

ALASKA MARITIME NATIONAL WILDLIFE REFUGE

Homer, Alaska

ANNUAL NARRATIVE REPORT

Calendar Year 1984

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



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US FISH & WILDLIFE SERVICE--ALASKA



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HOMER OFFICE
ALASKA MARITIME NATIONAL WILDLIFE REFUGE
Homer, Alaska

ANNUAL NARRATIVE REPORT
Calendar Year 1984



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NATIONAL WILDLIFE REFUGE SYSTEM

REVIEW AND APPROVALS

HOMER OFFICE
ALASKA MARITIME NATIONAL WILDLIFE REFUGE
HOMER, ALASKA

ANNUAL NARRATIVE REPORT
CALENDAR YEAR 1984

John L. Martz 3/4/85
Refuge Manager Date Refuge Supervisor Review Date

James L. Mayhew 4/8/85
Regional Office Approval Date

US FISH & WILDLIFE SERVICE--ALASKA



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INTRODUCTION

The 1,400,000 ha (3,500,000 ac) Alaska Maritime National Wildlife Refuge (AMNWR) was established in 1980 by the Alaska National Interest Lands Conservation Act (ANILCA). This act added 186,000 ha (460,000 ac) of additional lands to eleven existing refuges combining practically all coastal refuge areas under one office. There are about 3,000 headlands, islands, islets, and pinnacle rocks within the refuge. These areas are used annually by about 30 million nesting seabirds representing about 75% of Alaska's seabird population.

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

The entire Alaska Maritime National Wildlife Refuge complex is administered from the port town of Homer, Alaska located on the south end of the Kenai Peninsula, about 360 km (220 mi) by road from Anchorage. There is a sub-headquarters at Adak, on the Aleutian Islands, which administers the AIU. All other units are administered from Homer. Homer receives funds from the Regional Office. Adak receives a portion of the funds from Homer and the remainder is used to manage the other units and the Homer office. Personnel are managed in much the same way with the AIU having a separate staff and the other unmanned units operating from Homer.

The sea is common to all refuge areas, but each unit has its own unique features. Lush rain forests dominate much of the precipitous small islands in the GAU; there are mountains rising directly from the sea to over 2750 m (9,000 ft) on the volcanic and treeless AIU; and treeless areas of permafrost and high coastal escarpments are found in the CSU.

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

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A. HIGHLIGHTS

The refuge permanent staff increased by two during the year with a much expanded volunteer program.

Vessel charter for 122 day program was very successful.

Open house held for office during National Wildlife Week.

D. PLANNING

1. Master Plan

The Alaska National Interest Lands Conservation Act (ANILCA) requires all Alaskan refuges to prepare a comprehensive plan. These plans are to serve as the station master plan and will be initiated by a special planning team from the Regional Office. The primary objectives of the comprehensive plans are to (a) inventory and describe the resources and values of the refuge, (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.

The revised AMNWR schedule is as follows:

<u>Activity</u>	<u>Date</u>
Initiate discussions with refuge staff	5/84
Prepare planning directives	9/85
Hold scoping meetings	3/86
Collect and document data	4/86
"Affected Environment" section draft completed	6/86
Review data	6/86
Identify resource potentials	8/86
Formulate alternatives	11/86
Finalize alternatives	2/87
Assess impacts and effects	6/87
"Alternatives and Effects" section draft completed	6/87
Identify preferred alternative	8/87
Publish draft	11/87
Public review	1/88
Publish final	5/88
Protest period	6/88

On February 16 the planning team met for the first time with the staff. A large list of refuge "resource issues" was worked up by the staff at that meeting and enlarged on during the following several weeks. On August 28, the planning team

biologist met with the staff to discuss preferences for methods and objectives of mapping this somewhat complex and confusing refuge.

E. ADMINISTRATION

1. Personnel



#80100 John L. Martin, Refuge Manager
1/85

M.L.N.



#80101 Tom J. Early, Assistant Refuge Manager
1/85

M.L.N.



#80026

Edgar P. Bailey, Wildlife Biologist
1/83

T.J.E.



#80102

Mike Nishimoto, Wildlife Biologist
1/85

T.B.F.



#80063 G. Vernon Byrd, Wildlife Biologist
5/84

R.C.A.



#80096 Carol M. Hagglund, Budget Assistant
11/84

M.L.N.



#80103 Trina B. Fellows, Clerk/Typist
1/85

M.L.N.



#80038 Robert C. Angell Refuge Volunteer
5/84

T.J.E.



Dave McCargo (left) and Steve Kirkhorn Refuge Volunteers
 #80058 5/84 T.J.E.

Permanent

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. Mike Nishimoto, Refuge Biologist, GS-11, EOD 4-15-84 PFT
5. G. Vernon Byrd, Refuge Biologist, GS-11, EOD 4-29-84 Perm. Int.
6. Carol M. Hagglund, Budget Assistant, GS-7, EOD 08-21-83 PFT
7. Trina B. Fellows, Clerk-Typist, GS-3, EOD 11-28-83, PFT

YCC

8. Kathy Libal YCC, FT, 6-10-84/8-10-84

Volunteer

9. Bill West, Volunteer, FT, 1-17-84/3-1-84
10. Shana Loshbough Volunteer, PT, 3-1-84/4-5-84
11. Jennifer King, Volunteer, FT, 3-19-84/4-12-84
12. Robert Angell, Volunteer, FT, 4-11-84/8-31-84
13. Ann Hurley Volunteer, FT, 4-17-84/4-19-84
14. Dave McCargo, Volunteer, FT, 5-1-84/6-12-84
15. Steven Kirkhorn, Volunteer Ft, 5-1-84/5-22-84
16. Laura Hoffman, SCA, Volunteer 5-18-84/8-3-84 Refuge Vol.
 9-1-84/10-31-84
17. Clark Richins, Volunteer, FT 6-11-84/7-20-84
18. Dee Boersma, Volunteer, FT, 6-24-84/7-9-84
19. Emily Davies, Volunteer, FT 6-24-84/7-9-84

20. Gary Lyon, Volunteer, PT, 6-30-84/7-20-84
21. Ed Murphy, Volunteer, FT, 7-6-84/7-20-84
22. Alan Springer, Volunteer, FT, 7-13-84/7-20-84, 8-2-84/8-9-84
23. Robert Willging, Volunteer, FT, 7-27-84/9-7-84
24. Mark Koepsel, Volunteer, FT, 10-1-84/10-5-84
25. Susan Steinacher, Volunteer, FT, 11-28-84/12-20-84
OJT
26. Allison Butler OJT, PT, 2-1-84/5-1-84

The refuge staff is again growing with the filling of two GS-11 Wildlife Biologist positions this year. On April 18, Mike Nishimoto reported for duty at Homer as a permanent full-time Wildlife Biologist. Mike was previously with the Southeast Alaska Ecological Services office in Juneau. Mike's expertise in marine ecology, pollution, EIS and EA documentation and reviewing, as well as being certified for diving has added a great deal to the refuge staff. Mike is the biologist in charge of the Gulf of Alaska Unit. On May 9, G. Vernon Byrd reported for work as a permanent part-time Wildlife Biologist. Vern's past experience, expertise, and enthusiasm for seabirds is greatly welcomed to the staff. He is in charge of the Bering and Chukchi Sea Units of the refuge. When not on duty in Homer Vern lives in Colville, Washington with his family.

Breakdown of Homer office employees by fiscal year:

	<u>Permanent</u>			<u>Total</u>
	<u>Full-Time</u>	<u>Part-Time</u>	<u>Temporary</u>	<u>FTE</u>
FY 1981	1	0	0	0.14
FY 1982	3	0	0	2.75
FY 1983	3	0	2	3.80
FY 1984	6	1	0	6.50

2. Youth Programs

Kathy Libal was our only YCC student this year. Kathy is a junior at Homer High School and did an outstanding job for us this year. She was involved in many aspects of refuge activities ranging from wildlife surveys aboard the Whaler to I & R programs aboard tour boats to challenging and routine administrative work.

3. Other Manpower Programs

Allison Butler was employed with us through the Homer High School Gifted and Talented Program. She worked only one to two hours per day two to three days per week and her work involved filing the photographic slides.



Volunteers are worked extremely hard during the long field season and must be ready to go on a moments notice. Here volunteer Bob Angell takes a short break on the deck of the Vestfjord.

#80041 5/84

T.J.E.

4. Volunteer Program

A total of 17 volunteers were employed through the Homer Office during the year. Several were on full-time while others contributed only several hours per day depending on the assignment. The volunteer program added a very positive aspect to our office operation as well as a positive image by the local people of the refuge.

Robert Angell, Dave McCargo, and Steve Kirkhorn, all were full-time employees during their tenure. They worked almost exclusively in the field following some initial work preparing for the field season at Homer.

Laura Hoffman was our only Student Conservation Association (SCA) volunteer this year and spent the first half of her employment period in the field and the remaining working directly from the Homer Office. After her SCA commitment expired she remained on as a refuge volunteer. Besides working in the local area for the GAU, she assisted in the office on typing, running errands, interpretive programs, and filing many of the summer season's slides.

Bill West worked full-time on many aspects of refuge administration including initiating the refuge slide filing

system. Shana Loshbough and Jennifer King assisted a great deal in setting up interpretive displays and conducting refuge talks at various locations during National Wildlife Week. Clark Richins was a high school student visiting in Homer and worked with us full-time during the summer on miscellaneous administrative office projects in the Homer area.

Ann Hurley, an Anchorage veterinarian, worked several days for us sterilizing red foxes at the Village of Nikolski (AIU). Dee Boersma and Emily Davies were researchers from the University of Washington working in the Barren Islands (GAU). Ed Murphy and Alan Springer, both with the University of Alaska, Fairbanks, worked on research projects in the BSU and CSU.

Gary Lyon, a local artist, worked at the Homer Office and assisted in the survey of the BSU this summer.

Robert Willging, Mark Koepsel, and Susan Steinacher were all working at the Adak Office but employed through the Homer Office for administrative purpose.

5. Funding

Funding for the Alaska Maritime National Wildlife Refuge is through the Homer headquarters. The specific funds are then internally distributed between Adak and Homer. The funding for the Aleutian Islands Unit is discussed in that unit's section. All other unit funds are distributed from the Homer Office. Following is a summary of the total refuge funding (including the AIU):

	1260 Wildlife Resource	1480 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
FY-85	1,105,000	245,000	1,350,000

Funds in quarters maintenance, account 1994, were not included since there has been considerable latitude in where those funds were used. In FY82 and FY83, 1994 funds were spent on the station that received rent. In FY84 the funds were retained in the Regional Office for distribution on a "need" basis. In FY85 at least 90% of the funds must be used at the station where they are collected.

In FY82 the vessel charter costs came out of the Regional Office budget. Since then, all charter costs have come from the refuge budget.

A comparison of FY82 to FY85 Homer (not entire refuge) funding is as follows:

	1260 Wildlife Resources	1480 Endangered Species	Total
FY82	230,000	31,000	261,000*
FY83	462,200	155,400	617,600
FY84	502,500	140,000	642,500
FY85	615,000	140,000	755,000

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

The Alaska Maritime National Wildlife Refuge is headquartered in the Ross Duncan building located on Pioneer Avenue in downtown Homer. A total of \$37,120 (which includes utilities, snow and refuse removal) was paid for lease of office/storage space in FY84. An additional 77 sq m (827 sq ft) of space was added in 1984 bringing the total leased space to approximately 333 sq m (3587 sq ft). The entire building is comprised of approximately 375 sq m (4,032 sq ft). Beginning in FY85 the current rental rate of this building is at \$4950 per month.

FY84 salary and travel costs for the Homer office totaled \$240,000 and \$60,000 respectively. The largest single equipment purchase was a 10 SP Data General computer system for \$13,600.

6. Safety

No lost time accidents were reported for the year. Assistant Manager Early is the Station Safety Officer. All permanent employees are involved in the monthly safety meetings held the first Monday of each month.

The following is a list of the monthly meetings:

<u>Month</u>	<u>Subject</u>
January	Winter Walking Safety
February	Back Country Skiing/hiking Safety
March	Home Safety
April	Boating/Survival/Comprehensive First Aid & CPR
May	Hand tool/Appliance Safety
June	Office Safety
July	Lifting/Moving Safety
August	Gun/Hunting Safety
September	Fire Prevention
October	Winter Driving Safety
November	Hypothermia
December	Holiday/Drinking Driving Safety

The session in April involved most field volunteers as well as the permanent staff. In addition to this training session in preparation for the field, all personnel required to go on a refuge boat are required to go overboard with a survival suit on. This is very effective in familiarizing people with putting the suit on as well as giving confidence with their use. Incidentally, we did find that several of the suits did leak slightly and were sent in immediately for repair.



Safety is constantly on the minds of employees in all work situations.

#80075 5/84

R.C.A.

The FWS-Region 7 has a very extensive program for aircraft safety with stringent requirements for pilots and aircraft, as well as passengers. Little attention is paid to boating safety and little if any guidelines are available from the Regional Office. Therefore, most aspects of boating safety training are up to the Refuge Manager's discretion. An excellent video and workbook series on boating safety is available from the University of Alaska, Cooperative Extension Service, the U.S. Coast Guard, and the Kodiak Community College. The four sessions are "Sea Survival", "Shore Survival", "Hypothermia", and "Cold Water Near Drowning."

7. Technical Assistance

The Homer office staff worked with National Marine Fisheries Service and the Homer Society of National History to develop a Marine Mammal Information Center out of the Pratt Museum in Homer. This center will be the area's information collecting point for beached and stranded marine mammals as well as selected sightings of marine mammals offshore.

The refuge also provided boat transportation for the Christmas Bird Count in December which added a new dimension to the count and also a few more species.

8. Other

The Homer office funds the charter vessel for use by the entire complex. This year the charter was also utilized briefly by FWS Research and Wildlife Assistance personnel and personnel from the National Marine Fisheries Services and the Environmental Protection Agency. The vessel was a 98' crab boat the Vestfjord and was chartered from May 1 to August 30. It provides the only logistical support for most field activities on this far-flung and remote refuge during the critical seabird nesting season.

The vessel was chartered for the 122 day period for a cost of \$183,921. An additional amount of \$36,302 was spent for fuel. Total cost per use-day was \$1805.11. The vessel had a crew of four who were employed by the contractor to operate and maintain the boat as well as to assist government personnel in unloading and onloading equipment. The crew also voluntarily assisted in setting up camps and with many other non-mandated activities which aided everyone's morale.

A brief schedule of vessel activities follows:

<u>Date</u>	<u>Activities</u>
5/1	Leave Homer
5/3-15	Work in APU conducting a reconnaissance of wildlife populations and setting up fox trapping activities on Bird Island
5/16-18	Work in eastern Aleutians. Release sterile pairs of red fox on Uliaga Island. (AIU)
5/19-22	Fox control work in eastern Aleutians. Aleutian Canada goose survey
5/23-27	Work in western Aleutians. Set up fox trapping activities on Rat Island
5/28-6/6	Transport personnel and gear to St. Matthew Island (BSU)
6/7-27	Work in Aleutians on Aleutian Canada goose surveys, fox control, and wildlife surveys and studies
6/28-7/10	Work in Pribilof on land and wildlife surveys. Pick up personnel from St. Matthew Island (BSU)

7/11-25 Reconnaissance of islands in eastern Bering Sea up to Nome
 7/26-8/7 Work in western Aleutians on Aleutian Canada goose transplant. Also pick up fox control personnel
 8/8-19 Band and measure Aleutian Canada geese on Chagulak Island in east-central Aleutians.
 8/20-29 Travel back to Homer. Enroute pick up field gear left on Bird Island (APU)
 8/30 Arrive Homer

H. Public Use

1. General

The present location of the Homer office affords a good opportunity for the refuge to establish a viable interpretive and information center. The office moved to this location in late 1983 and activities are being accomplished which provide for increased visitor use. A refuge identification sign was constructed by the Kenai NWR sign shop and put up early in the year. Visitor use has increased a great deal as a result of this. The refuge is also increasing I & R activities in the Homer area significantly, but until an Outdoor Recreational Planner (ORP) can be hired this activity will be a lower priority than many others.

7. Other Interpretive Programs

A very successful open house was held March 24th at the office with a continuous series of three wildlife films and a refuge slide program shown as well as many other interpretive displays on exhibit. Volunteer Homer artist and refuge volunteer, Gary Lyon, just completed the painting of a 12 X 16 foot wall mural of a large seabird colony and sea lion haulout site. Also, several wall mounts of waterfowl were on display with interpretive material written by a local volunteer. Susan Steinacher, a biological technician from the Adak office, was loaned to Homer to complete a large interpretive map of Alaska and the AMNWR just prior to the open house. An exhibit also was on display from the China Poot Bay Society Center for Coastal Studies.

Local volunteer Jennifer King presented programs to about 30 school classes during National Wildlife Week. The local schools included Anchor Point Elementary, Seldovia Elementary, Paul Banks Elementary, McNeil Canyon Elementary, and the Russian village school at Nikolaevsk.



Refuge volunteer Gary Lyon painting wall mural for Homer Office. Besides being very aesthetically pleasing it offers a great tool for interpretation.
#80033 3/84 T.J.E.



WB Byrd talking to a group of elementary school students during "Sea Week".
#80031 5/84 J.L.M.

The Kenai Peninsula School Borough have "Sea Week" during the middle of May annually. This year WB Byrd and WB Nishimoto assisted with the program by leading students on beach walks near Homer and China Poot Bay, a rich tidal flat across the bay from Homer.

17. Law Enforcement

ARM Early and WB Byrd have law enforcement authority on the Homer staff. All incidents, which were off-refuge, were turned over to the FWS agent in Soldotna. We do respond directly to animal pick-up with species under our jurisdiction.

18. Cooperating Associations

On March 28 approval was received to open an Alaska National History Association sales outlet. Presently 14 different items are available for sale, but all have been slow thus far with only 19 items sold totaling \$52.15

Efforts are being made to increase visitation. An ORP position is planned for recruitment in early 1985 and a portion of the lower floor of the office building was obtained allowing easy access to the facility which should increase sales in the future.

I. EQUIPMENT AND SUPPLIES

4. Equipment Utilization and Replacement

Our 1981 Chevrolet Suburban had to be overhauled this spring as a result of a broken fan belt. The breakdown occurred on the first trip taken by a volunteer in the vehicle and wasn't noticed until too late. New employee road tests are now stressing familiarization with the vehicle's gauges and tell-tale signs of vehicle problems.

A 25' Boston Whaler "Frontier" boat is on loan to us from Kenai NWR. It was picked up in February and is used for local surveys in Kachemak Bay. Engine problems developed in late summer and it was determined that one of the engines had blown a piston. The most economical means of repair was to replace the engine. We decided to replace both with the new '85 models which have a more dependable oil injection system.

6. Computer Systems

An IBM PC 256K Computer purchased several years ago is used primarily for word processing with some use for tracking our budget. This year we installed a Correctstar speller to work with our Wordstar. We are pleased with its ease of use and proof reading capabilities. Our budget is tracked with a general accounting program and VisiCalc. To catalog our

slides MBA Context was purchased as recommended by the IRM division, but it has inadequate retrieval capabilities. IRM suggested that we purchase a Data General 10 SP for entering biological data. The system was advertised as being compatible with MS-DOS, but proved to be partially compatible with our IBM software and only with certain programs. Data General, however, does have their own MS-DOS software which we plan to purchase.

J. OTHER ITEMS

3. Items of Interest

RM Martin was assigned as Chairman of the Regional Wilderness Task Force which drafted wilderness management plans for Alaska. The plans were submitted late summer and the task force disbanded.

ARM Early received a Special Achievement Award for serving as Acting Refuge Manager during the later part of 1983 during RM Martin's work in Fairbanks.

RM Martin is a member of the Kachemak Bay Rotary Club, the Homer Yacht Club, the Kachemak Bay Conservation Society, The Coast Guard Auxiliary, the Homer Rifle and Pistol Club, and on the Board for the Kachemak Bay Ski Club. ARM Early is also a member of the Kachemak Bay Rotary Club, the Homer Winter Carnival Committee, the Alaska Natural History Association, and on the Board for the Homer Society of Natural History. WB Bailey is on the Board for the Kachemak Bay Conservation Society, member of the Kachemak Bay State Parks Advisory Committee, and was selected by Homer's mayor for the Hazardous Wastes Task Force. WB Nishimoto and BA Hagglund are members of the Homer Society of Natural History, Kachemak Bay Conservation Society, and the Alaska National History Association. Clerk/Typist Fellows is the Sec/Treas of the Homer Booster Club, a member of the Homer Winter Carnival Committee, the Homer Society of Natural History, and the Alaska Natural History Association.

With the increases in staff of the Homer office as well as related increased activities throughout the refuge we are finding this to be a very complex office in terms of diverse land /water ownership status, responsibilities, and problem complexities. It is becoming more imperative to expand communication lines both between our own staff personnel and with other FWS and agency personnel to avoid misunderstandings, lack of problem identification or resolution or duplication of work.

4. Credits

Sections E.1 and 5 and H.18 were written by BA Hagglund. Section I.6 was written by WB Nishimoto. All other sections

were written by ARM Early. The entire report was edited by Early. Typing and final assembly was accomplished by C/T Fellows.

ALASKA PENINSULA UNIT
ALASKA MARITIME NATIONAL WILDLIFE REFUGE
Homer, Alaska

ANNUAL NARRATIVE REPORT
Calendar Year 1984

U.S. Department of the Interior
Fish and Wildlife Service
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REVIEW AND APPROVALS

ALASKA PENINSULA UNIT
ALASKA MARITIME NATIONAL WILDLIFE REFUGE
HOMER, ALASKA

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CALENDAR YEAR 1984

John L. Math 3/7/85 _____
Refuge Manager Date Refuge Supervisor Review Date

Regional Office Approval Date

INTRODUCTION

Next to the Aleutian Islands the Alaska Peninsula Unit (APU) encompasses the largest amount of land of any unit of the Alaska Maritime National Wildlife Refuge (AMNWR). This unit includes all federally owned islands, islets, and rocks off the south side of the Alaska Peninsula between Katmai National Park and the tip of the Alaska Peninsula, excluding the Sanak Islands. Over 800 islands totaling roughly 243,000 hectares (600,000 ac) comprise this unit, which incorporates two refuges established before designation of the AMNWR by the Alaska National Interest Lands Conservation Act (ANILCA) in 1980. The Semidi Islands, designated a refuge in 1932, and Simeonof Island, a refuge since 1958, also are the only areas in the APU which include ambient waters. Seal Cape, a small area south of the village of Chignik, is the only portion of the Unit located on the Alaska Peninsula itself, all other areas being offshore islands. Most of the islands are exceedingly rugged with mountains reaching nearly 600m (2000 ft); a few islands such as Simeonof and Sutwik have numerous lakes and extensive marsh habitat.

Except for the Aleutians, the greatest diversity of breeding seabirds is found along the south side of the Alaska Peninsula. Over 6,000,000 seabirds, comprised of at least 25 species nest in this region. Murres, numbering over a million individuals, are among the most common diurnal birds. Although little data are available on breeding numbers of storm-petrels because they are nocturnal and often nest in talus, these birds probably greatly outnumber murres. In some areas, such as in the Sandman Reefs, storm-petrels, Cassin's auklets, and ancient murrelets outnumber all diel species combined. The largest aggregation of seabirds along the south side of the Alaska Peninsula is in the Semidi Islands, where approximately 2,400,000 birds representing at least 19 species breed. About one-quarter of the resident seabirds along Alaska's coastline from British Columbia to the tip of the Alaska Peninsula nest in the Semidi Islands. The Semidis are the easternmost breeding site for least auklets, and the easternmost colonies of crested auklets occur in the Shumagins; the rhinoceros auklet reaches the western limit of its range in the Sandman Reefs. Both Cassin's auklets and ancient murrelets appear more numerous off the Alaska Peninsula than elsewhere in the state.

Both harbor seals and Steller's sea lions number in excess of 35,000 animals in the APU region, six sea lion rookeries and many haulouts are present. At least 15,000 sea otters, more than in any other part of the state except the Aleutians, also inhabit this region. Sea otters are particularly abundant in the Sandman Reefs and the Shumagin Islands.

Tundra swans migrate along the Alaska Peninsula, and several pairs nest on a few islands. Thousands of geese, primarily

brant and emperor geese, migrate through the region, and many winter in the Sandman, Shumagin, and Sanak islands. Also, thousands of ducks, predominantly scoters, harlequins, scaup, oldsquaws, mergansers, and eiders, winter there. Common eiders, mallards, teal, and scoters are among the more common nesters. A unique race of Canada geese, perhaps a relic population of endangered Aleutian Canada geese, nest on one tiny island in the Semidis. Besides waterfowl a myriad of shorebirds migrate along the Alaska Peninsula, and several species like rock sandpipers also nest locally. Rock sandpipers are probably the most abundant resident species. Red-throated loons nest on some of the islands, and three other species of loons winter in this region.

More than 1500 bald eagles occur along the south side of the Alaska Peninsula; 110 eyries have been recorded on islands. A few golden eagles also inhabit refuge islands, and peregrine falcons nest on several islands, especially near large alcid concentrations. Gyrfalcons, rough-legged hawks, and short-eared owls also occasionally nest.

Surprisingly few of the islands remain truly pristine due to past introductions of foxes, rodents, and ungulates. Foxes were released on 60 islands on the south side of the Alaska Peninsula. They have disappeared or were removed from all but 19 islands. Of these, seven have red foxes, while the others have arctic foxes. Foxes destroyed fossorial and surface-nesting seabird colonies on numerous islands and left only remnant populations on others. More damaging than foxes on some islands are the ground squirrels and voles which were released with them as an added food source besides nesting birds. Irruptions of these rodents on some islands have resulted in severe overuse of vegetation and subsequent erosion. Eradication of rodents is all but impossible on larger islands.

Starting before 1900, cattle, sheep, and goats were introduced to several islands. Cattle remain on 10 islands where they continue to seriously overgraze vegetation and accelerate erosion. Caribou occasionally swim to islands but cause no problems since their use is intermittent. Sutwik is the only sizable island off the Alaska Peninsula which has escaped introductions of exotic mammals. Brown bears regularly swim to islands and raid seabird colonies, mainly gulls and puffins. The interaction between bears and humans has markedly influenced the distribution and abundance of seabirds on islands. River otters abound on most islands and locally prey on some bird colonies.

Few people visit refuge islands, except in the vicinity of villages, primarily Sand Point, Squaw Harbor, and King Cove; six other villages are located in the region. Occasionally local people go ashore on islands to hunt ptarmigan, marine mammals, or waterfowl. Egging and hunting of seabirds is generally negligible in this region where most residents

derive their livelihoods from commercial fishing. Aleuts once lived on most of the larger islands, many of which have rich archaeological resources. In fact, the first contact between Russians and Alaska Natives occurred in 1741 in the Shumagin Islands. The islands thus far have been little affected by offshore oil exploration and development, but exploration is beginning in Shelikof Strait to the north. Human competition for fish relied upon by seabirds poses the greatest potential threat to seabirds.

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A. HIGHLIGHTS

Attempts to remove cattle from Simeonof and other islands continued.

Surveys in the Pavlof and Chiachi islands during early period of vessel charter filled gaps in wildlife and habitat data and raised questions on control of unauthorized grazing.

Foxes were eliminated from Bird Island in the Shumagins.

B. CLIMATIC CONDITIONS

Cold Bay provides the only long term weather records available for the south side of the Alaska Peninsula. Intermittent records are available from Sand Point in the Shumagin Islands and from Chignik, which lies 170 km (110 mi) to the northeast. Sand Point's annual mean temperature is 37.9 °F, and it averages 60.3 inches (4-year record) of precipitation. Chignik, one of the wettest stations in the state, averages 127 inches of precipitation and has an annual mean temperature of 38.5°F, based on 8 years of data. Judging from Cold Bay's 1984 data, the islands south of the Alaska Peninsula experienced a warmer and drier year than usual. Temperatures at Cold Bay were below normal only during 4 months; precipitation was above average only during 3 months (see table). The Shumagin Islands experienced an exceptionally dry and calm summer, which should have boosted fledging success of seabirds in general, provided that food resources were adequate. In stormy summers cormorants and other cliff - and surface - nesters often sustain poor reproductive success.

Climatological data for Cold Bay, Alaska - 1984.

Month	<u>Temperature</u> (°F)				Monthly mean	Departure from mean (40 yrs.)	<u>Precipitation</u> (in.)		Departure from mean	<u>Wind</u> (mph) Mean speed
	Ave. Max.	Extreme	Ave. Min.	Extreme			Water Equivalent	Snow		
Jan.	34.8	40	27.5	16	31.2	+2.9	2.30	14.3	-0.40	16.5
Feb.	23.6	39	13.7	4	18.7	-8.8	2.82	17.7	+0.55	17.2
Mar.	38.1	47	29.3	0	33.7	+5.1	1.56	2.3	-1.56	13.6
Apr.	35.9	47	27.3	17	31.6	-1.4	1.79	1.9	-0.16	17.8
May	42.8	57	33.1	25	38.0	-1.5	1.20	0.5	-1.27	14.8
June	52.0	60	42.0	35	47.0	+1.6	1.45	0	-0.71	16.4
July	53.7	65	45.7	38	49.7	-0.6	1.77	0	-0.73	15.5
Aug.	59.9	73	49.5	43	54.7	+3.5	1.48	0	-2.22	18.4
Sept.	54.4	61	45.0	37	49.7	+2.2	2.87	0	-0.90	17.1
Oct.	45.8	53	35.8	26	40.8	+1.3	3.64	1.9	-0.65	17.1
Nov.	40.9	48	33.0	20	37.0	+7.2	7.61	10.3	+3.32	17.1
Dec.	41.0	48	34.0	25	37.1	+11.8	3.19	6.9	+0.07	21.1
Total	43.6	73	34.6	0	39.1	+1.2	31.68	55.8	-3.90	16.9

D. PLANNING

1. Master Plan

The Alaska National Interest Lands Conservation Act (ANILCA) requires all Alaskan refuges to prepare a comprehensive plan. These plans are to serve as the station master plan and will be initiated by a special planning team from the Regional Office. The primary objectives of the comprehensive plans are to (a) inventory and describe the resources and values of the refuge, (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.

The revised AMNWR schedule is as follows:

<u>Activity</u>	<u>Date</u>
Initiate discussions with refuge staff	5/84
Prepare planning directives	9/85
Hold scoping meetings	3/86
Collect and document data	4/86
"Affected Environment" section draft completed	6/86
Review data	6/86
Identify resource potentials	8/86
Formulate alternatives	11/86
Finalize alternatives	2/87
Assess impacts and effects	6/87
"Alternatives and Effects" section draft completed	6/87
Identify preferred alternative	8/87
Publish draft	11/87
Public review	1/88
Publish final	5/88
Protest period	6/88

On February 16 the planning team met for the first time with the staff. A large list of refuge "resource issues" was worked up by the staff at that meeting and enlarged on during the following several weeks. On August 28, the planning team biologist met with the staff to discuss preferences for methods and objectives of mapping this somewhat complex and confusing refuge.

2. Management Plan

Wildlife inventory plans were written for seabirds, waterfowl, shorebirds, raptors, passerines, marine mammals, and reindeer. Comments were solicited on the 18 plans covering different groups of species on the refuge. The draft plans will be revised in 1985.

