eaglets banded confirmed their successful fledging.

Year round vehicle and boat surveys on the Naval Station and vicinity were sporadic and incomplete this year due to weather conditions which denied access to many survey areas, and to higher priority off-island refuge activities. Nevertheless, the predicted population trends which follow seasonal events were discernable.

Increased eagle use of the Naval Station (NAVSTA) area occurs during the harsh winter and in the summer when parent birds are feeding their growing young. Eagle visitation decreases in the less stressful spring and usually during the fall when the salmon spawn. This fall however, the decrease was not as pronounced. Perhaps this was because there was not a large salmon run this year and eagles made more use of the productive Finger Bay stream near the dump, thereby keeping dump attendance enforced, and the closure of the caribou hunting season on Adak this year.

Installation of perches on priority power poles (designated by refuge staff) by the Navy Public Works Department continued. Nineteen eagles were electrocuted on NAVSTA powerlines, an increase of four over calender year 1982. Nevertheless, it demonstrates an improvement since 1981 when installation of perches was begun (Figure 1). Increased eagle electrocutions this year may be an artifact of the extremely harsh winter Adak experienced in 1983, and consequent use of the NAVSTA as a foraging site.

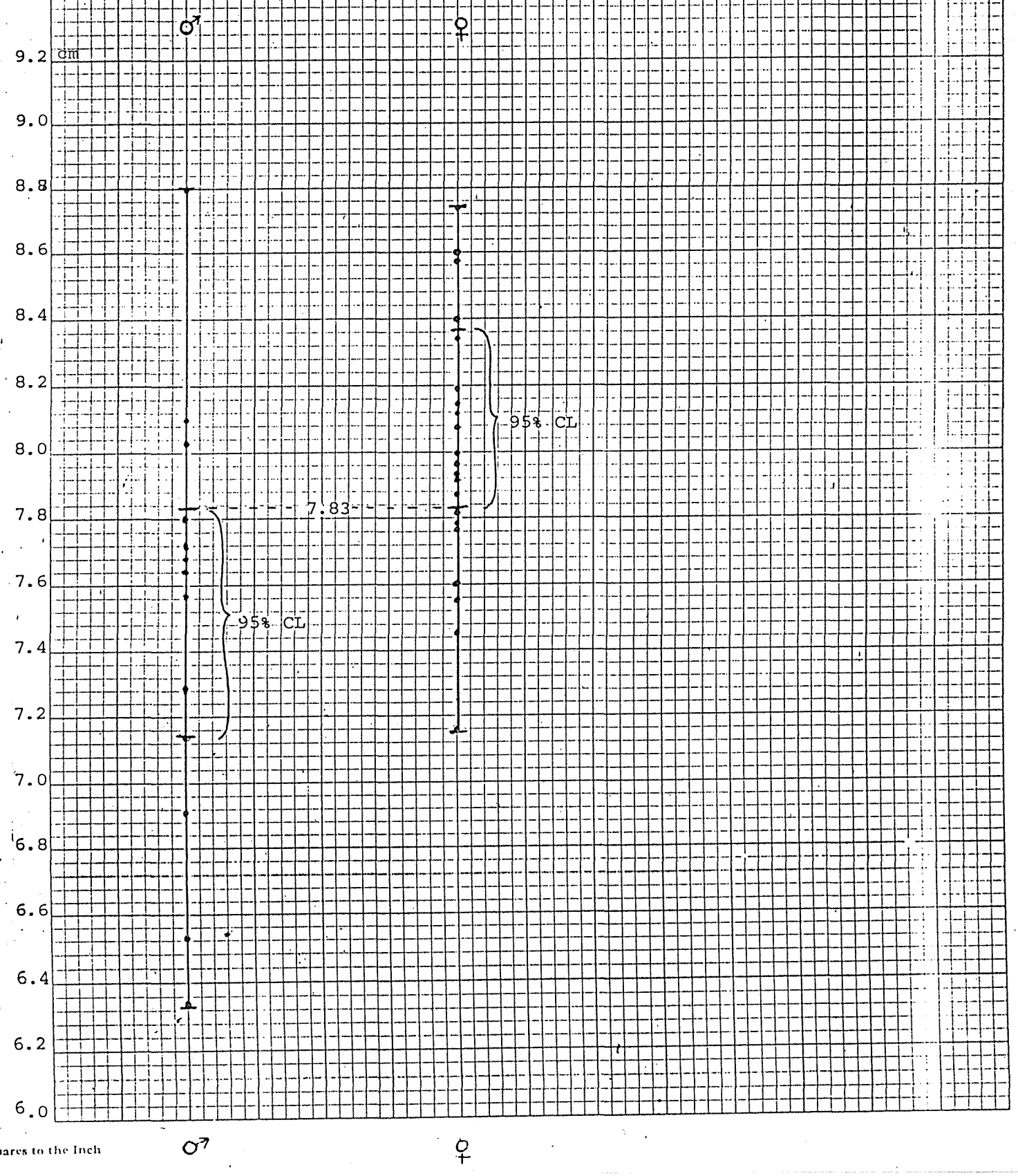
FIGURE 1. NUMBER OF EAGLE ELECTROCUTIONS PER YEAR ON THE ADAK NAVAL STATION, 1980-1983.



Carcasses of electrucuted eagles were weighed, measured and necropsied for sex determination. Measurements of male and female eagles were analysed for a statistically significant difference in hopes that a way of sexing live eagles can be found. Thus for tarsus width and total mandible length show significant differences between the sexes and have non-overlapping 95% confidence limits (Figures 2 and 3). Measurement criterion is: tarsus width 1.54-1.64 cm for females, 1.14-1.51 cm for males; mandible length 7.83-8.76 cm for females, 7.15-7.83 cm for males.

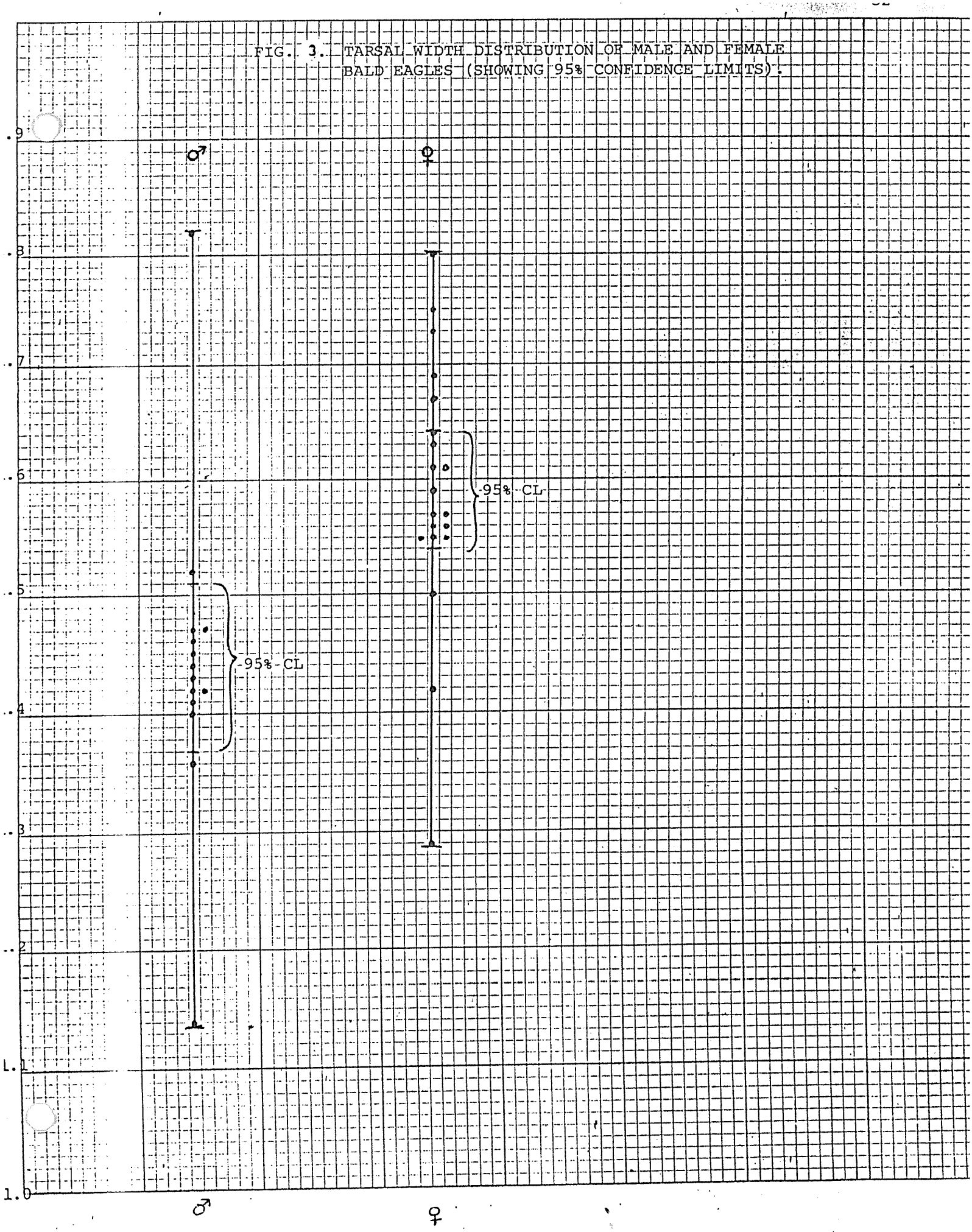
Adak bald eagles are very protective of their nests. When doing surveys of the nests, protective clothing must be worn. (L.S. 1983)

FIG. 2. MANDIBLE LENGTH DISTRIBUTION IN MALE AND FEMALE BALD EAGLES (SHOWING 95% CONFIDENCE LIMITS).



10 Squares to the Inch

FIG. 3. TARSAL WIDTH DISTRIBUTION OF MALE AND FEMALE BALD EAGLES (SHOWING 95% CONFIDENCE LIMITS).



7. Other Migratory Birds

The Aleutian Islands serve as an important breeding and wintering grounds, and offer refuge to an international list of migratory birds. Although North American birds are more abundant, some Asiatic species have been sighted and/or breed regularly on some islands. There are currently some 242 species on the refuge bird list.

A breeding bird survey was conducted on June 21 in conjunction with the Nongame Wildlife Program of the Alaska Department of Fish and Game.This census follows a prescribed 18.5 mile route with specific lookout points every half mile. Results are shown in Table 16.

TABLE 16. BREEDING BIRD SURVEY RESULTS, ADAK ISLAND, ALASKA IN 1983.

Species	Number Recorded
Pelagic cormorant	3
Green-winged teal	5
Greater scaup	13
Harlequin duck	10
Red-breasted merganser	6
Bald eagle	20
Rock ptarmigan	21
American black oystercatcher	1
Rock sandpiper	2
Red-necked phalarope	7
Parasitic jaeger	1
Glaucous-winged gull	54
Black-legged kittiwake	14
Aleutian tern	2
Pigeon guillemot	3
Ancient murrelet	14
Tufted puffin	24
Horned puffin	2
Common raven	3
Song sparrow	19
Lapland longspur	247
Rosy finch	5
TOTAL 22(SPECIES)	476(INDIVIDUALS)

Our Christmas bird count was conducted on December 18; results can be seen in Table 17. Exceptionally high numbers or rare sightings are marked with an asterisk. Harlequin ducks had the greatest number of individuals as they did last year, but were almost double last year's figure with at total of 978 observed. Bald eagles and ravens also had record highs with 397 and 398 seen respectively. Over 300 bald eagles were counted within three miles of the Naval Station. Other unusual sightings

included black-legged kittiwakes, glaucous gulls, and mew gulls. Altogether 4530 individual birds representing 38 species were observed by an all time high of 18 observers.

Table 17. RESULTS OF CHRISTMAS BIRD COUNT, ADAK ISLAND 1983.

Species	# Recorded	Species	# Recorded
Common loon	1	Bufflehead	75
Loon spp.	5	Red-breasted merganser	180
Horned grebe	22*	Bald eagle	397*
Red-necked grebe	4	Rock ptarmigan	1
Pelagic cormorant	130	Am. black oystercatcher	16*
Red-faced cormorant	3	Sanderling	30
Cormorant spp.	367	Rock sandpiper	15
Emperor goose	6	Mew gull	33
Green-winged teal	69	Glaucous-winged gull	756
Mallard	113	Glaucous gull	5
Northern pintail	10	Black-legged kittiwake	186
Gadwall	4*	Common murre	2
European wigeon	1	Murre spp.	23
American wigeon	1	Pigeon guillemot	29
Greater scaup	66	Marbled murrelet	5
Scaup spp.	2	*Aethia* spp.	6
Common eider	47	Alcid spp.	7
Harlequin duck	978*	Common raven	398*
Oldsquaw	183	Song sparrow	13
Black scoter	8	Rosy finch	67
Scoter spp.	50		
Common goldeneye	209		
Winter wren	3		
Snow bunting	4		

A list of uncommon bird sightings made on the refuge unit in 1983 is shown in Table 18.

TABLE 18. NOTEWORTHY BIRD SIGHTINGS IN THE ALEUTIANS IN 1983.

Species	Loc	#'s	Date	Significance
	Attu	3	5/16-6/4	
Yellow-billed	Adak	1	6/14	
loon	Attu	3	5/16-6/4	Add. summer rec.
Laysan albatross	W. AIU	105	10/20-11/2	1st Oct/Nov rec.
Pink-footed				
shearwater	Attu	2	9/6	1st fall rec.
Short-tailed				
shearwater	Adak	2,500+	9/ -10/	Unprecidented
	Dutch	100	9/21	nearshore
	Attu	20+	7/31-10/14	records
Greater white-				
fronted goose	Attu	2	9/21	1st fall, 3rd AIU
Baikal teal	Attu	1	10/14-11/3	1st fall, 2nd AIU
Garganey	Adak	2	5/1	
	Agattu	1	5/28	
Spot-billed duck	Adak	1	10/24	5th AIU rec.
White-tailed eagle	Attu	2-3	5/18-10/10	2nd yr.-fledged 1
Common buzzard	Nizki	1	5/26	1st N.Am.rec. no photo
Hobby	Attu	1	5/20	1st N. Am. rec.
European kestrel	Attu	1	10/17	1st Oct., 6th AIU rec.
Common ringed plover	Attu	1	9/11-9/13	1st Sep., 5th AIU rec.
Eurasian dotterel	Attu	1	Sept.	3rd AIU rec.
Black-winged stilt	Nizki	1	5/24-6/2	1st N.Am. rec. photos
Greater yellowlegs	Attu	1	9/18-9/19	1st Sep., 3rd AIU rec.
Green sandpiper	Nizki	1	5/24	3 prior rec., photo.
	Shemya	1	5/29-6/1	in Aug. (1st "doc."
	Attu	1	8/16-8/19	N. Am. rec.)
Common sandpiper	Attu	brood(3)	5/18-7/27	1st N. Am. breed. rec.
Western sandpiper	Attu	2-3	8/18-9/24	3rd fall, 5th AIU rec.
Little stint	Shemya	1	5/31-6/1	3rd/4th AIU rec.,
	Attu	2-3	9/5-9/9	photographed
Curlew sandpiper	Shemya	1	6/1	3rd AIU rec.
Long-billed dowitcher	Attu	1-3	9/13-9/24	3rd fall, 4th AIU rec.
Long-tailed jaeger	Adak	1-7	7/30-8/21	Unprecidented #'s &
	Attu	1	7/22-9/10	length of use in AIU
Black-tailed gull	Shemya	1	6/2	2nd AIU rec.
Ross gull	Alaid	1	5/29	1st photo doc AIU rec.
Dusky warbler	Attu	1	9/21	2nd AIU rec.
Red-breasted				
flycatcher	Shemya	1	- -	3rd AIU rec.
Northern wheatear	Attu	1	9/19-9/25	5th AIU rec.
Gray-cheeked thrush	Attu	1	9/20	2nd AIU rec.
Dusky thrush	Attu	1-3	5/20-6/2	5th AIU rec.
Black-backed wagtail	Attu	2 broods	5/16-9/27	1st N. Am. breed.
Bohemian waxwing	Amukta	2	5/24	2nd/3rd AIU rec.
	Attu	2-5	5/16-6/4	
Golden-crowned				
sparrow	Attu	1	9/23-9/28	5th AIU rec.
White-winged				
crossbill	Attu	1	7/30	1st AIU rec.

8. Game Mammals

Caribou were introduced to Adak in 1958 and 1959. The herd has grown rapidly due to normally mild winters, lush vegetation, and lack of predators and biting insects. Many islanders hunt caribou and the world's record bull weighing over 700 pounds was taken here in 1968. The management goal, set by the Alaska Department of Fish and Game, is a post-season population of 150-240 animals. The danger of overpopulation is a very real and major concern of the Aleutian Islands Unit since no natural predators exist on the island. Population control is accomplished by the sport hunting harvest. Continued Naval support in the form of transportation for hunters and refuge staff for research is essential to properly manage the Adak caribou herd.

A major research study of the caribou herd was initiated in 1981. The objectives are to develop information on productivity and range conditions and to develop an estimate of range carrying capacity. This information will also be used to develop recommendtions for carrrying capacities to protect wildlife and other resource values on other islands in the Aleutian Islands Unit where caribou/reindeer grazing now occurs or may occur in the future. In April of 1982, a revised plan was prepared for the caribou study.