E. Administration

1. 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. Mike Nishimoto, Refuge Biologist, GS-11, EOD 4-15-84, PFT
5. G. Vern Byrd, Refuge Biologist, GS-11, EOD 4-29-84 Perm. Int.
6. Carol M. Hagglund, Budget Assistant, GS-7, EOD 08-21-83 PFT
7. Trina B. Fellows, Clerk-Typist, GS-3, EOD 11-28-83, PFT
8. Robert Angell, Volunteer, FT, 4-11-84/8-31-84
9. Dave McCargo, Volunteer, FT, 5-1-84/6-12-84
10. Steve Kirkhorn, Volunteer FT, 5-1-84/5-22-84

4. Volunteer Program

For the third successive summer David McCargo volunteered his time to eradicate foxes and conduct seabird surveys. He worked long hours, often in adverse weather with practically no days off, and also provided a detailed written report of his field activities. It certainly is rewarding to secure the repeated services of such a highly dedicated and experienced volunteer.

5. Funding

Funding for the Alaska Maritime National Wildlife Refuge complex is through the Homer headquarters. The funds are then internally distributed between Adak and Homer. The funding for the Aleutian Islands Unit is discussed in that unit's section. All other unit funds, including Alaska Peninsula Unit are distributed from the Homer office. Following is a summary of the total refuge funding.

	1260	1480	
	Wildlife Resources	Endangered Species	Total
FY82	346,000	75,000	421,000
FY83	730,000	250,000	980,000
FY84	1,124,000	245,000	1,369,000
FY85	1,105,000	245,000	1,350,000

In FY82 the vessel charter costs came out of the Regional Office budget. Since then all charter costs have come from the refuge budget.

A comparison of FY82 to FY85 Homer funding is as follows:

	1260 Wildlife Resources	1480 Endangered Species	Total
FY82	230,000	31,000	261,000*
FY83	462,200	155,400	617,600
FY84	502,500	140,000	642,500
FY85	615,000	140,000	755,000

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

The Alaska Maritime National Wildlife Refuge is headquartered in the Ross Duncan building located on Pioneer Avenue in downtown Homer. All administrative activities of the Alaska Peninsula Unit are accomplished from this office. A total of \$37,120 (which includes utilities, snow and refuse removal) was paid for lease of office/storage space in FY84. An additional 77 sq m (827 sq ft) of space was added bringing the total leased space to approximately 333 sq m (3587 sq ft). The entire building is comprised of approximately 375 sq m (4,032 sq ft). Beginning in FY85 the current rental rate of this building is at \$4950 per month.

FY84 salary and travel costs for the Homer office totaled \$240,000 and \$60,000 respectively. The largest single equipment purchase was a 10SP Data General Computer system for \$13,600.

6. Safety

All permanent and temporary staff are involved in monthly safety meetings while at the Homer office. In addition, prior to field activities all participate in a series of First Aid, CPR, Defensive Driving, and Sea/Land Survival Safety sessions.

8. Other

A Special Use Permit was issued to Lamont-Doherty Geological Observatory, Columbia University to maintain their seismic stations on Big Koniuji, Chernabura, Deer, and Nagai islands. They are using extremely sensitive monitors to measure changes in distances between preestablished topographic points.

Two permits were issued to the U.S.G.S. to conduct geologic studies on the Shumagin Islands and the Pavlof Islands in support of the Alaska Mineral Resource Assessment Program (Section 1010 ANILCA).

A permit was issued to Denver Research Center, Anchorage Field Station to collect up to 15 goose eggs from nests on Kaliktagik Island in the Semidi Islands. The blood of the hatched goslings will be analyzed to determine subspecies of geese there.

Two permits were issued to ARCO Alaska, Inc. to conduct surficial geological surveys on several small islands in the unit. Data gathered were submitted to the Regional Office Oil and Gas Coordinator.

A permit was issued to Wildlife Assistance, USFWS, Anchorage to monitor seabird populations on several small islands. Another permit was issued to the University of California to conduct surficial geological studies on Paul, Jacob and Sutwik Islands.

F. HABITAT MANAGEMENT

7. Grazing

Grazing is one of the major and most time consuming activities on the APU. This year most effort centered on removing cattle from three islands, Simeonof and Chernabura in the Shumagin Group and Caton Island in the Sanak Islands.

The cattle on the islands were put up for sale by GSA beginning in 1982 and after two "sales" with only 310 of the 845 head removed the cattle were declared to be of no commercial value. Simeonof Island, which has the best harbor facilities and grazing habitat, held most of the interest for cattlemen. Keith Roylance, who had removed some cattle from the island in late 1983, was not able to remove anymore even though granted an extension through most of June 1984. On July 23 the cattle on all three islands were made available for free public take with news releases in most state newspapers, including the Wall Street Journal. Eradication of the cattle by FWS personnel was planned for October 12 but delayed because the Shumagin Corporation wanted to introduce animals from Simeonof to Unga Island near Sand Point. The Shumagin Corporation was to send us a plan of action of their removal by December 10. This deadline was not met and was extended to January 15. By the end of the year, approximately 450 animals were still on three islands.

There are approximately 75 head of cattle on Wosnesenski Island. In January the permittee informed us that he could not pay the bill for the last three quarters of 1983 plus the first quarter of 1984. An appeal by him to the Refuge Manager concerning the number of head of cattle and the nature of some of the charges was denied. He presently has appealed to the Regional Director. Total charges owed the government for grazing the island presently stands at \$3,952.80.



Insular flora on Chernabura Island is being markedly altered and locally destroyed by overgrazing.

#10200

5/84

E.P.B



Virtually all Elymus, Calamagrostis, and other grasses are being stripped in accessible locations, resulting in replacement by yarrow and other less palatable plants. Erosion also is accelerating.

#10201

6/84

E.P.B



Upon landing on the southwest side of Simeonof Island, one is greeted by eroding banks and foxes feeding on dead cows lying in rotting kelp, mud, and manure.

#10203

6/84

E.P.B.



Desertification is pronounced on Simeonof, which was designated a refuge in 1958. Ironically Simeonof, the most trashed refuge island south of the Alaska Peninsula, is a wilderness area.

#10204

6/84

E.P.B.

G. WILDLIFE

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 relic of a former continuum of "Aleutian" Canada geese which once may have extended as far east as the Geese Islands off Kodiak or whether the population is comprised simply of an intermediate race between Aleutian and Taverner's Canada geese is still undetermined.

3. Waterfowl

Waterfowl surveys along the south side of the Alaska Peninsula were flown by Izembek NWR personnel in the spring and fall, but they rarely included offshore islands. Emperor goose numbers along the Peninsula were higher than in 1983. Most geese were seen in Wide Bay. On May 22, 25 Canada geese flew westward along the north side of Bird Island. They probably were Aleutian geese heading for Chagulak or Buldir islands.

5. Shorebirds, Gulls, Terns, and Allied Species

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 additional areas with which nobody on the staff had adequate familiarity.

In early May of 1983 most of the Pavlof and Sanak islands were surveyed enroute to the Aleutians. The remainder of the islands not visited in 1983 were briefly examined this year along with the Chiachi Islands. The only previous survey of seabirds in the Pavlof Islands was in 1973, when cursory observations were made from the R/V Aleutian Tern. 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 nested on an island from burrows used in previous years. In the case of gulls and puffins we made guesses on minimal breeding populations based on numbers of adults present for gulls and rough estimates of burrow numbers for puffins.

Chiachi Islands

Between May 1-11, 1984, we visited 18 islands south of the Alaska Peninsula with the chartered F/V Vestfjord. The

several ancient murrelet burrows and remnants of gull nests used the previous breeding season. Approximately 3,500 tufted puffins and 1200 gulls were believed using this island in 1973; in late July 1976, 200 puffins and 800 gulls were sighted. No landing was made on the island in earlier visits.

Except for a pair of oystercatchers, no seabirds appear to nest on Road Island, a small brushy isle in Ivanof Bay. Voles occur on this island and on the unnamed one east of Chiachi. No previous survey data are available for this island.

Pavlof Islands

After surveying the Chiachi Islands and deploying personnel and supplies in the Shumagin Islands, the islands in the Pavlof group not surveyed in 1983 were briefly visited. Kennoys and Omega islands, two islets east of Wosnesenski, reportedly had 1200 glaucous-winged gulls, 500 tufted puffins, and 150 pigeon guillemots in June 1973, but because of the early date we found only empty puffin and unidentified burrows, plus 70 gulls. Pelagic and red-faced cormorants and oystercatchers also probably nest there; brant and wandering tattlers were present on Kennoys, the larger of these islets. Bald eagles nested on both islets; sea otters and sea lions were also present.

Outer Iliasik Island, outermost of the Pavlofs, was circumnavigated and covered partly on foot on May 10. Because of extensive shoals, particularly on the south side, it is not possible to travel close to shore around much of this rugged island. Although we saw few birds, in 1973 approximately 500 glaucous-winged gulls and some cormorants nested on cliffs on the north end. Red foxes inhabit the island. A peregrine falcon circled cliffs at the south end, and four bald eagle eyries were noted. Rock ptarmigan occur on the island.

Dolgoi, the largest of the Pavlof Islands, is mostly Native-owned, and rough seas precluded observations outside of Dolgoi Harbor. Red foxes abound there and cattle from Simeonof were illegally introduced to this brushy, mountainous island about 10 years ago. Gulls were the only seabirds sighted on Dolgoi. Fox-free Olga and Entrance islands are used by seabirds; in 1973, 250 glaucous-winged gulls, 6000 tufted puffins, and 100 pigeon guillemots were recorded on Olga Islands, and 200 gulls were noted on Entrance Island. We saw less than 100 puffin burrows collectively on all those islets along with around 60 smaller burrows. Voles also are present on both Olga Islands; sea otters were common in Dolgoi Harbor.

Chiachi Islands, located approximately 50 km (30 mi) northeast of the Shumagins, were first circumnavigated and then landings were made on six of the islands not previously visited by anyone with the refuge. Although the Chiachi Islands were entirely selected by the village of Perryville and are therefore not in the AMNWR, at least a cursory knowledge of these islands was necessary to complete a reconnaissance of marine bird and mammal rookeries on all islands on the south side of the Alaska Peninsula. Furthermore, knowledge of these islands is necessary in the event of any proposed land exchanges with Native corporations.

Arctic foxes were introduced to five of the nine Chiachi Islands in the 1920's or 1930's for fur farming, but they have disappeared from every island. Despite the absence of foxes few seabirds appear to use the islands, probably because they are close to the Alaska Peninsula and were formerly frequented by bears, which often prey on seabirds. Bears still occasionally visit the islands, as bear tracks were noted on two islands. Use by bears undoubtedly has been markedly reduced because of the nearby proximity of Perryville, Ivanof Bay, and other villages. Chiachi Island, largest of these islands (1814 ha or 4480ac), also is the highest with elevations reaching nearly 518 m (1700 ft). This mountainous island is largely covered by alder thickets and has little suitable seabird habitat. Except for a large cove on the east side with streams draining into it, the perimeter of Chiachi Island is precipitous. Pinusuk, Shapka, and Petrel islands, also lying off Chiachi, were not visited in 1984 since they were surveyed in 1976.

Paul, Jacob, and Egg islands

Located roughly 8 km (5mi) southwest of Chiachi Island, they are also rugged, with elevations exceeding 460m (1500 ft.) on the first two. The east side of Jacob is especially precipitous and is the only locale with distinct seabird colonies. In June 1973, 3000 tufted puffins, 100 horned puffins, and 100 glaucous winged gulls were estimated at Noon Point. Though too early to begin nesting, we noted about 300 gulls and several double-crested cormorants at this site. Eel grass beds occur in Kupreanof Harbor, located between Paul and Jacob islands; brant, scoters, and other waterfowl use this area. Pine grosbeaks, a very unusual species for this area, inhabited a spruce grove surrounding an old fox farmer's cabin. Arctic terns were observed on the northeast end of Egg Island in 1976, but we saw none. This probably was because of the early date or because of desertion arising from predation by river otters which inhabit those islands. Three eagle eyries were located on Paul and Jacob islands.

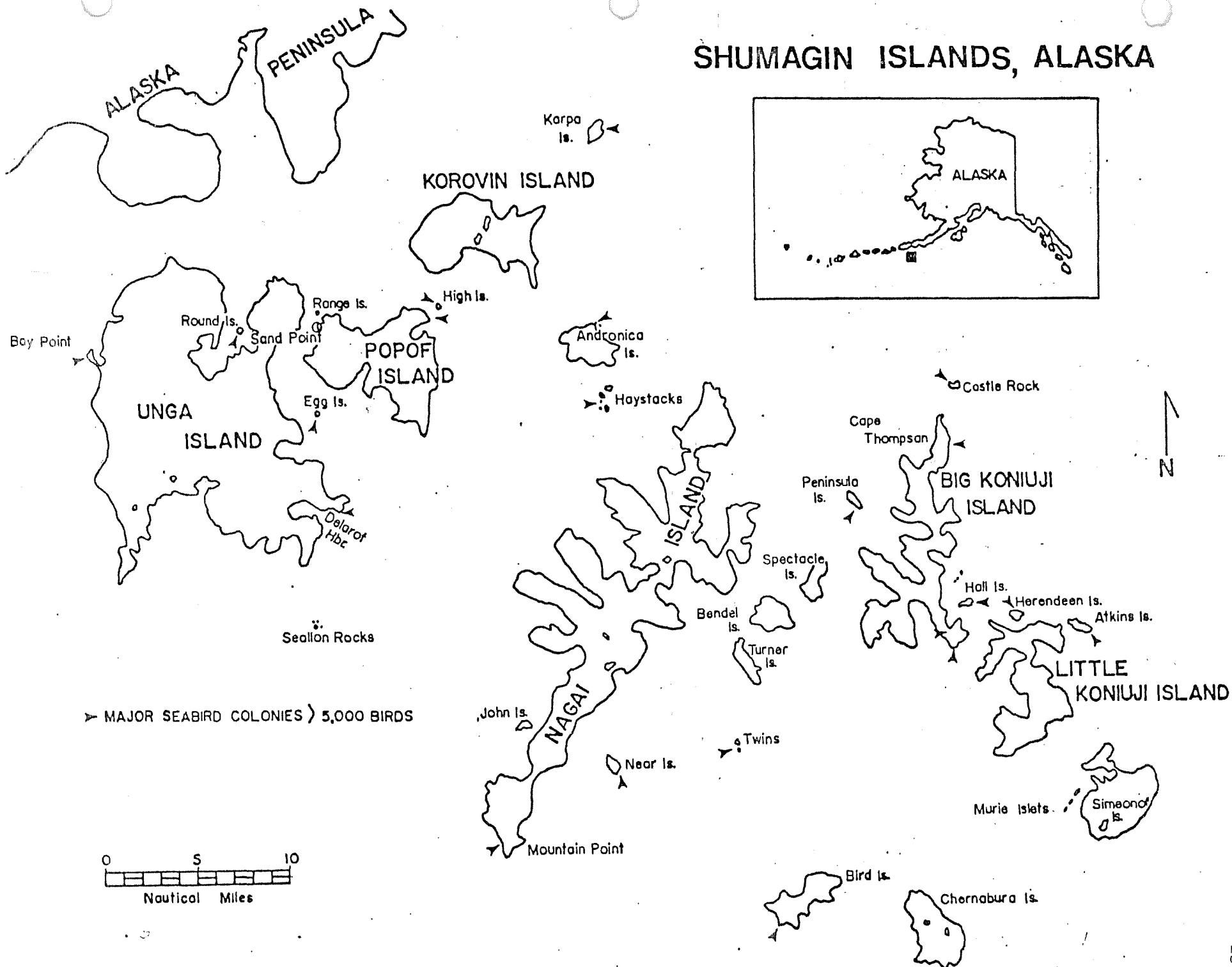
The largest seabird colonies in the Chiachi Islands area are on tiny Leader Island, which lies 5 km (3mi) west of Jacob Island. We found about 150 empty tufted puffin burrows, plus

Shumagin Islands

Bird Island. Our stay on Bird Island to remove foxes was too early to acquire accurate data on breeding populations and reproductive performance, but despite our departure from the island on June 5 it seemed that the number of puffins was much lower than reported on previous visits. In June 1970 former Aleutian Islands NWR Manager Jones and Biologist Bailey circumnavigated Bird Island by dory and camped there. Although no actual counts were made in 1970, tens of thousands of tufted puffins were on the precipitous southwest side of Bird Island, and even larger numbers of kittiwakes and murres were present. Jones alluded to "acres of puffins" and mentioned that the number of tufted puffins was the largest he had ever seen, despite 20 years of traveling in the Aleutian Islands. On June 11, 1973, Sowl estimated nearly 100,000 birds, including 23,000 puffins on the island. In June 1946 Gabrielson stated that five species of pelagic birds comprising a population of roughly a million individuals nested on Bird Island. Either Gabrielson and Jones overestimated the bird population on this island, or it possibly has drastically declined in the past 40 years, as we estimated only 42,000 black-legged kittiwakes, 7000 common murres, 3,000 tufted puffins, and low numbers of 10 other species of seabirds. Since foxes were released on Bird Island around 1908, sustained heavy predation probably is largely responsible for the apparent decline in numbers of birds using the island. Even though none of the population estimates are based on quadrats or other accurate census techniques, the decrease in bird number seems too great to be due solely to differences in observers and to vagaries in colony attendance. Moreover, though not quantifiable, the decline in puffin numbers was very apparent to Bailey, who was involved in all surveys except the one in 1946. Although the survey in 1984 was several days earlier than previous visits to Bird Island, it is extremely unlikely that a majority of puffins had not arrived yet because tufted puffins usually begin laying by the end of May in this region. Besides the impact of foxes on the island, the irrupting ground squirrel population has altered vegetation and caused erosion even along the island's steep southwest slopes, which formerly undoubtedly were used by puffins and other fossorial birds.

Besides destroying habitat, ground squirrels also directly affect chicks of some species of seabirds. Arctic ground squirrels were found to be carnivores on St. Lawrence Island, where voles also depredated 20% of the parakeet auklet chicks in areas studied. Up to a third of the diet of the Franklin's ground squirrel in Canada consists of animal matter, and these rodents are known predators on the nests of quail and other ground nesting birds in other regions. Ground squirrels also limit the distribution and density of nocturnal seabirds in the Semidi Islands.

SHUMAGIN ISLANDS, ALASKA





Grazing damage is visible on Simeonof from atop Bird Island,
over 30 km away! Chernabura (right), also shows damage.
#10205 5/84 E.P.B.



Spectacular arch on southwest tip of Bird Island
#10206 6/84

D.M.



Kittiwakes, the only seabirds present in large numbers in early May, swirl about cliffs on Bird Island's west side.
 #10207 6/84 E.P.B.



Bird Island, like other isles in the outer Shumagins, has striking granite sand beaches. Ponds near beaches are frequented by river otters.
 #10208 5/84 E.P.B.



Sea otters by the hundreds congregate around Bird Island, especially during stormy weather.

#10213 6/84

E.P.B.



Seismometers and other devices were installed by university permittees on many islands in the Shumagins. The Shumagin Fault has not had a major release in over 100 years, and geologists are predicting a 9.0 earthquake in this region within the next 20 years.

#10214 5/84

R.L.

Kittiwakes and murre which comprised most of the birds breeding on Bird Island, were just starting to nest when we left. No murre eggs were seen on ledges and about 70% of the kittiwakes had started building nests.

The most interesting discovery was a small colony (about 100 birds) of northern fulmars on the cliffs west of Point Welcome. Fulmars nest nowhere else in the Shumagins, the nearest colonies being in the Semidi Islands 250 km (150mi) to the northeast. This is apparently a new colony, for this species never was reported on Bird Island before. The nearest fulmar colony west of the Shumagins is on Chagulak Island in the east-central Aleutians.

We spent a night atop the cliffs above the arch near the western tip of Bird Island to determine the presence of nocturnal nesting seabirds. Fork-tailed and Leach's storm-petrels were intermittently heard; one ancient murrelet was heard. Before foxes and ground squirrels were introduced, this island probably supported large numbers of these birds in addition to possible other nocturnal species.

Though no nests were found, eight apparent pairs of parasitic jaegers occupied the island during the month we were there. They displayed territorial behavior and probably nested after our departure. One jaeger was caught in a trap but was freed relatively uninjured. Jaegers nest on very few islands off of the Alaska Peninsula. Other seabirds apparently breeding on Bird Island included red-faced and pelagic cormorants (a few double-crested cormorants also observed), glaucous-winged gulls (100 pairs), parakeet auklets, pigeon guillemots, and horned puffins. Since the last species is normally the latest species to arrive at colonies in this region, many more than the 30 birds we saw on any given day may have appeared after our departure on June 5.

Murie Islets and unnamed islet off Simeonof Island. After leaving Bird Island we spent a night on Chernabura Island enroute to Simeonof to see if cattle were being removed. We also surveyed a small unnamed island off the southern end of Simeonof, for which no previous information exists; then a day was spent on the Murie Islets just off the west side of Simeonof. About 50 pairs of glaucous-winged gulls nested on the unnamed islet, and approximately 100 mostly empty tufted puffin burrows were located. Three Leach's storm-petrels were inside burrows but had not yet laid eggs on June 6; the islet's storm-petrel population probably numbers about 100 pairs. Of the 42 gull nests counted, most contained only one egg. Parakeet auklets were heard off the south side of the islet and probably nest there. At least two pairs of oystercatchers were present. River otter sign was prevalent, and they probably accounted for the low numbers of seabirds present; many burrows had been excavated by otters. Two abandoned eagle nests were present along with a raven nest containing three nearly fledged chicks.

We remained overnight on the central and largest of the Murie Islets to ascertain the presence of nocturnal seabirds. Leach's storm-petrels were more frequently heard than fork-tails; the Murie Islets may support a few thousand storm-petrels. Burrows on these flat islets are extremely difficult to locate beneath tussocks of chest-high beach rye (*Elymus*). Coverage of the entire central islet revealed 143 gull nests and approximately 500 adults; some nests surely were missed in the deep grass. A total of over 1000 gulls probably nest on all of the Murie Islets combined. A few mew gulls were present, but no nests were found. With the hordes of gulls present we did not disturb the small (100 pairs) arctic tern colony on the southernmost island. Except for around Kodiak Island, this is one of the only two tern colonies on the south side of the Alaska Peninsula.

Big Koniuji Island. After a brief period on nearby Little Koniuji to confirm the continued presence of fox, a cursory examination of the crested auklet and horned puffin colonies in the Yukon Harbor area was made. Only 7000 auklets were estimated on June 8 during evening hours when maximum numbers should have been present. Roughly 30,000 auklets were counted there in 1976, and Townsend believed that there were more auklets at Big Koniuji in 1911 than at the Pribilofs, where several hundred thousand now nest. Townsend also mentioned that auklets nested in boulders near the beach as well as at higher elevations, but nesting now is restricted to the most rugged areas high on the mountainside. This colony appears to be declining, and the introduction of red fox in 1916 and arctic fox in 1921 presumably caused this evident decline. Only red fox remain, and they concentrate near the auklet and puffin colonies; they cache hundreds of birds.

In June 1976, 66,000 horned puffins nested in colluvium 1 km south of Yukon Harbor, yet on June 8 we saw less than 50 birds. This species is the last breeding seabird to arrive at most colonies, but they should have all arrived before our visit. Although horned puffin attendance at colonies before and during incubation varies greatly, it seems unlikely that this fully accounts for seeing so few birds. We will repeatedly revisit this site in 1985 to determine whether a real decline in numbers has occurred.

We counted approximately 7800 black-legged kittiwake and 150 cormorant (three species) nests along the cliffs near Cape Thompson at the north end of the island. A few pairs of glaucous-winged gulls and parakeet auklets also breed there. In 1976, 7900 kittiwake and 200 cormorant nests were recorded; in 1984 we did not note the 6000 auklets and 5000 puffins reported previously. The largest concentration of seabirds in the Shumagins is found on Castle Rock, just north of Cape Thompson. Lack of a safe place to leave a boat limited our stay there to a short duration.

Andronica Island. Despite the recent disappearance of arctic fox, few seabirds use this island. Damage by voles is extensive, particularly around the island's perimeter. Andronica's soils appear to be largely volcanic cinders and support little vegetation compared to most nearby islands. No nocturnals were heard there.

Haystack Rocks. Approximately 3500 kittiwake nests and 800 murres were enumerated on these islets south of Andronica. In July 1977, 3900 kittiwake nests and 9900 murres were recorded. The drastically lower number of murres in 1984 may have been due to the earlier date. Murres had not yet begun to lay when we visited these islets on June 10; colony attendance is especially variable early in the nesting period. Puffins were scarce in 1984, whereas over 8000 were estimated in 1977. Four nocturnal species nest on the Haystacks.

High Island. Although we estimated about 500 gulls using this small island off Popof Island, only 15 nest were found. Though over 4000 puffin burrows were there, few were occupied. Human footprints and the closeness to the village of Sand Point suggest that this island is frequently disturbed by people probably collecting gull eggs and possibly puffins, though no evidence of digging for the latter species was evident.

Henderson and Range islands. Henderson Island, lying off the west end of Korovin, had not been surveyed during the last reconnaissance of the Shumagins in 1977. This small flat isle now has no nesting seabirds and is overrun with voles. One of the only two tern colonies in the Alaska Peninsula Unit is on Range Island, situated just north of Sand Point. We estimated approximately 30 pairs of arctic terns using this tiny island which recently was conveyed to Sand Point. Since it is so close to Sand Point, people and dogs often visit the island. Besides this disturbance river otters prey on the colony at times, resulting in abandonment in some years. No previous estimates are available for this long-standing colony.

Semidi Islands

In June, Forsell and Kogan of the Research staff in Anchorage and Zwiefelhofer (Kodiak NWR) visited the Semidi Islands aboard the R/V Ursa Minor (Trip Report: Semidi Islands-June 1984). Two weeks were spent looking for Canada goose nests on Kiliktagik Island and counting seabirds on this island, plus Kateekuk and Anowik islands. In three days on Kiliktagik Island they found 16 goose nests, and 13 eggs were collected from different nests; 37 eggs were measured. Clutches ranged in size from two to six. Birds became readily habituated to their disturbance and could be approached to within about 2 m (6 ft) before flushing. They estimated

approximately 70 geese using this small island; at least 20 pairs are believed nesting.

Counts of cliff-nesting seabirds (see table) were made from a skiff. Counts made by Hatch in previous years were higher in all cases. Some murres were noted with eggs. The sizable disparity in numbers of murres on Kateekuk may have represented an actual decline or may have been due to timing of the census or to differences in counting techniques. Several tufted puffin adults and eggs, plus a few fulmars, were collected, and over 30 pelagic transects were conducted.

Cliff nesting seabirds counted on three of the Semidi Islands in 1984.

SPECIES	KATEEKUK		KILIKTAGIK		ANOWIK	
	1984	Hatch	1984	Hatch	1984	Hatch
Red-faced cormorant	140	326	60	---	166	290
Black-legged kittiwake	5,516	6,500	1,780	1,900	2,968	3,200
Common murre*	48,876	---	6,040	---	29,504	---
Thick-billed murre*	5,728	---	2,936	---	3,148	---
Total murres*	54,604	100,000	8,976	9,000	32,652	40,000

*All murre numbers are double the number of birds counted on the cliffs. Based on Hatch and Hatch, 1980.

6. Raptors

In 1984 we located 16 new bald eagle nests in the Chiachi, Pavlof, and Shumagin Islands. Four eagle nests were found on both Outer Iliasik and Bird island. Our most significant find was a golden eagle eyrie on Bird Islands. This represents the first such record in the Shumagin Islands or on any islands off the Alaska Peninsula, except for Kodiak. Besides Kodiak, where two nesting records exist, the only other golden eagle nest found in the Alaska Peninsula region was at Cold Bay. Sight records of this species also exist on Unalaska Island. The nest on Bird Island contained two downy chicks when first discovered on May 20. This eyrie was briefly rechecked every few days until June 1, when we found the nest was empty. The adults were still in the area, but the young birds must have fallen or been blown out of the nest. Several partly eaten ground squirrels were observed at

the eyrie. We plan to revisit this eyrie in 1985.

Peregrine falcons were observed at Bird and Outer Iliasik islands in 1984, but no eyries were discovered. Short-eared owls were seen on Bird Island.

9. Marine Mammals

Harbor seals, northern sea lions, and sea otters were noted incidentally on seabird surveys. Over 1000 sea lions were observed in May at Chernabura Island, site of one of the only two rookeries in the Shumagins. As many as 220 sea otters were counted in the bight on the northwest side of Bird Island. Sea otters moved into kelp beds in this area in stormy weather. Marine mammals were scarce in the Chiachi and Pavlof islands in May.

10. Other resident wildlife

Voles, primarily tundra voles (Microtus oeconomus), and ground squirrels occur on many islands off the Alaska Peninsula. Vole populations on some islands, are amazingly high, amounting to several burrows per square meter. On some islands rodents consume nearly all of the standing dead plant material, causing localized erosion. Voies and ground squirrels probably were introduced to most of these islands to augment birds as a food supply for foxes.

14. Scientific Collections

As mentioned in the discussion of the Semidi Islands, research personnel from Anchorage collected 13 Canada goose eggs and 18 tufted puffins.

15. Animal Control

A month was spent on Bird Island eradicating foxes. This 1740-ha (4300-ac) rugged island is one of the three southernmost of the Shumagins. Bird Island is roughly 8 km (5 mi) long and 3 km (2 mi) wide at its narrowest point and has approximately 27 km (17 miles) of shoreline, consisting mainly of cliffs and boulder beaches. The only reliable landing site is on a steep cobblestone beach on the northwest side. Many small streams and ponds are present in the island's four valleys.

Ground squirrels, probably introduced as an added food source for foxes, have severely altered the island's flora, particularly strand vegetation and in better drained areas with heath and grass-umbel communities. Ground squirrels evidently have irrupted on Bird Island, and densities there are much greater than on other islands.

Arctic foxes, probably originating from animals introduced earlier from Attu to nearby Simeonof, were released on Bird

Island around 1908 when 6 ha (15 ac) of land were patented and a cabin was built on the northwest shore. The remains of another cabin exist above the beach on the east side of the island. A fox farm began on Chernabura Island to the east at about the same time. Since none of the Shumagins were in refuge status like the Aleutians to the west, no records on numbers of foxes introduced and trapped on Bird Island are available. Judging from the island's habitat, conspicuous fox trails, and descriptions of the bird colonies there 40 years ago, Bird Island initially must have supported a sizable fox population. When we first arrived, it was apparent that although some fox trails on passes between different sides of the island were visible from long distances the present fox population was exceedingly low. At first no fresh scat or tracks were located; so 20 traps were set to sample different parts of the island. Foxes were caught in only two traps. Our base camp was established at the fox farm cabin at the northwest side of the island, and all 99 no. 1 3/4 double-spring traps were deployed around the island. Scents, lures, or canned tuna were used with traps. Sets were nearly always single traps along trails or on beaches.

Ground squirrels seriously complicated the trapping operation since they repeatedly sprung traps, requiring frequent resettings. In most areas usually a third of the traps caught ground squirrels within a day or two, which necessitated much extra time to check trap lines. Trapping in ground squirrel colonies was futile because virtually all traps soon were sprung. Since ground squirrels were ubiquitous, ranging from the highest elevations to beaches, foxes were more randomly distributed than on islands lacking introduced rodents. On most islands foxes primarily inhabit beaches and areas above seabird cliffs. The more random distribution of foxes during summer on Bird Island because of ample food in the form of ground squirrels made trapping much more difficult, and sometimes several days passed before catching a fox. All the various commercial attractants used, plus salmon oil and tuna, appeared to draw foxes, but they might have been caught anyway because most sets were on trails. "Alogonquin Call" and "PR Paste" seemed to be the best attractants. Lures or scents were most important on beaches, where no trails were present, and may be indispensable with low density populations.