Due to limited personnel availability and higher priority work, only three major work efforts for caribou management were accomplished and are as follows: 1) post-calving survey, 2) helicopter census, and 3) completion of vegetation transects.

The post-calving survey was completed during the last week of May and first week of June. Seventeen Adak residents volunteered to assist with the survey. They participated in pre-survey training sessions taught by refuge staff and then worked in the field as part of a census team led by a refuge staff member. The volunteers greatly aided in covering larger portions of the known and suspected calving grounds. This wide coverage supported the results of previous observations where the majority of cow-calf associations were seen near Boot Bay Table 19 is a summary of caribou sightings during the 1983 post-calving survey. Caribou movements and harsh weather and terrain contributed to the relatively low success in obtaining more accurate productivity data.

TABLE 19. CARIBOU SIGHTINGS DURING THE 1983 POST-CALVING SURVEY, ADAK ISLAND, ALASKA.

DATE	#CALVES	#YEARLINGS	#♂	#♀	#UNIDENTIFIED	TOTAL	OBSERVER #
MAY: 24					3	3	
24		2				2	
24		2				2	
24	1			1		2	
24					1	1	5
25	2			2		4	
25		1		1+		2	
25	1			1		2	
25		2		4+	1	7	
25	1			1		2	
25					12	12	
25				1+		1+	
25				2*		2*	
25	1			3		4	14
26		2		1		3	
26	2			2		4	
26					3	3	
26	1	2			8 (Adult)	11	18
27		1					19
JUNE 1				2		2	20
2			1			1	
2		4	(1	3)		4	22
3					4	4	
3	2	4*			3	9	24
4		3			6	6?	
4	3				5	8	
4	1			2		3	
4					5	5	
4	1			1		2	
4					8	8	
4					4*	4	
4		2	2			4	
4			1	1	2	4	
4	1			1		2	
4					2	2	
4					3	3	36
5					7*	7	37
5	1			1		2	
5		2			4	6	
5	10		10		2	22	40
TOTALS	28(15)	27(14)	5(2)	42(23)	78(46)	180	

(Percentages in Perenthesis)

On 22 August 1983, an aerial survey of Adak was completed using a U.S. Coast Guard heicopter. The morning of the survey was foggy and left some doubt if a census could be accomplished, however, by late afternoon, the fog had burned off and it was sunny to partly cloudy with no wind. Observation conditions during the survey were excellent. Two additional attempts to use Coast Guard helicopters earlier in the year had failed, one due to mechanical problems and the other due to a Coast Guard Search and Rescue mission. Combining good weather and an available, functional helicopter at times seemed almost impossible.

The Coast Guard helicopter provided the necessary transportation to census our caribou herd. The weather cooperated also. (L.S. 1983)

The survey began at about 4:30 p.m. and was completed at about 9:00 p.m. The majority of the survey was flown at approximately 300 feet above ground level with slight variations made according to terrain. Observations were made through the front windows by the pilot and co-pilot and on both sides of the helicopter by refuge observers. The main door of the helicopter was open during the survey and utilized by one refuge observer strapped in with a safety harness. The other observer was seated near the door. Due to fuel limitations, the entire survey required two sorties.

Whenever caribou were sighted, the helcopter approached slowly and just close enough to get a total count of the animals. A composite picture was taken with a 35mm camera and a 80-200mm zoom lens using black-and-white film. No attempt was made to gather a complete set of close up sex and age composition photos due to the limited time available.

The majority of the significant caribou areas were covered on the survey and a total of 177 caribou were counted. The largest concentration of caribou was found on Yakak Peninsula where 64 animals were sighted among several groups. The Caribou Peninsula area had 45 caribou, Mount Vincennes had 32 and Lake Angie had 27. Nine additional animals were seen at three different locations.

It was judged that 75-80% of the Adak caribou herd was observed. The total population was therefore figured to be 221 to 236 animals. It is speculated that this low population number is at least due in part to our record winter snowfall (over 12 feet), however no winter mortality surveys were conducted to confirm this as fact.

The results of the helicopter census and its management implications were discussed with the various Military Commands, the two sportmen's clubs on Adak, and the general populace. Based on these discussions, in order to conserve the caribou resource, it was recommended to the Alaska Department of Fish and Game that the 1983/84 Adak caribou season be closed before it even opened. After careful consideration of all the facts, this recommendation was accepted and the season subsequently closed. Barring another exceptionally harsh winter, sufficient caribou should be available to support a hunting season next year.

Vegetation transects were finally completed on Adak this year. (L.S. 1983)

The vegetation transects were completed this year! Two weeks in the field by five refuge biotechs and three SCA volunteers was needed to finish the 53 remaining transects. Then almost two and a half months were necessary to sort, dry and weigh all the samples collected. The analysis of these samples is still pending.

9. Marine Mammals

Marine mammals were recorded during vehicle and nearshore boat surveys at Adak and from the charter vessel "Western Pacific" while en route to and from other islands. Sea otters and harbor seals were the most commonly seen species. More Steller's sea lions were observed in the bays and nearshore areas of Adak this year than had been the case in 1982. Minke whales were also noted in many of these same waters. Harbor porpoises were seen on several occasions as was a pod of orcas.

Refuge staff members salvaged the skeleton of a bull sea lion that washed up on the Clam Lagoon seawall. It is presently being cleaned and prepared for rearticulation. A beaked whale (species unknown) was also found washed up on the Lake Andy seawall in April and data was taken from this specimen. Marine mammals information such as this is forwarded to the Smithsonian Institution.

These northern fur seals are being herded with the sticks and not clubbed. (D.D. 1983)

One member of our staff accompanied a team of researchers from the National Marine Mammal Laboratory, NMFS, to Bogoslof Island in August. The purpose of the trip was to count and tag northern fur seals. Sixty-five adults and 11 pups were observed at the recently established rookery on the northwest part of the island. A total of 39 fur seals were tagged (Table 20). Three previously tagged fur seals were also observed at the rookery. At least two of these had been tagged by scientists in Russia, one on Medney Island in 1976. Two additional female seals had tag scars on their flippers.

TABLE 20. NORTHERN FUR SEALS TAGGED ON BOGOSLOF ISLAND, AUGUST 11, 1983.

Tag #*	Sex	Status**	Tag #	Sex	Status
2001	F	WW	2020	F	WW
2002	F	WW	2021	M	IMM
2003	F	BW	2022	F	WW
2004	F	WW	2023	M	IMM
2005	F	WW	2024	M	IMM
2006	F	WW	2025	M	IMM
2007***	F	WW	2026	F	WW
2008****	F	WW	2027	M	IMM
2009	F	WW	2029	M	IMM
2010	F	WW	2030	F	IMM
2011	M	IMM	2031	M	IMM
2012	M	IMM	2032	M	pup
2013	M	IMM	2033	F	pup
2014	F	BW	2034	M	pup
2015	M	IMM	2035	F	pup
2016	M	IMM	2036	F	pup
2017	M	IMM	2037	F	pup
2018	F	B&WW	2039	F	pup
2019	F	B&WW	2039	F	pup

* Blue plastic Reese tags
** WW = white whisker
BW = black whisker
B&WW = black & white whisker
IMM = immature

*** had tag scar-left side
**** right only; left tag "OM 7719-USSR"

10. Other Resident Wildlife

Rock ptarmigan are the only resident game bird present in the Aleutian Islands. Permanent ptarmigan transects established at Adak in 1981 were not monitored this year due to other refuge obligations. Judging from the number of ptarmigan bagged by hunters however, it appears the ptarmigan had a very good year despite poor berry production.

Occasionally refuge staff members are called upon by various facilities on the Naval Station to pick up wildlife. Commonly these calls concern birds that have gotten into warehouses and must be removed for sanitation purposes (ravens, rosy finches, snow buntings), or have been injuried by cars, or have been blown into buildings by strong winds (gulls, kittiwakes, ravens, snow buntings), or have become disoriented as a result of storms and strong winds (fork-tailed storm petrels). If injuries are minor, the birds are treated and released. If the injuries are major, the birds are euthanized.

Rock ptarmigan are Adak's only resident game birds. (C.A. 1983)

11. Fishery Resources

Pink salmon are the most heavily harvested of the three anadromous fish species utilizing streams on Adak. Dolly varden and kokenee are harvested to a lesser extent, while halibut is available to "salty dogs".

Salmon spawning "runs" were considerably smaller than expected this year, and fishing activities on Adak decreased proportionally. Approximately 6500 pink salmon were counted during the peak of spawning in the the Finger Bay stream in 1983 compared to 100,000 counted in 1982. A relatively small run is expected in odd-numbered years, but the far-reaching effects of "El Nino" may also have been significant. Ocean temperatures increased 2 degrees C. above normal in the Gulf of Alaska resulting in a significant decrease in many salmon spawning populations on the mainland.

Although a two-year study was initiated by the Alaska Department of Fish and Game in 1982 to inventory the potential commercial salmon resources of streams on Aleutian islands, funding cuts precluded their planned completion in 1983.

14. Scientific Collections

Under the Refuge collecting permit, five least auklets were collected on Buldir for Mr. Doug Forsell and six northern fulmars, five thick-billed murres, and five black-legged kittiwakes were collected on Chagulak Island for Mr. Scott Hatch. Both researchers are employed by the Migratory Bird Section of the National Fisheries Research Center in Anchorage. An addi-

tional one common murre, two least auklets, three parakeet auklets, four crested auklets, two black-legged kittiwakes, one pigeon guillemot and one horned puffin were collected for the seabird diorama being constructed at the Adak FWS visitors' center by Chris Ambroz. No other scientific collections were made on the Unit except for the salvage of dead specimens.

15. Animal Control

Sixteen glaucous-winged gulls were shot on Shemya Island by Air Force personnel as part of their ongoing authorized depredation control.

Additional animal control work was conducted on Amukta and Kiska Islands in the form of arctic fox eradication. This was done to benefit the endangered Aleutian Canada goose. For more detailed information on these projects see Section G.2 of this report.

16. Marking and Banding

A short summary of our 1983 banding efforts is shown in Table 21. Details of banding efforts can be found in the section reference listed in the Table.

TABLE 21. SUMMARY OF AIU-AMNWR BANDING AND MARKING IN 1983.

Species	# banded	# marked	Section Reference
Aleutian Canada goose	107	105 (blue plastic leg band)	G-2
Mallard*	1	-	-
Bald eagle	15	1 (color-marked YWW) 15 (red numbered leg band)	G-6
Glaucous-winged gull**	12	-	-
Common raven**	1	-	-

* Found as a duckling, raised by Refuge personnel and released at Clam Lagoon.
** Banded incidentally during bald eagle trapping/banding.

H. PUBLIC USE

1. General

Most of the people currently living in the Aleutian Islands are active duty military personnel and their dependents. The Adak Naval Air Station is located on Adak Island and consists of approximately 5,000 people. The Sheyma Air Force Base and the Coast Guard Station on Attu Island add approximately another 1,000 military personnel to the islands's population. Five native villages on Unalaska, Umnak, Akutan, Nikolski and Atka Islands contain another 500 individuals.

We try to visit Shemya, Attu and each of the native villages at least once during the year although weather and logistical problems often prevent this. These trips give us the opportunity to discuss refuge programs/objectives with the people, present films and/or slide shows to interested residents, and provide environmental education activities for students. A film and slide show was presented to military personnel on Shemya in June and a nature program was provided for students at Atka in August. Attu and Unalaska were also visited during the year.

The average tour of duty for military personnel on Adak is generally 1-1/2 to 2 years. This provides a unique opportunity for the Unit to contact a continually changing population with interpretive, educational and informational resources.

Various I & R programs were conducted during the year in the refuge visitor center. Interpretive displays on Aleutian Canada geese, arctic fox, seabirds, caribou, salmon, waterfowl, and sea otter were set up at different times during the year. Twenty-six articles were published in the Naval Station newspaper "Eagles Call" and the Naval Security Group Activity newspaper "Tundra Times" on a variety of natural history topics, refuge programs and state and federal regulations of importance.

The AIU also participated in producing 13 television spots through the local Navy broadcasting service, one of these, a report on Adak's large bald eagle population and the Navy's assistance to the USFWS to prevent eagle electrocutions, received fleet-wide distribution. The last 4 releases were part of a new series entitled "Adak Outdoors" which is aired weekly. Topics covered included refuge programs, special wildlife sightings public use regulations, and natural history notes.

These forums provide an excellent opportunity for us to make the public aware of special refuge events and regulations, and to provide some basic information on refuge wildlife and outdoor recreation opportunities.

Public use surveys on Adak recorded an estimated 20,467 visits. Consumptive use totalled only 14,357 activity hours, down from

41,315 activity hours in 1982. This was due primarily to a poor fishing season caused by a light salmon run and the closure of the 1983-84 caribou hunting season. Non-consumptive use was estimated at 28,230 activity hours.

A refuge orientation/slide show was given once a month to newly arrived military personnel. Hiking, hunting and fishing opportunities, regulations, and other recreation activities were discussed. Enforcement briefings were given to Naval Station and Naval Security Group Activity security personnel.

Since August, the Adak Naval Station "Blue Card" lectures have been held in the Refuge Conference Room. Naval Regulations require any person living on the Naval Station who plans to hunt or hike to attend this class and obtain a blue card prior to venturing afield. The class was held twice a month and was conducted by personnel from the Navy's Natural Resources Division. By letting them use our conference room, those people attending the class were exposed to refuge interpretive displays and literature. We felt that if a refuge staff member was present at the front desk to answer questions and sell books prior to and after the class, we placed the refuge program before a much larger segment of the Adak population than ever before. However, the refuge employee did not conduct the blue card lectures.

Staff personnel regularly attended Navy command staff meetings and civic league meetings to keep island organizations aware of refuge operations and programs. Refuge ORP Edgerton also served as the USFWS representative to the Adak Community Education Council.

2. Outdoor Classrooms - Students

During June and July, an environmental education program was conducted on Adak for grades K-6. Eighty students participated in nature hikes, beach and tidepool explorations, bird studies, wildflower identification, compass reading and art. Activities focused on natural concepts such as adaptation, interdependence and predator-prey relationships. Students reacted well to the combination of new games, explorations, discussions and worksheets used as teaching tools.

An abbreviated version of the Adak program was presented on Atka Island for 3 days in August. Eight young and enthusiastic students participated in the activities. This short program, although valuable, was very limiting. It provided enough time to develop rapport and trust with the children but not enough time to conduct an effective program. Nevertheless, the visit to Atka provided the refuge staff with a better understanding of the needs and desires of the Aleut community.

Exploring the tide pools with young children can be exciting for the student and teacher alike. (T.E. 1983)

A total of 299 elementary students with 44 teachers and parents participated in a field trip to Finger Bay to observe and learn about spawning salmon biology. The 3-day activity occurred in early September and covered the following topics: The fertilization process, salmon biology, water quality and stream management.

6. Interpretive Displays and Demonstration

No funds were available for professionally designed interpretive displays for the headquarters visitor center. A number of temporary displays were utilized on a rotating basis this year. These displays focused on caribou, salmon, Aleutian Canada geese, Arctic fox, marine mammals, waterfowl, terrestrial birds, and the sea otter.

Children at the Adak elementary school enjoyed the System 70 display. (T.E. 1983)

The USFWS "system 70" display unit, which had not been used for many years, was completely refurbished and displayed in the lobby of the elementary school. Many of the standard display panels were changed to include pictures and messages more appropriate to the Aleutian Islands Unit. We were very pleased by the final product which has been seen and enjoyed by many students, teachers and parents.

7. Other Interpretive Programs

The World War II battlefield on Attu Island was nominated in 1981 to the National Register of Historic Places. Volunteer Historian, Rod Poole, again presented a slide talk on "The Battle of Attu." The presentation attracted 37 people.

In conjunction with National Wildlife Week in March, 15 wildlife related programs, tours and demonstrations were presented both at the Refuge and the Adak Regional School System to more than 590 people. We sponsored a poster contest for the elementary school students. The Refuge open house attracted over 300 people. Refuge personnel presented nine special slide programs for civic groups and the public on Adak during the year. These programs centered on the resources of the Aleutian Islands and refuge management activities.

Adak citizens turn out in force at Refuge Headquarters every year to see the many displays for National Wildlife Week. (R.F. 1983)

Our annual waterfowl identification workshop was held in October and was well-attended by 30 hunters and birdwatchers. Topics covered included clues to identification, rules and regulations, clothing and equipment, and ways to reduce hunting losses. The film entitled "Ducks On The Wing" was presented as well as a slide show that emphasized huntable verses non-huntable species.

A bird identification workshop was held in December to help give island residents the necessary information and tools to enjoy birdwatching on Adak. Attendance was low (7) for a number of reasons, including weather and other activities scheduled on island. Future workshops are planned to coincide with spring and fall bird migrations.

In August, a new film was presented every two weeks at the visitor center to offer island residents an opportunity to learn more about the state of Alaska and its natural resources. Nine films were presented in the visitor center to approximaely 200 people. The films were also utilized by the Adak region school district. The National Park service film "The Denali Wilderness" was shown a total of 15 times outside the visitor center to a combined audience of 590 people.

8. Hunting

In addition to being a Federal Reserve, the Aleutian Islands Unit is also a State Game Refuge under regulations promulgated by the Alaska Department of Fish and Game, and therefore the entire refuge is closed to hunting with the following exceptions: 1) Umnak, Atka, Unalaska, Akun, Akutan, Sanak and Tigalda Islands are open to hunting, 2) Shemya, Attu and Great Sitkin Islands are open to waterfowl and ptarmigan hunting and 3) Adak Island is open to waterfowl, ptarmigan and caribou hunting. Table 22 provides a breakdown of hunting visits and activity hours.