Since no trapping probably has occurred for decades on this island, no precautions were taken to avoid human scent on traps, nor were new traps boiled or dyed before use. Experience on Amukta Island indicated that such efforts were unnecessary.

Trapping also was complicated by the presence of river otters, which necessitated avoiding sets on trails along streams, around ponds, or on trails between ponds and beaches. Despite caution at least one and possibly three



A fox farmer's cabin built around 1908 was our base camp for a month spent on Bird Island trapping foxes. This 6 ha inholding, the only private land on the island, is being acquired by the refuge through exchange of lands.

#10211

5/84

E.P.B.



In June counts of cliff nesting seabirds were made at Big Koniuji, Haystacks (above), and other islands in the Shumagins.

#10212

6/84

E.P.B.



An irruption of ground squirrels on Bird Island is causing severe overgrazing. Note patch of comparatively ungrazed grass. Rodents were often released on islands along with foxes as an added food source.

#10209

5/84

E.P.B.



Overuse by ground squirrels is more profound near beaches, which accelerates erosion along bluffs. In some areas not even patches of the original Elymus-umbel beach communities remain. In many areas all standing dead material has been consumed, leaving only moss-covered hummocks. Use of "1080", a currently banned poison, appears to be the only hope for eradicating introduced voles and ground squirrels.

#10210

5/84

E.P.B.

otters were caught; they either pulled out of a trap or pulled up the trap stake and escaped with it. Six magpies and one jaeger also were caught. Ground squirrels often were eaten in traps by eagles, sometimes making it uncertain as to what triggered a trap.

Relying on solely traps is frustrating and risky because no alternative methods of eradication exist if some foxes become wary of traps. Shooting is not a viable alternative to traps on most islands, particularly on one like Bird where fox densities are extremely low. In fact, we did not see any untrapped foxes during our month's stay on the island. Approval for the use of M-44 or M-50 cyanide devices should be obtained for all islands where fox eradication is planned. Besides being an alternative means of removing difficult to trap foxes, toxicants are more efficient in the most rugged and inaccessible areas because it is not imperative to regularly recheck such areas.

After 30 days of trapping only 12 foxes were captured; all but two of the seven females were gravid. One female aborted two pups when trapped. Since eradication efforts began in early May, we presumably managed to eliminate foxes before any pups were weaned. Two foxes were trapped on the same day only twice. Only one fox for certain escaped from a trap, as evidenced by the circumference of damage around it. This fox apparently was barely caught by a toe and hopefully was later recaptured. Three of the five males caught were trapped during the last week; more males also were caught on Aumkta Island toward the end of the trapping effort, apparently reflecting the more widespread movements of males during the denning period. Five of the 12 foxes were trapped along the seabird cliffs on the southwest end of the island; four were caught near mountain passes in the interior, and only three were captured on beaches. No foxes were trapped after May 26, and no tracks were noted during our last 10 days on Bird Island. Before leaving we removed all traps near streams and on beaches to lessen the chance of catching river otters. Seventy-one traps were left set in case any foxes remained on the island, but a majority of those most likely soon were sprung by ground squirrels. When the island is rechecked for fox sign in the spring of 1985, most of these traps probably can be recovered.

H. Public Use

1. General

Very little public use activity is conducted in this unit. We talked to several residents of Perryville, Ivanof Bay and King Cove informally in May while conducting surveys in the area. Until increased staff support is available, no formal interpretation activities are planned in villages.

17. Law Enforcement

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

J. Other Items

3. Credits

Sections on climate, habitat (except grazing) and wildlife were entirely written by WB Bailey. Most of the remaining sections were by ARM Early. BA Hagglund provided fiscal data. CT Fellows typed the report. Early and Bailey edited the report.

ALEUTIAN ISLANDS UNIT
ALASKA MARITIME NATIONAL WILDLIFE REFUGE

Adak, Alaska

ANNUAL NARRATIVE REPORT

Calendar Year 1984

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

REVIEW AND APPROVALS

ALEUTIAN ISLANDS UNIT
ALASKA MARITIME NATIONAL WILDLIFE REFUGE

Adak, Alaska

ANNUAL NARRATIVE REPORT

Calendar Year 1984

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Refuge Manager, Adak

2/14/85
Date

John L. Mart
Refuge Manager, Homer

3/4/85
Date

Refuge Supervisor Review

Date

Regional Office Approval

Date

INTRODUCTION

The Aleutian Islands Unit Alaska Maritime National Wildlife Refuge

The Aleutian Islands National Wildlife Refuge was established in 1913 by Executive Order of President Taft. Today the refuge is called the Aleutian Islands Unit (AIU) of the Alaska Maritime National Wildlife Refuge (AMNWR). It is part of a network of over 420 refuges in the United States. The refuge unit manages nearly 200 islands stretching over 1760 km (1100 mi) from just west of Unimak Island to Attu totalling approximately 0.7 million ha (1.7 million acres). Most of the islands are designated wilderness. Exceptions are military reservation lands or islands, former military sites and lands or islands selected by Native Corporations under the Alaska Native Claims Settlement Act (ANCSA). Unimak Island, adjacent to the Alaska Peninsula, is managed by the Izembek NWR. The Sanak Islands, south of the Alaska Peninsula, are managed by the AMNWR main headquarters.

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

The refuge staff has completed an island-by-island survey of the biological, botanical and physical features of the Aleutians. Present refuge management objectives call for maintaining the islands in as near a natural condition as possible. Specific management goals include the eventual elimination of introduced arctic fox from most islands, the restoration of the endangered Aleutian Canada goose (ACG) to additional islands within its former breeding range, periodic wildlife inventories on each island, studies of various wildlife populations and control of human access to and activities on uninhabited islands.

The Aleutians are the emergent peaks of a submarine mountain range believed to have appeared as islands about 8,000 years ago when the surrounding seas rose at the end of the last ice age. Most of the islands are mountainous 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 maritime climate of the Aleutian Islands is characterized by persistent fog and overcast skies, frequent, often violent cyclonic storms and high winds. Weather is very local and fog, low ceilings, precipitation and clear weather can all occur within a distance of a few miles or even within a span of a few minutes at one location.

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

The Aleutian Islands are rich in wildlife. A total of 242 species of birds have been recorded on the islands and adjacent waters and 21 species of mammals occur regularly. New species of birds, primarily from Asia are added to the list almost annually. Species composition and density vary significantly from island to island and depend on the islands' 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 is very much at home in the chain and reaches its greatest population densities from Adak west to Kiska. Once highly valued for its fur, the otter was almost exterminated by overhunting. Now under strict protection, its population in the Aleutian Islands has increased to over 100,000. Other common sea mammals are the Steller's sea lion and the harbor seal. Caribou have been introduced to Adak. Atka supports a thriving herd of introduced reindeer.

The arctic fox is native to Kootok Island in the far eastern Aleutians. The species was also found on Attu by the earliest explorers, but it was most likely introduced there. The red fox is native to several islands from Umnak eastward. Beginning in the 19th century, but increasing in the 1920's, arctic fox were introduced to most islands in the Chain. The introductions were required to develop a commercial fur farming enterprise with the fox utilizing the abundant island wildlife for food. The fur farming industry in the Aleutians collapsed during WWII. Fox pelts continue to have little commercial value and complete removal of the introduced animal is necessary if native bird life is to be restored. The introduction of Norway rats occurred chiefly during WWII and both the fox and rats have seriously affected nesting birds. Arctic ground squirrels introduced to a few islands complete the list of non-native mammalian species.

Huge numbers of sea birds are the most striking feature of many islands. Millions of fulmars, storm-petrels, cormorants, kittiwakes, gulls, guillemots, murres, murrelets, auklets and puffins congregate in vast nesting colonies. Great numbers of waterfowl winter in the Aleutians and ducks nest throughout the chain. The endangered ACG, currently having an increasing population of about 4400 birds, nests in numbers only on tiny Buldir and Chagulak islands, with a new population beginning to

breed on now fox-free Agattu Island. Bald eagles, peregrine falcons, gyrfalcons and other raptors are also found along with numerous resident and migrant shorebirds. Winter wrens, rosy finches, song sparrows, snow buntings and Lapland longspurs are among the most common of the small passerines.

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

The Aleutians were once home to about 10,000 Aleuts. Their numbers were severely decimated following the Russian discovery of the islands in 1741. Today, only four small native villages exist in the Aleutian Chain. The communities are Atka, Nikolski (on Umnak Island), Unalaska and Akutan.

A civilian fishing community exists at Dutch Harbor on Amaknak Island adjacent to Unalaska Village. A U.S. Navy community is at Adak (site of refuge unit headquarters), U.S. Air Force personnel occupy Shemya Island and a small U.S. Coast Guard staff mans a navigational station near the east end of Attu Island.

Perhaps the greatest benefit the Aleutian Islands offers is their potential as outdoor laboratories for scientists conducting studies under natural, near pristine conditions. Outdoor writer Michael Frome issued a challenge to our generation when he referred to the Aleutians as "a great oceanic crossroads, a natural treasure which this nation must now properly acknowledge and safeguard for the future."



Aleutian weather is not all wind, rain and fog. Intermittent pleasant days produce scenes that cause one to marvel at the beauty of nature. (E.V.K. 1984)

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L. INFORMATION PACKET

A. HIGHLIGHTS

Refuge unit grazing programs, inherited in 1980 from Bureau of Land Management (BLM), are beginning to be straightened out. (Section F.7).

Six bird species were found for the first time using refuge lands in 1984. Two were Asiatic in origin and four were North American species. (Section G.1. et. al).

Spring surveys of Agattu and Alaid/Nizki islands in May and June found numerous returning transplanted ACG. Wild birds were found to be nesting on Agattu Island for the first time in 70 years. (Section G.2).

Arctic fox eradication was wrapped up on Amukta Island and begun on Rat and Kasatochi islands to benefit the endangered ACG and seabirds. (Section G.2).

A record number of remote field camps were operated in the Aleutians in 1984 with as many as five being staffed simultaneously. (Section G.2).

Banding of 20 ACG was accomplished on Chagulak Island to aid in determination of wintering grounds for this population first discovered in 1982. (Section G.2).

Chagulak Aleutian Canada goose population believed larger than original estimate. (Section G.2).

The first non-leucoparidea Canada goose for the Aleutians was recorded at Amchitka in May. (Section G.3).

Migratory bird populations at Alaid/Nizki islands continues to increase dramatically following introduced fox eradication. (Section G.5).

An Asiatic (Old World) warbler, never before recorded in North America, attempted to nest at Attu in 1984. (Section G.7).

The Adak Christmas Bird Count attracted a record number of observers. (Section G.7).

Adak public use and refuge unit headquarters visitation attained record high levels. (Section H).

Adak map and recreational guide completely revised and reprinted. (Section H.18).

Alaska Natural History Association (ANHA) sales approached \$8,000 during the year. (Section H.18).

Three ARMM construction projects were accomplished. (Sections I.1 and I.2).

B. CLIMATIC CONDITIONS

It becomes more apparent each year that there is no "normal" weather pattern in the Aleutian Islands. Conditions, temperatures and resulting precipitation, whether it be rain or snow, vary widely from year to year and island to island. Weather data for 1984 were no exception. Four widely scattered reporting stations are maintained in the Aleutians. From west to east they are the U. S. Coast Guard LORAN station at Attu, the U.S. Air Force Base at Shemya, the U.S. Naval Air Station (NAS) at Adak and the Reeve Aleutian Airways office at Dutch Harbor.

Much of the Attu Island data was not reported in 1984 (Table 1), so one is inclined to assume weather at that western Aleutian station was similar to Shemya Island only 56 km (35 mi) to the east. Such may have been the case for temperatures, but a comparison of reported total precipitation (rain plus melted snow) for January and February indicates that Attu received four and a half times more precipitation with 37.2 cm (14.51 in) than Shemya did with 8.2 cm (3.19 in), although Attu received only about one and a half times more snow with 111.3 cm (43.4 in) than Shemya did with 71.5 cm (27.9 in) during the same period. A cooperative study observer on Attu from 12 April to 17 October provided some details. He experienced fewer storms than expected, with most being minor or of only local significance (which disappointed those who visited the western Aleutians seeking rare Asiatic migrant birds). Attu's snow cover in early 1984 was apparently considerably greater than that observed in early 1981, 1982 or 1983. The island remained snow covered right down to sea level into mid-April and practically all fresh water was frozen over. Temperatures ranged from 8.7 C (low 20's F) to 21.4 C (mid-40's F). The spring melt began in early May. The month was uncharacteristically mild with several days of clear, blue skies and temperatures to 34.2 C (high 60's F) with little or no wind. The only major storm occurred on May 12. June consisted of mild, rainy, misty or foggy days with only a few sunny days when temperatures reached about 36.4 C (low 70's F). An all consuming fog was characteristic in July and early August, although a noticeable storm passed over the island at the end of July. Other storms didn't follow until late August and early September, finally pushing away the summer fog and ushering in a surprisingly mild fall. Clear skies with little or no wind allowed temperatures to drop in September. Steady westerly winds and continuing mild conditions dominated during the first half of October. By October 17 night time temperatures were dropping below 0 C (32 F) and peaks over 600 m (2000 ft) in elevation were dusted with fresh snow. November and December conditions were similar to those reported in 1983.

Shemya weather was near normal early in the year (Table 2), but became wetter than normal during the summer months. By the end of the year total precipitation was nearly 21 percent higher

Table 1. 1984 Attu, Alaska, weather summary with comparisons to 1983 data

	<u>Inches of precipitation</u>		<u>Inches of snow</u>		<u>Days of measurable precip.</u>		<u>Degrees fahrenheit</u>					
	<u>1984</u>	<u>1983</u>	<u>1984</u>	<u>1983</u>	<u>1984</u>	<u>1983</u>	<u>Maximum</u>		<u>Minimum</u>		<u>Average</u>	
							<u>1984</u>	<u>1983</u>	<u>1984</u>	<u>1983</u>	<u>1984</u>	<u>1983</u>
JAN	9.32	M	28.1	M	17	M	37	M	12	M	27.7	M
FEB	5.19*	M	15.3	M	14*	M	40	43	14	22	28.5	M
MAR	M**	M	M	M	M	M	M	M	M	M	M	M
APR	M	M	M	M	M	11*	M	49	M	10	M	M
MAY	M	5.00	M	M	M	M	M	M	M	M	M	37.4*
JUN	M	1.10	M	M	M	M	M	M	M	M	M	41.2
JUL	M	10.28	M	M	M	M	M	M	M	M	M	46.0
AUG	M	21.16	M	0	M	22	M	70	M	38	M	49.3
SEP	M	10.91	M	M	M	M	M	M	M	M	M	45.8
OCT	8.30	9.73	0	0	17	20	55	54	32	29	41.7	41.3
NOV	7.41	7.53*	21.4	22.6	12	11*	47	48	28	18	34.7	32.2
DEC	8.11	4.92*	22.5*	24.6*	14*	16*	37	37	22	19	29.2	30.4*
Totals:	38.33+	70.63+	87.3+	47.2+	*	*						
Extremes:							*	70*	12*	10*		
Average:											*	*

* Incomplete data

** Missing data

Table 2. 1984 Shemya, Alaska, weather summary with comparisons to 1983 and normal data

	<u>Inches of precipitation</u>			<u>Inches of snow</u>		<u>Days of measurable precip.</u>		<u>Degrees fahrenheit</u>						
	<u>1984</u>	<u>1983</u>	<u>NORM</u>	<u>1984</u>	<u>1983</u>	<u>1984</u>	<u>1983</u>	<u>Maximum</u>		<u>Minimum</u>		<u>Average</u>		
								<u>1984</u>	<u>1983</u>	<u>1984</u>	<u>1983</u>	<u>1984</u>	<u>1983</u>	<u>NORM</u>
JAN	1.80	1.36	2.31	14.7	11.5	21	19	38	37	18	16	30.0*	30.0	31.3
FEB	1.44	1.10	1.85	13.6	8.5	20	21	36	37	14	20	29.9	31.0	30.2
MAR	1.39	1.19	1.82	10.1	9.7	24	24	41	39	22	22	32.6	33.2	31.7
APR	0.96	2.27	1.82	4.9	5.2	15	25	41	40	27	25	35.8	35.2	34.6
MAY	1.63	1.76	1.73	T	T	21	16	45	44	35	33	39.7	38.2	38.3
JUN	2.19	1.03	1.65	0	0	18	15	47	47	38	37	M**	42.1	42.3
JUL	5.21	1.68	2.68	0	0	19	17	54	56	40	42	47.5	46.8	46.0
AUG	4.78	2.47	3.64	0	T	21	20	58	59	40	45	49.2	49.9	48.9
SEP	2.79	2.85	3.16	0	T	17	17	54	54	36	39	48.1	47.4	47.5
OCT	3.52	6.12	4.03	T	T	19	28	54	54	36	32	42.1	44.0	41.3
NOV	4.49	3.21	3.96	14.3	10.1	26	28	46	46	24	21	34.7	35.1	35.3
DEC	3.31	2.69	2.87	19.5	11.3	29	27	41	41	23	26	32.1	34.8	32.4
Totals:	33.51	27.73	31.52	77.1	56.3	250	257							
Extremes:								58	59	14	16			
Average:												38.6*	39.0	38.3

* Incomplete data

** Missing data

than that recorded during 1983, but near normal. Shemya temperatures were near normal throughout the year.

Adak weather data for 1984 indicate the central Aleutians had a generally drier than normal year (Table 3). The year began cold and snowy, nearly attaining the severity of the record previous winter. Conditions didn't moderate until June and the summer (July through August) was down right pleasant and relatively dry, although there were persistent periods of foggy, cloudy, dreary days during most of June and late in July. The fall was much warmer than average although September was also wetter than normal. Adakians "sweltered" under the persistent "heat wave" and "drought" into October with temperatures running about three degrees above normal. The 36.4 C (72 F) recorded on 2 September was the highest temperature recorded for that month in Alaska. The only freezing temperature of -1 C (30 F) occurred on 21 October. It didn't even stop the late blooming wildflowers. Conditions changed in November, however, when at least a trace of precipitation was recorded on all 30 days! A two inch snowfall on 14 November finally snuffed out the remaining wildflowers. Snow was recorded on 21 days in November and totalled 51.3 cm (20 in). In addition, 19.5 cm (7.6 in) of rain fell between snow storms and melted all the snow in the lowlands. Fifty one cm (20 in) of snow was also received in December, but once again it was washed away by 12.3 cm (4.8 in) of rain and warm temperatures. Some form of measurable precipitation was recorded on all 31 days of December.



Although snowfall did not total last years record amount, it did fall frequently and in sufficient quantities to catch some of us off guard. (F.Z. 1984)

Adak experienced considerably less wind in 1984 than is normally expected with gusts never exceeding 129 kph (80 mph). The year was somewhat drier than average, but snowfall was much higher than normal. The annual average temperature was slighty

Table 3. 1984 Adak, Alaska, weather summary with comparisons to 1983 and normal* data

	<u>Inches of precipitation</u>			<u>Inches of snow</u>			<u>Days of measurable precip.</u>		<u>Degrees fahrenheit</u>						
	<u>1984</u>	<u>1983</u>	<u>NORM</u>	<u>1984</u>	<u>1983</u>	<u>NORM</u>	<u>1984</u>	<u>1983</u>	<u>Maximum</u>		<u>Minimum</u>		<u>Average</u>		
									<u>1984</u>	<u>1983</u>	<u>1984</u>	<u>1983</u>	<u>1984</u>	<u>1983</u>	<u>NORM</u>
JAN	4.97	3.83	6.20	29.1	36.6	19.5	27	26	44	46	15	8	33.1	29.6	33.2
FEB	4.27	4.88	4.67	35.6	42.3	18.3	24	24	41	47	11	15	30.0	32.2	32.9
MAR	6.71	3.18	5.43	26.2	22.0	20.6	27	28	47	42	20	13	36.4	33.7	34.4
APR	4.55	3.47	4.66	13.1	7.8	8.5	23	28	47	52	26	26	37.3	37.4	37.3
MAY	2.74	1.47	4.28	1.2	0.3	1.5	21	23	54	50	34	33	42.4	40.7	40.8
JUN	1.67	1.95	3.17	0	0	T	19	19	57	56	42	35	47.6	45.2	44.9
JUL	1.76	2.28	2.98	0	0	0	15	18	69	61	40	41	51.8	48.6	49.1
AUG	3.01	3.56	4.13	0	0	0	19	22	70	71	41	43	54.0	53.4	51.2
SEP	5.15	4.52	4.74	0	0	.01	22	15	71	61	41	32	51.7	48.1	48.2
OCT	4.49	8.09	5.99	T	1.0	1.9	24	28	55	55	30	31	45.2	44.2	42.8
NOV	9.58	8.60	8.10	19.8	15.3	12.0	29	27	50	46	25	22	39.0	36.5	37.5
DEC	6.79	6.62	7.25	19.7	8.6	22.1	31	25	50	46	25	21	38.1	36.4	34.0
Totals:	55.69	52.45	64.38	14.47	133.9	104.5	281	283							
Extremes:									71	71	11	8			
Average:													42.2	40.5	40.8

* Average of data from the past ten years

above normal due primarily to a warmer than usual summer, fall and early winter. As a result, conditions were good for wildlife and habitat during the 1984 breeding and post-breeding seasons. Wintering birds that normally arrive at Adak during the fall either arrived quite late or hadn't arrived at all by year's end evidently due, at least in part, to mild conditions in Russia and Alaska far north of the Aleutians.

Dutch Harbor weather data, representing conditions in the eastern Aleutians, indicate a slightly wetter year than 1983 through September due primarily to a very wet January (Table 4). By contrast, August was very dry. Dutch Harbor temperatures through September averaged very near those recorded in 1983. Even the annual high temperature was only one degree higher than that recorded the previous year and the annual low was identical for the two years. Dutch Harbor weather data for October, November and December were not available for inclusion in this report.

C. LAND ACQUISITION

1. Fee Title

In mid-December we received word that the AIU had acquired fee title to approximately 1200 ha (3,000 acres) on Unalaska Island. This area includes Kashega Lagoon. The acquisition came as a complete surprise as we had been laying the ground work to exchange Service lands on the island to native corporations for offshore islands that have higher wildlife values. Service acquisition of this parcel was tied to acquisition of high value seabird nesting cliffs on the Pribilof Islands, however. By year's end, complete details of the acquisition had not been received from our Realty Division Office.

3. Other

Negotiations on the proposed land exchange between the Service and the Ounalashka Corporation of Unalaska Island for the subsurface rights to 78 ha (195 acres) on Amaknak Island reported in last years narrative have begun. It is anticipated that the exchange will be finalized in 1985. The Ounalashka Corporation already owns the surface rights to the Amaknak land. The Service will give up the subsurface rights to this parcel and obtain approximately 152 ha (380 acres) of offshore islands and islets. The islands being acquired by the Service have high numbers of seabirds.

Table 4. 1984 Dutch Harbor/Unalaska, Alaska, weather summary with comparison to 1983 data

	<u>Inches of Precipitation</u>		<u>Inches of Snow</u>		<u>Days of Measurable Precip.</u>		<u>Degrees Fahrenheit</u>					
	<u>1984</u>	<u>1983</u>	<u>1984</u>	<u>1983</u>	<u>1984</u>	<u>1983</u>	<u>Maximum</u>		<u>Minimum</u>		<u>Average</u>	
	<u>1984</u>	<u>1983</u>	<u>1984</u>	<u>1983</u>	<u>1984</u>	<u>1983</u>	<u>1984</u>	<u>1983</u>	<u>1984</u>	<u>1983</u>	<u>1984</u>	<u>1983</u>
JAN	9.04	0.36*	14.0*	M	25	2+*	42	40	19	10	31.6*	28.0*
FEB	5.88	6.90	43.2	24.4	28	26	39	41	7	16	23.2*	M
MAR	6.90	6.96	2.5	6.3	21	24	45	43	2	2	33.1*	32.6
APR	3.47	2.71	10.0*	3.5	14*	23	46	54	10	10	M	37.6
MAY	2.18	4.28	T	0	19	18	55	55	15	26	39.3*	41.9
JUN	2.19	2.14	0	0	19	16	63	58	34	39	43.3	47.6
JUL	0.82	2.38	0	0	11	11	72	65	41	35	52.3	51.8
AUG	0.34	3.48	0	0	9	17	75	74	47	45	56.5	55.2
SEP	7.76	7.07	0	0	19	21	58	59	34	39	50.6*	49.1
OCT	--	1.91	--	0	--	23	--	56	--	26	--	42.0
NOV	--	M**	--	M	--	3+*	--	43	--	34	--	M
DEC	--	10.10	--	0.5*	--	23	--	45	--	14	--	36.6*
Totals:	*	48.29*	*	34.7	*	207*						
Extremes:							75	74	2	2		
Average:											*	38.8*

* Incomplete data

** Missing data

D. PLANNING

4. Compliance with Environmental and Cultural Resource Mandates

In passing the ANCSA, Public Law 92-203, the U. S. Congress enacted a large scale settlement of Native America land claims. Section 14 (h)(1) of ANCSA allows each of the 12 regional native corporations to select cemetery sites and historical places on unreserved and unappropriated land, including existing national wildlife refuge lands. The Secretary of the Interior has charged the BIA with the responsibility to certify the claims. There are approximately 380 claims within the AIU. If valid, the Secretary of the Interior has authority to convey fee title of the sites to the appropriate regional corporation.

During the 1983 and 1984 summer field seasons, Bureau of Indian Affairs (BIA) personnel investigated 34 sites on Adak Island and nine sites on or near Unalaska Island. With only a few exceptions, all were valid native sites under Section 14 (h)(1) of ANCSA. Due to their isolation, however, the sites may remain under the protection of the AIU. It is expected that the corporations would rather select lands not as well protected or having higher economic value.

5. Research and Investigations

Investigation of the sea-air exchange (SEAREX) of chemical substances

University of Rhode Island, SEAREX Executive Committee, Dr. Robert A. Duce. This is the second year of a study in the Aleutian Islands that is 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 eastern Aleutians on Bogoslof Island. A number of individuals were tagged.

Revegetation of distributed 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. No field study on this subject was conducted in 1984.

Aleutian Canada goose investigations

U. S. Fish and Wildlife Service (FWS), AIU-AMNWR. The ACG study continued and consisted of a spring survey on Agattu and Alaid/Nizki Islands, arctic fox eradication follow up on Amukta Island, initial arctic fox eradication efforts at Rat and Kasatochi Islands, collection of eggs and goslings at Buldir and Chagulak islands, transplanting of geese from Buldir to Agattu islands, banding of geese on Chagulak Island and checking islands in the Andreanof Island Group for presence of fox. A detailed discussion of these efforts is contained in Section G.2.

Caribou habitat productivity and use on Adak Island

FWS, AIU-AMNWR field work was completed in 1983. Analysis and a report discussing the data collected was incomplete by the end of 1984 (see Section G.8).

Field investigations of historic places and cemetery sites

BIA - Visits were made to reported historic places and ancient cemetery sites on or adjacent to Unalaska Island. These investigations will verify or refute ANCSA 14 (h)(1) claims by Alaska native corporations.

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, 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 of arc magmas is also being investigated.

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 in populations, study the pre- and post-breeding movements of regularly breeding species, catalog incidentals and determine how the migratory system works in the Near Islands. The data were gathered at Attu from April to October for the second year study.

The breeding avifauna of Attu Island

George F. Wagner. A three year study to catalog and census the breeding birds of Attu Island, including mappings of suitable breeding areas/habitat on the island and a determination of causes of annual fluctuations in breeding species populations. The study, in its second year, was active from April to October.

Maintenance and upgrade of seismic telemetry stations

U.S. Geological Survey, Adak Seismological Observatory. Personnel from the observatory manned by the U.S. Navy and the U.S. Geological Survey personnel visited Great Sitkin, Bobrof, Kanaga, Tanaga, Umak and Kagalaska Islands to maintain and

upgrade the seismic telemetry stations. Stations are located on each of these islands for ongoing earthquake prediction studies.

6. Other

RM Zeillemaker is the leader of the ACG Recovery Team. The team met at Arcata, California, on 4 and 5 December 1984 with an all day field trip to the northwest corner of California on 6 December. Efforts were initiated for a proposed revision of the ACG Recovery Plan in 1985.

E. ADMINISTRATION

1. Personnel



1, 2, 3, 5, 4, 6, 7, 9, and 8

Personnel

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. Thomas R. Edgerton, Outdoor Recreation Planner, GS-7, PFT
5. Karen R. Shaw, Clerk-Typist, GS-4, PFT (EOD 2/12/84)
- 6a. MaryAnn Griffiths, Clerk-Typist, GS-3, PFT (EOD 11/11/84)
- 6b. Deborah J. Pape, Clerk-Typist, GS-3, PFT (resigned 10/13/84)
7. Robert P. Schulmeister, Maintenance Worker, WG-8, PFT
8. Mark E. Wilkins, Laborer, WG-2, INT
9. Chris Ambroz, Biological Technician, GS-5, TFT
10. Donald Dragoo, Biological Technician, GS-5, TFT (resigned 4/14/84)
11. Leslie Slater, Biological Technician, GS-5, TFT (resigned 5/18/84), Volunteer (EOD 11/30/84)

12. Susan Steinacher, Biological Technician, GS-5, TFT (resigned 6/19/84)
13. Natasha Kline, Biological Technician, GS-5, TFT (resigned 7/3/84)
14. Mark Koepsel, Biological Technician, GS-5, TFT (EOD 6/24/84, resigned 9/30/84)
15. Brian Jones, Laborer, WG-2, TFT (8/23/84 - 10/13/84)
16. Brad Elmore, OJT Student, TPT (resigned 5/24/84)
17. Darnell Owens, OJT Student, TPT (resigned 5/24/84)
18. Rich Johnson, SCA Aide, TFT (4/4/84 - 6/27/84)
19. Leslie Schirch, SCA Aide, TFT (5/1/84 - 8/8/84)
20. Bob Willging, SCA Aide, TFT (5/4/84 - 7/27/84)
21. Cathy Edgerton, Volunteer (6/4/84 - 8/13/84)
22. Ellen Deines, Volunteer (7/27/84 - 8/10/84)
23. Tracy Knutton, Volunteer (EOD 9/24/84)
24. Pat Davis, Volunteer (EOD 10/24/84)
25. Roger Jurack, Volunteer (EOD 10/28/84)

The refuge unit staff remained at seven permanent full time personnel (Table 5). Karen Shaw transferred from NAS Adak in February to fill the vacant GS-4 Clerk Typist position. Our other Clerk Typist, Deborah Pape, resigned in October to accept a position with the U. S. Navy. Her position was filled by Mary Griffiths who transferred from NAS Adak in November. All but one of our long term Biological Technicians departed this year. Don Dragoo took a position with Research Division at the Anchorage Regional Office in April, Leslie Slater left in May to take a temporary position with the National Marine Fisheries Service, Sue Steinacher left in June to take a temporary position with the National Marine Fisheries Service, and Natasha Kline resigned in July to attend the University of Miami where she is working towards her Doctorate. Brian Jones, was recruited as a Laborer from August to October to assist with housing maintenance, primarily exterior repainting.

Table 5. AIU staffing, fiscal year 1980 through 1985

<u>Year</u>	<u>Permanent</u>		<u>Temporary</u> <u>all</u> <u>categories</u>	<u>Total</u> <u>FTE's</u>	<u>Volunteers</u>	
	<u>full</u> <u>time</u>	<u>part</u> <u>time</u>			<u>SCA</u>	<u>Other</u>
FY-85	7	0	5*	10.8**	4	3
FY-84	7	0	7*	10.5	3	5
FY-83	6	2	5*	11.0	4	5
FY-82	5	1	1	7.0	0	0
FY-81	7	1	1	9.0	0	0
FY-80	7	5	11	--	0	0

* 1 local hire, 1 intermittent and 3-5 seasonal bio-techs

** Estimated

Three aides were recruited from the Student Conservation Association (SCA): Rich Johnson, Leslie Schirch and Bob Willging. Rich and Bob worked for 12 weeks on our biological field projects. Leslie worked with the Adak Environmental Education program.

3. Other Manpower Programs

An On-The-Job Training program for high school seniors was continued with the Bob Reeve High School at Adak. Two students were employed by the refuge during the 1983-84 school year for 20 hours per week. Their salaries were paid by the school. The students were exposed to a wide variety of refuge tasks. These included assisting on surveys and eagle necropsies, sorting vegetation for the caribou range study, organizing our refuge slide file and helping develop interpretive displays for the refuge visitor center.

4. Volunteer Programs

Six volunteers worked on the AIU during the 1984 field season. Three of the volunteers were selected through an agreement with the SCA, Vashon, Washington. The summer field season could not have been successfully completed without the dedicated efforts of our volunteers. They contributed many hours to the Amukta fox eradication, Agattu and Alaid/Nizki spring ACG surveys, Rat and Kasatochi fox eradication, Chagulak Island AGC nesting survey and banding effort, Adak general wildlife surveys, Buldir/Agattu ACG capture, banding and transplant operations and a variety of other refuge projects and environmental education programs.

In late summer, ORP Edgerton and Biologist Deines conducted a briefing for 14 Adak residents (U. S. Navy personnel and dependents) interested in volunteering for the refuge. This meeting was the beginning of an intensified effort to recruit volunteer help from the Adak community. This effort proved successful, as three individuals have contributed over 110 hours toward improving visitor center displays, cataloging refuge slide files and organizing library reprint files since October. In addition, volunteer Susan Steinacher contributed 160 hours toward the completion of a mural for our new seabird diorama in December.

5. Funding

Funding for the AIU is included in the AMNWR budget. AIU funding was received from wildlife resources (1260), endangered species (1480) and Accelerated Refuge Maintenance Management (ARMM) (Table 6). Funding in 1984 was adequate due to the expeditious use of several volunteers and SCA aides.

Table 6. AIU funding, fiscal years 1981 through 1985 in thousands of dollars

<u>Year</u>	<u>Discretnry MB (1260+)</u>	<u>Discretnry SE (1480)</u>	<u>Discre. ARMM</u>	<u>Discre. total</u>	<u>Contr. ARMM</u>	<u>Grand total</u>
FY-85	435	105	95	635	54	689
FY-84	326.5	105	200	631.5	176	807.5
FY-83	384.1	89.6	N/A	473.7	N/A	473.7
FY-82	346	75	N/A	421	N/A	421
FY-81	225	140	N/A	365	N/A	365

6. Safety

Maintenance Worker Schulmeister served as station safety officer from January 1 through September 30. Wildlife Biologist Deines took over as safety officer on October 1.

Safety meetings were held monthly and 14 movies were shown. Meeting topics included home fire safety, ear and eye protection, land and water safety, winter driving, seat belts, cold water/cold weather survival, animal immobilization, drug safety and winter hazards.

Fire safety inspections were completed once a month in the refuge headquarters building by the Navy Fire Department. Regional Safety Officer Ginny Hyatt conducted a safety inspection of the refuge unit headquarters, housing units and vehicles in May. The Navy fire department conducted the annual housing fire inspection in eight Service housing units.

A variety of safety training was received by refuge personnel during the year. Sixteen permanent, seasonal and volunteer employees were certified for C.P.R. Ginny Hyatt presented an eight hour multi-media first aid course and a one day defensive driving course to the refuge staff. Seven staff members attended the 16 hour U. S. Coast Guard auxiliary boating safety class. A week-long spring training session for field personnel covered the Coast Guard cold weather/cold water training films, personal floatation devices and survival suits, the care and use of outboard motors and small boats, radio operation and communication procedures and the operation and maintenance of the "Kittiwake", our 25 foot Boston Whaler. Field personnel involved in fox removal were also trained in the use of M-44's. Safety related purchases during the year included wood frame windows for quarters one, two and three that can be opened and are large enough for emergency fire exits; four new Emergency Position Indicator Radio Beacons (EPIRB) plus batteries for existing EPIRB's; 12 Mustang PFD work suits and 11 survival suits; two SGC portable HF radio units and two motorola HF table top radio units; radar, depth sounder and automatic

bilge pumps for the "Kittiwake"; and DC operated smoke alarms for additional fire safety protection in Service housing units.

The headquarters building fire alarm system sounded off frequently during the first eight months of the year. Navy Public Works alarm shop personnel worked on the system throughout the year. We hope they have found and will correct the problem. Exhaust fumes from a Navy construction battalion heavy equipment yard across the street from our building results in exhaust being drawn in through our headquarters heating system and dispersed to the smoke detectors. Since the alarm system is hooked directly into the Navy fire station, the Fire Department responded to many false alarms set off by the fumes. We hope there will be fewer false alarms once repair of the alarm system is completed by the Navy.

Safety Manager Schulmeister was scheduled for an OSHA safety manager's training class in Anchorage during March. The meeting was cancelled without the refuge being informed, resulting in an unnecessary expensive trip to Anchorage.

8. Other

The Adak office consumed considerable time in preparing analysis and dialogue regarding A-76 activities early in the year. We received word late in the year that the issue was no longer being pursued on the AMNWR.

F. HABITAT MANAGEMENT

1. General



Volcanic in origin, the Aleutian Islands are mountainous and rugged with several sporting snow caps the year around. (F.Z. 1984)

The AIU of the AMNWR contains nearly 200 named islands totaling 1,092,675 ha (2.7 million acres). These islands stretch over 1760 km (1100 mi) from the tip of the Alaska Peninsula to within 800 km (500 mi) of the Soviet Union's Kamchatka Peninsula. Commonly referred to as "The Chain", all but portions of the seven larger eastern islands are included in the refuge unit. Due to their close proximity to the Alaska Peninsula, Unimak and Amak islands are administered by the Izembek National Wildlife Refuge, headquartered at Cold Bay, Alaska. The Sanak Islands south of the Alaska Peninsula are managed from the AMNWR headquarters at Homer, Alaska. Except for the Aleut village at Atka, the NAS at Adak, the U. S. Air Force base at Shemya and the U. S. Coast Guard LORAN station at Attu, the only signs of recent human activity on the refuge unit are the unhealed scars and debris remaining from WWII.

2. Wetlands

Many of the islands have freshwater "potholes" and some areas 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 efforts attempt to steer development away from wetlands and lagoons. The refuge unit staff monitors construction projects on military installations and makes recommendations on proposed activities by native corporations as well as the military. The military, especially at Adak, was quite cooperative and sensitive to our suggestions throughout the year.

7. Grazing

Some semblance of order was finally made from the stack of grazing leases that the AIU inherited from BLM in 1980. Of the seven original leases, only two remained active in 1984, however, and an additional program was added when cattle removed from another unit of the AMNWR were dumped on Akun Island, partially administered by the AIU.

Total acreage of government controlled lands in each lease have been reduced by 50 - 55 percent due to conveyance of the remainder to native corporations. All of the leased lands have been selected by native corporations, but not all has been conveyed. The Service still controls all non-conveyed lands. Since very little fencing has occurred, livestock range over the entire leased area. To compensate for this, charges were calculated by multiplying the percentage of FWS controlled lands by the total Animal Unit Month's (AUM). For example, if 50 percent of the leased lands were FWS controlled, then 50 percent of the total AUM's were estimated to be on those lands at any one time and were charged for. A grazing rate (established in 1979) of \$2.40/AUM was initially used.



Livestock business has operated from Chernofski Harbor, Unalaska Island, since at least 1948 and probably earlier. (E.V.K. 1984)

Marketing livestock products (meat and wool) from the Aleutians is an expensive business. The ranchers have balked at paying \$7,000 to \$8,000 in grazing charges when their yearly profit might be only \$12,000 to \$14,000 maximum. As a result, both of the long time grazing permittees appealed Service grazing rates in late fall, 1984. Using guidelines set forth in the refuge manual, the rate was adjusted downward to \$1.05/AUM. Final billings for the two permits were then \$4,995.90 and \$1,890.00. A new grazing rate was being conducted by year's end survey to establish a rate that will go into effect in 1985.

The third grazing operation was unanticipated by the Service. The AMNWR office in Homer had acquired, by impoundment, approximately 600 head of cattle on Simeonof Island in 1982 due to failure of the permittee to pay past grazing fees. These cattle were turned over to GSA to sell. After a number of sale attempts and long negotiations, approximately 300 head were removed by barge and transported by a contractor to Akun Island, in the Aleutians. The AIU controls 25 percent of Akun. The remaining 75 percent has been conveyed to the Akutan Native Corporation. We do not know all the details, but after the cattle were placed on Akun, the buyer became involved in a legal suit and apparently has relinquished ownership. All attempts to contact this person have failed. At year's end, we were negotiating a grazing permit with an individual that has a grazing lease with the Akutan Corporation for the island, but claims no ownership of the cattle!

9. Fire Management

During 1984, all refuges in Alaska with a history of natural wildfires were required to prepare a Fire Management Plan. Prior to starting on the plan, a request was submitted to the Regional Fire Management Coordinator for a record search of fires that has occurred in the Aleutian Islands. A hand search of the BLM wildfire records failed to locate any recent natural fire history. Consequently, the AIU was granted an exemption from the fire management planning process. Due to our prevailing cool, damp, foggy weather conditions and the sponge like properties of our tundra, it is almost impossible for a wild fire to occur in the Aleutians.

12. Wilderness and Special Areas



Remote, unpopulated islands that make up the AIU range in size from 41 to 104,762 ha (102 to 261,905 acres). This scene of Attu typifies the true wilderness that so many areas represent. (C.E. 1984)

Alaska Natural Interest Land Conservation Act (ANILCA) designated approximately .5 million ha (1.3 million acres) of the Aleutian Islands Unit as Wilderness. Notable areas of the Unit excluded from the designation include 50,828 ha (127,870 acres) on Shemya, Attu, Adak, Amchitka and Ugamak islands for military and lighthouse purposes or WWII debris and approximately 80,000 ha (200,000 acres) selected by native corporations under the ANCSA.

Other special designations which occur or are proposed for the refuge unit are listed below:

<u>AREA</u>	<u>DESIGNATION</u>
Aleutian Islands Unit	Biosphere Reserve
Agattu Island	Research Natural Area

Buldir Island	Research Natural Area
Kiska Island	Battlefield registered as a Historic Landmark*
Attu Island	Battlefield registered as a Historic Landmark*
P-38 G Lightning Aircraft, Attu Island	National Register of Historic Places
B-24 D Liberator Bomber Aircraft, Atka Island	National Register of Historic Places

* Proposed

The National Park Service (NPS) nominated both the Attu and Kiska battlefields to the list of Historic Landmarks in September. If accepted, they would automatically be placed on the register of Historic Places. Discussions with our Regional Archeologist revealed that this action by the NPS would override the refuge nomination of Attu in 1982 and the nomination study of Kiska in 1983. Our nominations were evidently mishandled somewhere by the Service.

G. WILDLIFE

1. Wildlife Diversity

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

In separating the North Pacific Ocean from the Bering Sea and bridging North America to Asia, the Aleutian Islands offer refuge to an international variety of birds. Migrants converge from all points of the compass. Over 70 Asiatic species have been observed in the Aleutians, particularly from Adak, west. Several have been reported nowhere else in North America and observations occur almost annually. These include whooper swan, bean goose, an Asian form of green-winged teal, common pochard, tufted duck, smew, white-tailed eagle, common green-shank, wood sandpiper, Far Eastern curlew, common sandpiper, long-toed stint, eye-browed thrush, olive tree-pipit and rustic

bunting. A large variety of seabirds nest on island cliffs, talus slopes and tundra covered slopes in dense, noisy colonies. Their rookeries vary in size and composition, but some of the more numerous species include northern fulmar, fork-tailed and Leach's storm-petrel, red-faced and pelagic cormorant, glaucous-winged gull, black-legged kittiwake, thick-billed and common murre, pigeon guillemot, ancient murrelet, least and crested auklet and horned and tufted puffin.

Six new bird species were observed this year in the Aleutians causing the list of avifauna to grow to 242 species. Species diversity knowledge has increased due to more field investigations by non-refuge as well as refuge personnel. Attour, Inc. continued spring surveys at Attu and a private researcher conducted spring through fall surveys at Attu. Dr. David Sonneborn, a private birder from Anchorage, conducted spring surveys at Shemya. Refuge and other FWS personnel conducted surveys at Alaid, Nizki, Agattu, Buldir, Rat, Amchitka, Adak, Kasatochi, Amukta, Chagulak and other islands during the year. Accounts of the new species (pin-tailed snipe, northern flicker, lanceolated warbler, bluethroat, yellow warbler and white crowned sparrow) can be found in sections G.5 and G.7.

There are no native terrestrial mammals that occur in the Aleutians west of Umnak Island except possibly the arctic fox population on Attu Island. The arctic fox is native to Rootok Island, the red fox and tundra vole only occur west to Umnak Island. Including the Norway rat and arctic ground squirrel, a total of four terrestrial mammal species have been introduced to the Aleutians. Eighteen species of marine mammals ply Aleutian waters.

2. Endangered and/or Threatened Species

Two endangered species were recorded in the Aleutians during 1984. The ACG is not known to nest anywhere outside of the Aleutians and receives considerable attention by the refuge staff annually. The short-tailed albatross, however, is not observed very often away from its island nesting grounds south of Japan, so when one was seen at close range near Kiska on 2 August, the word passed quickly up and down the Chain. There have been only seven observations in the Aleutians since 1944. The last sighting prior to 1984 occurred in 1981, but a 1983 albatross observation near Buldir may also have involved this species.

The ACG experienced another productive year in the Chain. The AIU staff, AMNWR Homer staff, Regional Endangered Species staff, Regional Research staff and Regional Wildlife Assistance staff cooperated in a field program from early May through August that involved 11 islands within the Aleutians and one island in the Alaska Peninsula Unit of the AMNWR.



Clam Lagoon on Adak continues to show its significance for wildlife as four ACG were observed there in May. (F.Z. 1984)

Endangered species work in the Aleutians was initiated when four geese appeared at Clam Lagoon, Adak, on 5 May. Other projects were conducted at Alaid/Nizki, Agattu, Amukta, Rat, Chagulak, Buldir, Uliaga, Adugak and Amchitka islands in the Aleutians and Kalikligak Island in the Shumigans. Details of each project follow:

Surveys for returning ACG were conducted from 26 May to 24 June on Agattu and from 26 May to 7 June on Alaid/Nizki islands. Field procedures followed guidelines developed from previous work on those islands. On Alaid/Nizki a two-person team set up a field camp and spent 13 days thoroughly searching the islands for geese and conducting migratory bird investigations. ACG were observed or heard on all but two of the days. A total of 50 goose observations (including vocalizations) were made. Five of these observations were of two banded geese, as shown in Table 7.

Table 7. Banded ACG observed at Alaid and Nizki 27 May-6 June

<u>Blue band number</u>	<u>Release site</u>	<u>Release date</u>	<u>Sex</u>	<u>Hatching year</u>	<u>Source</u>	<u>Winter obser.</u>
935	Agattu	6 Aug 82	M	82	Pat.*	21**
936	Agattu	6 Aug 82	M	82	Pat.	22***

* Patuxent Wildlife Research Center, Laurel, MD

** Modesto & Crescent City, CA, 6 Nov. 83 - 10 Apr 84

*** Crescent City, Colusa, Modesto & Crescent City, CA
13 Nov - 5 Apr 84

The two banded birds had been seen several times previously on the wintering grounds in California, but had not been observed in the Aleutians since their release on Agattu in 1982. No geese from the 1981 Nizki Island release were observed this year.

Unlike previous years, the geese observations were widespread across the two islands. Indications were that the geese frequenting the two islands were at or near breeding age as four of the five identifiable birds were paired and even exhibited some territorial aggression. This apparent dispersion across the two islands can be expected as the birds reach breeding age, become more secretive and seek suitable breeding habitat. Documenting nesting on Alaid or Nizki will probably require considerable effort in the future due to low population numbers (only one transplant effort in 1981) and their scattered distribution. No flocks of geese were observed, unlike in 1982 and 1983.

Similar surveys for returning geese were conducted on Agattu during May and June. Two biologists stayed in the old fox trapper's cabin at Aga Cove along the east shore of the island and spike camps at Cape Sabak on the southeastern tip of the island twice. Initially, they concentrated on documenting returning geese. As the season progressed and the time for nesting began, they concentrated on searching for nests. As time permitted, they also worked on removing fencing material from the former Aga Cove release area.

A record number of goose observations were made this year. The total of 399 goose observations included an estimated 40 - 50 individuals, there were only 100 observed in 1983. Most geese were seen in the Aga Cove area as in past years, which is to be expected as long as transplants and releases are made at that site. Many observations, however, were also made in the Cape Sabak area. A sighting counted as an observation if there was a definite spatial or temporal separation between individual geese or goose flocks. Of the 399 total observations, only 140 were close enough or long enough to discern the presence or absence of leg bands. A total of 43 observations were made of banded geese. This represents 30.7 percent of the observations where the presence or absence of bands could be discerned. Twenty-five (58.1 percent) of the 43 leg bands observed could be read. Fifteen individual birds were involved (Table 8), two of which were found dead. The cause of death of the one goose is unknown, but a peregrine falcon is suspected of having killed the other bird.

Table 8. Banded Aleutian Canada geese observed at Agattu Island May - June 1984

Colored band number	Initial 1984 observ. date	Total 1984 observ. dates	Hatch year	Aga Cove rel. date	Sex and Age at Banding	Date and number of observations on wintering grounds
264	6/6	1	1980	8/80	F-L	80/81 6X & 83/84 15X
322	6/2	1	1980	8/80	F-L	80/81 6X, 81/82 34X, 82/83 23X, 83/84 15X & 84/85 4+X
346	?	1	1979*	8/80	M-AHY	---
C-39	5/31	1	1983	7/83	F-L	---
C-45	5/31	1	1983	7/83	M-L	---
C-49	5/28	3	1983	7/83	M-L	---
C-50	5/31	1	1983	7/83	M-L	---
C-51	5/28	2	1983	7/83	F-L	---
C-52	5/28	4	1983	7/83	F-L	---
C-57	5/28	1	1983	7/83	F-L	---
C-59	6/18	1	1983	7/83	M-L	83/84 1X
C-79	6/16	1	1982*	7/83	M-AHY	---
E-29	6/4	5	1983	8/83	M-L	83/84 22X & 84/85 6+X
E-45	6/8	1	1983	7/83	M-L	83/84 23X & 84/85 4+X
X-10	6/16	1	1982	8/82	F-L	---

* Or earlier

** Source Northern Prairie Wildlife Research Center, Jamestown, ND, all others Buldir Island

As in 1983, there were no observed movements of banded geese between Agattu and Alaid/Nizki islands. Of the 13 live banded geese seen, only three were banded prior to 1983. As shown in Table 8, only six of these birds have been observed on the wintering grounds in California. Half of these six birds seen in California were released at Agattu in 1983. As with previous spring goose surveys, the majority of the banded birds were recorded at Aga Cove and were from the release of the previous year. This fixation with Aga Cove is to be expected for non-breeding birds following the year of release, as they tend to return to the site of their first flight. As the birds mature, they become more secretive while involved with breeding activity and selection of preferred nesting habitat.

The increasing number of unbanded birds observed on Agattu each year probably results from one of three sources: wild birds from other islands pairing with birds released on Agattu while

both are on the wintering grounds, geese pioneering from established breeding populations at Chagulak and/or Buldir which may be at or near saturation densities and birds produced on Agattu by geese released there in previous years. It is possible that the majority of the unbanded birds observed could be Agattu produced, since the first goose nesting at Agattu occurred with wing-clipped birds released in 1974 and several large releases of transplanted geese have been made on Agattu since then.

A banded goose (C-52) was observed on 28 May at Aga Cove and on 31 May and 18 June at Cape Sabak, indicating some movement between those areas. This type of movement was also noted in 1983 when the remains of a banded goose released at Aga Cove were found at Cape Sabak.



Coastal slopes represent prime ACG habitat near Cape Sabak on the southeastern tip of Agattu Island, not the inland lakes. (C.E. 1984)

Three nests and one brood with four goslings were located during the survey following procedures developed at Buldir Island. The nests contained five eggs, three eggs and four eggs respectively (Table 9). The nests and brood were the first to be found on Agattu since the initial transplant effort and the first for truly wild birds in 70 years. Of the 41 Patuxent wing-clipped geese released in 1974, four pairs nested (two successfully) and five goslings were produced that year. None of the birds were seen after 1975. Each 1984 nest was found on a steep, grass covered slope.

Table 9. Site characteristics of three Aleutian Canada goose nests found on Agattu Island, 1984

<u>Date Located</u>	<u>Number of Eggs</u>	<u>Site Vegetation</u>	<u>Aspect</u>	<u>Degree of Slope</u>	<u>Elevation in Feet</u>
2 June	5	Elymus-umbel	S	15	340
18 June	3	Elymus-umbel	W	35	250
20 June	4	Elymus	W	20	290

Habitat and general site conditions compare favorably with that used by geese nesting at Buldir. The average clutch size of the three Agattu nests was four eggs. This is lower than the 5.5 eggs per nest recorded during the 1982 Buldir nesting study. The reason for the difference is unknown, but may indicate younger birds involved with the Agattu nesting. The observers located the Agattu nests only after the incubating female flushed. Females stayed on the nests until observers were very close, in one case only 0.7 m (2 ft) away. When flushed, females tended to remain in the vicinity and vocalize considerably.

The location of three nests and a brood in the Cape Sabak area is an indication of the quality of goose nesting habitat there. This was not surprising since the largest flock of geese (16) observed in 1983 was at Cape Sabak. The utilization of the southern portion of Agattu corresponds with the nesting preference found at Buldir. It is unfortunate that weather and time did not allow additional searches west of the Cape along the south side of Agattu in 1984.



Discovering the first wild ACG nest at Agattu in 70 years documented the success of refuge transplant operations. (S.S. 1984)

It should be noted that a great amount of search effort was required to locate each nest. Since only two observers were available for the survey, it is possible that several other nests went undetected. The search for nests of a small recolonizing population on an island the size of Agattu can be compared to searching for the proverbial "needle in the haystack". The fact that two biologists were able to locate three nests and one brood in such an expansive area was indeed fantastic.

Removal of the fencing material from the Goose Creek area was accomplished to eliminate that potential hazard to geese and other birds and to remove material from wilderness lands. The arduous task was tackled using fencing pliers, sledge hammers and a come-along jack with chain. The woven wire was removed from the posts, rolled and secured with wire in manageable sized bundles. The posts were then removed with the jack and chain and bundled with wire. All the bundles were then piled. Deeply embedded brace posts were pounded completely into the ground rather than being removed. In August when geese were transplanted from Buldir, some of the woven wire was removed and disposed of at sea. The remaining material will be removed in later years.

While surveys were being conducted for returning geese in the Near Islands, efforts were continued in the eastern half of the Aleutian Chain to benefit the geese. The 1982 discovery of a second wild breeding population of the endangered ACG on Chagulak Island suggested the possibility of natural expansion of the geese to neighboring islands if the introduced arctic fox were eliminated. A fox eradication program, begun in 1983 on Amukta Island located about four miles southwest of Chagulak Island, was continued this year. The initial means of fox eradication utilized leghold traps, sodium cyanide devices (M-44 coyote-getters) and firearms. Diphacinone poison baits were also distributed along fox trails and other areas used by foxes on Amukta at the end of 1983.

A three-member field crew was employed on Amukta from 19 May to 11 June 1984 to continue fox eradication, pick up the M-44 devices and collect baseline data on the wildlife resources of the island.

Unlike last year, preliminary scouting for fox and well used fox trails was done from our chartered vessel. We checked out all major areas of the island before emphasis was placed on any other work. As with all projects conducted in the Aleutians, weather was the controlling factor and continually hindered the field operations. In some cases it prevented personnel from setting or checking the traplines on schedule.



A charter aircraft was used for the first time to take refuge biologists from Adak to Dutch Harbor to meet the charter vessel. (F.D. 1984)

A weatherport tent was used as a base camp once searches from the vessel were completed and two dome tents were used for spike camps. Work began on the east side of the island but was expanded to cover all sides. The northeast, west and north areas were worked from temporary spike camps lasting from one to five days. An inflatable boat provided transportation to and from spike camps, but the majority of the fox eradication effort was accomplished on foot.

During the 23 days spent on Amukta Island, no fox or fox sign were found. A total of 786 trap days were expended on the island in 1984. While setting the traps, attempts were made to recover the M-44's set the previous year. Out of the 209 M-44's set in 1983, a total of 119 were recovered in 1984. Attempts were also made to locate any diphacinone drop baits distributed in 1983. None were found. During the 1983 effort, ACG were sighted flying over the island on four separate occasions. This year, however, they were observed on the ground for the first time. Geese were observed feeding on the west ridge, southeast and north sides of the island. Three geese stayed in the base camp area for three consecutive days. On several occasions, the birds approached to within 27.3 m (90 ft) of the tent. These observations and the fact that no fresh fox sign was found during the period spent on the island indicate that Amukta is probably now fox free. A crew will visit the island again in 1985 for final verification of fox-free status.

As part of our ongoing efforts to eradicate arctic fox on selected Aleutian islands, another program was initiated this summer on Rat Island. For the first time, the AMNWR recruited

Animal Damage Control (ADC) personnel from the lower 48 (Region 6) to independently conduct fox removal. Kim Hanson of Colorado and Mike Goos of North Dakota were selected to perform the task. Their efforts at Rat Island spanned the period 25 May to 29 July 1984.



Kim Hansen, one of two from ADC personnel recruited from Region 6, is standing near an arctic fox den on Rat Island. (M.G. 1984)

Mechanical means similar to those employed on Amukta Island the previous year were used, including leghold traps, M-44 coyote getters, predator calls, rifles and shotguns. The most successful means of eradication was calling and shooting, accounting for 46 percent of the fox taken. Trapping was the second best method. It should be noted that the use of M-44 coyote getters was somewhat limited due to late delivery by a supplier. No poison baits were used on the island. The two trappers worked on foot, from a cabin site on the north side of the island.

During the 65 day eradication effort on Rat Island a total of 175 fox were killed, believed to be the entire island population. Of that number, 163 were adults (93 female and 70 male) and 12 were pups. All were blue phase arctic fox. The small number of pups resulted from the timing of the project which was initiated early enough to almost eliminate reproduction. Early season fox control efforts are important.

The island will be checked for fox sign in 1985. Assuming the eradication effort was indeed successful, Rat Island will be an

additional migrational stopover and potential nesting area for the ACG. The Rat Island project pointed out the importance of use of professionally trained predator control (ADC) personnel in assisting the refuge in removing introduced fox from important wildlife islands throughout Alaska.

A partial nesting survey of Chagulak Island ACG was conducted by six biologists on 14 and 15 June 1984. The goal was to collect one goose egg from five separate nests on the island for mitochondrial DNA sequencing analysis. The egg collection was but one part of a larger research effort that will hopefully result in a determination of the subspecies status of geese nesting at Kaliltagik Island south of the Alaska Peninsula.

Of the four significant goose habitat areas on Chagulak the west side was selected for a thorough search of nests. The procedures used in the nest-search were patterned after those developed at Buldir Island. When a nest was found, the eggs were counted and one was collected until a total of five were taken. Standard measurements of all eggs in each nest were also taken. While one egg was being measured, the remaining eggs were covered with the down in the nest and a sweater or coat to help keep them warm. The collected egg was then placed in a padded styrofoam container and hand carried from the side of the mountain to an inflatable boat and taken to an incubator aboard the charter vessel. A photograph of each nest and the surrounding area was also taken. Before leaving each nest, all eggs were recovered with goose down. All activities around the nest were performed as quickly as possible so the adult could return to its nest before the eggs cooled. Eggs from two nests were floated to allow an estimate of their stage of development and the age of the embryo.

A total of eight ACG nests were found in the western goose habitat area of Chagulak Island. The nests were located at elevations ranging from 158 to 302 m (521 to 997 ft) above sea level (ASL). The average elevation at which nests were located was 245 m (808 ft) ASL. All nests but one were located on a west facing slope. That nest was located on a south-southwest facing slope.

The vegetation and habitat in which each Chugulak Island goose nest was found appeared to be slightly different from that used by geese nesting on Buldir Island. No nests were found in what could be described as lush Elymus/umbell habitat typical of Buldir. All nests found on Chagulak were located in a mixture of shorter vegetation types including as mossy/willow and Elymus/Claytonia. The exact reason for the apparent different nesting habitat between the two islands is unknown. It could be speculated that either of the choices is atypical or typical. It could also be speculated that the nesting requirements for ACG throughout the Aleutian Island chain may not be as restrictive as initially thought and that many areas not thought to

have good goose habitat might indeed have excellent habitat. One main similarity between Chagulak and Buldir nests, however, is the apparent need for some type of physical backdrop. The backdrop may consist of vegetation (large Heraculum), a small or large boulder or another terrain feature (small hummock), but it always appears to be present. A more detailed study of Chagulak nests would be necessary before any conclusive comparisons could be made on nesting habitat selection.

The number of eggs per nest ranged from 4 to 7 with an average clutch size of 5.75 eggs per nest. These figures compare favorably with those of the 1982 Buldir ACG nest survey. The average Buldir clutch size was 5.50 eggs per nest.

Measurements of the eggs in the eight nests ranged from 72.3 mm (2.89 in) to 84.4 mm (3.38 in) in length and 49.6 mm (1.98 in) to 54.7 mm (2.19 in) in width. The average length was 79.0 mm (3.16 in) and the average width was 52.2 mm (2.09 in). Measurements taken for 144 eggs in 1976 on Buldir averaged 79.8 mm (3.19 in) x 52.5 mm (2.10 in) in length with a range of 73.2 mm (2.93 in) to 88.1 mm (3.52 in) and 47.8 mm (1.91 in) to 57.4 mm (2.30 in) for the width. Egg measurements were not obtained during the 1979 and 1982 Buldir nest surveys.



Scott Hatch of Research in Anchorage measuring Aleutian Canada geese eggs on Chagulak Island. (F.D. 1984)

Incidental observations of other geese in the area, especially banded birds, were also made while searching for nests. These

observations were made with binoculars only, being second in importance to the egg collection effort.

A total of 42 observations of ACG were made during the two days on Chagulak Island. The majority of the birds were either not banded or too far away to allow observations of leg bands. Most of the birds were observed in pairs or small flocks and exhibited some territoriality, but one flock of 16 birds was also observed. The number of potential duplicate observations made is unknown due to movement of the birds and changes in time or movement of the observers. The birds were mainly observed in the higher mossy/willow habitat. The highlight of these observations was the sighting of a bird with a red leg band on its left leg and a metal FWS band on its right leg. The bird was too far away to allow reading of the colored band number and no attempt was made to get closer. Based on banding records, this bird was most likely banded on the wintering grounds in California. This phenomenon suggests that the Chagulak Island geese winter in the same areas as the Buldir Island birds.

The locating of eight nests with an average clutch size of 5.75 eggs and the observation of 42 birds also suggest a larger Chagulak Island population of ACG than initially estimated from 1982 observations. Since the west side goose habitat area is but one of four areas and is not the largest of the four, the Chagulak Island population could be as high as estimated at 250 to 300 birds. The importance of this population to the total ACG population could be considerable if the Buldir population was ever exposed to an environmental catastrophe on the island. Adverse impacts could include disease, extreme weather, oil spills or other pollution problems. The Chagulak Island ACG breeding population is about 900 km (558 mi) east of Buldir Island, which would, hopefully, exclude it from disasters impacting the western population.