TABLE 22. VISITS AND ACTIVITY HOURS FOR ADAK CONSUMPTIVE USES.

	Visits		Activity Hours	
	1982	1983	1982	1983
Hunting				
Caribou	1,202	0	25,806	0
Ptarmigan	444	560	1,207	1,676
Waterfowl	74	130	268	376
Total Hunt	1,720	690	27,281	2,052
Fishing	6,090	5,553	13,510	11,771
Total	7,810	6,243	41,315	15,875

There was no caribou season this year because the population was lower than that required for a sustained harvest. As a result, ptarmigan and waterfowl received a bit more pressure than in past years.

9. Fishing

Fishing continues to be the most popular consumptive use on the Unit (Table 22). Saltwater enthusiasts angle for halibut and set crab pots in nearby waters. Stream and lake fishermen concentrate on pink, red, and silver salmon, and of course, Dolly Varden. The 1983 pink salmon run was below average along the entire Aleutian Chain yet popular areas like Finger Bay and NAVFAC Creek still received very heavy use. Finger Bay stream has been designated "fly fishing" only, by Naval directive, to reduce fishing pressure in that popular spot. High quality wilderness fishing is also available for those interested in hiking.

Halibut fishing in the Aleutians can be fun and exciting. (T.E. 1983)

The Recreation Services Division of the Naval Security Group Activity command on Adak has a recreational vessel "Kuluk Clipper" which takes up to six fishermen daily to the halibut "hotspots". Demand is incredible with the vessel being booked up months in advance. Reservations are taken on a first come, first served basis. The vessel enjoyed good success during the summer which added to the demand.

10. Trapping

Trapping for arctic fox is allowed on Adak Island. Permits are unlimited and free. Twenty-six trappers took part in the season. Most of the trapping is limited to the Adak area and sites near cabins.

11. Wildlife Observation

Landscape, wildflower, and wildlife photography buffs are in their glory on a clear Aleutian day. Bald eagles are common at the Naval Station and are favorites of the local folks. It is a bit more difficult to photograph the sea otter or caribou, however, they are also highly regarded prizes with the camera or binoculars. Table 23 outlines visits and activity hours for selected non-consumptive wildlife uses.

TABLE 23. VISIT AND ACTIVITY HOURS FOR SELECTED NON-CONSUMPTIVE WILDLIFE USES.

Wildlife Observations	Visits 1982	Visits 1983	Activity Hours 1982	Activity Hours 1983
Hiking	4,032	4,033	18,560	17,058
Land Vehicle	9,755	6,175	9,805	6,195
Photography	1,384	2,057	2,184	2,057
Other	1,844	365	5,288	2,920
TOTALS	17,051	12,630	35,909	28,230

13. Camping

The entire Unit is open to camping, however, most use occurred on Adak where five USFWS backcountry cabins are available on a first come, first served reservation basis. The cabins received moderate use by backpackers and fishermen, and during the fall and the winter by caribou hunters.

When the weather cooperates, hiking and camping on Adak are outstanding! (F.Z. 1983)

16. Other Non-Wildlife Oriented Recreation

Cross-country skiing, sledding and tubing have become extremely popular winter activites with all 90 pairs of skis from the Navy Recreational Services Department being rented out on good weekends; hiking and beachcombing are other popular activities throughout the year.

17. Law Enforcement

At present, most enforcement work is limited to Adak Island. The lack of logistical support makes enforcement on other islands virtually impossible at this time.

A summary of citations issued is shown in Table 24.

TABLE 24. 1983 LAW ENFORCEMENT SUMMARY, AIU.

Violation	Number	Fines
Shooting migratory waterfowl from a motor vehicle	2*	$20.00
Take migratory waterfowl with unplugged shotgun	1	$50.00
Off-road vehicle tresspass	1	Turned over to Navy
Illegal fishing lure	3	Oral warning

*Includes the driver of the pickup and one other person who fired from the bed of the pickup.

All violations involving military people on the Naval reservation were turned over to the Navy command for prosecution. Military people who violated regulations off the Naval reservation and all civilians were issued federal citations.

We know that infractions of fishing regulations (i.e. snagging salmon in fresh water, over limit of fish, taking fish with illegal gear) occur. We receive phone calls from people reporting these; however, catching the person in the act is something else. We respond to many of these calls and find nothing wrong or that the person has already left the area. Several undercover investigations were conducted with negative results. Unless the local populace begins to care more and help clean up their own act, the problem will remain. Our small staff isn't able to solve the problem alone.

During the majority of the year, Assistant Manager Klett was the only person on our staff involved with law enforcement. It proved very difficult, with the increased administrative workload, to get into the field.

We received a report from the U.S. Coast Guard the early part of February that several crab fishing boats were anchored or tied up at the Constantine Harbor pier at Amchitka. By month's end we started hearing rumors that a large amount of vandalism was occurring to U.S. Government facilities/equipment belonging to both the U.S. Fish and Wildlife Service and the Department of Energy (formerly the Atomic Energy Commission). The burning down of a building was confirmed by a fisherman who was evacuated for medical reasons to the Naval Hospital, Adak.

Refuge Manager Zeillemaker, and Administrative Officer Hagglund flew to Amchitka, via U.S.C.G. C-130, for a quick inspection trip on April 21st. They verified that the majority of the buildings had been broken into, that vehicles had been removed from the building and left in the tundra or wrecked and that the buildings contents had been ransacked. A copy of their inspection report was sent to the Department of Energy in Las Vegas, Nevada and to our Regional Law Enforcement Division in Anchorage.

The vandalism on the island occurred between September 23, 1982, when the Department of Energy personnel left the Island and April 21, 1983, when Refuge Manager, Zeillemaker visited the Island. During this period, the military had a permit for manuevers on the Island between October 1, 1982 and December 30, 1982. No information is available at the present time as to when personnel were actually on the Island. (We learned from the pilot of the C-130 that took the DOE crew to Amchita that military personnel had wrecked the Chevrolet truck mentioned in the report. The pilot had been a member of the Board of Inquiry that investigated the accident after military maneuvers were over). From information supplied by an informant, it is known that several fishing vessels were docked in Constantine Harbor on February 16, 1983. On that evening, the "Jones Cabin" was burned.

A short, thorough inspection of the vandalism was conducted by Special Agent Hood (Anchorage), Assistant Manager Early from the Alaska Maritime NWR, Homer, and Environmental Protection Agency Scientist Costa, on August 7th when DOE made their annual site inspections.

An edited copy of Special Agent Hood's report follows:

> Warehouse #2 was searched first. The entire building had been ransacked. Empty cans were scattered throughout the building, most drawers and cupboards had been opened and items removed, and any large boxes stored in the building by Department of Energy personnel in September 1982, had been pried open and items removed. The Chevrolet truck that had been wrecked by the Air Force personnel had been parked in the warehouse. All of the windows had been broken out of the truck, apparently after it was placed in the warehouse. A number of opened C-ration cans and beer cans were picked

up in the kitchen, upstairs bedrooms and from the tail-gate of the wrecked truck for fingerprint analysis. Photographs were taken throughout the building.

Some type of tracked vehicle had been driven from Warehouse #2 across the tundra to the road near the South Hangar. Deep ruts had been cut into the tundra and photographs of this damage were taken near where the vehicle returned to the road.

The Pumphouse Quarters were checked, but were found to be alright. All windows and doors were still boarded up and no damage was noted. The South hangar was checked next. It was obvious that the building had been entered. Four different areas of "graffitti" were found spray-painted on the wall and on two sheets of plywood in the building.

A number of old pickup trucks belonging to the Department of Energy had been left in the building. All of them had the doors open and the hoods up and some showed evidence of vandalism. A great deal of material is stored in the hanger and many items were scattered around. However, since the three large overhead doors were open, some of the damage could have been done by the wind. No evidence was collected in the building, but photographs were taken.

An inspection of the dock area on Constantine Harbor was made next. The burned remains of the "Jones Cabin" was checked and photographed. Because of the time elapsed since the fire (02/16/83) no evidence was found. It did appear the fire was deliberately set, since the building was totally consumed by the fire.

Two separate stacks of king crab traps were in the dock area, one stack of about 160 on shore and another stack of perhaps 60 on the docks. The pots on the shore all appeared to have the same number on the floats. In addition, many of the floats had 1980-81 ADF&G license numbers on them.

The Department of Energy personnel had left three trail bikes in Warehouse #6. Two were still in the warehouse, one missing the rear tire. The third bike was found parked along the road near the docks. It did not appear to be damaged.

Two trucks that had been parked in the South hanger were found along the road above the docks and near the large fuel storage tanks. The trucks had apparently been used to haul stolen items to the dock, as one still had a number of storage batteries on board. Both had been vandalized; broken windows and damages to the engines.

Several names had been painted on the large storage tanks at this location. Photographs were taken of the tanks by Assistant Manager Early.

The large tank truck with the snow plow blade was found along the road between the docks and the runway. It had been vandalized; broken windows, motor damaged and damages to the hydrolic system on the snow plow.

A fourth truck was found abandoned along the road near the "fox" runway. An outboard motor and box of blazo was on board this truck and a small aluminum boat was in the ditch beside the truck. The truck, like the others, had been vandalized.

Warehouse #6 was checked very quickly. This warehouse contained a great deal of equipment, including two large boats with outboard motors, tools, and supplies. The building had been broken into, thus allowing rain and snow to enter the building, causing much additional damage. It was impossible to determine how much, if anything, had been stolen, but it appeared almost everything in the building had been rifled through, as many items were scattered about in the building.

The area near the docks where the remains of World War II airplanes have been piled was also checked. It was impossible to tell whether any parts had recently been removed, knowing the condition of the parts and the way they were piled up and damaged.

Ending the year, the investigation is still pending.

18. Cooperating Associations

The Alaska Natural History Association (ANHA) outlet had sales totalling $3,350 which was down slightly from 1982. Due to a staff shortage, the outlet suffered because of a lack of attention earlier in the year. The mid-year addition of an outdoor recreation planner coming aboard the refuge staff solved the continuity problem and the Adak Branch expects a healthy growth over the next few years due to an increasing number of refuge programs, plus setting up ANHA sale outlets at all community-wide events.

A USFWS/ANHA sales booth was set-up at the Adak Fall Festival in October. This one-day event drew large crowds and many people stopped by the booth to ask questions, viewed a pictorial history of the refuge unit, received refuge brochures and purchased a variety of Natural History items. The activity was highly succesful and is planned for the future at both the Spring and Fall Festivals.

The Refuge display at the fall festival proved to be a great success. (C.E. 1983)

Eighteen different items were available for sale this year and included books on the NWR system, Alaska Wildlife, the Aleutian Islands and plants. Colorful bird and mammal prints, slides, postcards, and maps of Alaska and Adak were also sold. The Adak outlet sold 26 ANHA memberships, all in November and December. This new interest is a positive sign for the future.

All in all, we felt it was a worthwhile year and that the Association is still very important to the interpretive/educational program of the unit. The main drawback to the program is the large volume of paperwork required to conduct the Association's business.

I. EQUIPMENT AND FACILITIES

2. Rehabilitation

Mild fall weather (late September and October) allowed us to paint one badly needed coat of stain on quarters #1, #2, and #3, the housing complex storage shed and most of quarters #6. These buildings will be given a needed second coat as soon as weather permits in 1984. In addition, quarters #4A, #4B,#5A, and #5B, will be stained the same color at that time.

New doors and locksets were purchased to replace badly weathered existing doors for the arctic entrances of quarters #1, #2, and #3. Quarters #6 received a new door for its arctic entrance. All four furnace entry doors on the duplex housing units were refitted and had new hinges installed.

The edging of the metal roof on quarters #6 was replaced. The roof had a tar coating and a roof sealer applied to it to stop a water leak problem. The ceiling insulation and tiles had to be replaced due to water damage.

A third bedroom was added to quarters #3 by partitioning off part of the living room area. This allowed one more room for use by the Bio-Tech staff. A new 8-person bunk house has been discussed as a replacement for quarters #6 and will be requested.

Plans were drafted and materials purchased for enlarging arctic entrances on the north side of each of the duplex units. Work on this project is being delayed until the Navy and the U.S. Fish and Wildlife Service come to an agreement on possible relocation of the FWS housing.

All sink and bathtub faucets in quarters #1, #2, #3, and #6 had to be rebuilt or replaced. Water lines under the same houses had to be repaired due to rusted and broken pipe supports. New pipe supports were installed. Pipe insulation and heat tapes were installed on water lines under quarters #1. The same project is planned for quarters #2 and #3.

3. Major Maintenance

A lot of projects were accomplished, but because the refuge went without a maintenance worker for over 5 months, the year ended with a long list of things yet to be accomplished. Maintenance Mechanic Bowers did a good job of completing service and maintenance on all equipment prior to leaving in April so most equipment was still in good operating condition after five months of no service.

A major project that started early in the year was repairing one of the Chevrolet Suburbans. The vehicle was hit in the front end while parked. The entire front end was rebuilt and the vehicle repainted. The vehicle was in service for only a short time before the transmission gave out. The parking gear was apparently broken from the accident and pieces from the gear damaged the rest of the transmission. The cost of repair parts exceeded that of a rebuilt transmission so the year ended with the vehicle awaiting the transmission. Boats and outboard motors suffered the most from lack of service and repair. Two weeks of repair and servicing was required on the 21-foot Boston Whaler in October so that the boat would be safe and usable for survey work. Work started with the trailer. A new tongue had to be fabricated before the boat could be pulled out of the water. Radios, lights, starting, steering and engines all needed extensive work. At the end of December all radio and safety equipment was removed from the 21-foot whaler and set up in a new 25-foot whaler. The new whaler was set up according to installation procedures. Radios, bilge pump, fire extinguishers, anchors and battery switches were installed. A week was spent breaking in the new motors and assuring that all

systems were operating properly. Some training of operators was completed before the year ended.

Heating equipment repairs, replacements and servicing involved a lot of time. All electric heaters in Quarters #1, #2, and #3 were removed, serviced and cleaned. New thermostats, fans and heating elements were added where needed. Oil fired furnance relays were replaced on quarters #4B and #5B. The entire burner unit on #5B had to be dismantled, cleaned and parts replaced after the poorly designed furnance crawl space was flooded. Exhaust leaks were repaired in quarters #5B to stop furnace exhaust and fuel oil fumes from entering the forced air system. The same work was completed on the headquarters heating unit. A new wiring harness was installed on the front end loader.

4. Equipment Utilization and Replacement

As mentioned under I-3, a new 25-foot Boston Whaler, christened the "Kittiwake", was purchased and arrived in December. This boat will replace the 21-foot Whaler "Tufted Puffin" that was acquired in 1979. This replacement is a more stable boat with an enclosed cabin which allows for safer and more comfortable use for surveys in the variable Aleutian weather.

Notice the snow is on the outside of the cabin instead of on the inside like our old boat. (F.Z. 1983)

A requisition for a new vehicle to replace a well used 1978 Dodge pickup truck was sent to the regional office. Five outboard motors were surveyed during the year. Some of these have been around since Bob Jones operated a wooden dory in the Aleutians back in the mid-sixties.

5. Communication System

The 6SB-900SC Sunnair radio was set up with the TCl 613 antenna system for a headquarters base station. A Motorola Micom HF, SSB radio, antenna tuner and 16-foot whip antenna as well as a CB radio with 102-inch whip were installed on the new Whaler.

6. Energy Conservation

Electric meters requested from Navy Public Works in 1982 were finally installed on U.S. Fish and Wildlife quarters #1, #2, and #3. This isn't in itself an energy conserving project, but it will save the refuge a fair amount of money. The Navy had been charging a flat rate for electricity which turns out to have been considerably more then was being used.

Programmable thermostats were installed on the furnace systems in the two duplex units to help cut down fuel consumption. Timers were also ordered for installation on all electric hot water heaters. Thermostats and rheostat switches on electric heaters in quarters #1, #2, and #3 were repaired or replaced so heating could be controlled.

Gravel fill was placed around the bases of quarters #1, #2, and #3 to stop wind drafts from removing heat from the under flooring and causing drafts into the houses. Re-insulating and covering holes in the sub-flooring made by plumbing contractors was started on quarters #1, #2, and #3 to further reduce heat loss.

Windows with better insulative qualities were ordered for quarters #1, #2, and #3. These will also add needed safety exits which present windows do not offer.

Loose flexible heating ducts on forced air heating systems in the duplex units were repaired to prevent direct heat loss. Air spaces between the floors and false walls between the hot water heater rooms and bathrooms of the duplex units were caulked to stop cold air drafts.

J. OTHER ITEMS

2. Other Items of Interest

With the early closure of the king crab fishing season in the Bering Sea area and the prospect of a poor catch in the Kodiak area, we experienced a large buildup of crab boats along the Aleutian Islands when the season opened November 10th. Along with this buildup came requests from three airline companies for Special Use Permits to use the decertified runway on Amchitka Island to provide air support (personnel, mail, freight and supplies) to 150 fishing boats and eleven crab processing boats in the Amchitka/Kiska area.

We received word of the initial request via a phone call from the Regional Office. The Chairman of the Board of the National Fisheries Institute had contacted U.S. Senator Steven's Anchorage office, who in turn contacted the USFWS Regional Director regarding the issuance of the permit to use the runway. Why they went this route is unknown, but they would have received faster and more efficient action on their permit request.