The 1984 ACG capture, banding and transplant was conducted on Buldir and Agattu Islands from 30 July to 5 August. Six personnel from AIU, two Region 6 ADC personnel, one biologist from Research and one volunteer biologist from the Endangered Species Office in Anchorage participated. Three of the people picked up at Shemya Island by the charter vessel were not able to get ashore and participate in the goose capture effort due to foul weather and rough seas. The bad weather and tight work schedule allowed only one transplant to be made to Agattu. The geese Buldir were transplanted to Agattu via the charter vessel "Vestfjord".

Based on previous experience, goose search and capture efforts were conducted by having all available personnel walk abreast 10 to 30 m (33 to 99 ft) apart through the upper edge of the lowland tall plant association. When a bird was sighted, everyone converged on that area as other geese are normally

found in the same area. The geese were captured using large, long handled dip nets.



Forest Lee (Father Goose) was a volunteer and primary consultant during this years Buldir/Agattu goose transplant. (F.D. 1984)

After capture, each goose was 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. The bags were pre-cut to snugly fit geese and in an effort to prevent injuries. The open end of the bag was tied with a short piece of rope to limit the birds 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 each backpack frame. Each cage could hold three to five adult geese or four to six goslings. Unnecessary walking with birds in the pack was avoided. If one particular area was worked for a time, the loaded packs were removed so that crew members could chase other geese. Hiking back to camp was completed without unnecessary delays or rough treatment of the birds.

Upon return to the main camp at North Marsh, the geese were removed from the backpack cages and burlap bags and placed in wooden crates to await processing. The banding materials, tubing supplies (force feeding) and other equipment necessary to process the birds were then gathered. Processing of the geese then began with each person being responsible for one specific task in a assembly line type operation. The age and sex of each bird were determined first, the metal FWS band was applied next, and a blue colored leg band was applied last.

The colored band was placed on the right leg of males and left leg of females. All information along with the capture date and location was recorded in a field log.



When we say we walk over hill and dale carrying packs loaded with Aleutian Canada geese, we mean it. The camp is the small white dot down near NW beach. (C.E. 1984)

All geese were then tube fed with a 15cc protein mixture. The tube feeding continued once daily thereafter, including the day of transplant. The birds were also tube fed just prior to release on Agattu. The tube feeding helps reduce the shock of handling and increases the chances of survival and success of the transplant.

This year two research efforts were conducted with the geese on Buldir. One occurred during capture and the other occurred when the birds were loaded for transport to Agattu. Fecal samples were collected from all birds when possible, to allow analysis of the extent of coccidial parasitism in the Buldir population. Fresh samples were taken directly from captured birds whenever they would cooperate. If this wasn't possible, then samples were taken from the burlap bags used for transporting the geese. The band number, sex, age and capture location of the bird was recorded on each vial. The above system worked well until the bags had to be reused. Samples were then still gathered from the bags but labeled as being from an unknown goose. Random fecal samples of uncaptured geese were also taken in the field at each capture location.

After processing, the birds were released into a fenced 5 x 15 m (16.5 x 49.5 ft) enclosure constructed of metal fence posts and poultry wire, including a poultry wire roof. Burlap was attached to the sides of the enclosure to provide a visual barrier for the birds. A small plywood table was placed at one

D end of the pen to afford the birds some protection from rain. The area within the enclosure provided natural food and cover. Water and commercial goose feed were also provided. The band numbers of any birds which appeared to be suffering from paralytic shock syndrome were recorded at this time and at each subsequent tube feeding. These birds were attended to more closely to allow constant monitoring of their recovery.

The Bean Goose Lake area, Extra Plateau, Kittiwake Lake and Dip Camp area were all searched for geese. Kittiwake Lake again had a large number of geese on it (150 birds), but the birds were almost impossible to move off the lake and only 15 were captured. A raft and cracker shells are recommended for use there in the future. The Dip Camp area was the most productive capture site this year with 45 geese being captured there (a record number).

Just prior to transport to Agattu, the birds were removed from the holding pen and tube fed. They were then placed in wooden crates covered with burlap and lined with Elymus arenaria. Adults and goslings were put into separate crates to eliminate potential trampling mortality. The number of birds placed into the wooden crates was also limited to four to six adults or six to eight goslings to prevent injury.

It was just prior to transport that the second research effort was conducted. It involved taking several measurements, collecting a blood sample and collection of feather pulp. This data and material will be used in a larger mitochondrial DNA sequencing study which is hoped will determine if there is but one sub-species of ACG with some geographic genetic variation across the Chain or three (or more) distinct sub-species.

Once the geese were placed in the crates, they were taken to the charter vessel via inflatable boat. The goose crates were then securely tied to the deck of the 29.7 m (98 ft) "Vestfjord" and covered with a heavy canvas. All efforts were made throughout handling of the geese to provide maximum protection from the elements. In previous years, transport of the geese usually occurred late on the day of capture or early the following morning. Such was not the case in 1984 as weather delayed transport operations, allowing only one trip on 3 August, the final day of the project. Upon arriving at Agattu Island the following morning, all geese were tube-fed aboard the vessel, taken ashore to the release point via inflatable boats, and released in the Goose Creek drainage of Aga Cove.

Prior to release the geese were placed in an irregularly shaped fenced holding pen measuring approximately 25 x 50 m (82.5 x 165 ft). The structure had been part of a pen used in previous releases to allow the geese to reestablish family groups. The smaller fenced holding pen proved quite satisfactory for this purpose. Burlap bags were attached to the wire to provide a visual barrier. The birds settled down quickly after release

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into the pen, even feeding on the vegetation. Two hours later the birds were released from the holding pen and the transplant was complete.

A total of 92 ACG were captured on Buldir Island in 1984. Four goslings were not transplanted to Agattu because they died during or after capture. One adult bird died during transplant to Agattu. The five birds that died represented a five percent mortality rate for all birds captured. The remaining 87 geese (56 goslings and 31 adults) were successfully transplanted to and released on Agattu Island. The total was composed of 22 male goslings, 34 female goslings, 14 male adults and 17 female adults. The average age for the goslings was 33.7 days.

Although every effort was made to minimize the impact of capture and handling, some geese still exhibited signs of partial paralysis (paralytic shock syndrome) when they were released into the holding pens on Buldir and/or Agattu. In most cases, however, the affected birds seemed to recover within about 24 hours, but fourteen birds released on Agattu continued to show some sign of paralysis. Eleven of these were mobile, having only slight impairment of movement. The remaining three birds were immobile, but could stand. Seventy-eight percent of the geese exhibiting some signs of paralysis were goslings. A few birds sustained minor abrasion injuries during handling and transport. These injuries were treated with spray antiseptic.

If a successful nest search occurs on Agattu next spring, geese captured in summer 1985 will be transplanted to a different island. That would be the first time that birds have not been transplanted to Agattu to Buldir since 1981. Amchitka Island has been tentatively selected for the 1985 transplant with Rat Island or Alaid/Nizki as alternative sites.

An additional goose banding effort was conducted on Chagulak Island after completion of the Buldir transplant. The goal was to band at least 20 geese to help determine the wintering grounds of Chagulak birds. Seven biologists spent two days on the island in August, concentrating on the relatively accessible west and north side goose habitat areas. Search methods were based on past experience at Buldir.

The Chagulak efforts covered entire drainage basins in both locations. The extremely rugged, boulder strewn, steep terrain with tall dense vegetation made goose search and capture efforts very difficult and somewhat hazardous to the capture team. Most geese were encountered in or along the major rock strewn intermittent streams or in sparsely vegetated boulder slide areas near cliff bases. A large long handled dip net was used for capture. The net not only helped prevent injury to birds during capture, but provided important stability as walking sticks for the searchers while clambering over or around large boulders hidden in the vegetation.



The western "valley" on Chagulak Island was thoroughly searched for goose nests. (F.Z. 1984)

Usually the sighting of one goose resulted in others being located in the same area. Immediately after capture of a group of geese, the birds were all brought together and placed (adults singly and goslings in pairs) in burlap bags. These bags helped keep the birds calm and prevented injury until each bird could be aged, sexed, banded and released. Measurements and a blood sample were also taken from each adult bird as part of the research mentioned earlier. Metal FWS bands were placed on the right legs of females and the left legs of males. Green plastic leg bands with white numerals were then placed on the opposite leg of each bird. Whenever possible, birds caught in one area were released together or at least in small groups in the same area.



Does this look like goose habitat? It was the capture site for ten geese caught on the north side of Chagulak Island. (F.Z. 1984)

A total of 22 ACG were captured on Chagulak Island. Of this total, 12 birds were captured the first day on the west side and ten the next day on the north side. One gosling captured each day was not banded and was retained for research purposes. Of the 20 geese banded, two were adult males, two were adult females, ten were male goslings and six were female goslings. The ages of the captured goslings ranged from 14 to 50 days with an average of 29.7 days. Fecal samples were taken from 13 of the 20 released birds. The collection of samples was dependent on the cooperation of the birds and a clean bag. Only one bird showed any signs of suffering from paralysis due to the stress of handling.

Six other ACG, all capable of flight, were observed, but not captured on the west side on 11 August. Five geese were observed, but not captured, on the north side on 12 August. Of those on the second day, one was capable of flight and the others (including one gosling) disappeared into the surrounding dense vegetation before being overtaken by their would be captors. It was not possible to determine if any of the birds which escaped capture were banded.

It should be noted that the goal of banding 20 ACG on Chagulak was reached with great difficulty at the last possible moment. This is an extremely difficult island for goose work due to its rugged, steep terrain, tall, dense vegetation, and foggy weather conditions. No further goose capture attempts are required, however, since ten of the 20 banded geese were observed on the wintering grounds in California prior to the end of the year, ending a successful project.



Homer office staff releasing sterile red foxes on Uliaga Island as part of a study on red fox - arctic fox competition for habitat. (B.A. 1984)

In early May five pairs of red foxes with sterilized males were transplanted from Umnak Island to small Uliaga Island. This is part of a study to determine if sterile red foxes can biologically eliminate introduced arctic foxes. The Uliaga project, developed by Homer biologist Ed Bailey, is designed to prove or disprove the theory proposed by Dr. Ed West in 1982 that the larger, more aggressive red fox leads to the disappearance of smaller, less aggressive arctic foxes in certain situations through biological exclusion. Competition for food, territories and den sights and other factors are involved.

A check of the island in mid-August indicated both species remained on Uliaga. Additional checks of the island will be scheduled for 1985.

While the charter vessel "Vestfjord" was returning to AMNWR headquarters at Homer, brief stops were made at Uliaga and Adugak islands in the eastern Aleutians. The task involved checking the progress of experimental introductions of sterilized red foxes on the two islands, in an attempt to learn if the more aggressive red fox will eliminate arctic fox. There may have been some den site displacement of the arctic fox by the red fox, but nothing conclusive was observed that would suggest red foxes can eliminate arctic foxes in a short period of time. Historically, on islands where both red and the arctic fox have been introduced, only the red fox has persisted. It is hoped that this experimental introduction of red fox will allow history to repeat itself and provide us with an additional fox eradication tool for smaller islands.

Two investigations were conducted in May and November regarding a proposed classified military project in the western Aleutians. The project, if completed, could adversely impact the endangered ACG.

3. Waterfowl

The whooper swan, six species of geese and 32 species of ducks have been recorded in the Aleutian Islands. Of those, the swan, one goose and ten duck species are Asiatic in origin. The following information is provided for unusual North American and Asiatic species observed in the Aleutians this year.

Whooper Swan - Observed at Attu in late April and early May.

Bean Goose - Two were seen at Massacre Valley, Attu, 28 and 29 May.

Canada Goose (Not Aleutian subspecies) - A bird of a subspecies larger than leucopareia was sighted at Amchitka on 3 May. This is believed to be the first record for a Canada goose other than leucopareia west of Unimak Island in the Aleutians.

Green-winged Teal (Eurasian) - This Aleutian subspecies is a common year-around resident in the central and western islands.



A pair of Aleutian green-winged teal on Clam Lagoon at Adak. Note the horizontal patch of white feathers on the side of the male. (F.Z. 1984)

- Falcated Teal - A female was recorded in Navy Town Cove, Attu, 21 May to 3 June.
- Spot-billed Duck - Single adult plumaged birds were observed at Adak 25 March and 28 May.
- Garganey - A male was recorded on a small lake at Murder Point, Attu, on 22 May. A female plumaged bird was found on a Shemya Lake 20-22 September.
- Northern Shoveler - Not commonly observed in the Aleutians, this species was apparently relatively wide spread in the Aleutians this spring. A pair was at Clam Lagoon, Adak, on 13 May and ten were together there on 17 May. Up to 16 (twice what is normally observed) were at Attu 21 May to 5 June. A pair was at Shemya 24-31 May and a female was there 20 September.
- Eurasian Wigeon - Up to 15 were seen at Shemya on 26 May, but their numbers decreased significantly by 30 May. A pair recorded at Nizki Island on 5 June and single drakes at Lake Andrew and Clam Lagoon, Adak on 14 June lead to speculation that the species breeds somewhere in the Aleutians.
- American Wigeon - A male recorded at Henderson Marsh, Attu, was only the fourth record (fifth bird) for that island. One drake observed at Andrew Lake, Adak, on 9 September represented the first Aleutian record between 26 June (1973, Attu) and 3 October (1983, Adak).
- Common Pochard - Up to five (including two drakes) were spotted on small lakes at Murder Point, Attu, 20-30 May. Two females were at Middle Lake, Shemya, 24-26 May. A drake

- and two hens were recorded on a pond near Lake Andrew, Adak, on 28 May.
- Canvasback - Two drakes and a hen appeared at Adak on 11 February. The two drakes were also observed later at Clam Lagoon, Adak, 18 and 22 February. They remained into March.
- Tufted Duck - Eight were observed in the Adak small boat basin on 11 February and seven remained there into March. The species was present at Adak in good numbers through the first half of April. Up to five were seen at Shemya 24-30 May. One drake was sighted during the Adak Breeding Bird Survey on 21 June, leading to speculation on possible breeding status. Others remained at Attu into late June, leading an observer there to also suspect breeding. A flock of 21 birds at Andrew Lake, Adak, on 30 October was the largest number ever recorded at one time in the central Aleutians. Three to four were noted on Amchitka lakes 7-13 November. Only two to six were seen at Attu during the 20 May to 8 June period. Except for 1981 when they were not seen, this was the lowest spring total ever recorded at Attu.
- King Eider - One to two males were noted at Attu 21 May to 4 June.
- Steller's Eider - A female spotted on Massacre Bay, Attu, on 22 May was only the fourth record for the island in nine years.
- Barrow's Goldeneye - A high plumaged drake was observed on Clevenger Lake, Amchitka, on 7 November. The bird was seen again on 14 November. It represented only the tenth known record west of Unimak Island.
- Smew - Three females were noted on Henderson Marsh, Attu, 20-24 May. Up to five females were observed at Shemya 24-30 May and one was also seen there 19-20 September.
- Common Merganser - A female plumaged bird was recorded at Shemya 24-27 May. A pair was sighted at Puffin Point, Alaid, on 27 May and a drake and two hens were observed at Barrier Point, Nizki, on 3 June. A female with four ducklings was observed along Kent Creek, Attu, on 9 August. To our knowledge, the Asiatic Mergus merganser merganser is the only documented subspecies from the Near Islands. The spring 1984 observations were attributed to that subspecies; therefore, this may represent a first nesting record for the subspecies in North America. Unfortunately no photographs were obtained.

4. Marsh and Water Birds

Four species of loons, three species of grebes, three species of albatross, nine species of smaller tube-noses, three species of cormorants, an egret, a night-heron, and the sandhill crane have been recorded in the Aleutian Islands. Of those, the short-tailed albatross and the egret are from Asia. The Asiatic short-tailed albatross is an endangered species (reported in section G.2.) The Chinese egret (also an endangered spe-

cies) occurred only once in 1974. Several of the tube-noses are from the southern hemisphere. The following gives information only for unusual species or sightings.

Yellow-billed Loon - Two single sightings occurred at Attu 25 May and 5 June. This represents the lowest count for the species at that westernmost island in the last eight years.

Red-necked Grebe - Attu records from late April to early May and from late September to early October were the first since 1980 for that island. Farther east (i.e. Adak) the species winters in good numbers.

Mottled Petrel - One was observed on 21 August south of Yunaska Island. It was sighted for about 30 seconds as it flew in a southerly direction.

5. Shorebirds, Gulls, Terns and Allied Species

Seven species of plovers, 43 species of sandpipers, three species of jaegers, a skua, 13 species of gulls, four species of terns and 15 species of alcids have been recorded in the Aleutian Islands. Of those, five species of plovers, 22 species of sandpipers, five species of gulls and two species of terns are Asiatic in origin. The rock sandpiper and the glaucous-winged gull are year-round residents. The following gives occurrence information for all unusual North American and Asiatic species.



Glaucous-winged gulls following the charter vessel "Vestfjord". (C.A. 1984)

Black-bellied Plover - A breeding plumaged individual was located on the mud flats of Clam Lagoon, Adak, on 30 August. Only four previous "fall" records in the Aleutians are known.

- Lesser Golden Plover - The first fall occurrence of this species was detected at Adak on 24 August. On 17 and 18 September hundreds could be seen or heard just before dark. These nights were unusually still for Adak, so the birds could be heard until at least midnight. Conditions changed the next night and no more birds were seen or heard. The last Adak record of four birds occurred on the slopes of Mt. Moffett on 15 October. Up to three birds were also found daily at Amchitka 5-9 November, a new late date for the Aleutians.
- Mongolian Plover - One was observed on the south shore of Shemya on 25 May and another on the north shore the next day. The species was recorded at Attu from early June to early October. All previous records are for spring or fall migration periods only. The adult male bird on Attu exhibited distraction behavior characteristic of nesting on 1 July, however, no nest, young or female could be found. Weather did not permit a return until four days later. At that time, a fox was seen in the exact area with a shorebird in its mouth which could have been the male plover. This species commonly nests on the Commander Islands 320 km (200 mi) to the northwest of Attu, but has not been recorded nesting in the Aleutians.
- Common Ringed or Semipalmated Plover - A lone bird representing one of these species was observed on tidal mud flats along Sweeper Creek, Adak, on 6 August. The bird departed before appropriate optical equipment (i.e. a spotting scope) could be obtained. Both species have been recorded previously in the area (ringed east to Adak and semipalmated west to Amchitka and Buldir).
- Common Greenshank - Up to four were seen at Attu 21-31 May. One was observed at Shemya on 24 May and four were there on 25 May.
- Lesser Yellowlegs - One was sighted at Clam Lagoon, Adak, on 30 August. There are only four previous "fall" records for the Aleutians. There is also a summer record at Emerald Island.
- Spotted Redshank - One or two were recorded at Attu 22-26 May. A winter plumaged bird was seen at Hospital Lake, Shemya, on 21 September.
- Wood Sandpiper - Up to 18 were noted at Attu 21 May to 8 June. Up to eight were at Shemya 24-30 May. Others were present at Attu through late August and at least two pairs were known to have nested there. On Alaid one was observed at Goose Pond and another was seen on the south shore near South Lake on 29 May. One bird was found at Midden Lake and another at Lower Trail Pond, Alaid, on 2 June.
- Green Sandpiper - One was observed at Barbara Point, Attu, on 4 June.
- Gray-tailed Tattler - One to two were seen at Shemya 24-30 May. Two were flushed from coastal rocks near Puffin Point, July through late September. A winter plumaged bird was noted along the north shore of Shemya on 20 September.

- Common Sandpiper - Up to three were observed at Attu 21 May to 3 June. One to three were also seen at Shemya 24-27 May. One was recorded near Rocky Point, on the south shore of Alaid on 27 May. Others occurred at Attu during late August.
- Terek Sandpiper - The species was sighted at Attu in early August.
- Whimbrel (Asiatic) - One or two were seen at Attu 23 May to 6 June.
- Bristle-thighed Curlew - The species was reported at Attu in late May.
- Far Eastern Curlew - One was observed as it passed over Murder Point, Attu, on 21 May.
- Black-tailed Godwit - Single birds were at Attu 22 May to 5 June.
- Bar-tailed Godwit - Single birds were recorded at Attu 21 and 24 May. A flock of 11 was noted as they passed over Alaid on 31 May. The single bird observed at Adak on 14 June represented the fifth latest spring record known for the Aleutians.
- Western Sandpiper - Single birds were sighted at Attu 3-4 June. There is only one previous spring record on Attu. The species was also present there from late August until late September.
- Rufous-necked Stint - Single birds (the lowest count in eight springs) were seen at Attu 23 May to 3 June. One was noted as it flushed from the outlet of South Lake, Alaid, on 27 May. The species also occurred at Attu from late August to early September.
- Temminck's Stint - One was found at Upper Lake, Shemya, on 27 May.
- Long-toed Stint - Up to four were observed at Attu 20 May to 7 June. One to two were seen at Shemya 24-26 May. A few were also recorded at Attu in late August.
- Baird's Sandpiper - The species was sighted at Attu from early to late August. A lone bird was also seen at Clam Lagoon, Adak, on 18 September. There are 11 previous fall records for the Aleutians, but only three for Adak. One was observed along the South shore of Shemya on 23 September.
- Pectoral Sandpiper - Two were seen at Shemya on 25 May. Four were observed on Alaid on 2 June. Several were noted as they passed through Attu between mid-August and mid-October. About 35 were sighted at Shemya 19-26 September. The fall migration at Adak for this species was disappointing for the second year in a row. The only positive identifications were of single birds on 20 September and 16 October.
- Sharp-tailed Sandpiper - Up to 19 were observed at Shemya 19-26 September. A few were noted as they passed through Attu between mid-September and mid-October. None were reported elsewhere.
- Buff-breasted Sandpiper - One juvenile bird was seen at Attu on 8 September representing the first record for that island.

- Ruff - A subadult male (front feathers white, back rufous, sides gray) was spotted at Clam Lagoon, Adak, on 28 May.
- Pin-tailed Snipe - One was sighted near Lake Andrew, Adak, on 5 May. This sighting may be the first for North America. Another bird was found 20 days later (25 May) at Attu. It was observed again on 26 May. This individual was flushed several times and observers got a good look at it. The bird frequented drier spots in the Navy Town marsh. It was not difficult to separate (by behavior, call, and appearance) from the nominate race of Gallinago gallinago, however, the identification of the bird as this species, rather than Swinhoe's snipe, rests primarily on considerations of range, likelihood of occurrence, and little understood and poorly described call differences.
- Common Snipe (Asiatic) - Five were observed at Shemya 25-26 May. This western Pacific form also nested at Attu where it was present from mid-May to late September. There are no previous records. The nest contained three eggs when discovered on 21 June. It was later noted that it failed. The North American race breeds in the eastern Aleutian Islands.
- Long-tailed Jaeger - Single birds were recorded at Attu 30 May and 7 June. A pair of adults were seen flying over Jaeger Pond, Nizki, on 31 May, a first for that island.
- Common Black-headed Gull - Up to ten were sighted at Shemya 24-29 May. One or two were also seen at Attu 3-7 June.
- Herring Gull - The species is not regular at Adak, but an adult was there on 17 May. Those observed in the western Aleutians are an Asiatic subspecies. One of these was observed at Shemya 26-27 May and a second year bird was seen at Attu 3 and 8 June and again in early September.
- Slaty-backed Gull - A second year bird was found at Attu 23-25 May. One was seen at Shemya on 24 May. A second year bird was observed on the Alaid end of the Alaid/Nizki sandspit on 27 May and an adult was sighted with glaucous-winged gulls in the Southeast Beach gull colony at Nizki on 31 May. The wing remains of a second adult bird were also found while checking gull nests there. An adult pair had been observed in that colony 24 May through 3 June 1983. Hopes for discovering the first North American breeding slaty-backed gulls were dashed.
- Sabine's Gull - A flock of about 15 and an additional pair were observed in the vicinity of Unimak Pass on 24 August.
- Common Tern (Asiatic) - An individual of the Longipennis subspecies was observed near the end of the Attu east runway on 23 May and 8 June.
- Marbled Murrelet - Late on a clear May evening at Attu several were thought to have been heard flying toward the sea from western mountains. An observer familiar with the calls made the identification. This observation strongly suggests the species may nest on Attu. If confirmed, the occurrence would represent a considerable westward

expansion of the known breeding range (unless they are of an Asiatic subspecies).

A survey of breeding bird populations was completed on Alaid/Nizki Islands. This work was done while censusing returning ACG on the two islands. The survey found that all populations of nesting seabirds on the two islands have increased dramatically since the introduced arctic foxes were completely eliminated in 1976. The Nizki populations appeared to have increased even from 1983 to 1984. This is extremely interesting since the 1983 survey of that island documented population increases of from 185 to over 600 percent in nesting seabirds. The results of these surveys support our justifications for the removal of introduced arctic foxes from other islands within the Aleutian Chain and elsewhere in the AMNWR for the benefit of breeding populations of migratory seabirds, waterbirds, shorebirds and songbirds.

During fox eradication work on Amukta Island, a survey of wildlife resources was conducted. This was done to provide baseline information on seabird, marine mammal and inland bird populations for pre- and post-fox removal comparisons. This survey was accomplished by circumnavigating the island in an inflatable boat and recording all wildlife observed with a specific count at the kittiwake and murre colony on the west side. A total of 2,247 birds representing 14 species and 292 marine mammals representing three species were observed during the 7 June circumnavigation of Amukta (Table 10). Murres were the most numerous species observed. They nest in three colonies on the west side of the island. The small colony on the southwest coast contained 273 individuals and the other two colonies contained 667 and 251 birds. Four specific counts were made at the large south central colony and three at the adjacent colony to the north to obtain an average number.

TABLE 10. Wildlife observed during Amukta Island circumnavigation, 7 June 1984

<u>Species</u>	<u>Individuals Observed</u>
Murre Species	1,191
Black-legged Kittiwake	286
Glaucous-winged Gull	181
Cormorant Species	170
Horned Puffin	112
Pigeon Guillemot	106
Parakeet Auklet	102
Harlequin Duck	57
Tufted Puffin	16
Common Eider	13
Bald Eagle	5
Common Raven	4

Table 10. Continued

<u>Species</u>	<u>Individuals Observed</u>
Crested Auklet	3
Ancient Murrelet	1
Stellars Sea Lion	220
Harbor Seal	58
Sea Otter	14

Black-legged kittiwakes were also numerous. A total of 161 were counted at the southwest colony and 125 were counted at the south central colony. None were observed at the northern colony. The most noteworthy incidental observation made during the Amukta visit was that of ACG (see Section G.2).

While searching for ACG on the island, murre census plots were counted. Ten counts were made during the afternoon/early evening on 23 June. The low number observed for the five plots was 466 murres and the high was 592. It should be noted that the specific plot boundaries varied somewhat from those previously established. The average ratio of thick-billed to common murres was about 1 to 15 respectively. A total of 258 black-legged kittiwake nests were observed in plot #1. The count occurred a little too early to allow determination of the percent of birds having eggs in their nests.

For the first time ever, arctic fox eradication efforts in the AIU were conducted primarily to benefit migratory nesting seabirds. This project was conducted at Kasatochi Island, a 287 ha (717 acres) island, located in the central Aleutians 19 km (12 mi) north of the western tip of Atka Island. The island is circular with a diameter of about 2.4 km (1.5 mi). A crater with a summit of 314.5 m (1,038 ft) descends inward to a .8 km (.5 mi) wide caldera at near sea level. The outer slopes of the island are steep from sea shore to rim. Shear cliffs interspersed with rock slides dominate the north side. Fine sand beaches are found along the east side. All slopes are heavily vegetated.

The historic and present population of significant seabird numbers, its close proximity to Adak and its small workable size made Kasatochi a prime candidate for fox eradication. Over 30,000 auklets presently nest there and puffins were reported in large numbers during the 1930's before fox predation greatly reduced their population. Kasatochi was selected for eradication efforts when ACG work on Chagulak Island was completed early. Fox eradication was conducted during the period 16-19 June with a three day mop up operation in August. The goal of this effort was to eliminate as many fox as possible in the limited time available.



A swarm of crested and least auklets on Kasatochi Island. Numbers like these and the fact that they did not evolve with a natural terrestrial predator make them easy prey for introduced arctic fox. (C.A. 1984)

Using the 29.7 m (98 ft) charter vessel "Vestfjord" as a base camp, crews of two to three people worked various parts of the island. Fox were called, then shot with firearms or caught along trails with leghold traps or gassed in their dens with denning cartridges. A total of 59 fox were killed during the eradication effort (18 males, 29 females and 12 unknown). Forty one were shot and 11 were trapped. The results indicate high natality. Thirteen of the females were found to be lactating. Three of the females were examined, showing seven, eight and nine placental scars. Most fox were taken within the two large auklet colonies on the island where the predators depend greatly on the birds for food. Unlike fox elsewhere, most animals at Kasatochi were not wary of man. This made eradication quick and easy.



An arctic fox stalking his dinner. (C.A. 1984)

A large scale eradication effort similar to that required at Amukta was not planned or necessary at Kasatochi. Initial efforts appear promising. A mop up effort is planned for 1985 to assure complete removal of all fox.

6. Raptors

Four eagle species, ten hawk species and three owl species have been recorded in the Aleutian Islands. Two of the eagle species, three of the hawk species and one of the owl species are Asiatic in origin. The northern bald eagle is abundant year around at Adak and is a very popular photographic subject. The following information covers unusual North American and all Asiatic species recorded.



The majestic bald eagle on Adak. (F.D. 1984)

White-tailed Eagle - The known Temnac Valley, Attu, nest site was first visited this year on 24 April. The valley was choked with snow and the nest site was buried. A single bird was finally sighted on 1 May. All subsequent sightings through early August were also of a single bird. It is possible that one of the pair died during the winter of 1983-84, the pair failed to nest in 1984, or the pair nested somewhere else on the rugged 90,247 ha (223,000 acre) island. The species was not observed outside Temnac Valley in 1984, however.

Eurasian Kestrel - One or two birds were observed at Attu 3-4 June. Another was also sighted in early October. The circumstances surrounding the spring sightings lead observers to speculate that the species might be nesting on Attu. This was the third Aleutian occurrence there, following a spring record in 1982 and a fall record in 1983.

- Northern Hobby - A juvenile bird was observed and photographed at Attu 7-8 October for the first fall record in the Aleutian Islands. The first observation occurred in May 1983.
- Gyr Falcon - A gray phase bird was observed on Amchitka 6 November and a white phase bird was seen there 9 and 13 November.
- Snowy Owl - This appeared to be a banner year for snowy owls in the Aleutians. Birds were observed at Attu from mid-April to late September, a single bird was seen at Alaid on 2 June, a first for that island, and after receiving reports from Adak residents since December 1983, the refuge staff finally observed one after dark near Clam Lagoon on 17 February. One was photographed harrasing bald eagles near Clam Lagoon on 31 July, representing the first Adak record for that month. Summer reports for Adak continued into August with one seen near NSGA on the 5th and one near Clam Lagoon on the 28th. During field work along the road system of Amchitka Island in November, two were observed on the 6th, one on the 8th, six on the 9th, seven on the 10th and two on the 11th.