All three Special Use Permits were issued. Our biggest concern was the vandalism that might occur if stormy weather caused a buildup of fishing/processor vessels in Constatine Harbor at Amchitka Island for a long period of time (see Section H.17). The permits included a special condition regarding the transportation of a U.S. Fish and Wildlife Service employee or designee, upon request, on any of the supply flights. No flights had been contracted at year's end, so we do not know if any vandalism has occurred.

There was talk regarding a joint agreement with the Department of Energy (DOE) and the U.S. Fish and Wildlife Service where the DOE would provide air transportation for USFWS employees to Amchitka Island to check on U.S. government facilities/equipment stored there. This office gathered cost information, which was supplied to DOE, but nothing has materialized yet.

3. Credits

Rough drafts were deciphered and fed into the computer by Deborah Pape, Leslie Slater and Don Dragoo with assistance from Fred Deines and Natasha Kline. The various sections of the report were written by the following individuals:

A. Highlights - Fred Deines
B. Weather - Fred Zeillemaker
C. Land Acquisition - Fred Deines
D. Planning - Van Klett and Fred Deines
E. Administration - Fred Zeillemaker, Van Klett, and Fred Deines
F. Habitat Management - Fred Deines
G. Wildlife Sections
   1. Fred Deines
   2. Fred Deines, Don Dragoo, and Chris Ambroz
   3 & 4. Don Dragoo and Natasha Kline
   5. Fred Deines, Don Dragoo, and Natasha Kline
   6 & 7. Natasha Kline
   8. Leslie Slater and Fred Deines
   9. Don Dragoo
   10. Natasha Kline
   11. Leslie Slater
   14. Chris Ambroz
   15. Don Dragoo
   16. Natasha Kline
H. Public Use - Tom Edgerton and Van Klett

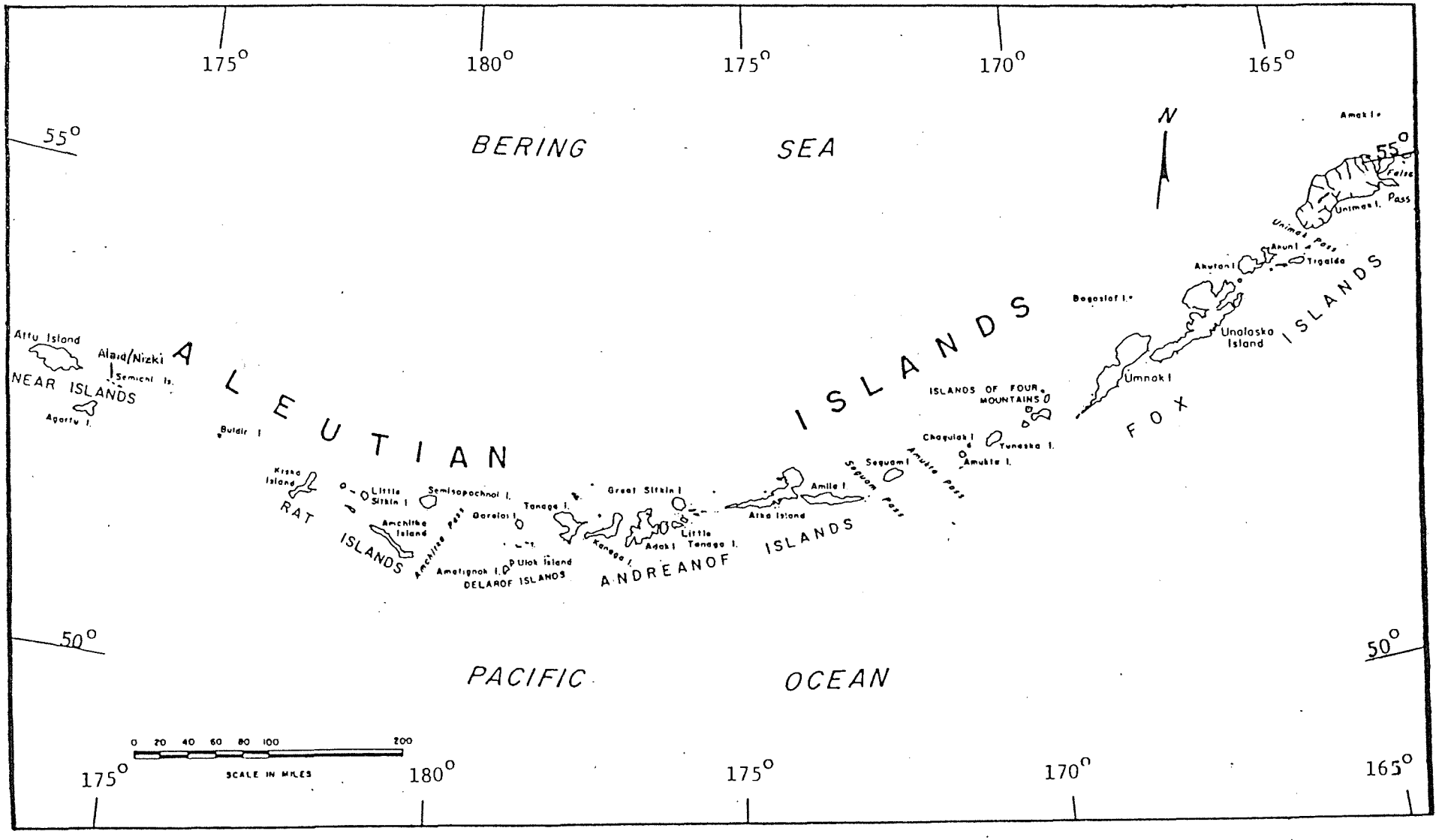
I. Equipment and Facilities - Bob Schulmeister
J. Other Items - Van Klett
K. Feedback - Fred Zeillemaker

All editing was done by Van Klett and Fred Deines. Collating of the text was completed by the entire staff.

Surveys for nocturnal seabird species are always interesting and can be breathtakingly beautiful also. (F.D. 1983)

K. FEEDBACK

This manager continues to be dazzled by the number and complexity of tasks we are required to accomplish each year with insufficient staff. Other Alaska refuge managers might point out that their stations have even smaller staffs than we have at Adak. I don't dispute that, but if we can marginally get the job done with our staff (see Table 5), those refuge managers must be forced to forego many management tasks and data gathering activities just to fight the constant and ever increasing paperwork battle. It is a shame what we in the field are expected to accomplish with our meager, brush fire weary staff. When are the Washington Office and Regional Office going to properly staff Alaska's 16 refuges containing in excess of 75% of all NWR lands? Volunteer, local hire and other seasonal positions are helpful, but not entirely satisfactory for providing the needed continuity for long term programs. We need FTE's and positions.


175°
180°
175°
170°
165°
55°
BERING SEA
N
Amak I.
Pass
Unimak I.
Akun I.
Tigalda
Akutan I.
Bogoslof I.
Unalaska Island
Umnak I.
ISLANDS OF FOUR MOUNTAINS
Chagulak I.
Tanaga I.
Amukta I.
Seguam I.
Amlia I.
Atka Island
Great Sitkin I.
Little Tanaga I.
Adak I.
Kanaga I.
Tanaga I.
Gareloi I.
Semisopochnoi I.
Little Sitkin I.
Amchitka Island
Amchitka Pass
Amatignak I.
Pt. Utak Island
DELAROF ISLANDS
Kiska Island
Buldir I.
Agattu I.
Semichi Is.
Alaid/Nizki
Attu Island
NEAR ISLANDS
RAT ISLANDS
ANDREANOF ISLANDS
FOX ISLANDS
ALEUTIAN ISLANDS
Unimak Pass
Seguam Pass
Amukta Pass
50°
PACIFIC OCEAN
0 20 40 60 80 100 200
SCALE IN MILES

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

As the Nation's principal conservation agency, the Department of the Interior has basic responsibilities for water, fish, wildlife, mineral, land, park, and recreational resources. Indian and Territorial affairs are other major concerns of America's "Department of Natural Resources."

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RF-7350100-2-March 1974

3079-74

BIRDS OF THE ALEUTIAN ISLANDS NATIONAL WILDLIFE REFUGE

BIRDS OF THE CHAIN

The Aleutian Islands National Wildlife Refuge stretches 1,100 miles westward from the tip of the Alaska Peninsula to within 500 miles of the Kamchatka Peninsula of the Soviet Union. Spanning 26° of longitude, the islands form one of the most extensive units of the National Wildlife Refuge System.

Commonly called the *Chain,* the Aleutian Islands are emergent peaks of a submarine mountain range, the Aleutian Ridge. All but five of the islands are included in the refuge. Except for the Aleut villages of Atka and False Pass and a few active military installations, the only signs of human habitation on the refuge are unhealed scars from World War II activities.

Bird life on these treeless islands has been critically affected by foxes introduced in early fur farming enterprises. The once abundant Canada goose *(Branta canadensis leucopareia)* is dangerously near extinction as a result of the fox introductions. Today this goose nests only on tiny Buldir Island which escaped fur farming efforts.

The short-tailed albatross still may occur but is almost extinct. Its upper mandible and long wing bones are common remains in Aleut kitchen middens and testify to the birds' former abundance and overland wandering. Black-footed and Laysan albatrosses, however, still soar offshore on motionless wings.

In bridging the North Pacific to Asia, the Aleutian Islands offer refuge to an international list of birds. Migrants come from all compass directions. Whooper swans winter in the western islands with tufted ducks and the Aleutian race of green-winged teal. At the eastern end of the refuge, whistling swans, black brant, and the North American race of green-winged teal are typical North American representatives. A high percentage of the world's emperor geese winter on the refuge.

Short-tailed and sooty shearwaters that nest on the opposite side of the globe fly north at the approach of the Antarctic winter and become numerous offshore during the Aleutian summer.

Seabirds nest on the islands' cliffs and heather-covered hillsides in noisy colonies. Their rockeries vary in size and composition, but some of the more diverse include Northern fulmars, storm petrels, cormorants, gulls, kittiwakes, murres, guillemots, murrelets, auklets, and puffins.

To aid the observer in knowing what birds to expect in a particular area, the refuge has been broken into three geographical subdivisions (see map). The number(s) in parenthesis, following the status of a particular species, indicate(s) where on the refuge the status applies. If no number is present, the status applies to the entire refuge.

The list contains 127 species and subspecies of regular occurrence and 59 species of casual or accidental occurrence. The seasons are difficult to define, since they vary yearly, however, the peak of spring migration usually occurs between mid-May and mid-June. Fall migrants are seen from mid-August through early November.

The abundance and status symbols used in the list follow:

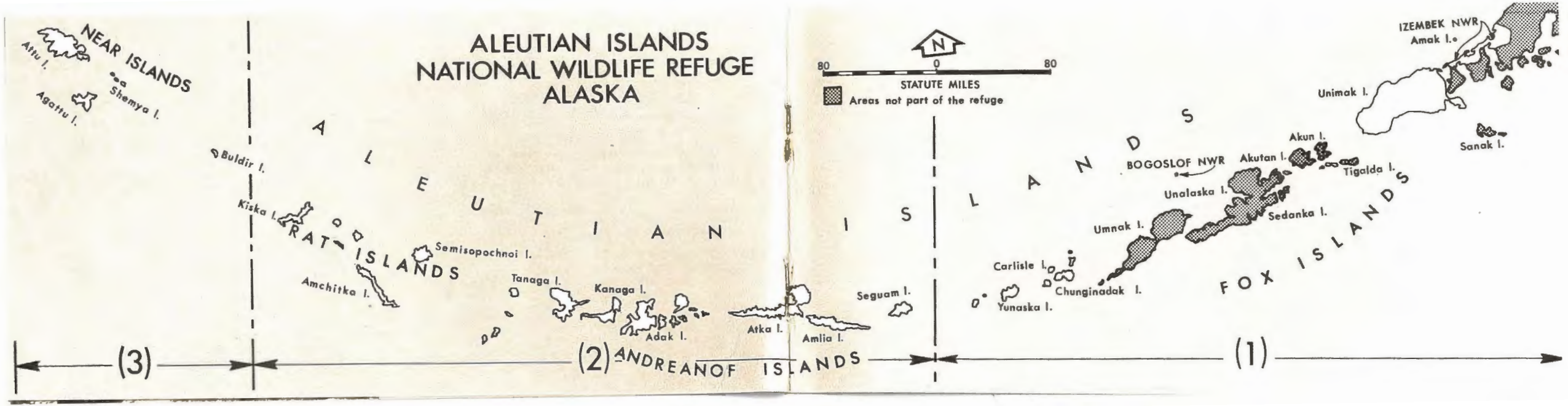
Relative Abundance		Status	
A	– Abundant	M	– Migrant
C	– Common	PR	– Permanent Resident
U	– Uncommon	SR	– Summer Resident
O	– Occasional	WR	– Winter Resident
R	– Rare	V	– Vagrant
		[ ]	– Offshore
		*	– Known Breeder

Distribution (See Map)

(1) Eastern Aleutians (Unimak Island to Amukta Pass)

(2) Central Aleutians (Seguam Island to Kiska Island)

(3) Western Aleutians (Buldir Island to Attu Island)


ALEUTIAN ISLANDS
NATIONAL WILDLIFE REFUGE
ALASKA
N
80
0
80
STATUTE MILES
Areas not part of the refuge
NEAR ISLANDS
Attu I.
Agattu I.
Shemya I.
Buldir I.
Kiska I.
RAT ISLANDS
Amchitka I.
Semisopochnoi I.
Tanaga I.
Kanaga I.
Adak I.
Atka I.
Amlia I.
Seguam I.
ANDREANOF ISLANDS
Carlisle I.
Yunaska I.
Chuginadak I.
Umnak I.
Unalaska I.
BOGOSLOF NWR
Akutan I.
Akun I.
Tigalda I.
Sedanka I.
Unimak I.
IZEMBEK NWR
Amak I.
Sanak I.
FOX ISLANDS
(1)
(2)
(3)

LOONS

Common Loon* ..... U-PR
Arctic Loon ..... U-WR
Red-throated Loon* ..... U-PR

GREBES

Red-necked Grebe ..... R-SR (1&2), U-WR
Horned Grebe ..... U-WR

TUBENOSES

Black-footed Albatross ..... [U-SR, R-WR]
Laysan Albatross ..... [U-SR, R-WR]
Northern Fulmar* ..... C-SR, [U-WR]
Sooty Shearwater ..... [U-SR]
Short-tailed Shearwater ..... [A-SR]
Scaled Petrel ..... [R-SR]
Fork-tailed Storm Petrel* ..... A-SR
Leach's Storm Petrel* ..... A-SR

CORMORANTS

Double-crested Cormorant* ..... U-SR (1)
Pelagic Cormorant* ..... C-PR
Red-faced Cormorant* ..... C-SR, [U-WR]

SWANS

Whooper Swan ..... U-WR (2&3)
Whistling Swan* ..... U-PR (1)

GEESE

Canada Goose (Cackling) ..... U-M (1)
Canada Goose (Taverner's) ..... A-M (1)
Canada Goose (Aleutian)* ..... R-SR (3), R-M
Black Brant ..... A-M (1), R-V (2&3)
Emperor Goose ..... A-WR
White-fronted Goose ..... R-M (1)

DUCKS

Mallard* ..... U-PR
Gadwall ..... O-SR (1), R-WR (1&2)
Pintail* ..... U-PR
Green-winged Teal* (Aleutian) ..... C-PR
Green-winged Teal* (North American) ..... C-SR (1), U-WR (1), O-V (2)
European Wigeon ..... U-M, O-WR
American Wigeon ..... O-M (1), R-V (2&3)
Northern Shoveler ..... O-M
Canvasback ..... R-WR (2)
Greater Scaup* ..... C-WR, U-SR
Tufted Duck ..... O-PR (2&3)
Common Goldeneye ..... C-WR, O-SR
Bufflehead ..... C-WR (1&2), R-WR (3)
Oldsquaw ..... C-WR, R-SR
Harlequin Duck ..... C-PR
Steller's Eider ..... C-WR (1), R-WR (2)
Common Eider* ..... C-PR
King Eider ..... C-WR (1), R-WR (2), U-WR (3)
White-winged Scoter ..... C-WR (1&2), O-SR (1&2)
Surf Scoter ..... R-V
Black Scoter ..... C-WR (1&2), R-SR (1&2)
Smew ..... R-M (2&3)
Common Merganser ..... U-PR (1), O-WR (2&3)
Red-breasted Merganser* ..... U-SR, C-WR

HAWKS and FALCONS

Rough-legged Hawk* ..... O-SR (1), R-M (2)
Bald Eagle* ..... C-PR (1&2), R-V (3)
Marsh Hawk ..... R-V
Gyrfalcon* ..... U-WR, R-SR

Peregrine Falcon* (Peale's).....C-PR
Merlin.....R-V (1&2)

PTARMIGAN

Willow Ptarmigan* .....C-PR (1)
Rock Ptarmigan*.....C-PR

CRANES

Sandhill Crane.....O-M

SHOREBIRDS

Black Oystercatcher* ..... C-PR (1&2)
Semipalmated Plover*.....U-SR (1)
American Golden Plover.....U-M
Black-bellied Plover.....R-M
Ruddy Turnstone.....C-M, U-SR
Common Snipe..... R-M (1)
Whimbrel.....R-M
Wood Sandpiper*..... R-SR (2&3), O-M
Wandering Tattler.....U-M
Lesser Yellowlegs .....R-V (2)
Rock Sandpiper*.....C-PR
Sharp-tailed Sandpiper .....O-M
Pectoral Sandpiper .....O-M
Baird's Sandpiper .....R-M
Least Sandpiper*.....C-M (1), U-SR (1)
Dunlin.....R-M, R-WR
Western Sandpiper.....C-M (1), R-V (2)
Bar-tailed Godwit.....U-M
Sanderling ..... U-WR

PHALAROPES

Red Phalarope.....[A-M (1), C-M (2)]
Northern Phalarope*..... U-SR, C-M

JAEGERS

Pomarine Jaeger ..... [U-M, U-SR]
Parasitic Jaeger*.....C-SR
Long-tailed Jaeger ..... [R-M]

GULLS and TERNS

Glaucous Gull..... O-WR
Glaucous-winged Gull*.....C-PR
Slaty-backed Gull..... R-V
Herring Gull ..... R-WR
Mew Gull.....O-WR (1&2)
Black-headed Gull .....R-M
Black-legged Kittiwake*.....C-SR, [U-WR]
Red-legged Kittiwake* .....C-SR (3), [R-M]
Sabine's Gull ..... [R-M (1&2)]
Arctic Tern*.....C-SR
Aleutian Tern*..... U-SR

ALCIDS

Common Murre*..... A-PR
Thick-billed Murre*..... A-PR
Pigeon Guillemot*..... A-PR
Marbled Murrelet.....U-PR (1&2)
Kittlitz's Murrelet*.....U-SR, R-WR
Ancient Murrelet*..... C-SR, R-WR
Cassin's Auklet*.....U-SR (1&2), R-SR (3)
Parakeet Auklet*..... C-SR, O-WR
Crested Auklet* .....A-SR, U-WR
Least Auklet*.....A-SR, O-WR
Whiskered Auklet*.....C-SR
Horned Puffin* ..... C-SR, U-WR
Tufted Puffin* ..... A-SR, U-WR

OWLS

Snowy Owl*.....U-PR (3), R-WR (1&2)
Short-eared Owl* .....U-SR (1), U-M

CASUAL or ACCIDENTAL

Yellow-billed Loon
Short-tailed Albatross
Flesh-footed Shearwater
Cook's Petrel
Bean Goose
Spotbill Duck (Chinese)
Falcated Teal
Garganey
Baikal Teal
Blue-winged Teal
Common Pochard
Barrow's Goldeneye
Spectacled Eider
Hooded Merganser
Golden Eagle
White-tailed Eagle
Steller's Sea Eagle
Osprey
American Coot
Ringed Plover
Surfbird
Black Turnstone
Far Eastern Curlew
Common Sandpiper
Greater Yellowlegs
Spotted Redshank
Greenshank
Red Knot
Great Knot
Long-toed Stint
Rufous-necked Sandpiper
Short-billed Dowitcher
Long-billed Dowitcher
Semipalmated Sandpiper
Black-tailed Godwit
Ruff
Bonaparte's Gull
Common Tern (Asiatic)
Rhinoceros Auklet
Common Cuckoo
Oriental Cuckoo
Skylark
Tree Swallow
Barn Swallow
Cliff Swallow
Eye-browed Thrush
Wheatear
Siberian Rubythroat
Arctic Warbler
Gray-spotted Flycatcher
White Wagtail
Gray Wagtail
Yellow Wagtail
Bohemian Waxwing
Brambling
Hawfinch
Dark-eyed Junco
Rustic Bunting
Yellowhammer

KINGFISHERS

Belted Kingfisher.....R-V (1)

SWALLOWS

Bank Swallow*.....U-SR (1)

CORVIDS

Black-billed Magpie.....R-V (1)
Common Raven*.....C-PR

DIPPERS

Dipper*.....U-PR (1)

WRENS

Winter Wren*.....C-PR

THRUSHES and PIPITS

Hermit Thrush.....R-SR (1)
Water Pipit*.....U-SR (1), R-WR (1), R-V (2)

SHRIKES

Northern Shrike.....R-V (1&2)

WARBLERS

Yellow Warbler*.....U-SR (1)
Wilson's Warbler.....R-SR (1)

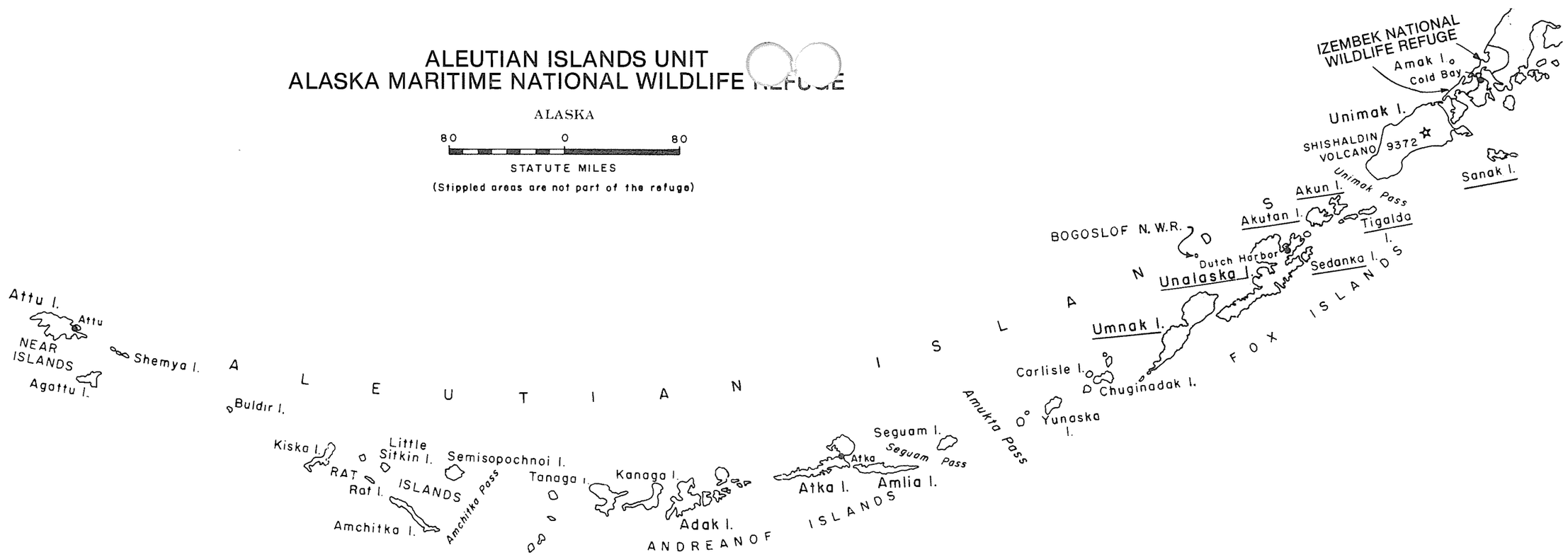
FINCHES and SPARROWS

Gray-crowned Rosy Finch*.....A-PR
Common Redpoll*.....C-SR (1) O-V
Savannah Sparrow*.....A-SR (1)
Golden-crowned Sparrow.....R-SR (1)
Fox Sparrow*.....O-SR (1)
Song Sparrow*.....C-PR

LONGSPURS and BUNTINGS

Lapland Longspur*.....A-SR
Snow Bunting*.....C-PR
McKay's Bunting.....R-WR (1)

ALEUTIAN ISLANDS UNIT
ALASKA MARITIME NATIONAL WILDLIFE REFUGE



ALEUTIAN ISLANDS UNIT OF THE ALASKA MARITIME NATIONAL WILDLIFE REFUGE consists of that chain of steppingstone islands reaching out from the Alaska mainland for a thousand miles into the North Pacific toward Kamchatka Peninsula of the Soviet Union. The nearly 80 named islands in the refuge make it one of the largest units in the Alaska Maritime National Wildlife Refuge. The refuge was established in 1913 by Executive Order of President William Howard Taft.

Most of the islands are mountainous, the emergent peaks of a submarine mountain range. Many have active volcanoes towering into the arctic sky; one of these Shishaldin on Unimak Island, reaches a height of more than 9,000 feet. The larger islands are dotted with lakes and cut by streams. Irregular shorelines have boulder beaches, sand beaches, rocky cliffs, and offshore islets and reefs.

The climate is characterized by fog and clouds; a day with sunshine is almost a rarity. Rain in summer is abundant. The Aleutian Islands are noted for frequent and violent wind squalls that make boating hazardous. Summer temperatures range only into the sixties; in winter the temperature generally hangs near the freezing point but sometimes drops to below 10 degrees Fahrenheit.

Snow is prevalent in winter, although it is apt to be wet and slushy except at higher elevations.

The Aleutians are treeless, supporting a dwarfed flora of willow and alder and alpine heaths and meadows. Some taller shrub growths occur on Unimak and Attu. A stand of beach grass marks shorelines, and offshore waters support great beds of kelp. Copious summer rains keep the islands emerald green at that season; in spring and fall the vegetation is brown and sere.

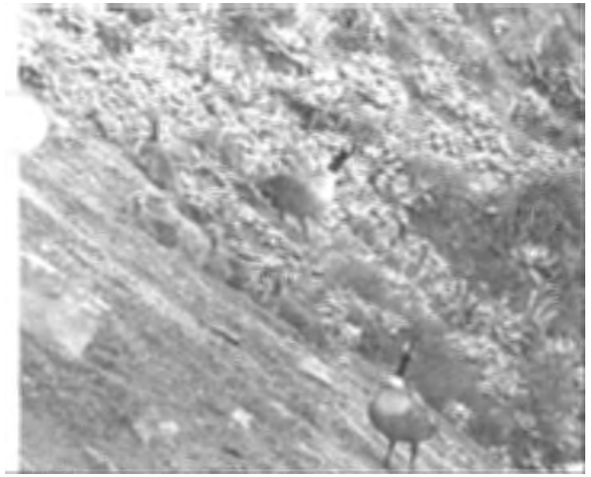
The Aleutian Islands Unit is largely an uninhabited wilderness. Once the home of thousands of Aleuts, it now has only two villages, Atka on Atka Island and False Pass on Unimak Island. Disease decimated these people following the arrival of the Russian pioneers, and many of the survivors disappeared or left during American and Japanese military occupation of the islands in the Second World War. There are a few active military installations, but they occupy little of the refuge's space.

Some of the islands have large areas covered by abandoned military installations-hundreds of Quonset huts, miles of roads, old landing strips, warehouses, telephone lines, and piles of trash of every description. Attu, Shemya, and Adak still have active military installations.

The Aleutian Islands are rich in wildlife. Birds especially are much in evidence at all times. The easternmost islands have a fauna typical of the Alaskan mainland to the east; the western islands have Asiatic features. Olaus Murie described the Aleutians as a "melting pot for faunal elements from two continents not yet reaching an equilibrium."

The sea otter, a marine mammal that bears the world's most valued fur, makes its principal home in the waters off islands in the chain. Once almost extinct from years of overhunting, strict protection has brought its numbers back to nearly 20,000. Another and much larger sea mammal, the northern sea lion, is common.

Unimak Island, an ecological extension of the Alaska Peninsula, is a closely managed stronghold of the brown bear. The island has over 1,000 caribou, and wolves and wolverines are common. Mammals like voles, shrews, lemmings, ground squirrels, and



Aleutian Canada geese on the steep slopes of Buldir Island.

weasels are scarcely to be found west of Unimak.

Foxes have an interesting history in the islands. Formerly, the blue phase of the arctic fox was found only on Attu, and the red fox from Umnak east. Principally during the 1915-25 period and later, blue foxes were introduced on most of the Aleutians, converting them into a commercial fur farming enterprise utilizing wildlife for food. Complete removal of the introduced foxes is necessary to restore native bird life. This has already been done on Amchitka, Agattu, and Alaid-Nizki Islands with a prompt and striking increase in wildlife of the islands.

Another unfortunate result of modern occupation of the islands has been the introduction of Norway rats on many islands, probably chiefly during World War II. These voracious rodents have a serious effect on nesting birds. The possibility of eliminating them seems remote.

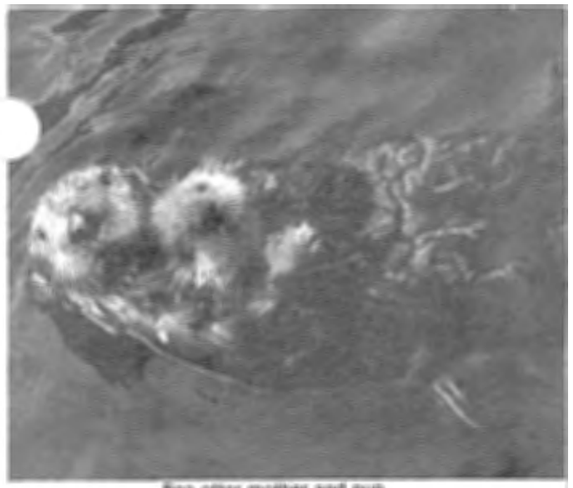
The most obvious feature of Aleutian wildlife is the large quantities of colonial sea birds. Hundreds of thousands, perhaps millions, congregate in vast nesting rookeries — fulmars, two species of petrels, three species of cormorants, black-legged kittiwakes, glaucous-winged gulls, guillemots, murres and murrelets, six species of auklets, and two species of puffins. Three species of loons are easily found — common, arctic, and red-throated.

Great numbers of waterfowl winter in and among the islands, mostly oldsquaws, king eiders, and harlequin ducks. Of all the emperor geese in the world, about half winter on the refuge. During the summer, common teal (a Eurasion bird), mallards, pintails, greater scaups, mergansers, and common eiders nest on the islands. Formerly the Aleutian Canada goose lived on all the islands from Amlia west; now it is found only on tiny Buldir Island, which escaped fox introductions. It is now one of the world's rarest birds, but habitat restoration is progressing toward ultimate restocking of its former breeding range.

The bald eagle is resident in substantial numbers. The peregrine falcon is common, and some gyrfalcons are to be found. Some shorebirds nest in very large numbers, primarily black oystercatchers, rock sandpipers and northern phalaropes. The rock ptarmigan is found throughout the refuge, and there are willow ptarmigans on Unimak. Among the small land birds, winter wrens, gray-crowned rosy finches, Savannah, fox and song sparrows, Lapland longspurs, and snow buntings are abundant. A number of Asiatic birds have been found including the whooper swan, falcated teal, Steller's sea eagle, wood sandpiper, black-tailed godwit, slaty-backed gull, black-headed gull, oriental cuckoo, eyebrowed thrush, arctic warbler, Siberian rubythroat, gray-spotted flycatcher, white, gray and yellow wagtails, brambling, and rustic bunting.

Streams issuing from the islands are used by large numbers of spawning salmon, and make a significant contribution to the numbers of these valuable food fish.

Thick-billed murres are among the sea birds that nest abundantly on the Aleutian Islands.



Sea otter mother and pup.

Owing to their isolation and the lack of commercial travel service, the Aleutian Islands are difficult to visit. There is scheduled air service to Cold Bay, Dutch Harbor, Adak, Shemya, and Attu. Hotel and restaurant accommodations are found at Cold Bay, and Dutch Harbor.

Military clearance is necessary to visit defense installations. Information concerning the refuge not available in this leaflet may be obtained from the Refuge Manager, Aleutian Islands Unit, Alaska Maritime National Wildlife Refuge, Box 5251 NAVSTA, FPO Seattle WA 98791.

BOGOSLOF NATIONAL WILDLIFE REFUGE, established in 1909, is administered from the Adak headquarters. It consists of two rocky islands totaling 390 acres lying about 30 miles north of Umnak Island. It has a northern sea lion herd of about 800 animals and contains important sea-bird rookeries.

All photographs by Karl W. Kenyon, BSFW.

In its assigned function as the Nation's principal natural resource agency, the Department of the Interior bears a special obligation to assure that our expendable resources are conserved, that renewable resources are managed to produce optimum yields, and that all resources contribute their full measure to the progress, prosperity, and security of America, now and in the future.

758-82

ALEUTIAN ISLANDS UNIT

ALASKA MARITIME NATIONAL WILDLIFE REFUGE

Upper—Mount Gareloi, an active volcano on Gareloi Island (west of much larger Tanaga Island).
Lower—Northern sea lions on Sea Lion Rock, Amak Island.

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

Washington • Issued 1966 • RL-522

BERING SEA UNIT

ALASKA MARITIME NATIONAL WILDLIFE REFUGE

Homer, Alaska

ANNUAL NARRATIVE REPORT

Calendar Year 1983

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

Personnel

Refer to the Homer Office Section

Review and Approvals

Submitted by	Date	Regional Office	Date

BERING SEA UNIT
Alaska Maritime National Wildlife Refuge

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A. Highlights

About 4,500 acres of land on St. Matthew Island was conveyed to several Native organizations in August amidst strong protests by environmental group.

B. Climatic Conditions

In 1981 a remote meteorological station was installed on St. Matthew Island. The station was installed by Brown and Caldwell, a consulting engineer firm under contract from several oil companies doing exploratory work in the Northern Bering Sea. The station transmits air temperature, barometric pressure, wind direction and speed, and north and east wind components. Only several months data are available from the station as the information became unnecessary later in 1983. Brown and Caldwell contacted us in July asking if the weather information used by us warranted the continued existence of this station on the Wilderness area. We told them the station would have to be removed if they no longer needed the information or maintained the equipment themselves. The land on which the station exists was transferred to the Cook Inlet Region, Incorporated (CIRI) group in August. No other weather data is available from the Bering Sea Unit.