7. Other Migratory Birds

The only "non-migratory" bird in the Aleutian Islands is the rock ptarmigan although several of the so called "migratory" species don't migrate out of the Aleutians. Excluding those species covered in other sections of this report, species not leaving their individual breeding islands include the common raven, winter wren, song sparrow, snow bunting and rosy finch, leaving 69 "other" migratory species for this section. Many of those species have been recorded passing through the Aleutians between wintering grounds (in North America, Asia, Hawaii, Japan or elsewhere in the Pacific) and breeding grounds (in mainland Alaska or eastern Russia). The apparent exceptions are American dippers, black-backed wagtails, water pipits, savannah sparrows and Lapland longspurs. Nobody seems to know what Aleutian redpolls do, but they have been recorded during all months of the year and at least occasionally nest on the islands. Of those species covered in this section, at least 37 are Asiatic in origin. The information that follows covers unusual North American and all asiatic species recorded during the year.

- White-throated Needletail - Two birds were sighted on 24 May just north of the mouth of Aboud Creek, Attu. One was spotted roosting on a nearby cliff face. The next morning a bird was seen still roosting at that point, but it soon flew away. Another was observed at Attu on 27 May.
- Northern Flicker - As incredible as this one may seem, a "red-shafted" flicker was flushed, chased and studied south of Clevenger Lake, Amchitka, on 7 November. It wed utility poles and wooden building roofs for perches and represented the first record of any species of woodpecker for

the entire virtually treeless Aleutian Islands. What makes the record all the more interesting is the fact that the "red-shafted" form only occurs in the south eastern panhandle portion of Alaska. Those further north in Alaska (i.e. closer to the Aleutians) are of the "yellow-shafted" form.

Eurasian Skylark - Single birds were observed at Attu 21 May and 6 June. Others were detected there in mid-September.

Middendorf's Grasshopper Warbler - A territorial male was observed at Attu 16 July to 10 August, but no breeding was detected. The presence of the species during the breeding season is unprecedented.

Lanceolated Warbler - A lone bird was identified at Barbara Point, Attu, on the evening of 4 June. This was the first record of this species for North America. Seven to 11 birds were then observed at several sites on Attu daily from 4 June until mid-June with up to 25 birds being present. The high number included at least 16 males thought to be establishing territories. They were observed into July and at least one bird was observed carrying nesting material, but no nests could be located. Photographs and one specimen were obtained. The specimen is at the University of Alaska Museum in Fairbanks.

Arctic Warbler (Asiatic) - A single observation was made of this species at Attu in early October.

Red-breasted Flycatcher - A male and a female seen at opposite ends of the east-west Attu runway on 25 May represent the sixth and seventh Alaskan record of this species. These sightings also occurred at least eight days earlier than any previous record. A single bird was observed at Shemya 26 and 27 May. A single bird was also sighted at Attu on 4 June.

Gray-spotted Flycatcher - A bird observed at Attu on 25 May was a week earlier than any previous Alaskan record. Another single bird was sighted on 26 May, two were located on 27 May and the last individual was sighted on 28 May on Attu. One was also seen at Shemya 25 and 27 May.

Siberian Rubythroat - Two birds were observed at Attu 27 May and 8 June along the South Beach area. That site has been the most consistent area in which to find the species. Another bird was seen at Attu in early October.

Bluethroat - A single bird, representing the first record for the Aleutian Islands, was sighted at Attu 25-27 September.

Eye-browed Thrush - One to two were observed at Attu 25-28 May. One was also seen near the cabin in Aga Cove, Agattu, on 26 May.

Dusky Thrush - An adult plumaged eunomus bird was carefully studied in Jones Cove, Nizki, foraging among driftwood logs and beach rocks on 31 May.

Yellow Wagtail - Up to four birds, well below the normal number, were observed at Attu 21 May to 5 June. From one to three were seen at Shemya 24-30 May. Single birds were also observed at Alaid along the south side, in Trapp Cove, and on Southeast Beach on 27 May. On 28 May, one

was seen near the east end of Alaid. Another was observed on the north side of West Point, Nizki, on 30 May. In all instances, the observers expected more sightings than were obtained.

Gray wagtail - One was observed at Attu on 25 May. An adult plumaged bird was seen in Paradise Canyon near the west end of Alaid on 29 May. One was also sighted at Shemya on 30 May. A single bird was also seen at Attu in mid-October.

Olive Tree-Pipit - Two were noted along the road toward Alexai Point, Attu, on 26 May. One was also seen at Attu in late September.

Red-throated Pipit - One to two birds were observed at Attu 23 May to 7 June. Two were seen at Shemya on 24 May. Others were noted at Attu from early September to early October. Single birds were also observed at Shemya 23 and 24 September.

Bohemian Waxwing - A single well-described bird was observed foraging among hilltop rocks east of Andrew Lake, Adak, on 15 October. Another was seen at Attu at about the same time. There had been one previous fall record for the Aleutians (10/24/71 at Amchitka).

Brown Shrike - One was seen at Attu in late September.

Northern Shrike - A single immature plumaged bird was seen preying on song sparrows at Unalga Bight, Adak, on 25 October.

Yellow Warbler - The species was added to the Aleutian Islands list when one was observed at Attu on 25 September.

Yellow-rumped Warbler - The May 1980 Attu record was for an "Audubon's" form. The bird discovered at Attu on 8 October this year was a "Myrtle's" form. Photographs were obtained.

Fox Sparrow - A single bird was observed at Shemya on 26 September. The two previous Aleutian records were in 1894 and 1944.

Golden-crowned Sparrow - A few were observed flying over Attu in late September and early October. Up to five were seen at Shemya 23-26 September.

White-crowned Sparrow - One was sighted at Shemya on 22 September, the first record for the species in the Aleutian Islands.

Little Bunting - One was at Shemya on 24 September.

Rustic Bunting - One was seen at Attu 25 May to 7 June. Eight were at Shemya on 25 May and one was seen on 27 May. Others were sighted at Attu from late September to early October.

Brambling - The single bird observed at Attu 21 and 22 May represented the lowest number recorded there in eight springs. Five were seen at Shemya on 24 May. The species was also sighted at Attu in early October.

Common Rosefinch - One was observed at Shemya on 24 September.

The second-annual Breeding Bird Survey was conducted on 21 June in conjunction with the Nongame Wildlife Program of the Alaska

Department of Fish and Game and Patuxent Wildlife Research Station, Laurel MD. This census was expanded to follow a prescribed 40 km (25 mi) route with specific survey points every one-half mile. A total of 645 birds of 24 different species were recorded. (Table 11).

Table 11. Adak Breeding Bird Survey, 21 June 1984

<u>Species</u>	<u>Number</u>	<u>Number of stops</u>
Pelagic Cormorant	1	1
Green-winged (Com.) Teal	69	11
Mallard	9	6
Northern Pintail	11	2
Tufted Duck*	1	1
Greater Scaup	24**	2
Harlequin Duck***	30	1
Red-breasted Merganser	5	2
Bald Eagle	21****	10
Rock Ptarmigan	19	11
Red-necked Phalarope	7	3
Parasitic Jaeger	12	8
Glaucous-winged Gull	50	13
Black-legged Kittiwake	6	2
Arctic Tern	6	1
Aleutian Tern	54	9
Marbled Murrelet	4	1
Horned Puffin	1	1
Common Raven	3	3
Winter Wren	1	1
Song Sparrow	19	13
Lapland Longspur	283	48
Snow Bunting	4	3
Rosy Finch	5	4

* A single drake may indicate breeding, but there are no nesting records for North America.

** A flock of 21 (both sexes) were not considered breeding birds. The other three birds were possible breeders.

*** Not known to breed in the Aleutian Islands.

**** Seven adults, 14 immatures.



The large Aleutian form of the rosy finch is a year round resident in the islands. (F.Z. 1984)

The 17th annual Adak Christmas Bird Count was conducted on 28 December, the finest winter day of 1984. A total of 39 species and 4313 individual birds were recorded including the first Adak double-crested cormorant. Record numbers were tallied for common loon, arctic loon, red-necked grebe, mallard, northern pintail, red-breasted merganser, rock ptarmigan, rock sandpiper, pigeon guillemot and marbled murrelet (Table 12). A record 20 participants covered the count circle in a record six parties.

Table 12. Adak Christmas bird count, 28 December 1984

<u>Species</u>	<u>No.</u>	<u>Species</u>	<u>No.</u>
Arctic Loon	29	Bald Eagle	254
Common Loon	5	(139a, 109i, 6u)	
Loon sp.	3	Peregrine Falcon	2
Horned Grebe	4	Rock Ptarmigan	31
Red-throated Loon	24	Black Oystercatcher	10
Double-crested Cormorant	1	Sanderling	22
Pelagic Cormorant	62	Rock Sandpiper	257
Red-faced Cormorant	2	Dunlin	1
Cormorant Species	231	Glaucous-winged Gull	442
Green-winged (Com.) Teal	102	Common Murre	10
Mallard	173	Thick-billed Murre	6
Northern Pintail	41	Pidgeon Guillemot	119
Greater Scaup	252	Marbled Murrelet	96
Common Eider	25	Ancient Murrelet	2
Steller's Eider	1	Alcid, sp.	127
Harlequin Duck	854	Common Raven	181
Oldsquaw	186	Winter Wren	2
Black Scoter	11	Song Sparrow	1

Table 12. Continued

<u>Species</u>	<u>No.</u>	<u>Species</u>	<u>No.</u>
White-winged Scoter	1	Snow Bunting	7
Common Goldeneye	229	Rosy Finch	49
Bufflehead	113	Hoary Redpoll	14
Red-breasted merganser	313		
(Total 16 sp, 4313 birds)			

Occasionally, refuge staff members are called upon by various facilities on the Naval Air Station to pick up wildlife. Commonly these calls concern birds that have gotten into warehouses (ravens, rosy finches and snow buntings) and must be removed for sanitation purposes. Others have been injured by cars, 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.

8. Game Mammals

Caribou were introduced to Adak in 1958 and 1959. The herd grew rapidly due to normally mild winters, lush vegetation, and lack of predators and biting insects. Within ten years many islanders were hunting caribou and the world's record bull weighing over 315 kg (700 lbs) was taken at Adak in 1968. The management goal, set by a cooperative agreement between the Service, the Alaska Department of Fish and Game and the U. S. Navy is a post-season population of 150-250 animals. The danger of overpopulation is very real and a major concern of the AIU staff since no natural predators or disease exist on the island. Population control is accomplished through the sport hunting harvest. Continued U. S. Navy support in the form of tug boat transportation for hunters and refuge monitors is essential to properly manage the Adak caribou herd.

Due to limited personnel availability and higher priority work, only two major caribou management efforts were conducted in 1984. They were the completion of aerial population surveys and the completion of a vegetation analysis.

Three aerial caribou surveys were conducted (6 June, 7 June and 7 July). The number of caribou counted on each totalled 360, 270 and 391 animals respectively. The speed of the fixed wing aircraft, rugged island topography, weather and the blending of caribou with the terrain contributed to the variance in the counts. The first two flights were conducted using a high wing twin engine British Islander. A Piper Navaho, a faster twin engine low-wing aircraft, was used for the third count. Each count consisted of a flight over the entire island. The flight on 7 June was conducted to verify the location of calving

grounds. The survey conducted on 6 June finally documented a specific calving ground in the upper Hidden and Boot Bay areas. All but two calves were observed in these areas. It was also discovered that aerial surveys conducted specifically to count calves are very difficult, if not impossible. The calves, unlike cows, naturally blend in with the vegetation and conceal themselves behind or beneath the cows, making them very difficult or even impossible to spot from the air. For these reasons, an on the ground caribou calf count will be conducted in 1985 if time and manpower permit. From the count conducted on 7 July, production of the herd was estimated to be 32.5 percent.



Aerial census of the Adak caribou herd is difficult due to their mobility, weather, terrain and the type of aircraft available. (C.A. 1984)

These census figures supported our decision to reopen a hunting season from September 1984 to March 1985 with a bag limit of 2 animals. The season was not opened in 1983 due to low survey counts. The 1982 season was closed early. With annual hunting pressure taking the place of natural predators, management can assure a viable caribou population can be maintained in the future.

In 1984 the caribou winter range investigation was finally completed. Considerable time and effort were expended on the range investigation, especially the vegetation transect work. The study helped delineate the caribou winter range on Adak, divide it into habitat types and give some insight into the species composition and potential production of the habitat. The potential caribou winter range was delineated to include all areas below 182 m (600 ft) in elevation south of the Adak military reservation line except for Thumb Valley, Gannet Valley, Scabbard Bay and Kagalaska Straight. A total of 31,634 ha (79,085 acres) of potential caribou winter range exists on

Adak. This corrected winter range figure represents about 43 percent of the total acreage of Adak.

Five vegetation types within the winter range were identified. They are seashore, lowland meadow, heath, fen and alpine meadow. Non-vegetation types on the island included open water and inland bedrock, for a total of seven community types. Twelve vegetation transects were completed in 1981, 35 in 1982 and 53 in 1983. At the end of the 1981 and 1982 work, an attempt was made to statistically analyze the variation between plots in order to determine how many samples would be necessary for each habitat type in future work. This analysis indicated anywhere from 48 to 161 transects ($P < 0.10$) or even 70 to 233 ($P < 0.05$) transects were required for some habitat types to obtain a statistically valid sample. It can be speculated that this high variation is at least in part due to sampling at slightly different times of the year, changing methods and different sampling personnel during the different years of the study, as well as the natural variation of the habitat. In any case, due to the large number of additional transects required and higher priority work, it was decided to obtain only 100 transects in total and not attempt any further statistical analysis in 1984, but concentrate on the frequency of occurrence and the productivity of the vegetation for the current study.

A total of 42 different vascular plant species and two lichens were collected in 1981. In addition 34 species were collected as part of the vegetation transect work. In order to analyze the production of plants collected from the vegetation transects, the individual species were divided into seven major groups. The net production of these vegetation groups for each of the five major habitat types is shown in Table 13. A summary of the total production of vascular plants and lichens found within the five major habitat types each of the three years of sampling is shown in Graphs 1 and 2. The production for each habitat was quite variable for each of the three years. The combined mean, however, especially for vascular plants was comparable between 1982 and 1983. This would suggest that at least for those two years the differences within habitat types were similar. The variability within each of the habitat types could at least in part be due to sampling at slightly different times of the year (8-10 August 1981, 7-11 September 1982 and 20 August to 8 September 1983) and other reasons previously given. The production of vascular plants would vary accordingly.

Table 13. Net production, maximum and minimum values in kg/ha per habitat types, Adak Island, Adak, Alaska 1981 to 1983

		<u>Lowland meadow</u>	<u>Alpine meadow</u>	<u>Heath</u>	<u>Fen</u>	<u>Seashore</u>
Grasses	81	0-1750	0-220	0-780	0-220	---
	82	130-7620	---	0-920	---	---
	83	244-4450	129-790	109-2241	100-1270	224-18284
Sedges	81	0-880	0-680	0-1480	190-1590	---
	82	130-3380	---	0-1200	---	---
	83	133-3873	115-789	140-1330	125-2461	102-904
Lichens	81	0-1000	1900-6330	0-1270	0-920	---
	82	300-1940	---	0-2980	---	---
	83	100-876	387-9407	110-5141	128-3258	0-6505
Forbes	81	0-1410	0-20	0-810	0-900	---
	82	100-920	---	0-300	---	---
	83	152-4752	101-361	106-823	109-11309	113-4748
Sub-Shrubs	81	0-830	1190-2590	980-5220	0-750	---
	82	0-5300	---	130-8300	---	---
	83	144-	806-7372	422-5669	126-2780	---
Mosses	81	0-2080	0-3230	0-2070	0-1310	---
	82	130-30520	---	0-4690	---	---
	83	141-2769	361-4627	729-7440	149-11255	109-3184
Ferns	81	0-30	---	---	---	---
	82	0-260	---	---	---	---
	83	135-1816	---	---	---	---

It should be noted that this range investigation was initiated in 1981 when no charter vessel was available for work on other islands during the entire field season. Since that year, even with good intentions, higher priority work on other islands has been of higher priority. Analysis of the vegetation transect work showed that considerably more time and effort (more transects) would be necessary to develop a statistically valid sample of the caribou winter range vascular plant production on Adak. For this reason the large amount of time already expended and other higher priority work, it was decided to terminate the study. Although we had hoped to be able to estimate carrying capacity of the Adak caribou herd from this study, it was not possible. Such a study would require considerably more time than can currently be justified. The study did, however, provide an excellent foundation from which a more detailed and complete analysis of the Adak caribou herd and range could be

completed in the future. We recommend that if money becomes available for such a project in the future, that it include a contract study by a university. A concentrated effort could yield a more detailed analysis of the range, the caribou carrying capacity of Adak and other biological factors which affect caribou management on Adak. Without additional manpower or money, the emphasis on caribou in future years will be on aerial census work and managing the sport hunting season.

9. Marine Mammals

Marine mammals were recorded during vehicle and nearshore boat surveys at Adak. A pod of killer whales was sighted at Chagulak and Adak Passes during the summer. This species was also noted in Sweepers Cove, Adak, as were several minke whales during the year.



Killer whales, photographed in Adak Pass, are always exciting to observe. (F.D. 1984)

10. Other Resident Wildlife

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

11. Fisheries Resources

Pink salmon are the most heavily harvested of the three anadromous fish species that utilize streams on Adak. Dolly varden and kokanee are harvested to a lesser extent, while halibut is available to "salty dogs". Good red and pink salmon runs occurred on Adak although the numbers were less than the peak runs of two years ago. Relatively large runs are expected on

even numbered years. No specific salmon spawning counts were completed this year due to higher priority work.

The fish highlight in 1984 was a dead beached female salmon shark (Lamna ditropis) at Clam Lagoon, Adak, in November. The cause of death was not determined, but it is suspected that the shark choked either on food or its own internal organs (stomach and esophagus) which were found lodged in the throat. This was the first salmon shark observed by the Adak refuge staff, although the species is fairly common throughout Pacific waters. The specimen weighed approximately 135-157.5 kg (300-350 lbs) and measured 240 cm (8 ft) long. The fish contained four unborn fetuses which were preserved. Samples were sent to the National Marine Fisheries Service for examination.



The menacing appearance of the jaws of this beached salmon shark make a person glad it predominantly eats salmon. (C.A. 1984)

14. Scientific Collections

Two ACG and 15 ACG eggs were collected on Chagulak and Kaliktagik islands for research studies on the subspecies of each of the different nesting flocks. No other scientific collections were made on the Unit except for the salvage of dead specimens.

15. Animal Control

Although a permit is issued annually for gull control along the Shemya Air Force Base runways, it was not necessary to shoot any this year for depredation control.

Additional animal control work was conducted on Amukta, Rat and Kasatochi islands in the form of arctic fox eradication. These efforts were accomplished to benefit the endangered ACG and

other migratory birds. For more detailed information on these projects see Sections G.2 and G.5 of this report.

16. Marking and Banding

A summary of 1984 banding efforts is shown in Table 14. Details of banding efforts can be found in the section references shown in the Table.

Table 14. Summary of AIU-AMNWR banding and marking in 1984

<u>Species</u>	<u>Number FWS banded</u>	<u>Number color banded (plastic)</u>
Aleutian Canada goose	83	83 (blue)
Aleutian Canada goose	20	20 (green)
Leach's storm-petrel	29	0
Fork-tailed storm-petrel	42	0

17. Disease Prevention and Control

Fecal samples were collected from ACG on Buldir and Chagulak islands for a coccidia monitoring program. A total of 80 and 26 samples were taken from geese on Buldir and Chagulak, respectively. The results of this sampling program were not obtained by the time this report was prepared. A brief description of the program is contained in Section G.2.

H. PUBLIC USE

1. General

Most of the people living in the Aleutian Islands are active duty military personnel and their dependents. The Adak NAS is located on Adak Island and consists of approximately 5,000 people. Shemya Air Force Base and the Coast Guard LORAN Station on Attu Island add approximately another 1,000 military personnel to the population of the chain. Four native villages on Unalaska, Umnak (Nikolski), Akutan and Atka Islands account for 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 some trips. These visits give us the opportunity to discuss refuge programs and objectives with the people, present films and/or slide shows to interested residents, and provide environmental education activities for students. Refuge films and slide shows were presented to

approximately 60 Air Force personnel at Shemya Island in August. ORP Edgerton intended to do the same for the 24 U. S. Coast Guard personnel on Attu, but due to weather he was only able to stay on the island for one hour. He made contacts with command personnel on both military installations and laid the groundwork for future interpretation/environmental education activities. Atka, Akutan, Nikolski 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, providing the refuge staff a unique opportunity to contact a continually changing population with interpretive, educational and informational resources.



The new roadside park on Shemya provides residents of "The Rock" a place to relax? (T.E. 1984)

Public use surveys on Adak recorded an estimated 20,116 visits. Use totalled 63,269 activity hours, up from 15,875 activity hours in 1983. This was due primarily to a better fishing season caused by a strong salmon run and the reopening of the caribou hunting season. Non-consumptive use was estimated at only 19,184 activity hours.

An hour-long slide program on the refuge and Adak's wildlife-oriented recreational opportunities was given 14 times to a total of 414 island residents. This program introduced the FWS and the AIU to military and civilian personnel new to Adak. The Adak staff also gave enforcement briefings to NAS and Naval Security Group Activity (NSGA) security personnel on public use regulations, especially those relating to hunting and fishing. A slide show on our summer field season was also presented to 24 members of the Adak Officers Association in late November. SCA Volunteer Leslie Schirch developed and presented an Aleutian wildflower slide show that was attended by 16 people in the summer.

The Adak NAS "Blue Card" lectures were held in the refuge conference room until October. These classes brought almost 400 persons into the visitor center. Adak Naval regulations require that any person who plans to hunt or hike on Adak first attend this class and obtain a "Blue Card". The class was conducted twice a month in the evening by volunteers from the NAS Natural Resources Division. A refuge staff member was always present to monitor activities, answer questions, distribute literature and handle cooperating association sales prior to and after the class. Although it was believed that opening the visitor center to class participants gave the refuge and its programs more exposure to Adak residents, it was not the most efficient use of limited staff time and caused added confusion to an island population that already thought the FWS taught "Blue Card" classes. Through mutual consent, the Navy moved the lectures to their own facilities in October.

Staff personnel attended 57 Navy command staff meetings to keep island organizations informed of refuge operations and programs during the year. ORP Edgerton also served as the FWS representative to the Adak Community Education Council and the Adak Civic League in 1984.

The AIU submitted 32 articles for publication in the Adak "Eagle's Call" (a weekly newsletter produced by NAS) and the "Tundra Times" (a monthly newsletter produced by NSGA). Refuge staff also contributed to the production of 31 television spots through the Armed Forces Radio and Television Service (AFRTS) detachment, the local Navy broadcasting service. News releases covered a variety of topics including refuge programs and activities, public use regulations, information on wildlife species and outdoor recreation opportunities. Although the Adak newspapers, television and radio are used whenever possible to disseminate refuge news, the turnover of Navy personnel and changing command directives for the news media often prevent the refuge staff from having a consistent and stable public relations program through the military.

In October the Associated Press released for nationwide distribution an article on the ACG project. Shortly thereafter, Alaska Statewide Television News Service aired a followup report to the Associated Press story.

2. Outdoor Classrooms - Students

In an attempt to involve more youth in summer environmental education activities this year, the I&R staff arranged to take 20 youth on a field trip each week as part of the "Summer Fun Program" operated by the Navy Youth Center. Unfortunately, poor weather conditions prohibited activity two out of three times it was planned and the Youth Center schedule did not allow for the flexibility we needed to follow through with organized activities. As a result, an environmental education trip to the beach was conducted for only ten fifth and sixth

grade students instead of the 60 in grades K-6 that we had anticipated. We did conduct a number of wildlife-related indoor activities for all 60 youth during the month of June. A short environmental education session was also conducted for five children from the Colby Nursery School in July.



SCA volunteer Leslie Schirch exploring a patch of wildflowers and elymus grass with young children. (E.V.K. 1984)

6. Interpretive Exhibits/Demonstrations

The I&R program on the AIU is becoming more visible and is starting to expand significantly; however, the program will very likely never reach its full potential without a completed professional display package in the visitor center. Although no funds were available this year to begin such a project through a contractor, a detailed statement of need was completed in February to start the ball rolling. Funds were provided in FY-85 and a new set of displays is expected to be completed and installed sometime during FY-86. In the meantime, we have continued to replace and improve old and outdated displays.

This year a new display on the Aleutian fisheries resource was completed and work continued on a beautiful seabird display that was begun in 1983. Designed and created under the direction of Biological Technician Chris Ambroz, the 3.3 m (11 ft) long display features a variety of seabird live-mounts shown in their appropriate nesting habitats (i.e. cliff, tundra and talus slope). The habitat is constructed of chicken wire and papier-mache with fiberglass molds. Taxidermy work was done by Chris and the mural was painted by Biological Technician/Volunteer Susan Steinacher. The diorama and interpretive panel should be completed in 1985. We hope to incorporate it into the professional display package slated for 1986.



Our seabird diorama is nearing completion. We are confident it will be a popular attraction and useful for environmental education purposes. (E.V.K. 1984)

Volunteer Pat Davis completed a detailed painting of the Aleutian chain, west of Unimak Island, on an 5.4 m (18 ft) section of wall in the visitor center late in the year. The display consists of a black silhouette of each island on the refuge unit. Photographs and interpretive information will be added in 1985 to give Adak residents and visitors a better orientation to and feel for the expansive island chain. We are confident the map will be a popular attraction and useful for environmental education purposes. Elsewhere in the visitor center, blank 1.2 x 2.4 m (4 x 8 ft) display panels were installed on four different walls. These panels will come in very handy over the next two years since they will readily hold and display photographs and other interpretive materials with velcro "hook tape". Finally, our maintenance staff began work on a new stand and display case for a family of mounted ACG and installed a glass encased bulletin board in the entryway to the visitor center.

In June the FWS "System 70" display unit was moved from the elementary school to the Pat Kelly Air Terminal on Adak where it received much more exposure to the public. The display received a good deal of attention by newcomers to Adak and other travelers. It helped insure that island residents and visitors know that they are on a National Wildlife Refuge.

7. Other Interpretive Programs

The AIU sponsored an open house at the refuge visitor center to begin National Wildlife Week in March. Three films were shown a total of six times to almost 200 people. In addition, 456 students were given an educational tour of the displays.

Refuge staff conducted four nature hikes for 54 enthusiastic Adakians during the summer. Two outings emphasized wildflower study and identification, another focused on tundra ecology and the third took a look at the marine environment and seashore life.



Wildlife watching and identification is an exciting pastime for many Adak residents. Here two "birders" record observations. (F.D. 1984)

A six-hour bird identification workshop was held in June to help give island residents the necessary information and tools to enjoy birdwatching on Adak. Fourteen people attended the workshop which consisted of a presentation and slide show followed by an afternoon field trip to the birding "hotspots" of Adak. This will be an annual activity planned to coincide with Adak's spring bird migration. In late December 14 people joined the refuge staff to participate in the annual Audubon Christmas Bird Count. This was a record number of participants and the six groups that were formed spotted 39 species. (See Section G.7).

Up until June, nature films were shown every other Sunday evening in the refuge visitor center. These films were presented to give island residents an opportunity to learn more about the State of Alaska and its natural resources. Beginning in June, the visitor center was open on Saturdays to accommodate those who could not stop by during the regular work week. Along with the new schedule, free nature films were shown each Saturday at 1 and 4 p.m.. This schedule held until late October when the visitor center opened Sundays from 1 to 5 p.m.

instead of Saturdays from 10 a.m. to 6 p.m. This change was made to better utilize limited staff time and enable even more island residents to come to the visitor center and view nature films which were shown at 2, 3 and 4 p.m. each Sunday. This year 22 different films were shown to a total of 678 persons.

In May refuge personnel along with the elementary and high school teachers sponsored the Navy's Officers "Hail and Farewell" at the NAS Officers Club to acknowledge those persons new to Adak and to say goodbye to those departing. The theme for the event was summer camp at "Camp Williwaw" and a good time was had by all.

8. Hunting

In addition to being a National Wildlife Refuge, the AIU is also a State Game Refuge and subject to regulations of the Alaska Department of Fish and Game. The entire refuge is closed to hunting except for Umnak, Atka, Unalaska, Akun, Akutan, Senak, Tigalda, Shemya, Attu, Great Sitkin and Adak Islands. Table 15 provides a breakdown of hunting visits and activity hours for Adak. Only waterfowl and ptarmigan hunting is permitted on Shemya, Attu and Great Sitkin. On Adak, these species and caribou may be harvested.

Table 15. Adak consumptive use

	<u>Visits</u>		<u>Activity hours</u>	
	<u>1983</u>	<u>1984</u>	<u>1983</u>	<u>1984</u>
Hunting				
Caribou	0	556	0	41,232
Ptarmigan	560	721	1,676	2,274
Waterfowl	<u>130</u>	<u>194</u>	<u>376</u>	<u>666</u>
Total	690	1,471	2,052	44,172
Fishing	<u>5,553</u>	<u>7,243</u>	<u>11,771</u>	<u>19,097</u>
Total	6,243	8,714	15,875	63,269

Waterfowl season on Adak opened on 8 October but, as is usually the case, significant hunting pressure occurred only the first two weekends. As the only upland game bird on the island, ptarmigan received fairly heavy pressure throughout the open season. Caribou hunting season began on 1 September and over 300 hunters had received permits from the refuge office by the end of the year. With no State office on Adak, administration of the hunt under the new registration system required tremendous amounts of AIU staff time. Many hours were spent issuing and renewing permits, registering kills and issuing violation warnings to hunters who did not renew their permits.

The Navy provides tug service to the public use cabins on the south half of Adak for active duty military personnel. This

service is provided during the caribou hunting season except for December and January. Approximately two-thirds of the entire caribou harvest is in conjunction with tug support. Caribou hunting is considered to be quite good on Adak and is extremely popular.

9. Fishing

Fishing continues to be the most popular consumptive use on the Unit (Table 15). 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 1984 pink salmon run was a very good one and popular areas like Finger Bay and NAVFAC Creek 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.

The Recreation Services Division of NSGA command on Adak has a recreational vessel named the "Kuluk Clipper" which takes up to six fishermen daily to the halibut "hotspots". Demand is incredible as the vessel is always booked up at least one month in advance.

10. Trapping

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

11. Wildlife Observation

Landscape, wildflower and wildlife photography buffs are in their glory on a clear Aleutian day. Bald eagles and sea otters are common at the NAS and are favorite subjects of the local folks. It is a bit more difficult to see caribou but they are also highly sought after with the camera or binoculars. Table 16 outlines visits and activity hours for selected non-consumptive use on Adak.

Table 16. Adak selected non-consumptive uses

<u>Wildlife observations</u>	<u>Visits</u>		<u>Activity hours</u>	
	<u>1983</u>	<u>1984</u>	<u>1983</u>	<u>1984</u>
Hiking	4,033	3,362	17,058	11,144
Land Vehicle	6,175	5,970	6,195	5,970
Photography	2,057	2,070	2,057	2,070
Other	365	0	2,920	0
TOTAL	12,630	11,402	28,230	19,184

13. Camping

The entire Unit is open to camping. Most use, however, occurs on Adak where five FWS backcountry cabins are available on a first come, first serve reservation basis. The cabins received moderate to heavy use by backpackers, fishermen and caribou hunters during 1984.



The "Taj Mahal" of the Adak wilderness cabins is the one at Three Arm Bay. (T.E. 1984)

16. Other Non-Wildlife Oriented Recreation

Cross-country skiing, sledding and tubing have become extremely popular winter activities on Adak. Hiking and beachcombing are popular activities throughout the year and berrypicking is done by many in the fall.



Hiking on Adak involves tricky footing and tired legs but the scenery makes it all worthwhile. (T.E. 1984)

17. Law Enforcement

ARM Van Klett attended the 40 hour enforcement refresher training session in Anchorage in February and ORP Tom Edgerton completed the nine week basic law enforcement training course at Glynco, GA, in March. Both requalified with their service sidearms in October.