C. Land Acquisition

1. Fee Title

In 1982, about 3,000 acres of wildlife habitat on the Pribilof Islands were purchased from the Aleut Regional Corporation for $1,920.000. Under Section 11417 of ANILCA, a total of $5,200,000 are to be used to purchase a total minimum acreage of 8,000 of seabird habitat. This year our Realty Office has been negotiating the purchase of the remaining 5,000 acres. It appears both St. Paul and St. George Villages are unsatisfied with their share as both villages are suing the Fish and Wildlife Service to put the money for the remaining acreage in an escrow account prior to the purchase being deeded. We own the 3,000 surface acres already purchased, the Natives own the subsurface but cannot exploit it while we have surface jurisdiction.

D. Planning

1. Master Plan

Refer to Homer Office Section.

5. Research and Investigations

Comparisons of Discarded Shells in the Subtidal Feeding Grounds of Walrus with Shells washed onto Adjacent Beaches (AKM-22-83).

No written report was received from Dr. John Oliver of Moss Landing, California. He indicated on the telephone that mainly the Pribilof Islands were used to determine shell density and distribution on beaches and in littoral areas. Walrus, whales, and sea otters feed on clams differently, which is revealed by examining shell fragments. Evidence at St. Matthew indicated moderate to heavy feeding by walrus on amphipods and tube-dwelling worms. Divers sampled walrus feeding areas so correlations could be made with shell fragments on nearby beaches. They plan to use side-scanning sonar in future years to sample larger areas used by walrus.

Population changes in the Common murre: differentiating between natural influences and competition with commerical fisheries.

Dr. Edward Murphy, Institute of Arctic Biology-University of Alaska, continued monitoring murres, and to a lesser extent Black-legged Kittiwakes, nesting on the cliffs at Bluff in Norton Sound. Although we did not provide funds for Dr. Murphy's continuation of this project in 1983, we did assist him by granting him "volunteer" status, thereby covering his logistical costs.

He and his associates have documented major declines in numbers of murres at Cape Thompson in the Chukchi Sea and downward trends in numbers at Bluff in Norton Sound. Reproductive success at Bluff is highly correlated with climatic conditons during the breeding season and is high in warm summers. Historical climatic data indicate that summers have been relatively cool in the past two decades. Thus a plausible hypothesis is that numbers at the Bluff colony have declined as a result of poor reproductive success in the past two decades.

Other studies have shown that mortality of subadult and adult murres is seasonally confined primarily to the winter months. Murres from colonies in northwestern Alaska over winter in the Bering Sea and feed primarily on Walleye Pollock. Pollock have been the focus of an intensive commercial fishery effort in the past two decades. Thus an alternative hypothesis for the observed decline in murre numbers is that human exploitation of pollock has resulted in sufficient ecological

competition with murres to depress survivorship and thus reduce numbers of murres in the past 20 years.

These two hypothesis must be differentiated and the first hypothesis, based on reproductive success, must be tested through field observation and simulation analyses of population numbers over the next four years. Since 1979 at the Bluff colony, summers have been exceptionally warm, and reproductive success has been high. This past summer was the warmest on record in the region.

Preliminary analysis of 1983 data reveal that murre poduction was fairly good. Kittiwakes, however, experienced poor reproductive success. Hatching success was near average but few chicks fledged. Apparently the unusually warm water in the Bering Sea caused a shortage or inavailability of forage fish in this region similar to that at Middleton Island and elsewhere. The kittiwake population in the Pribilofs also largely failed to reproduce in 1983 (G. Hunt, pers. comm.). Hundreds of adult kittiwakes also were found washed ashore north of Kotzebue in late August and early September; they evidently starved.

Overfishing probably is the most significant and insidious threat to seabirds, and Dr. Murphy's project is most relevant in terms of the management of marine birds and mammals. It does little good to spend thousands of dollars to eradicate foxes from islands to restore seabird nesting habitat if there is an insufficent prey base to support them. A simulation analysis indicates that numbers should increase over the next three years, beginning in 1982, if annual variability in reproductive success is the primary cause of changes in numbers. Since both pollock abundance and pollock catch per unit effort have continued to decline in recent years, murre numbers should continue to decline, rather than increase, in the next three years if the competition hypothesis is plausible. Dr. Murphy needs to further refine the relationship between reproductive success and environmental conditions during the breeding season and to test the reproductive success hypothesis.

<u>Breeding biology of seabirds on St. Matthew Island</u> (AKM-15 and 16-83).

A four-person field crew, consisting of Art Sowls, David Irons, Daria Carle, and Shelli Vacca arrived at St. Matthew Island on May 29 and departed the island on August 11. They operated out of a base camp at Bull Seal Rock Beach on the northwest side of the island.

The major accomplishments on St. Matthew Island were the establishment of permanent population monitoring plots for seabirds, continued monitoring of three walrus haul-out areas using time-lapse cameras, and investigating and comparing different census techniques of Least Auklets.

Approximately 82 permanent population monitoring plots were established on St. Matthew and Hall islands. Of these, 41 are for cliff-nesting species, principally Northern Fulmar, Black-leggd Kittiwake, Common and Thick-billed murres, Glaucous Gulls, and Tufted Puffins. Forty permanent plots were established for talus-nesting species, principally Least and Crested auklets.

Least Auklet census techniques were investigated at the Bull Seal auklet colony. Sixty-five birds were captured, banded, and dyed with picric acid. Censuses were taken using either a Lincoln Index method, the net movement method (Condor 85-274-280, 1983), and/or the Bedard method (Condor 71: 386-398, 1969). Time-lapse cameras were used very successfully to monitor attendance patterns of the colony. Event recorders were used to monitor attendance patterns of individual pairs with varied success. Twelve Least Auklets were collected in order to measure gular pouches, collect stomach contents, and determine sex of the individual.

Least Auklets, Pigeon Guillemots, Tufted Puffins, Thick-billed Murres, Northern Fulmars, and Black-legged Kittiwakes were collected (five species of each) and frozen for later use in analysis of heavy-metal contaminants.

Beached bird surveys were conducted weekly on the beach between Bull Seal Rock and the auklet colony.

Three walrus haul-out areas were monitored throughout the summer with time-lapse cameras. In order to obtain data on walrus populations during the fall and winter, the camera on Hall Island was reinforced and left in operation. St. Matthew Island was circumnavigated three times by Zodiac to census walrus and other marine mammals. Species observed were walrus, Steller's sea lions, largha seals, and gray whales.

Fewer walrus used the haul-out areas this summer compared to the summer of 1982. The decline could be attributed to reduced numbers in the overall population, reduced food supply around the island, or to the increased boat activity around the island this summer.

Human activity was much greater this summer than the summer of 1982. The increase in human activity was due principally to the boat and air activities connected with the COST well that was located west of St. Matthew Island.

Other accomplishments were the observance of four new bird species for the island (Cliff Swallow, House Martin, Black-backed Wagtail, and Greater Yellow-legs); collections and expansion of the plant species, including a range extension of fern _Athyrium filix femina_ and verification of 48 new species of lichen; and the continuance of a breeding biology and ecology study of the McKay's Bunting.

David Roseneau, a consultant with LGL Ltd. in Fairbanks, also did concurrent studies on St. Matthew's seabirds. Though no written report was received in time for inclusion in this report, Roseneau related that Crested Auklets virtually failed to nest on St. Matthew in 1983. Usually about 200,000 are present but few adults were seen, and the few nests checked all failed. Least Auklet nesting success, on the other hand, was better this year than in 1982. Parakeet Auklets are too scattered to detect any significant difference in numbers or productivity. Like in most other colonies in the Bering sea, Black-legged Kittiwakes again met with reproductive failure. Nesting commenced normally, eggs were laid, and chicks hatched, but when most young became about 8-10 days old, food resources apparently collapsed, and nearly all chicks subsequently starved; adults left the cliffs by early August. Many dead adult kittiwakes washed ashore north of Kotzebue in early September, evident victims of starvation. Curiously, kittiwakes seemed to be doing well prior to fledging at Cape Lisburne, but actual fledging success was not witnessed. Reproductive success of murres on St. Matthew appeared about average in 1983.

E. Adminstration

1. Personnel

Refer to the Homer Office Section.

4. Volunteer Program

Two volunteers, Dr. Ed Murphy, and Bob Day from the Institute of Arctic Biology, University of Alaska, Fairbanks were put on in this Unit working in the Bluff area. They are conducting a research project on seabirds in this area. More details are under section D.5.

5. Funding

Refer to the Homer Office Section.

6. Safety

Refer to the Homer Office Section.

F. Habitat Management

1. General

No habitat inventory or habitat manipulation occurred in this unit comprised of islands scattered in the Bering Sea.

2. Wetlands

The spit on the west side of Hagemeister Island partially encloses mud flats and eelgrass beds heavily used by waterfowl and shorebirds. Ponds are found on most of the larger islands.

6. Other Habitats

Tundra associations prevail on all islands; alder and willow thickets occur on certain hillsides and along streams on Hagemeister Island.

7. Grazing

Natives received permission from the BLM to graze reindeer on the 52,400 acre Hagemeister Island in 1965. With passage of ANILCA on 1980 we gained jurisdiction of the island and the grazing permit. Presently we are following BLM's guideline of allowing a maximum population of 450 reindeer on the island. We are charging only a $10.00 Administration Fee as per 43 CFR. We have had conflicting view points on this fee rate and hope to soon get clarification from the Regional Solicitor's Office.

Aerial counts of reindeer were made on Hagemeister in July and November and the estimated total population was 770 animals. This is the first time AMNWR personnel censused reindeer on Hagemeister and the first time an aerial census has been conducted since 1980. Portions of the island show heavy use with deeply rutted trails and associated overgrazing. The permittees will be contacted and told to remove the excess animals.

Summary of Censusing Reindeer on Hagemeister Island 1966-1983

Year	Number Censused	No. Slaughtered
1966	80	--
1967	234	--
1968	234	--
1971	1,011	1,290 lb.
1972	435*	285 deer
1973	360	88 deer
1974	867	3,215 lb.
1975	867	159 deer
1976	854	535 deer
1977	760	355 deer
1978	600*	97 deer
1980	650*	--
1983	770	--

*BLM Aerial Census
*FWS Aerial Census

Over the years little or no reindeer herding has been accomplished. The southern half of the island incurs most of the use and therefore conditions in this area are worse. Hagemeister is not a real productive island from a wildlife standpoint. The only concentration of wildlife occurs on the southern tip where a seabird colony exists on the cliffs. Reindeer are commonly found on the beaches in the area and may trample some of the fledging seabird chicks as they wander the shoreline prior to going to the ocean.

Concentration of reindeer on the south side of Hagemeister Island. The animals appear to concentrate on beach areas to escape biting insects in the summer months. E. Bailey

Reindeer trails on Hagemeister Island. Most extensive use and habitat damage was noted on the south side of the island during the July reconnaissance. N. Faust

Black-legged Kittiwake young litter the beach below a colony site on Hagemeister Island. Reindeer have trampled most of the birds but whether they died previously is presently unknown. E. Bailey

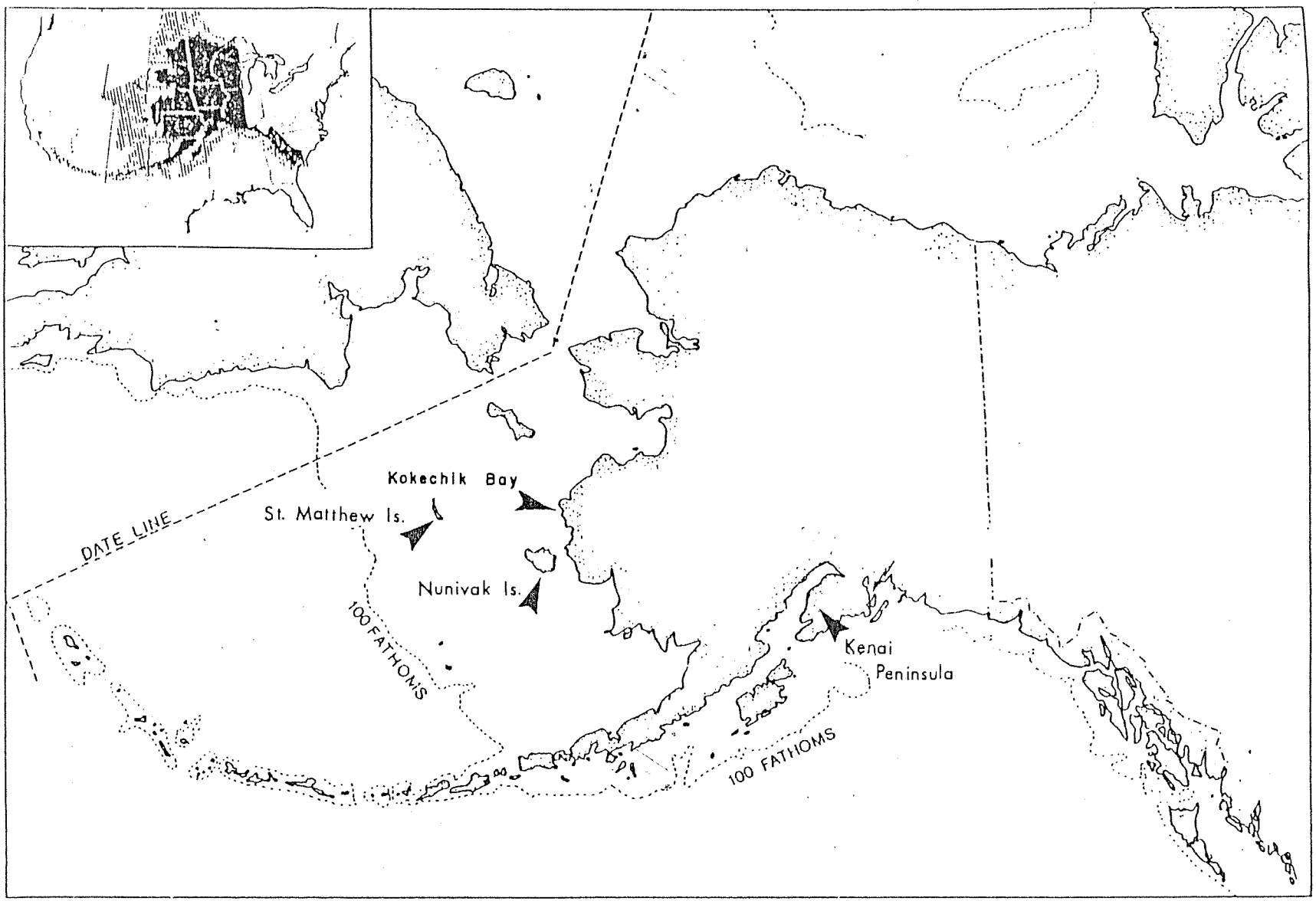
View of Alaska's longest spit. This 5 1/2 mile spit on Hagemeister Island is one of our beached animal survey transects and is also a possible nesting site for terns. The photo is looking west from just below the island's highest peak. N. Faust

12. Wilderness and Special Areas

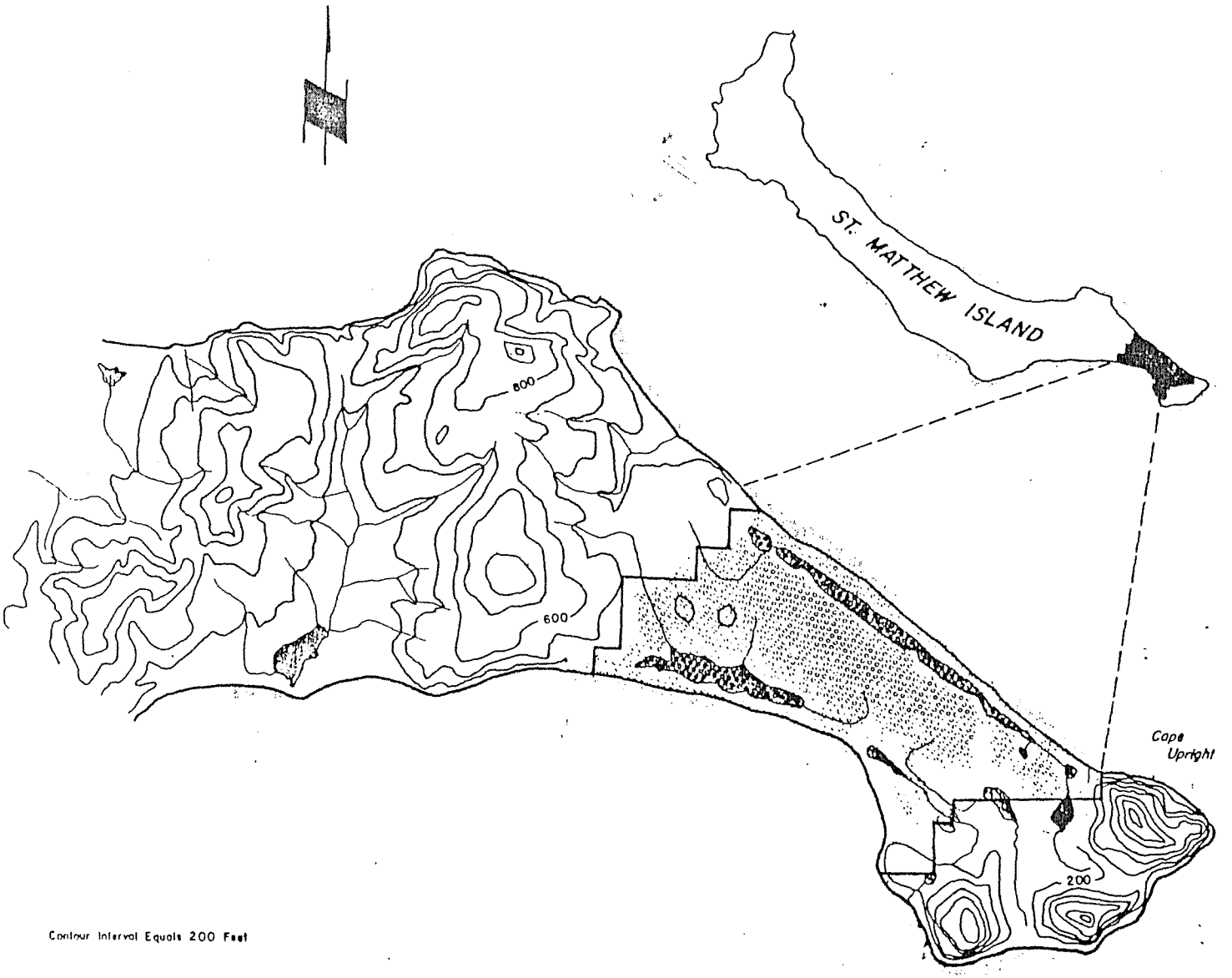
The St. Matthew , Hall, and Pinnacle Islands (Bering Sea NWR) were designated wilderness in 10/23/75 and contain a total of 81,340 acres. This is the only wilderness area in the unit.

On August 10, 1983, approximately 4,110 acres of designated wilderness lands on St. Matthew were exchanged for fee title to 5,937 acres of land on Nunivak Island (Yukon Delta NWR) and on the Kenai NWR. The U.S. will also acquire a perpetual non-development easement on 8,238 acres in the Kokechik Bay region of the Yukon Delta NWR. The exchange took place between the USDI and three Native Corporations: Cook Inlet Region, Inc., Calista Corporation, and Sea Lion Corporation (the CIRI Group).

In September, 1981 the Cook Inlet Region, Incorporated originally proposed the exchange through Section 1302 of ANILCA. The CIRI Group plans to develop the St. Matthew land as or support base for oil and gas exploration and production



Location of the Kenai Peninsula, Kokechik Bay, St. Matthew Island and Nunivak Island.



St. Matthew Island. The shaded area will be conveyed to the CIRI Group.

in the Navarin Basin, part of the Bering Sea outer continental shelf. The lands on St. Matthew that are conveyed will be subject to certain stipulations designed to minimize impacts to the environment and to provide that the lands be restored and returned to the Refuge when the support base is no longer needed.

The following brief summary of stipulations are included as covenants in the document which conveys land on St. Matthew to the CIRI Group.

1. The CIRI Group will comply with all permitting requirements under Federal and State laws.

2. Prior to constructing or utilizing any improvement on the Real Estate, CIRI shall consult the Regional Director, FWS.

3. If and when a support base is established on the island the CIRI Group shall support the FWS by providing:

a. Food and lodging for two persons on a year-round basis and for one additional person for the May 15-October 15 period.

b. Transportation of personnel from regular mainland facility.

c. Space for personnel use.

d. Use of or passage in support base aircraft, small vessels, trucks or snowmobiles.

e. Use of small tools and consumables.

f. Use of same on-site services as provided to other camp personnel.

4. If base is not in operation, FWS will have access to reasonable usage of food, shelter, small tools, and consumables, trucks and snowmachines.

5. All operations are to be conducted in a manner that reasonably minimizes adverse environmental consequences.

6. CIRI will restore the real estate as per a reclamation plan approved by the Regional Director.

There is still some controversy on the exact boundaries of the Bering Sea Subunit of the Refuge (St. Matthew Island complex). The Federal Register of Thursday, February 24, 1983 indicate the boundaries extend seaward as indicated in Executive Order number 1037, dated February 27, 1909 which establishes the Refuge. Presently the boundaries are being reviewed by the Solicitor's Office.

G. Wildlife

1. Wildlife Diversity

The islands in the Bering Sea have fewer species than in the Gulf of Alaska and off the Alaska Peninsula, but probably more than in the Chukchi Sea Unit.

2. Endangered and /or threatened Species

Arctic Peregrine Falons may occasionally visit some of the islands in the Bering during migration. Endangered Species personnel from the Regional Office confirmed nesting by Arctic Peregrines on refuge lands at Bluff. We do not know if the nest was successful.

3. Waterfowl

Eiders, scoters, Oldsquaws, and other waterfowl use the ponds on St. Matthew and other islands.

The shoals inside Hagemeister Spit contain abundant eelgrass and thus are frequented by large numbers of waterfowl, mainly Steller's Eiders and Oldsquaws. In fall migration this area probably is heavily utilized by Brant and Emperor Geese.

4. Marsh and Water Birds

Loons, grebes, and related species use ponds on Hagemeister and other islands.

5. Shorebirds

The mud flats inside the Hagemeister Spit are used by numerous shorebirds; we saw 16 species in the area, of which Black-billed Plover, Lesser Golden Plover, Whimbrel, Ruddy Turnstone, Western and Least sandpiper, Rock Sandpiper, and Arctic and Aleutian tern were among the most common.

6. Raptors

Ten bald eagles and one active nest were observed on Hagemeister Island.

7. Other Migratory Birds

Seabirds - Insular Surveys

Between 29 July and 3 August a survey of Hagemeister Island was made principally to enumerate introduced reindeer and seabirds. Information obtained concerning the island's nearly 800 reindeer and their habitats are discussed in the section on "grazing".

Since red foxes inhabit this mountainous 77,000 - acre island in Bristol Bay, nesting seabirds are relegated to cliffs, which are mainly on the rugged southern end of the island. The only previous systematic survey of Hagemeister Island was conducted in 1977 concurrently with the adjacent Walrus Islands, a state game sanctuary. In 1977 Arneson (ADF&G) estimated over 31,000 seabirds, representing nine species and comprising eight colonies, nesting on the island. This compares with our estimate of nearly 26,000 birds comprised of eight species in 12 sites or colonies (Table 1).

The apparent decline probably is not real, because of different observers and methods of estimation and because our survey was three weeks later than Arneson's. The disparity in the number of colonies reported in 1977 and 1983 largely lies with how colonies are separated or defined along the cliffs on the south side. One definitely distinct cormorant colony reported by Arneson on the north side was not present in 1983. One would expect fewer birds around August 1 at the time of our visit because of the likely departure of some failed breeders and nonbreeders. Comparisons between 1977 and 1983 (Table 2), disregarding the difference in observers and dates, reveal that our estimates were lower for all species except for kittiwakes. However, when Arneson's actual counts of nests or birds rather than his estimates are compared with our counts, our estimates are higher for all species except Parakeet Auklets. For example, Arneson's final total estimate for murres in which he attempted to adjust for breeding birds away from the cliffs and for birds on the cliffs he missed was triple his initial counts. Our figures, except for being rounded off high, are not inflated to reflect unkown numbers of birds feeding at sea or nests not visible. Hence, it appears that no significant overall population change has occurred at Hagemeister Island since 1977. Nevertheless, there may have been an increase in numbers of kittiwakes, the most numerous species in 1983 and one of the species for which our data and Arneson's show considerable disparity. Unlike elsewhere in the Bering Sea, kittiwakes successfully reproduced on Hagemeister.

Common Murres were the second most abundant nesting seabird in 1983 (Table 1). Judging from the few chicks observed, productivety was very poor, a contrast to Bluff and other areas in the Bering Sea where they did relatively well.

Pelagic Cormorants were the third most numerous species nesting on Hagemeister both in 1977 and 1983, though some individual colonies differed greatly between surveys. A few Red-faced cormorant nests were found in 1977, but we found none. Pigeon Guillemots are the most widely scattered species on the island; scattered pairs of Horned Puffins also are present. A small Parakeet Auklet colony exists at Clam Point. This species is particularly less evident around colonies later in the nesting period.

Species	Section 14 (east side)	Section 23	Section 2	Section 4	Clam Point	Islet North of Clam Point	Section 31 (SW side)	Section 25 (Point)	Section 25 (Islet)	Section 19 (Islets)	Section 3	Section 34 -35	Total
Pelagic Cormorant	30		360	70			120	80		30		720	1,410
Glaucous-winged Gull	10		20			10	20						60
Black-legged Kittiwake						200		1,900	30	12,000			14,130
Common Murre						1,000			3,500	5,300			9,800
Pigeon Guillemot	10	10	10	6	30						50		116
Parakeet Auklet					40								40
[illegible] Puffin	10		10		100						20		140
[illegible] Puffin	6		10		40								56
Total	66	10	410	76	210	1,210	140	1,980	3,530	17,330	70	720	25,752

Table 1. Estimated breeding seabird populations on Hagemeister Island.

Table 2. Total estimated breeding seabirds on Hagemeister Island, Alaska, in 1976 and 1983.

Species (9)	1976 (Arneson)	1983 (Bailey)
Pelagic Cormornat	2,350	1,410
Red-faced Cormornat	20	0
Glaucous-winged Gull	350	60
Black-legged kittiwake	11,300	14,130
Common Murre	16,500	9,800
Pigeon Guillemot	120	116
Parakeet Auklet	320	40
Horned Puffin	220	140
Tufted Puffin	40	56
Total	31,220	25,752

We found Rock and Willow ptarmigan and 10 species of passerine birds on Hagemeister.

9. Marine Mammals

Fur seals, Steller's sea lions, harbor seals, and walrus are the principal species using these islands.

Marine mammals are scarce at Hagemesiter Island, as only 95 harbor seals and one sea lion were recorded. We found 27 decapitated walrus around the island. Probably most originatd from the nearby Walrus Islands. Many carcasses had bullet holes, but it was not possible to determine whether any walrus had been shot on the island. A beached bird and mammal survey was conducted on the Hagemeister Spit; a total of 31 birds and 8 marine mammals was counted in eleven miles of beach examined. Similar surveys in Homer and the Barren Islands revealed practically no carcasses.

11. Fishery Resources

Seabird mortality in Japanese fishing nets in the Bering Sea increased significantly in 1983 and exceeded 260,000 birds.

14. Scientific Collections

Special Use Permit AKM-23-83 was issued to the University of Alaska Museum to allow collecting of bird and mammal specimens. These collections will be used to gather both systematic and biogeographic information for various species.

The complete list of animals collected. follows:

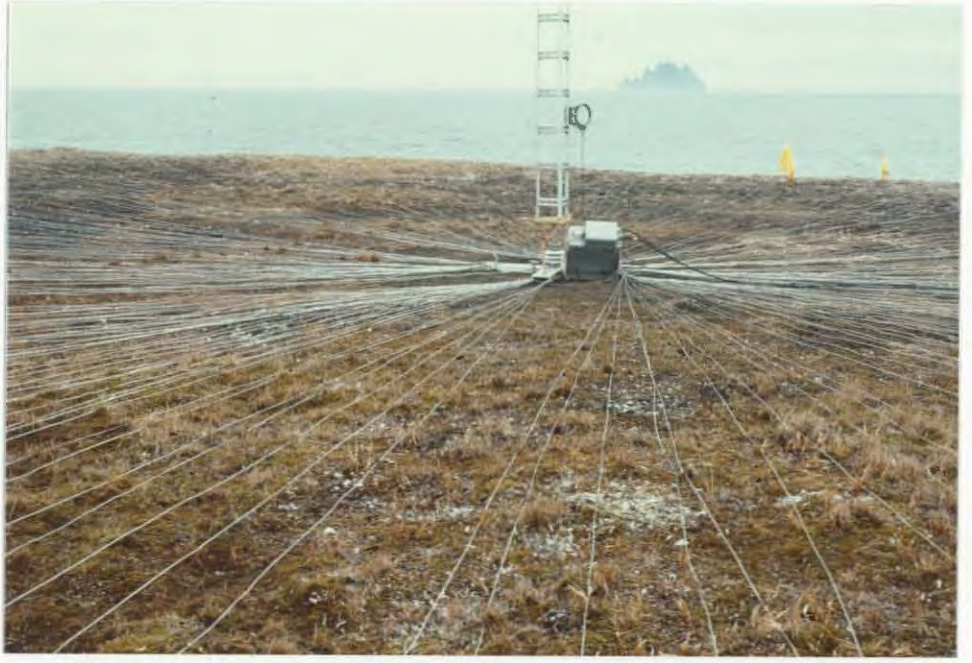
Date	Species	Collected	Age	Sex
6/30	Rock Sandpiper	2	Ad.	M
6/30	Rock Sandpiper	1	Ad.	F
8/2	McKay's Bunting	1	Juv.	F
6/29	McKay's Bunting	1	Ad.	F
6/29	McKay's Bunting	3	Ad.	M
6/30	Rosy Finch	1	Ad.	M
8/2	Rosy Finch	1	Ad.	M
8/2	Rosy Finch	1	Juv.	M
-	*Microtus abbreviatus*	4	Var.	Var.

H. Public Use

17. Law Enforcement

On September 29, we issued Marinav, Inc. a Notice of Violation for not adhering to the conditions of Special Use Permit AKM-6-83. The company set up a navigation tower on St. Matthew Island after the date stipulated on the permit. This date was established to eliminate disturbance to breeding seabirds occupying the cliff faces immediately below the point where the tower was situated. The violation was noted by FWS (WA) personnel on the island and reported to the Homer Office in July. The violation notice was written only after getting responses from the company and further questioning the FWS personnel involved. On October 10, 1983, the $250.00 fine was paid by the company. We realize the amount of the fine is insignificant but the fact that admission of a violation was made will influence issuance of permits to this company in the future and may also set a better precedent for permit compliance by other companies and agencies.

View of the Navigation tower put up by the Marinav Company on St. Matthew Island in violation of the Special Use Permit. The fine was paid by the company. D. Irons



Ground view of a typical Navigational tower site on St. Matthew Island showing the numerous ground leads necessary for effective signals. Pinnacle Island is in the background.
A. Sowls

J. Other Items

1. Credit

Refer to the Homer Office Section.

K. Feedback

Refer to the Homer Office section.

CHUKCHI SEA UNIT

ALASKA MARITIME NATIONAL WILDLIFE REFUGE

Homer, Alaska

ANNUAL NARRATIVE REPORT

Calendar Year 1983

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

Personnel

Refer to the Homer Office Section

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A. Highlights

A large die-off of seabirds was noted in Kotzebue Sound in the fall.

A controversial guiding permit was issued on Cape Lisburne and Cape Thompson areas under objections of the Tigara Native Corporation.

B. Climatic Conditions

Presently no weather records are available for this unit. Begining in 1984, the National Weather Service will provide the station with information collected by the Cape Lisburne Air Force Station.

D. PLANNING

1. Master Plan

Refer to the Homer Office Section.

E. Administration

1. Personnel

Refer to the Homer Office Section.

5. Funding

Refer to the Homer Office Section.

6. Safety

Refer to the Homer Office Section.

8. Other Items

A trip was made to the native village of Point Hope in August in an attempt to defuse a tense situation caused by the issuance of a Special Use Permit to a commercial hunting guide in the Chukchi Sea Unit. The permit covered lands in the Cape Thompson and Cape Lisburne areas but did not include any Native or State selected lands or allotments. The permit was issued only after talking with the Alaska Department of Fish and Game, several subsistence specialists in the area, and the Tigara Corporation (Point Hope Village). The Tigara Corporation claimed the activity interfered with subsistence use on their traditional hunting areas. Interviews were held with individuals from the community and only about one-third of those interviewed objected to the permit. The main contention of objection was because the permittee was from

outside the village area, he used aircraft for spotting animals and for access to the remote areas, and he did not bring any revenues into the local community. Most admitted that the permittee's take prior to ANILCA hadn't amounted to a great deal from their lands. A slide presentation was presented on the general objectives and activities of the AMNWR at the Tigara Corporation's regular monthly meeting in August. Most of those present at the meeting appeared to understand why we were obligated to issue the permit under terms of ANILCA but still resentful of it being done.

F. Habitat Management

1. General

No habitat manipulation is practiced in this area dominated by arctic tundra.

2. Wetlands

Small lagoons and ponds occur in the northwest corner of the Cape Lisburne area and in the Ogotoruk drainage near Cape Thompson.

12. Wilderness and Special Areas

The only area in the Chukchi Sea Unit designated as Wilderness is the Chamisso Island Complex in Kotzebue Sound. This 455 acre area was designated as Wilderness in January, 1975. Other areas not designated Wilderness are mostly still pristine.

G. Wildlife

1. Wildlife Diversity

This unit has much less diversity of species than any of the other units to the south. Studies in the Ogotoruk Valley and offshore revealed 121 species of birds.

2. Endangered and/or Threatened Species

Arctic Peregrine Falcons probably migrate through the area and nest at Cape Lisburne or Thompson. *Erigeron murri*, a threatened plant, occurs at Cape Thompson.

3. Waterfowl

Small coastal lagoons and freshwater ponds in parts of the Cape Lisbrune and Thompson areas host many species of migrants, especially brant, eiders, oldsquaw, and scoters.

6. Raptors

Occasional breeders include Golden Eagle, Gyrfalcon, Peregrine Falcon, and Rough-legged Hawk.

7. Other Migratory Birds

Eight species of seabirds use the area; murres and kittiwakes comprise the vast majority.