At the present time, most enforcement work occurs on Adak Island. The lack of logistical support makes enforcement on other islands virtually impossible at this time. It is station policy that all violations involving military personnel on the Adak Naval reservation are turned over to the appropriate Navy command for prosecution. Military personnel who violate regulations off the Naval reservation and all civilians are issued FWS citations. One Marine Sergeant was apprehended for hunting waterfowl with an unplugged shotgun in late December. Information on this case was given to his Commanding Officer.

Persons often report fishing violations (i.e. snagging salmon in fresh water, keeping too many fish and taking fish with illegal gear) to us. We respond to many of these calls. More often than not, however, we find no evidence of violation or cannot locate the alleged violator. Several undercover investigations were conducted with negative results. Our small staff does not have as much time as is necessary to do extensive routine patrols and help keep Adak's 1,000+ "sportsmen" in compliance. Assistance from the Navy helped correct this problem. This summer, NAS Adak revived its Natural Resources Management Division (NRMD) under the Station Security Department. One function of the NRMD is to provide qualified volunteers to check fishermen and hunters on the Naval Reservation for compliance with state and federal fishing and hunting regulations. These volunteers are given the authority to issue citations for game law violations, since all state and federal laws are covered under Naval Regulations. The AIU retained control of fish and wildlife associated management activities when the Naval Reservation was established in 1957. Therefore, Tom Edgerton and Van Klett conducted several training sessions with these volunteers and security personnel on fishing and hunting regulations and served as liaison officers with the NRMD personnel. The assistance of the volunteers was greatly appreciated. During July and August their officers were in the field almost every evening and week-end checking fishermen. They issued 24 citations and a number of warnings for violating bag limits, using illegal gear, fishing in a restricted area and fishing without a license.

The investigation concerning past vandalism of facilities on Amchitka reported in last years narrative produced no results. A visit to the island in May of this year indicated that crab fishermen had again visited the island during the winter. A 3/4 ton pickup was found parked on the pier with a note on the seat thanking the owner for its use. The note also told which

building the "goodies" were located in and explained that although the gas in the large storage tank had water in it, the fuel was usable. This information was passed to the FWS Law Enforcement Division in Anchorage, but by year's end they were still attempting to locate the fishing vessel that had transported the vehicle to Amchitka. When the boat is finally located, a citation will be issued for theft of government property (gas).

18. Cooperating Associations

For the first time since it began operating in 1980, the Alaska Natural History Association (ANHA) outlet experienced a sales level that began to approach its potential. Income was \$7,735.25 for 1984, an increase of 130 percent over 1983! This success was due to a number of factors. The sales area was rearranged and a new bookshelf was constructed to better display sales items. A major first time effort was made to create ANHA support on Adak. The result was that 112 people purchased memberships. Due to the regular turnover of personnel on Adak, this level of support is expected to continue. A FWS/ANHA sales booth was also set-up at the Adak "Spring Fling" in May and the "Fall Festival" in October. These one-day events are similar to arts and crafts fairs and are open to everyone on the island. The events drew large crowds and many people stopped by the FWS booth to ask questions, obtain refuge brochures and purchase natural history items. The activities were highly successful and are planned for the future.

Twenty different items were available for sale this year. They included wildlife prints, maps, postcards and books on the Aleutian Islands, WW II, native history, mammals, birds and plants. The very popular Adak map and outdoor recreation guide was extensively revised and updated this year. The new edition was received in late September and 820 copies were sold by the end of the year. A refuge T-shirt has been sold since June, becoming the second most popular item. The T-shirt features a silkscreened sea otter design with the words "Alaska Maritime National Wildlife Refuge, Adak, Alaska" outside a large circle.

The Adak visitor center attracted over 4,600 people in 1984 compared to just over 2,000 in 1983. This increasing visitation, along with an established membership and a better restocking budget, indicates a bright future for the Adak ANHA outlet. The growth experienced in 1984 is expected to continue. The ANHA continues to play a very important part in the educational/interpretive program of this refuge unit.

I. EQUIPMENT AND FACILITIES

1. New Construction

A 7.6 x 18.2 m (25 x 60 ft) cement pad was constructed at the rear of the refuge headquarters building. The pad will be used for storage of supplies and equipment that had previously been stored on the tundra, in the auto parking area or in a small storage shed that has been removed. Funds for this project were obtained through the ARMM program.



A new cement pad gives us more storage space. Chain link fencing will soon surround it. (E.V.K. 1984)

2. Rehabilitation

The five houses and one storage shed within the refuge housing complex were stained and the trim was painted in 1984. Entryways and garage bay doors at the headquarters building were also painted. The painting projects used up all of the summer's warm, sunny days (12-22 C or 54-71 F) and some not so warm days. Entryway steps into the residences were painted with enamel paint with added anti-slip material. On the more inclement days the interior of the bunkhouse was painted.

The three older housing units received a lot of badly needed attention. Kitchen and bathroom cabinets were installed and water fixtures in all the sinks and bathtubs were replaced. Sliding glass shower doors replaced old shower curtains and all metal frame caulked sheet windows were replaced with wood frame openable windows. Due to the cool, humid climate, moisture condensed constantly on the metal frame windows. This moisture had ruined some sheet rock and wall framing which was repaired during the window installation project. Metal entryway doors and new lock sets were also installed. Metal screening was placed around water and sewer pipes and over all

existing openings to the floor joists so rats could not get into the floor and wall insulation.



All housing units received a badly needed coat of paint. (F.Z. 1984)

Materials purchased in FY-83 for expanding the arctic entrances on quarters 4A, 4B, 5A and 5B still fill a large part of the carpenter shop. The wood may dry rot waiting for final approval from RO to proceed with this major project! Shelving was constructed in the shop area of the HQ building and in the office supply storage room to add additional valuable storage space. This project will continue during FY-85 with more shelving to be added to the library, shop and field gear storage areas.



Headquarters roof repair did not completely stop the internal leaking that often results from severe Aleutian storms. (F.Z. 1984)

Two major rehabilitation projects were contracted out under the ARMM program. Riverside Roofing of Washington state completed roof repairs on the refuge headquarters building. The roof has had major leaks since it was built in 1980. The project was completed as specified but, during an end-of-the-year storm, it appeared that at least one of the leaks still existed.

The second major project involved the new duplex housing units. During periods of heavy water runoff, the crawl space under one of the units would frequently flood as if a stream were flowing through it. On more than one occasion the water accumulation was more than sump pumps could remove. As a result, the furnace unit for one of the residences would flood. In FY-83 regional engineers designed a ditch to try to drain away the excess water, which was dug but did not work. In FY-84 a contract was awarded to R.L. Bates Carpentry of Washington state to raise the houses and heating systems three feet. The project was completed as required and in a timely manner. The extended 5 x 15 cm (2 x 6 in) frame lumber foundation solved the flooding problem but allows the units to do a lot of swaying in the strong Aleutian winds and numerous Adak earthquakes. No extra internal support was called for in the contract, so existing floors and cabinets sagged and continue to get worse. The contractor helped by leaving full house length steel I-beams that were used for raising the buildings. These two beams, one for each duplex, were used to support living and bedroom spaces on the south half of each building. Refuge maintenance workers will place 15 x 15 cm (6 x 6 in) timber supports under the north half of each duplex during FY-85 to stop floor and cabinet sagging in the kitchens and bathrooms. During the contract work, the regional engineer inspector discovered that the original contractor had not included cement footings under certain areas of the original frame foundation. The 5 x 15 cm (2 x 6 in) treated lumber base, therefore, sits on soft, wet sand.



Raising the duplex housing units and furnaces solved the flooding problem. The extra crawl space also makes routine maintenance much easier. (E.V.K. 1984)

Additional ARMM funding allowed the refuge to purchase over 400 yards of gravel that was used to extend the refuge headquarters parking area, fill the drainage ditch that didn't function, and fill low spots in the driveways and parking areas around the housing units.

An 2.4 x 4.8 m (8 x 16 ft) storage building was moved from the refuge headquarters area to the housing complex late in the year. The building will be remodeled and the leaking roof will be repaired. The building will be used as a storage area for the duplex housing residents. A second building located at the housing complex was relocated closer to quarters 1, 2 and 3 where it will be used for storage by occupants of these units.

3. Major Maintenance

All heating units in the refuge housing complex and headquarters building were cleaned and serviced. The heating unit for quarters 4B, the one that was often flooded, was rebuilt and reworked until it functioned properly. Two circulating pump motors and a high pressure relief valve on the headquarters boiler heating unit was replaced. Navy Public Works heat shop workers assisted refuge maintenance personnel in doing the annual cleaning, maintenance and inspection of the headquarters heating system.

4. Equipment Utilization and Replacement

Standard preventative maintenance, regular tune-ups and lubrication were accomplished on all vehicles, boats and boat motors. One of the Chevrolet Suburbans had a new transmission installed. Due to an accident in FY-83, the transmission park latch had been broken. Particles of aluminum from the latch worked their way through the transmission and ruined the entire unit. Due to the standard purchasing problems and our remote location, it took a year to get the new transmission to Adak.

In the absence of a maintenance worker during part of FY-83, a temporary laborer attempted to replace the wiring harness on the Erickson front-end loader. The result was that a new alternator, voltage regulator and starter had to be installed, burned wires had to be replaced and the remaining wires had to be routed to the correct connection points.

Snow removal was as popular during the winter months of 1984 as painting had been during the summer months. The increased use of the Erickson front-end loader called for increased maintenance work on the engine and hydraulic systems. Seals and O-rings throughout the hydraulic system had to be replaced.

A new replacement vehicle for the oldest refuge pickup was ordered in October 1983. The refuge was notified on 28 December 1984 that the vehicle would arrive some time in 1985.

5. Communication Systems

Two Motorola Micom HF radios, three portable SGC HF radios and two FM walkie talkies were purchased during the year. Some of the summer field camps spend as much as ten weeks on islands hundreds of miles from any other inhabited place. Last summer three different field camps had radios give out. One camp lost communications one day after setting up camp and spent their remaining two weeks without a means of communication in case of emergency. Another camp spent a full week with an inoperable radio. The new radios will enable all field camps to have two HF radios. Having a primary and a back up radio system from now on will be a welcome change.

6. Computer Systems

During the year the Unit staff became more familiar with the Station IBM Personal Computer (PC), a BMC monitor, an Epson MX-100 dot matrix printer and a NEC 3550 letter quality printer. We have word processing, general accounting and Visi-Calc programs which are used regularly.

7. Energy Conservation

All the thermally inefficient metal frame windows on the three older housing units were replaced with new wooden frame windows. These wooden frames give additional insulation and the new windows have double panes. Insulation was also wrapped around water pipes and placed under the subflooring of these three units and additional gravel was placed around the skirting of Quarters 1, 2 and 3 to slow air movement beneath the buildings during strong winds. Programmable thermostats were installed in the four duplex units and water heater lines were installed in all units during the year.

J. OTHER ITEMS

2. Other Economic Uses

For the last three years, Republic Geothermal, Inc., of Santa Fe Springs, California, has drilled test holes on the slopes of Makushin Volcano on Unalaska Island. On 25 August 1983 a major geothermal reservoir was located. According to the Alaska Power Authority, this was a major world class find and is comparable to a large oil field discovery. It is anticipated that this newly discovered power source will be utilized to operate steam turbines and generators to provide electricity to the two communities in the area. The site is approximately 19 km (12 mi) west of Dutch Harbor and Unalaska. Republic Geothermal completed testing of the geothermal wells this year. They also drilled an additional temperature gradient hole and deepened the existing wells by 151.5 m (500 ft). At years end, the Regional Aleut Corporation requested conveyance to them of

several sections of the land (previously selected) containing the geothermal wells.

3. Items of Interest

On 7 December, the 33.9 m (112 ft) fishing vessel "Intrepid" went aground in South Cove on Chuginadak Island, in the Islands of Four Mountains Group. All attempts to free the vessel that day failed. In the evening the area was hit with winds exceeding 40 knots. Reports received on the 8th from the U. S. Coast Guard revealed that the vessel was breaking up. A U.S. Coast Guard overflight conducted on the 10th showed the boat had broken into two and was wedged by the bow in South Cove. Of the 76,000 l (20,000 gal) of diesel fuel the boat carried, 60,800 l (16,000 gal) spilled into the sea. No oil slick or wildlife resource problems were observed. The wreckage will be checked at a later date to determine whether or not it creates an underwater obstruction.

When American military forces pulled out of the Aleutians after WWII, they left enormous amounts of equipment and considerable live ordnance at several sites. The airstrip on Tanaga Island was one of these sites. Two wooden frame buildings containing over 35,000 rounds of 20 mm anti-aircraft and .50 caliber machine gun ammunition were there. Approval was received for the Explosive Ordnance Disposal Group (EOD) stationed on Adak to go to Tanaga and destroy the ammunition in early 1984. The trip was finally made in mid-September. Upon arrival it was discovered that approximately 150 cases of .50 caliber ammunition was missing. "Three wheeler" tracks were noted in the area and all signs indicated that the ammunition had been removed 4-6 weeks prior to EOD's visit to the island. The Adak Naval Investigative Service took over the case which was still pending as the year ended.

On 23 June the FWS charter vessel "Vestfjord", its crew and members of the refuge staff rescued an injured kayaker from the Chapel Cove area on the south side of Adak Island. Mr. Jim Vermillion, a pilot for Reeve Aleutian Airways, was circumnavigating Adak with three companions when a large wave lifted his kayak and violently smashed him into an overhanging rock. His companions towed his kayak into calmer waters and activated their emergency locator beacons. All four of them eventually made their way to the FWS Chapel Cove cabin. Although the Coast Guard was unable to determine the exact location of the emergency signal, they knew it was coming from the False Bay area on the south side of Adak. The pilot of a small Peninsula airways plane finally spotted the kayak during regular Adak to Atka service. The "Vestfjord" arrived several hours later and transported the injured man to the Adak NAS hospital for medical treatment. Mr. Vermillion received a smashed left shoulder blade and a compressed fracture of his lower back. He was released within hours and was able to walk out of the hospital and return to his home in mainland Alaska the following day.

3. Credits

Tom Edgerton coordinated preparation of the entire report. Report sections were authored by the following:

- Introduction - all staff
- A. Highlights - Fred Zeillemaker
- B. Climatic Conditions - Fred Zeillemaker
- C. Land Acquisition - Van Klett
- D. Planning - 4 Van Klett, 5 Fred Deines, 6 Fred Zeillemaker
- E. Administration - 1 Karen Shaw, 3 Tom Edgerton, 4 Fred Deines/Tom Edgerton, 5 Fred Zeillemaker, 6 Bob Schulmeister and 8 Fred Zeillemaker
- F. Habitat Management - Van Klett
- G. Wildlife - 1, 3, 6 and 7 Fred Zeillemaker; 2, 4 and 5 Fred Deines, Chris Ambroz and Fred Zeillemaker; 8-11, 14-17 by Fred Deines and Chris Ambroz
- H. Public Use - Tom Edgerton and Van Klett
- I. Equipment & Facilities - Bob Schulmeister and Karen Shaw
- J. Other Items - Fred Zeillemaker, Van Klett and Karen Shaw
- K. Feedback - Fred Zeillemaker
- L. Bird and Mammal Lists - Fred Zeillemaker

Tables and charts were prepared by Fred Zeillemaker. Word processing, computer entry and photo placement were accomplished by Karen Shaw and Mary Griffiths. Initial editing was by Van Klett, Tom Edgerton and Fred Deines. The text was collated by Tom Edgerton, Karen Shaw and Mary Griffiths. The poloroid photographs were printed from slides by Fred Zeillemaker. Final editing was provided by Fred Zeillemaker and Karen Shaw.



As the sun slowly sinks behind a volcanic peak, angry waves pound upon the isolated beach and gulls gracefully ride the changing wind currents, it is easy to forget the physical demands of the preceeding day. (C.A. 1984)

K. FEEDBACK

Once again the AIU was forced to actively recruit volunteers to allow completion of assigned tasks. We really appreciate those who do volunteer for us, whether it be for a week or for six months, but last minute recruiting and selection processes occassionally result in inadequately prepared and/or trained personnel being assigned arduous and sometimes hazardous tasks at remote field locations. We have had good fortune over the past three field seasons, but we keep wondering what it will be like if something happens that involves a volunteer employee. We continue to need additonal FTE's to allow professional high quality completion of the many tasks we are assigned yearly through our Annual Work Plan Advices, Performance Standards, the telephone and through the mail.

BERING SEA UNIT
ALASKA MARITIME NATIONAL WILDLIFE REFUGE
Homer, Alaska

ANNUAL NARRATIVE REPORT
Calendar Year 1984

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

BERING SEA UNIT
ALASKA MARITIME NATIONAL WILDLIFE REFUGE
Homer, Alaska

John L. Muz 3/7/85
Refuge Manager Date Refuge Supervisor Review Date

Regional Office Approval _____ Date _____

INTRODUCTION

The Alaska Maritime NWR was created by the Alaska National Interests Act of 1980. It includes islands along the entire coast of Alaska except east of Point Barrow. The refuge complex is administered out of a headquarters office in Homer. The refuge has five units: the Aleutian Islands (with its own headquarters office at Adak), the Alaska Peninsula, the Gulf of Alaska, the Chukchi Sea, and the Bering Sea.

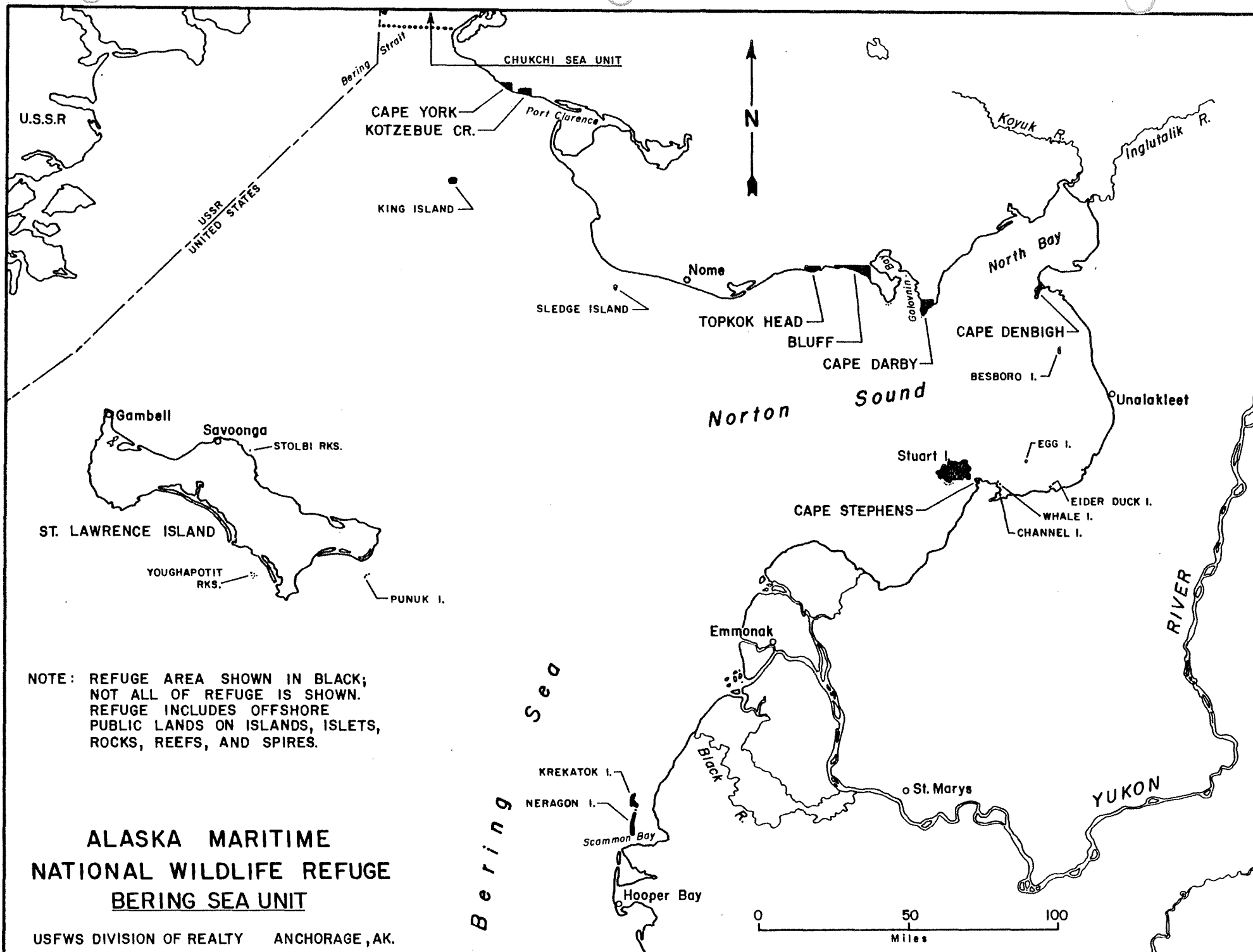
The Bering Sea Unit includes far-flung islands and headlands between the Aleutian Islands and the Bering Strait.

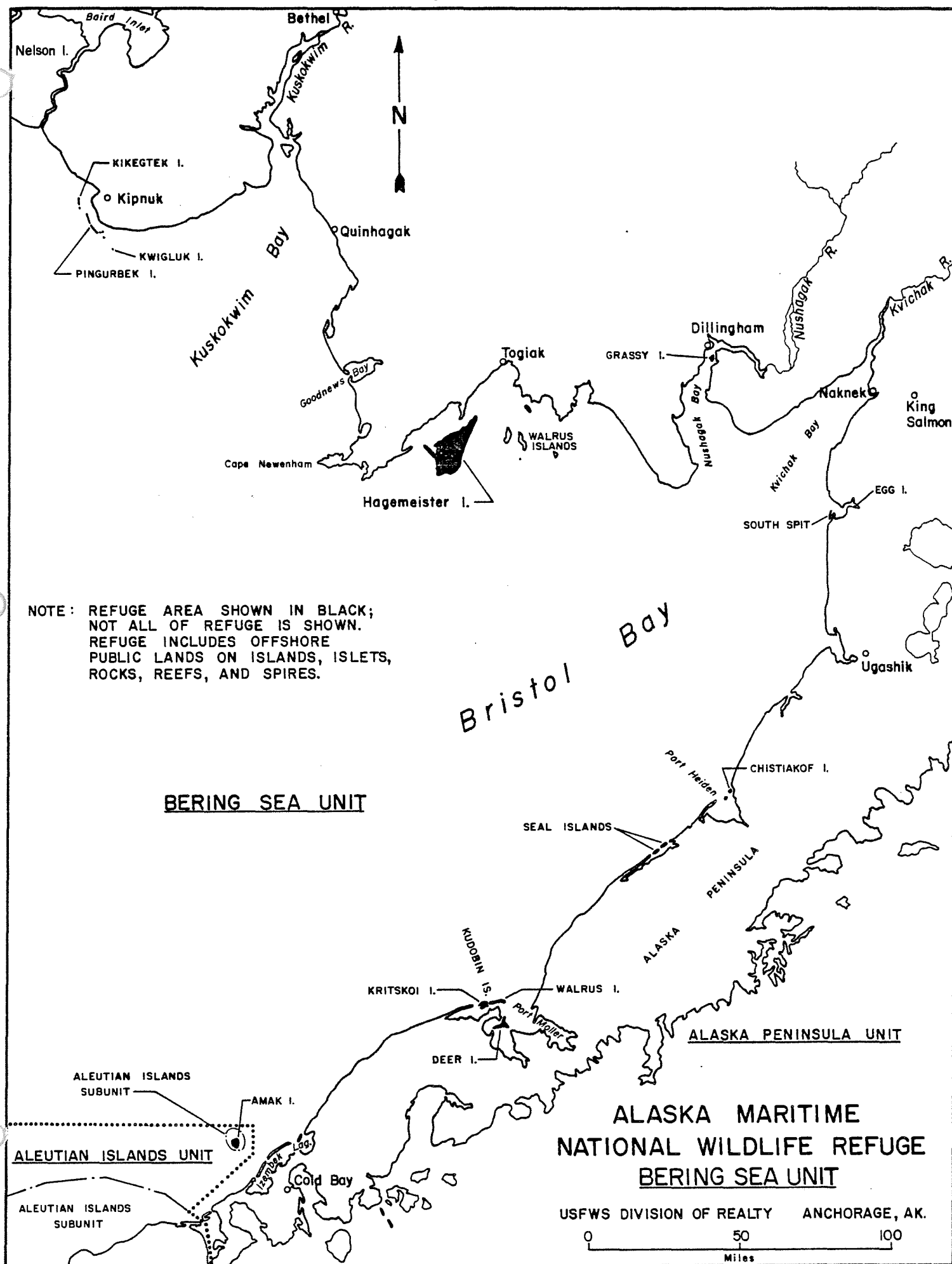
Although the topography varies from small sandy islands, like the Sand Islands off the Yukon Delta, to large volcanic islands, like St. Matthew, the areas all provide habitat for nesting seabirds. Marine mammals also occupy many of the sites. Since the creation of the refuge, there has been little opportunity for refuge personnel to visit properties in the unit. However, in 1984 a biologist was hired for the area and general wildlife surveys were made at most of the sites. Also by the end of 1984, a major portion of the seabird habitat at the largest colony in Alaska, the Pribilof Islands, had been added to the refuge.

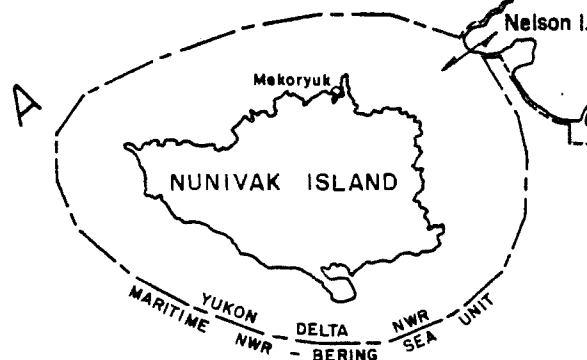
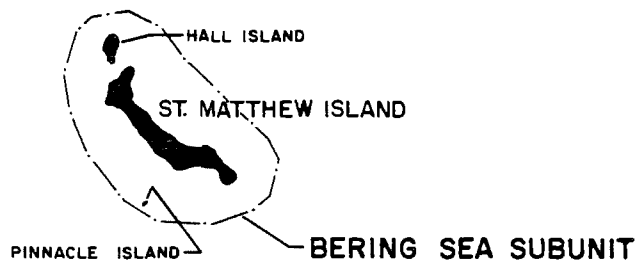
Some of the most serious potential threats to the seabirds and marine mammals in the Pribilofs and elsewhere in the Bering Sea Unit are related to oil development in the outer continental shelf. Not only can oil spills cause decimation of the birds and their food chain, but increased activities from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

Refuge objectives include establishing a seabird monitoring scheme that involves all the major species and which is of sufficient intensity to detect population changes of 20% or greater with 90% confidence. In addition, we should be able to identify the major causes of change. This will require a cooperative effort with other divisions in the Service, other federal, state, and local government agencies, and private organizations.

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

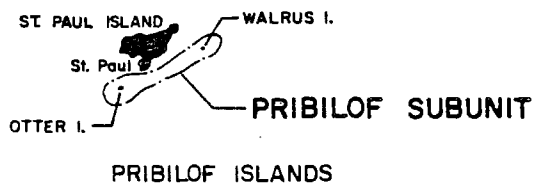




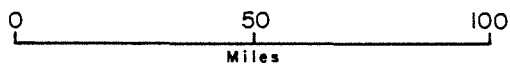


BERING SEA UNIT

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NOTE: REFUGE AREA SHOWN IN BLACK;
NOT ALL OF REFUGE IS SHOWN.
REFUGE INCLUDES OFFSHORE
PUBLIC LANDS ON ISLANDS, ISLETS,
ROCKS, REEFS, AND SPIRES.



ALASKA MARITIME NATIONAL WILDLIFE REFUGE BERING SEA UNIT

INTRODUCTION

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A. HIGHLIGHTS

The St. Matthew Island land exchange was ruled invalid by a U.S. District Judge in November 1984. (Section F.12)

Additional seabird nesting habitat has been purchased in the Pribilofs.

Kittiwakes and murrens experienced breeding failures in most areas of the unit this year.

B. CLIMATIC CONDITIONS

Fall and early winter temperatures were nearly normal in the Pribilof Islands and elsewhere in the Unit (Nat'l Weather Serv. Records), but February was particularly cold (12° F below normal at St. Paul I.). As a result, ice formed late but it extended relatively far south. A cool to normal spring and the absence of major storms at the appropriate time caused sea ice to recede slowly. Shore-fast ice remained at St. Matthew well into June and remained late in Norton Sound as well. The late ice year may have contributed to breeding failures in cliff-nesting seabirds by delaying warming and light penetration which are needed for plankton blooms. An abundance of plankton and warming seas create suitable conditions for several types of fish used by seabirds for food.



Cliff top at St. Paul Island. This is a part of the area acquired. Seabirds nest all along these cliffs. The person in the photograph is censing birds below. The three-wheeler trail is an established road.

#20068

7/84

T.J.E.



The Administrative Site on St. George Island is shown in the immediate foreground. This site was leased for a 99 year period for \$1 million as part of the "Pribilof Terms and Conditions" incorporated into ANILCA.
 #20073 7/8

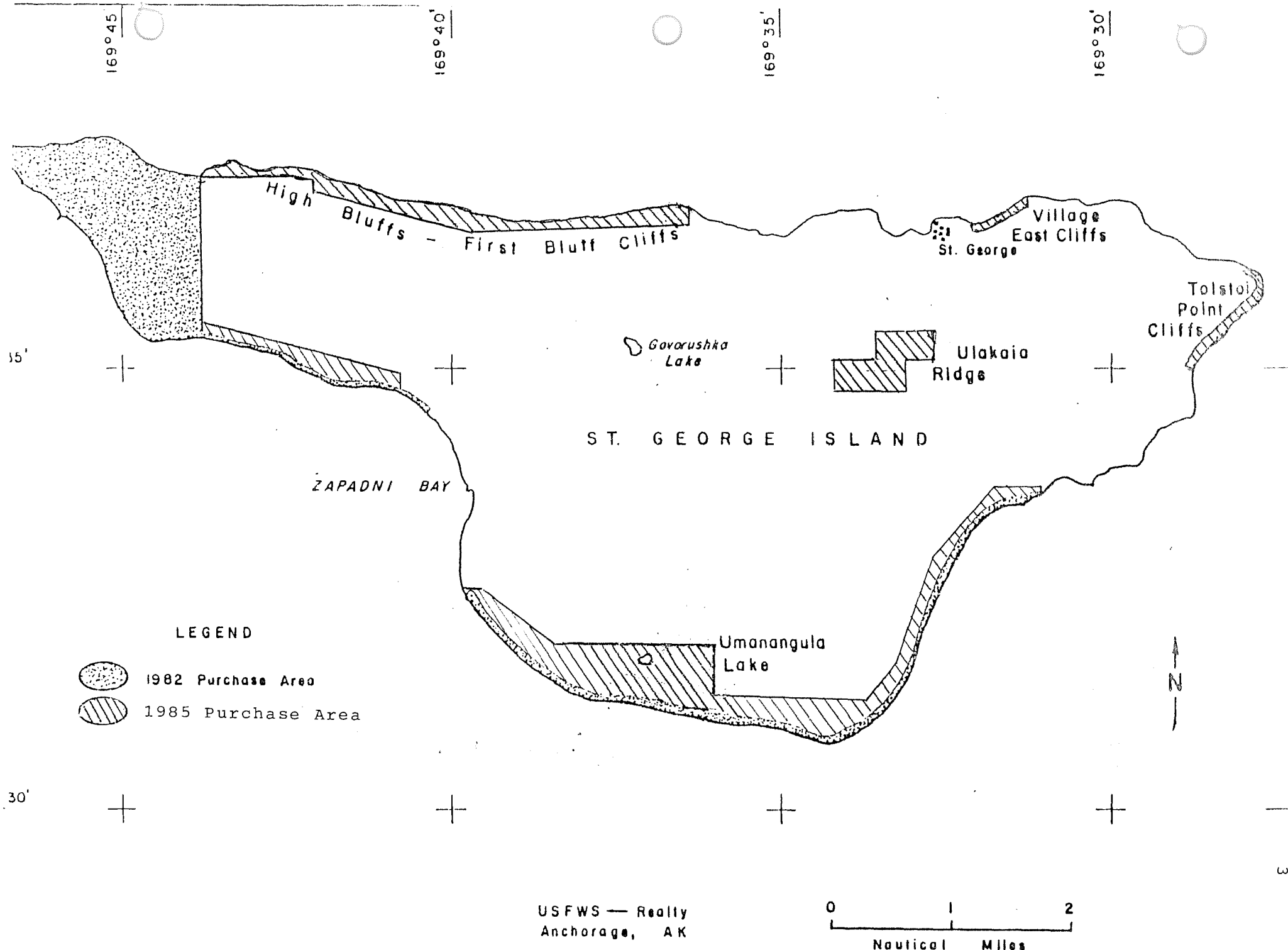
T.J.E.