On September 13 the Refuge Manager of Selawik National Wildlife Refuge reported observing and hearing of unusual numbers of dead seabirds in the area of Kotzebue Sound. We authorized the payment of nearshore flight of the area including Cape Thompson. A total of 595 kittiwakes, 34 shearwaters, 4 murres, and 2 gulls was observed from the air. Seven birds, including 5 kittiwake and 2 shearwaters, were collected and sent to FWS Research in Anchorage. All dead birds handled and observed closely were extremely emaciated. Tentatively we believe the unusual mass mortality is associated with the recent El Nino and most birds starved. Recent mortality and unusual behavior of seabirds have been noted in other areas of the world.

8. Game Mammals

A few grizzly bears, moose, caribou, wolves, and wolverines roam through the Cape Lisburne and Thompson areas. Muskoxen also occasionally are present, as are polar bears, mainly off the coast on pack ice. Twenty-one species of mammals have been recorded in the Cape Thompson area.

9. Marine Mammals

Fifteen species of marine mammals occur along the coast and many may haul out on refuge beaches.

14. Scientific Collections.

The only collections made this year involved those associated with the mass mortality of seabirds in the Kotzebue Sound Area. Five Black-legged Kittiwakes and two shearwater species were picked up dead and sent to Denver Wildlife Research Center, Anchorage for autopsy.

H. Public Use

7. Other Interpretive Programs

In late August a slide talk was presented to the Tigara Native Corporation of Point Hope. The program was a general description of our activities and objectives of the entire Refuge but concentrated on work in the Cape Thompson and Cape Lisburne areas.

17. Law Enforcement

ARM Early is the only individual on the staff with Law Enforcement authority. No LE related activity has been done on this unit due primarily to logistics, manpower, and limited activity.

J. Other Items

3. Credits

Refer to the Homer Office Section.

K. Feedback

Refer to the Homer Office Section.

GULF OF ALASKA

ALASKA MARITIME NATIONAL WILDLIFE REFUGE

Homer, Alaska

ANNUAL NARRATIVE REPORT

Calendar Year 1983

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

Personnel

Refer to the Homer Office Section

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A. Highlights

Highly visible and productive Gull Island in Kachemak Bay was found to be included within the Refuge.

Several beached animal transects were established in the unit in an effort to monitor seabird and marine mammal mortality.

B. Climatic Conditions

The Homer office of the National Weather Service sends us monthly weather records. Even though Homer is somewhat sheltered from heavy rainfall amounts and cloudy weather, major weather patterns effecting the unit can be assessed. We are scheduled to receive weather data in 1984 from stations on Kodiak and Yakutak which should be more indicative of this geographically and enviromentally diverse unit.

Listed below are climatological data from the Homer office of the National Weather Service.

Meteorological Data - Homer 1983

	Ave. Temp				Precip.		Ave.
Month	Max.	Min.	Ave.	Norm.	Total Water	Snow	Wind Sp.
Jan.	28.0	18.5	23.3	21.4	1.46	11.0	8.8
Feb.	35.6	25.0	30.3	24.9	1.57	1.1	7.0
Mar.	41.9	30.4	36.2	27.6	0.67	0.1	6.8
Apr.	43.8	33.0	38.4	35.0	1.05	1.0	8.8
May	50.7	41.5	46.1	42.3	0.54	---	8.2
Jun.	57.6	45.9	51.8	48.7	0.49	---	8.6
Jul.	60.5	48.7	54.6	52.3	1.00	---	8.0
Aug.	60.4	47.8	54.1	52.4	2.20	---	8.8
Sep.	53.0	40.5	46.8	47.0	1.96	---	9.3
Oct.	43.7	33.8	38.8	37.4	2.43	7.7	8.9
Nov.	39.0	30.2	34.6	28.2	13.9	---	10.1
Dec.	33.5	24.9	29.2	21.4	0.22	2.9	6.6
Totals	45.6	35.0	40.35	36.5	27.49	23.8	9.9

C. Land Acquisition

3. Other

After several requests to our Realty Division, Regional Office, we've determined that tiny Gull Island located several miles off the Homer Spit in Kachemak Bay, is under our jurisdiction. This island has about 7,500 nesting seabirds

totalling eight species and is viewed by probably more people than any other seabird nesting colony in Alaska and possibly the entire North American continent. As the Homer office staff expands, more interpretive work is planned for the area.

D. Planning

1. Master Plan

Refer to the Homer Office Section.

5. Research and Investigations

Reproductive Ecology of Seabirds at Middleton Island (NR-81, AKM-17-83)

Three biologists from Wildlife Operations in Anchorage and one biologist in Anchorage with the Denver Wildlife Research Center continued monitoring nesting of seabird populations on Middleton Island for the third successive year. Although the refuge no longer owns any lands on Middleton, an island in the northern Gulf of Alaska, we do retain an easement covering most of the cliffs and headlands used by nesting seabirds. Seven species of seabirds, one species of goose, four species of ducks, and five species of shorebirds breed on Middleton Island. In 1983 a total of nearly 2700 active Pelagic cormorant nests was located, a 3% increase over 1982. The researchers demonstrated the efforts of their presence at cormorant colonies by noting that productivity of a disturbed plot was 28% below the mean of undisturbed plots in 1983.

The breeding Glaucous-winged Gull population was estimated between 800 and 1000 pairs and was similar to the previous year. Gulls preyed heavily on kittiwake chicks. A total of 55,631 Black-legged Kittiwake nests was counted, 28% and 33% fewer than was found in 1982 and 1981, respectively. Productivity for kittiwakes averaged only 0.03 prefledging chicks/nest, and only about 1,700 young were produced, compared to 39,000 in 1981.

Approximately 7500 common Murres were on Middleton's cliffs this year, 25% fewer than in 1982. Thick-billed murres comprise less than 3% of the population.

The reproductive failure of kittiwakes on Middleton was not an isolated situation, for similar failures were reported at Chisik, Semidis, Kodiak, Pribilofs, and elsewhere. Kittiwakes in the Gulf of Alaska depend on capelin and sand lance and their reproductive efforts appeared to have failed this year because increasing surface water temperatures drove forage fish into deeper water where kittiwakes were unable to capture them. Other species, such as murres and gulls, which were

relatively unaffected, were either deep divers or depended on other sources of food.

Feeding Habits and Nesting Success of Seabirds in Chiniak Bay, Kodiak Island. (AKM-21-83)

Lynne Krasnow, former FWS biologist from Anchorage and presently a graduate student at Oregon State University, conducted studies on Kulichkof and other islands just offshore from the town of Kodiak. Though all of the larger islands in Chiniak Bay have been acquired by Natives, the status of Kulichkof and some other tiny islands and rocks still are not clear and thus remain under at least interim management of the refuge.

The feeding habits and nesting success of Glaucous-winged Gulls, Black-legged Kittiwakes and Tufted Puffins in Chiniak Bay were studied from May-August 1983. Comparisons with previous studies indicated that the nesting success of each species was lower than in 1977 or 1978. Gulls nesting on Zaimka Island fledged an average of 0.02 chicks per nesting pair in 1983 compared to 1.15 in 1977 and 0.74 in 1978. Kittiwakes initiated egg laying two weeks later than in 1977 or 1978 and none of the eggs laid at Kulickikof Island survived until hatching. Productivities at this colony in 1977 and 1978 were 1.23 and 0.77 chicks fledged per nesting pair, respectively. Puffins on Cliff Island fledged an average of 0.61 chicks per pair in 1983 compared to 0.80 in 1977 and 0.76 in 1978.

The unusual mortality of kittiwakes reported by fishermen in the second half of August was attributed to starvation. Warm surface water temperatures may have altered the distribution of key prey species. Capelin was less important in the diets of kittiwakes and puffins than in 1977 or 1978 and both species of seabirds expanded their diets to include more species of fish and invertebrates. Due to their greater diving range, puffins may have been more adept than kittiwakes at finding alternate prey. The feeding habits of adult gulls were not studied in 1977 or 1978, but in 1983, the diet of this species consisted mostly of intertidal invertebrates.

Nesting Ecology of Fork-tailed Storm-Petrels in the Barren Islands(NR-81, AKM-26-83)

Dr. P.D. Boersma, Institute of Environmental Studies-University of Washington, continued her research on storm-petrels, which already has yielded several noteworthy publications since work began on East Amatuli Island in 1976; notes on the nesting success of other seabirds also were obtained.

View of sheltered bay on East Amatuli Island in the Barren Island Group. This location is the site of the camp of the University of Washington's research project. T. Early

Approximately 650 permanently marked Fork-tailed Storm-Petrel burrows, including 130 nest boxes established in 1980, were checked. A total of 138 new birds was banded and information on mate fidelity and burrow and egg size was obtained on nearly 500 birds banded in previous years, Petrels bred comparatively late in 1983. It appears that male petrels "own" the burrows and solicit for new mates, if former mates disappear; this is especially interesting since this species is monogamous and monomorphic. Throw-up samples of petrels also were collected in a continuing study on oil contamination and food habits. Previous evidence revealed that storm-petrels are good indicators of pollution events at sea.

Though not adequately quantified, the numbers of Tufted Puffins in the Barrens appeared to be extraordinarily low in 1983. In 1981 mean numbers of puffins flying through the view of a fixed spotting scope for several minute trials over a period of 5 days in late July and early August was 50 birds (range 8-120). This year at about the same location values of less than 10 birds per minute were noted. Unfortunately insufficient time prevented the checking of burrows. Curiously, Horned Puffins seemed to be present on East Amatuli in usual numbers and were much more conspicuous because of the evident paucity of Tufted Puffins which normally vastly

outnumber Horned Puffins.

The most startling and disturbing observation in 1983 was the lack of breeding cormorants. Two colonies which were examined in all past years had virtually no active nests in 1983. The numbers of breeding gulls also seemed lower. On 29 June, only 4 of 44 completed nests examined at a colony on East Amatuli contained eggs, and the few eggs present showed little development. In contrast, in 1982 on 5 July, there were already large chicks at this colony. Obviously gulls and cormorants fared quite differently in the Barren Islands than they did at Middleton Island, roughly 200 miles to the northwest.

E. Administration

1. Personnel

Refer to the Homer Office Section.

5. Funding

Refer to the Homer Office Section.

6. Safety

Refer to the Homer Office Section.

8. Other Items

A Special Use Permit was issued for commercial guiding for wildlife observations on the Barren Islands. No activity was conducted under the permit, however.

A permit was also issued to the Bureau of Indian Affairs to conduct investigations of native historical and cemetary sites on East and West Amatuli.

A commercial fishing tent camp was permitted on the west side of Zaimka Island which is located near the mouth of Women's Bay on Kodiak Island. This was the only commercial fishing site permit issued by the refuge.

F. Habitat Management

1. General

No habitat manipulation was conducted.

2. Wetlands

Ushagat Island in the Barrens has some excellent ponds, marshes, and lagoons, which are little used for nesting

because of foxes.

Fresh water lakes on islands create popular bathing and feeding spots for many bird species. These lakes are on Dark Island near Afognak Island with the Latax Rocks offshore. In the distance, the Barren Islands can be seen to the north.
N. Faust

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 three small former refuges in southeast Alaska, all forested islands were created by the Alaska Lands Act. Though no logging is warranted on any refuge islands, ANILCA specified a joint timber management between the refuge and Koniag Native Corporation on Discoverer and Delphin islands on the north side of Afognak. Massive clear-cutting is occurring on Afognak and apparently the natives want the timber on surrounding islands as well. We visited Discoverer and Delphin islands, which total about 400 acres, in July, and while merchantable Sitka spruce and western hemlock exist on both, it certainly appears economically unjustified to log these two small, rugged islands. Furthermore, when Afognak is largely stripped of timber, surrounding islands will become increasingly important to birds and other wildlife reliant on climax forest. Both islands are heavily used by Sitka black-

tailed deer and brown bear, and Delphin also has a small seabird colony and nesting eagles (see further discussion in "Wildlife" section). Delphin Island is particularly important to wildlife and has magnificent trees up to 5 feet in diameter. This island, the smaller of the two, is very precipitous and has no good landing sites; nevertheless, it is regularly used by deer hunters. If Koniag indeed intends to log these islands, the Fish and Wildlife Service surely should at least attempt to dissuade them from logging tiny Delphin, a unique island in the Maritime Refuge.

7. Grazing

A Special Use permit for grazing Bear and Harvester Islands on the north east side of Kodiak was issued. This is the final year the permittee is under the BLM lease stipulations and beginning in 1984 the fees increase from $25.00 per year for all the cattle to $2.40 per AUM. This should not have serious effects on the permittee as he only grazes about 19 head but he is protesting the fees imposed. He received water rights for his dwelling on the island early this year. The islands are selected by both the Koniag Native Corporation and the State and we only have interim jurisdiction on the area. An aerial count was conducted in the fall by Refuge Manager Martin and counts were extremely hard due to timber, and access by the animals to several buildings. Habitat damage appears to be minimal.

12. Wilderness and Special Areas

Only Forrester, Hazy, and St. Lazaria islands are designated Wilderness areas in the unit. Below is a breakdown of these areas

Island	Acerage	Designation Date
Forrester	2,832	10/23/70
Hazy	32	10/23/70
St. Lazaria	65	10/23/70
Tuxedni	5,548	10/23/70

Presently Kenai NWR is handling the Tuxedni Refuge area. The transfer of management for this island from Kenai NWR to the Alaska Maritime NWR has been locked up in litigation over trepass cabins on the island. We did provide KNWR some money and 5FTE's to cover work on Chisik Island.

G. Wildlife

1. Wildlife Diversity

Since many of the islands in the Gulf of Alaska are forested, the diversity of avifauna in this region is greater than elsewhere in the refuge.

2. Endangered and/or Threatened Species

Occasional individuals of the endangered races of the Peregrine Falcon may visit the area during migration.

3. Waterfowl

Migrating and wintering waterfowl abound around the Pye Islands and in the Barrens. Canada and White-fronted geese and Brant visit the Barrens in migration.

4. Marsh and Water Birds

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

5. Shorebirds

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

6. Raptors

Bald Eagles nest on many of the islands; Peregrine Falcon eyries have been found in the Pyes, Chiswells, Barrens, and Forrester Island. Over 50 nests have been located along the south side of the Kenai Peninsula, which includes the Pye and Chiswall islands.

7. Other Migratory Birds

Seabirds - Insular Surveys

Between 12 and 19 July we conducted a reconnaissance of the Latax Rocks and other small islands on the north and east sides of Shuyak Island and of Discoverer and Delphin islands and vicinity on the north side of Afognak.

ANILCA (Sec. 1427) included all public lands, including submerged lands, adjacent to and seaward of Afognak Island to the exterior boundary of the former "Afognak Forest and Fish Culture Reserve" as part of the Alaska Maritime Refuge. The Latax Rocks along with the nearby Barren Islands also achieved refuge status with passage of the Alaska Lands Act.

No sizeable seabird colonies exist on the areas surveyed (Table 1). We estimated nearly 1000 nesting birds, primarily Tufted Puffins, on Sea Otter Island, but we were unable to finish searching for burrows ashore or remain on the island overnight to listen for nocturnals because of the presence of a bear. In 1978, 2000 pairs of Tufted Puffins and 200 pairs of gulls were estimated on this island; hence, bears evidently

Table I. Estimated breeding pairs of seabirds between Dark Island and Perenosa Bay, Afognak - Shauyak island, Alaska.

SPECIES	Dark Island	Latax Rocks	Sea Otter	Discoverer Island	Delphin Point	Delphin Island	Waterfall Bay	Total
Double-crested Cormorant					5			5
Pelagic Cormorant		5	12		130		10	157
Red-Faced Cormorant					150			150
Black Oystercatcher		2	2			2	15	21
Parasitic Jaeger	P?							
Glaucous-winger Gull		5			5		50	60
Mew Gull	P?							
Black-legged Kittiwake		20						20
Pigeon Guillemot	5		10			10		25
Ancient Murrelet			P?					
Parakeet Auklet		5				5		10
Horned Puffin		5	25					30
Tufted Puffin			400			20	100	520
Total	5	42	449	0	290	37	175	998

P-present C-common A-abundant

have caused considerable disturbance. A few seabirds nest on Delphin Island and on the Latax Rocks; a pair of Bald Eagles nest on Delphin Island. Dark Island, which is State-owned, once was the site of a fox farm, but now foxes are absent and bears frequent it. Bears also sometimes reach the Latax Rocks, where an estimated 5000 sea lions haul out. We found a new colony of nearly 300 pairs of cormorants on a cliff near Delphin Point, where Peregrine Falcons also were observed.

Over 30 islets and rocks lie east of Big and Little Waterfall bays in the northwest portion of Perenosa Bay on Afognak. The larger islets are covered mainly by beach rye, and a few have scattered clumps of wind blown spruce. Since bears reach these islets, relatively few seabirds consistently nest there. Nevertheless, almost 3000 Tufted Puffins and 600 Glaucous-winged Gulls reportedly nested there in 1976. We counted about 150 sea otters around these islets, and an additonal 300 at the eastern entrance to Shuyak Strait.

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 and Outer islands are major sea lion rookeries and they also haul out in the Latax Rocks, Sea Otter Island, and on other islands.

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 AMNWR lands. No record of visitor use has been obtained from these operators to date; however, we plan to get more involved in either direct interpretation on these boats and more openly establish communication with the operators.

J. Other Items

3. Credit

Refer to Homer Office Section.

K. Feedback

Refer to Homer Office Section.