C. LAND ACQUISITION

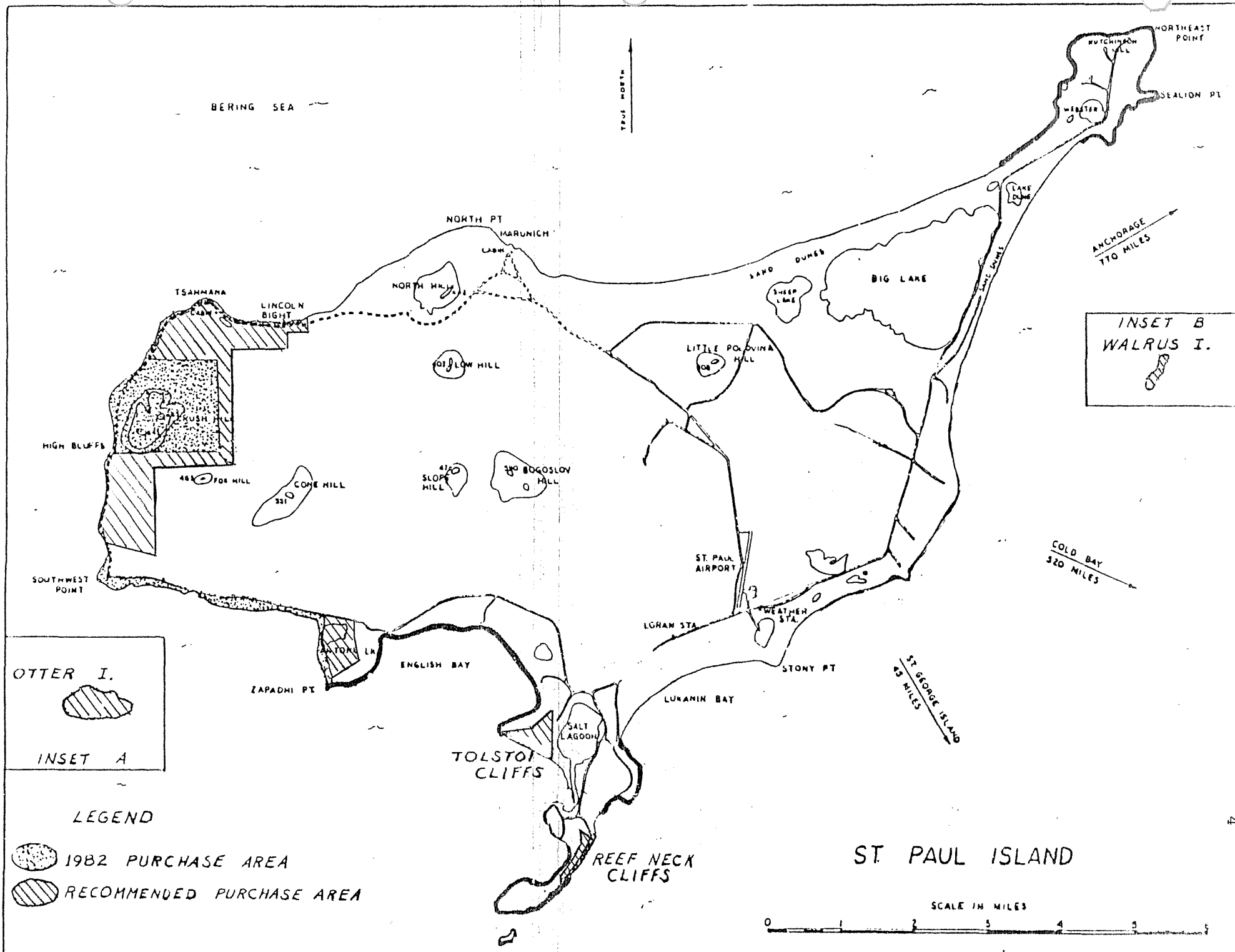
1. Fee Title

The program of land acquisition in the Pribilof Islands that began in 1982 with 1159 hectares (2863 acres) purchased progressed significantly this year. The islands of Walrus, Otter, and most of the important seabird nesting habitat on St. George Island are now part of the refuge. A total of 758 hectares (1872 acres) were purchased in 1984. The acquisition of most of the important seabird habitats on the remaining island, St. Paul, is nearly complete (see maps of the islands showing the areas acquired). Taken as a whole, the Pribilof Islands constitute the largest seabird colony in Alaska.

We surveyed most of these areas this summer in an effort to determine potential problems, to familiarize the staff with the new lands, and the leased administrative sites, to assess wildlife populations in general, and to plan for setting up long-term seabird monitoring plots.



Refuge Land Acquisitions on St. George Island, Alaska



D. PLANNING

1. Master Plan

The Alaska National Interest Lands Conservation Act (ANILCA) requires all Alaskan refuges to prepare a Comprehensive plan. These plans are to serve as the station master plan and will be initiated by a special planning team from the Regional Office. The primary objectives of the Comprehensive Plans are to (a) inventory and describe the resources and values of the refuge, (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.

The revised AMNWR schedule is as follows:

<u>Activity</u>	<u>Date</u>
Initiate discussions with refuge staff	5/84
Prepare planning directives	9/85
Hold scoping meetings	3/86
Collect and document data	4/86
"Affected Environment" section draft completed	6/86
Review data	6/86
Identify resource potentials	8/86
Formulate alternatives	11/86
Finalize alternatives	2/87
Assess impacts and effects	6/87
"Alternatives and Effects" section draft completed	6/87
Identify preferred alternative	8/87
Publish draft	11/87
Public review	1/88
Publish final	5/88
Protest period	6/88

On February 16 the planning team met for the first time with the staff. A large list of refuge "resource issues" was worked up by the staff at that meeting and enlarged on during the following several weeks. On August 28, the planning team biologist met with the staff to discuss preferences for methods and objectives of mapping this somewhat complex and confusing refuge.

5. Research and Investigations

AMNWR-NR84 Kittiwake and Murre Monitoring at Bluff (74500-BSU-03).

Ed Murphy and Alan Springer (refuge volunteers), Univ. of Alaska, Fairbanks.

Surveys of Black-legged Kittiwakes and Common Murres were conducted for the 10th consecutive year at Bluff in 1984.

This data base is the best available for these species, and it has tremendous value in trying to understand annual population fluctuations. Through these types of surveys we may eventually be able to evaluate the effects of environmental change (natural and otherwise) on seabirds. Recent surveys have been led by Dr. Ed Murphy, Inst. of Arctic Biol., Univ. of Alaska. This was the second year that surveys have been sponsored by the refuge. In 1984, kittiwakes and murres at Bluff experienced nearly total reproductive failure. Few kittiwakes built nests, and those that did abandoned them in early July. Murres also laid comparatively few eggs, and over half of those laid disappeared, probably due to predation while eggs were unattended. Inconsistent incubation is unusual for murres, but it was observed at Bluff in 1984. Dr. Murphy (pers. comm.) attributes failures to severe physiological stress from poor feeding conditions. The food web may have been disrupted as a result of late ice-breakup and prolonged intrusion of cold, high-salinity water in Norton Sound (Murphy, E.C. and A.M. Springer. 1984. Population status and reproductive success of murres and kittiwakes at Bluff, Alaska in 1984. Unpubl. Rep., Inst. of Arctic Biology, Univ. of Alaska, Fairbanks). We plan to try to support work at Bluff in the future through a research work order to the Cooperative Wildlife Research Unit, Univ. of Alaska, Fairbanks. The data gathered each year will appear in annual progress reports, and ultimately a paper will be published by Dr. Murphy and others.

AMNWR-NR84 Brief biological surveys of refuge properties in the Bering Sea (74500-bsu-04)

Alaska Maritime NWR Personnel.

Brief visits were made, for the first time by refuge personnel, to scattered refuge properties in the Pribilofs, off the Yukon Delta and in Norton Sound.



Seabird cliffs and adjacent plateau at Bluff. Birds on these cliffs are relatively easy to view from above making Bluff one of the best sites on the unit for long term monitoring.
 #20069 7/84 G.V.B.

Objectives were to delineate and count cliff-nesting seabirds and marine mammals, note major habitats, record observations of terrestrial birds and mammals, record signs of human activity, and make other general observations about the natural history of these areas. Details of the surveys are reported elsewhere (Byrd, G.V. 1984. Observations of Flora and Fauna in the Bering Sea Unit AMNWR in July 1984. Admin. Rep. USFWS, Anchorage, AK) so only a summary will be included here.

Surveys began in the Pribilof Islands where our objective was to become familiar with new refuge lands and to supplement studies already in progress (discussed latter in this report). We set up plots for and counted least auklets at several localities on St. Paul Island, but our main effort was to census cliff-nesting seabirds on Otter Island, from which few baseline data are available. We found that the island contained over 15,000 seabirds (Table 1). Replicate surveys of study plots at Otter Island should be done in future years. Since this island is the least disturbed of any of the Pribilof group, it provides an excellent control for assessing disturbance at St. Paul and St. George.

After leaving the Pribilofs, we surveyed the Sand Islands in the eastern Bering Sea. These were low and flat islands with

Table 1. Seabirds recorded at various locations in the Bering Sea Unit, Alaska Maritime
NWR in July 1984.

Species	Otter I.	Neragon I.	Kretatok I.	Egg I.	Besboro I.	Cape Denbigh	Cape Darby	Topkok Head	Sledge I.
Unid. Murre	12800			395	10 ^a	5360	10 [*]	8 ^a	
Com. Murre				267					1019
N. Fulmar	83								
Pelagic Corm.					120 (91)	51 (47)	306	108	326 (75)
Red-faced Corm.	35 (20) ^b								
Bl-leg Kittiwake			99	720	2 ^a	1676	46	17 ^a	1191
Unid-kittiwake	2434 ^c								
Horn puffin					5	p ^f		100	2
Glauc. Gull		300 (122) ^d	210 (9) ^e		47	85	319	188	39
New gull			6						
Arctic tern		6 (1)	21				36		
Survey date	7/12/84	7/14/84	7/14/84	7/16/84	7/16/84	7/17/84	7/17/84	7/18/84	7/19/84
Survey time ^g	1645-1930h	1400-1700	1900-2300	0900-1300	2200-2300	1900-2000	2230-0000	1515-1600	0930-10

^aIn nearshore waters or in flight

^bcounts of nests in parenthesis

^cat least 338 Red-legged kittiwakes

^d114 Gull chicks alive. 30 dead in addition to adults and nest

^e4 live chicks found also

^fpresent

^gAlaska daylight time

no vegetation and were occupied primarily by nesting glaucous gulls. One of the islands, Neragon, had a substantial gull colony (over 120 nests).



Neragon Island in the Sand Islands with a glaucous gull nest in the foreground. The island contained over 120 nests; most eggs had hatched prior to our visit.

#20100

6/84

G.V.B.

Other areas surveyed were in Norton Sound. Included were three islands and three headlands. As shown in Table 1, kittiwake and murre colonies occurred at Egg Island, Cape Denbigh, and Sledge Island. Kittiwake numbers were similar to those recorded in the mid-1970's at these locations, but it appeared most kittiwakes were not incubating eggs but simply standing on nest platforms. They apparently had a poor reproductive season at these sites, as they did at Bluff. Murre numbers were lower in 1984 than in the mid-1970's at all locations. Pelagic cormorants and glaucous

gulls were the main seabirds nesting at Besboro Island, Cape Darby, and Topkok Head (Table 1).

Cormorant counts in 1984 were lower at most sites than in the mid-1970's. Few dead birds were found on beaches at any of the sites, so apparently no large dieoff occurred.



Least auklets on the surface of a nesting area (they nest in sub-surface crevices among the rocks) near St. Paul Village.
#50350 7/84 G.V.B.

AMNWR-NR84 Seabird surveys at St. Matthew Island (74500-BSU-05).

Alaska Maritime NWR and Wildlife Assistance personnel (USFWS Anchorage).

The 1984 season was the third consecutive in which bird and mammal surveys were conducted at St. Matthew Island. The primary focus of this year's work was on improving methods of determining population change in least auklets. In addition cliff-nesting seabirds were surveyed, and marine mammal haul-out areas were checked periodically to determine their use in 1984.

Least auklets are difficult to monitor because they nest in crevices hidden from observers, and because they occur in very large flocks which tend to mill over colonies during

periods of activity. Continuing the approach devised in 1983 by Art SOWLS (USFWS, Anchorage), time-lapse cameras were used to determine daily periods of activity at colonies. By learning when birds are active at colonies, sampling schemes may be employed at appropriate times. The objective was to try to estimate the relative number of auklets using various 10-m x 10-m plots as an index to population change. This involved counting the birds present every 15 min. throughout the peak of morning activity. Counts were then averaged to provide an index to the "relative numbers" of birds using each plot in a particular year. In addition, two methods were employed to try to estimate the actual number of birds occupying selected plots (not just a relative index as above); a Lincoln-Index method (Davis, D. and R. Winstead. 1980. Estimating the numbers of wildlife populations. Chapter 14. Wildlife Management Techniques) and a Net Movement method (Byrd *et al.*, 1983. Condor 85:274-280). The Lincoln-Index method involved using picric acid (a plumage dye) and color leg bands to identify individuals. Analysis of data is not yet complete, but preliminary results indicate counts of birds on the surface of plots may provide a consistent index to populations. It remains to be seen whether changes in the index are indicative of real population change.

Cliff-nesting seabirds apparently began nesting relatively late in 1984 at St. Matthew. As a result, we were unable to get replicate counts of plots, since most of the crew left the island in early July. Nevertheless, the observations we were able to make, suggest kittiwakes and possibly murrelets had a poor year reproductively.

As in the past, walrus hauls were made on the northwest side of Hall Island (next to St. Matthew). Our peak count was 62 on July 9. This is similar to high summer counts in past years. In contrast, no walrus were seen at a traditional haul area near the southeast end of the island, and another known haul area, near Lunda Bay, was apparently used little.

A final report on the surveys at St. Matthew during the period 1982-1984 is scheduled for completion in 1985 (Art SOWLS pers. comm.).



Besboro Island, Norton Sound. The willows and alders supported a fairly diverse passerine population, and seabirds occupied the steep slopes (not visible) below the ridge.
 #20070 7/84 G.V.B.



Time lapse camera being set up by Art Sowls, USFWS, Anchorage in an Auklet colony on St. Matthew. Note the solar panel for charging the camera batteries. The clock provided the time each frame was exposed.
 #80028 6/84 R.C.A.



Biologist setting up 10m X 10m study plots for least auklets at St. Matthew.

#80029 6/84

R.C.A.



The St. Matthew team aboard the M/V Vestfjord making "hoop carpets" which we used along with mist nets to capture least auklets. Left to right are V. Byrd, C. Freshmen (Volunteer for USFWS, WA, Anchorage), A. Sowls (USFWS, WA, Anchorage), L. Hoffman (AMNWR volunteer), V. Hironaka (volunteer for USFWS, WA, Anchorage).

#80030 6/84

R.C.A.



Least auklets at St. Matthew. The yellow bird was dyed with picric acid and marked with color and USFWS leg bands.
 #50352 6/84 R.C.A.

AMNWR-NR84 Effects of harbor construction and other types of disturbance on cliff-nesting seabirds at St. Paul Island (74500-BSU-06).

William Rodstrom, Village of St. Paul

Work began in 1984 on a state of Alaska funded project for harbor construction. Following a recommendation from the USFWS, the village hired a biologist, William Rodstrom, to monitor the effects of harbor construction on cliff-nesting seabirds. Mr. Rodstrom established a series of study plots, some of which were on the refuge, in which he monitored reproductive success of cormorants, kittiwakes, and murre.

In Mr. Rodstrom's plots, cormorants and kittiwakes fledged almost no chicks. Just over half of the murre eggs that were observed hatched, but fledging success was unknown (Rodstrom, W. 1984. St. Paul seabird monitoring study 1984. Admin. Rep. submitted to the city of St. Paul, Alaska). In his report, Mr. Rodstrom also discussed the potential sources of disturbance to seabirds on the island, and he provided an up-to-date list of birds for the Pribilofs. There may be a monitor hired in 1985 to continue the work begun in 1984.

AMNWR-NR84 Monitoring seabird populations in the Pribilof Islands (74500-BSU-07).

LGL Alaska Research Associates, Anchorage, under contract to Minerals Management Service.

As part of an effort to assess the potential impacts of oil development in the Bering Sea, baseline data have been gathered periodically in the Pribilofs since 1975. In 1984 LGL had a contract to recensus established plots in order to assess population change and relative reproductive success. Although their report is not yet complete, preliminary results indicate that black-legged kittiwakes on St. Paul and St. George have extremely low reproductive success in 1984 as did thick-billed murres on St. Paul. Interestingly, thick-billed murres on St. George did as well as usual, and red-legged kittiwakes did not have significantly lower success than in past years at either island.

E. ADMINISTRATION

1. 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. Mike Nishimoto, Refuge Biologist, GS-11, EOD 4-15-84 PFT
5. G. Vernon Byrd, Refuge Biologist, GS-11, EOD 4-29-84, Perm. Int.
6. Carol M. Hagglund, Budget Assistant, GS-7, EOD 08-21-83, PFT
7. Trina B. Fellows, Clerk-Typist, GS-3 EOD 11-28-83, PFT
- Volunteers
8. Robert Angell, Volunteer, FT, 4-11-84/8-31-84
9. Laura Hoffman, Volunteer, 5-18-84/8-3-84 Ref. Vol. 9-1-84/10-31-84
10. Gary Lyon, Volunteer, PT, 6-30-84/7-20-84
11. Ed Murphy, Volunteer, FT, 7-6-84/7-20-84
12. Alan Springer, Volunteer, FT, 7-13-84/7-20-84, 8-2-84/8-9-84

4. Volunteer Program

We had one volunteer from the Student Conservation Association in 1984. Laura Hoffman was part of the team that studied birds and mammals at St. Matthew Island during June, and she helped perform biological surveys of refuge areas from the Pribilofs to Nome in July. Thereafter, until the end of her SCA appointment, Ms. Hoffman assisted in the Homer office with data summation, clerical needs, and field gear maintenance. She also provided interpretive talks to

tourists aboard a commercial tour boat to Gull Island, a refuge seabird colony near Homer. Other tasks involved working on the refuge slide and reprint files. After Ms. Hoffman's SCA appointment expired, she remained at the Homer office for two months as a refuge volunteer.

Robert Angell volunteered for the entire summer as the "official" expedition photographer. Mr. Angell also helped get equipment ready to send out in the spring and assisted in setting up field camps at various locations. At St. Matthew and other study areas, Mr. Angell assisted with wildlife observations in addition to recording all aspects of the operations on film. He was a part of the refuge team from late April until late August.

Gary Lyon volunteered to help with wildlife surveys in the Pribilof Islands and other areas surveyed in the BSU. He is a careful wildlife observer, and his contribution as one of the "biologists" on the crew was invaluable. Mr. Lyon was a part of the team during most of July.



Volunteers searching for gull nests on Neragon Island.
#20071 6/84

R.C.A.



Volunteer L. Hoffman preparing study skin of least auklet in the tent at St. Matthew Island.

#80031 6/84

R.C.A.

5. Funding

Funding for the Alaska Maritime National Wildlife Refuge complex is through the Homer headquarters. The funds are then internally distributed between Adak and Homer. The funding for the Aleutian Islands Unit is discussed in that unit's section. All other unit funds, including Bering Sea Unit are distributed from the Homer office. Following is a summary of the total refuge funding.

	1260 Wildlife Resources	1480 Endangered Species	Total
FY82	346,000	75,000	421,000
FY83	730,000	250,000	980,000
FY84	1,124,000	245,000	1,369,000
FY85	1,105,000	245,000	1,350,000

In FY82 the vessel charter costs came out of the Regional Office budget. Since then all charter costs have come from the refuge budget.

A comparison of FY82 to FY85 Homer funding is as follows:

	1260 Wildlife Resources	1480 Endangered Species	Total
FY82	230,000	31,000	261,000*
FY83	462,200	155,400	617,600
FY84	502,500	140,000	642,500
FY85	615,000	140,000	755,000

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

The Alaska Maritime National Wildlife Refuge is headquartered in the Ross Duncan building located on Pioneer Avenue in downtown Homer. All administrative activities of the Bering Sea Unit are accomplished from this office. A total of \$37,120 (which includes utilities, snow and refuse removal) was paid for lease of office/storage space in FY84. An additional 77 sq m (827 sq ft) of space was added bringing the total leased space to approximately 333 sq m (3587 sq ft). The entire building is comprised of approximately 375 sq m (4,032 sq ft). Beginning in FY85 the current rental rate of this building is at \$4950 per month.

FY84 salary and travel costs for the Homer office totaled \$240,000 and \$60,000 respectively. The largest single equipment purchase was a 10SP Data General computer system for \$13,600.

6. Safety

All permanent and temporary staff are involved in monthly safety meetings while at the Homer office. In addition, prior to field activities all participate in a series of First Aid, CPR, Defensive Driving, and Sea/Land Survival safety sessions.

On 5 July 1984, Robert Angell was in an inflatable boat on the way from the charter vessel to a beach on St. Matthew to pick up a group of people on shore. Engine problems and high winds combined to cause the boat to flip over. Mr. Angell recalled the survival training films he had seen in spring as part of the refuge training program, and he did everything correctly. He was wearing a mustang floatation suit, and he was able to hang on to the upside down boat until crewmen on the charter vessel could pick him up. Except for a mild case of hypothermia from being in the cold water (1 to 2 C) for an extended period, no injuries were sustained. Training and correct protective clothing saved his life along with quick actions from the charter vessel crew.

7. Technical Assistance

In November 1984 WB Byrd helped plan and moderate a conference hosted by the Minerals Management Service on seabird monitoring in areas that might be affected by oil development in the Bering Sea. In addition a paper was presented at the conference, "Diurnal auklets in the Bering Sea--the problem of determining population trends".

WB Byrd assisted William Rodstrom, biologist for the city of St. Paul Island, by reviewing his study plan for monitoring the effects of disturbance from harbor construction on cliff-nesting seabirds at St. Paul.

F. HABITAT MANAGEMENT

7. Grazing

The only grazing permit on the unit is for reindeer on Hagemeister Island. Prior to the creation of the Alaska Maritime NWR, the island was administered by BLM who originally issued the permit for grazing and set the maximum allowable herd size at 450 animals. In November 1983, 770 animals were counted on the island (see 1983 Annual Narrative Report for Alaska Maritime NWR). The permittee, Mr. Jack Gosuk of Togiak, Alaska was asked to reduce the population. According to his Annual Operations Report, Mr. Gosuk reduced the herd to approximately 550 animals during the winter of 1983-1984. A census by USFWS personnel has not been possible yet during the fall and winter of 1984 due to unfavorable weather conditions.

12. Wilderness and Special Areas

As stated in the narrative report for the refuge in 1983, 1,619 hectares (4,000 acres) of wilderness on St. Matthew Island had been traded to several Native corporations for the purpose of building a runway to support oil company operations in an outer continental shelf lease area called Navarin Basin. The legality of the trade was questioned by Audubon Society and other groups in a suit filed the day the trade was made. The following is a quotation from the legal opinion filed by the district judge of the U.S. District Court, District of Alaska on November 30, 1984: "On August 10, 1983, Deputy Under-Secretary of the Interior, William P. Horn, acting on behalf of the Secretary of the Interior James G. Watt (the Secretary), entered into a land exchange agreement with representatives of three Alaska Native Corporations. The three corporations, Cook Inlet Region, Inc. (CIRI), Calista Corp., and Sea Lion Corp., are referred to collectively as the CIRI Group. The Secretary transferred to the Natives a portion of St. Matthew Island, a wilderness area in the Alaska Maritime National Wildlife Refuge, in

exchange for various land interests in the Kenai and Yukon Delta National Wildlife Refuges. The driving force behind the exchange was to enable the CIRI Group to lease the St. Matthew Island parcel to private companies for construction and operation of support facilities for oil exploration and potential oil development in the Navarin Basin in the Bering Sea....On the same day the exchange agreement was executed the National Audubon Society and other environmental groups, joined by the Bering Sea Fishermen's Association, filed a complaint in this court...for declaratory and injunctive relief... The relief now requested by the plaintiffs is a declaration that the exchange agreement is unlawful and void, and an injunction preventing the defendants from carrying out the terms of the agreement and prohibiting the defendants from in any way conducting any activity on St. Matthew Island under the terms of the agreement...After an extensive examination of the record, I now conclude that Audubon has established that the Secretary, in executing the land exchange agreement, abused the discretion entrusted to him by law....I conclude that the Secretary's Public Interest Determination for the St. Matthew Island exchange suffers from serious errors of judgment and misapplication of the law which have led to a clear error of judgment...I conclude that the St. Matthew Island land exchange is invalid."

There has been an appeal of the ruling, but it appears no runway construction will be conducted on the island in the near future.



The flat area is the portion of St. Matthew Island wilderness that was traded to CIRI group for runway construction. In 1984 a judge ruled that the trade was illegal.

#20072

6/84

R.C.A.

G. WILDLIFE

2. Endangered and/or Threatened Species

A peregrine falcon was observed at Besboro Island on July 16 as it called loudly about mid-way along the steep ridge on the island's west side. Its behavior suggests it was nesting.

5. Shorebirds, Gulls, Terns, and Allied Species

Observations of asiatic shorebirds at St. Matthew Island included one Mongolian plover, June 2-7, and one ringed plover, June 3-10. An unusual North American species at that location was a greater yellowlegs on June 7.

Glaucous gulls were found nesting at nearly every site surveyed in the unit in 1984. In the Sand Islands we found breeding colonies with over 130 nests. Nearly all chicks had hatched by the time of our visit on July 14, and although young ranged from recently hatched to nearly fledged, the majority were about 1/2 to 3/4 grown.

Black-legged kittiwakes appeared to have had very poor reproductive success in the Bering Sea in 1984. Evidence of failures were available for Sledge Island, Bluff, Egg Island, St. Matthew Island, and the Pribilof Islands (see Section D. 5). Murres also did poorly at Bluff and possibly elsewhere in Norton Sound. Factors responsible may have included late ice breakup (see Section B) and possibly reduced food availability resulting from overfishing of pollock. This latter theory has been developed as a result of surveys at Bluff (Murphy, 1984. Population status and reproductive success of murres and kittiwakes at Bluff, Alaska. Rep. to Faculty, Summer Grant Program. Univ. of Alaska, Fairbanks).

9. Marine Mammals

Although the management of marine mammals in the Pribilof Islands is the responsibility of the National Marine Fisheries Service, it behoves us to be familiar with their population surveys since these marine mammals play such an important part in the ecology of the area. Fur seal populations have been declining at a rate of about 8-10% per year over the past several years after remaining relatively stable for over 50 years prior to that (Natl. Marine Fish. Serv. Records). Since one of the primary foods of seals is pollock in the Pribilofs, there may be a connection with the overharvest of this commercial fish and the decline. Recent studies in the Bering Sea are beginning to explain trophic relationships more clearly, and it may be possible to begin to assess causes of observed population changes if annual monitoring of various components of the ecosystem continues.

14. Scientific Collections

Five least auklets and one crested auklet were salvaged from trapping mortality at St. Matthew. Refuge personnel preserved the specimens, and they were donated to the Pratt Museum in Homer at their request.

H. PUBLIC USE

1. General

An interesting public use occurs on part of the refuge. When the famous Iditarod sled dog race and the Iron-dog (snowmachine) race occurs in the late winter. These races cross the Topkok Head and Bluff areas in Norton Sound. Special Use Permits are issued for the events. Since the racers seek good snow, they cross refuge areas which are confined to near the coast only when deep snow occurs there. As a result, no damage to the land occurs. When coastal areas have little snow, mushers go farther inland. A check of the Bluff area in July revealed no signs from the race. Neither habitat damage nor litter was observed.

11. Wildlife Observations

Hundreds of tourists visit St. Paul Island in the Pribilofs annually, most on package tours set up by Exploration Holiday Cruises. During the summer, three tours per week (two, 2-day and one 3-day) are held. Transportation is via Reeve Aleutian Airways from Anchorage. The tour company has a bus which takes visitors to a refuge area where they observe and photograph seabirds. We plan to evaluate the need and determine the best approach to providing interpretive information to these visitors.

It was discovered this summer that at least one scenic air tour and one boat tour for birdwatching is offered to Sledge Island (refuge) from Nome. According to personnel at the visitor information office in Nome, few people take advantage of these opportunities, however.



Pribilof tour group on cliff edge on St. Paul Island. This area is world renown for unique birding opportunities. #80035 7/84 T.J.E.

J. OTHER ITEMS

2. Other Economic Uses

A special use permit was issued to ARCO Alaska, Inc. to conduct surficial geological reconnaissance on Hagemeister Island.

NCS International was issued a permit to install a temporary navigation aid at St. Matthew. They installed it in early July just after the refuge crew left the island.



Tour bus stop along the main road on St. Paul Island. There are significant opportunities for interpretive programs here.
#80032 7/84 T.J.E.

4. Credits

The narrative for this unit was written by WB Byrd and typed by CT Fellows. ARM Early edited the report. BA Hagglund provided funding summaries.

CHUKCHI SEA UNIT
ALASKA MARITIME NATIONAL WILDLIFE REFUGE
Homer, Alaska

ANNUAL NARRATIVE REPORT
Calendar Year 1984

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

CHUKCHI SEA UNIT
ALASKA MARITIME NATIONAL WILDLIFE REFUGE
HOMER, ALASKA

~~Refuge Manager~~

Date _____

Refuge Supervisor Review Date

Regional Office Approval _____ Date _____

INTRODUCTION

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

Nearly half a million kittiwakes and murrens breed on cliffs at Cape Lisburne and Cape Thompson and 15,000 horned puffins nest at Chamisso and Puffin islands in Kotzebue Sound. These are the largest concentrations of seabirds on the unit. An extra-limital population of black guillemots, a species which normally is found in the north Atlantic, extends as far south as Cape Thompson and may be increasing. The most common species of bird nesting on the low barrier islands between Cape Lisburne and Point Barrow is the common eider. One of the refuge islands, Solivik Island, has the largest eider colony in the Chukchi Sea.

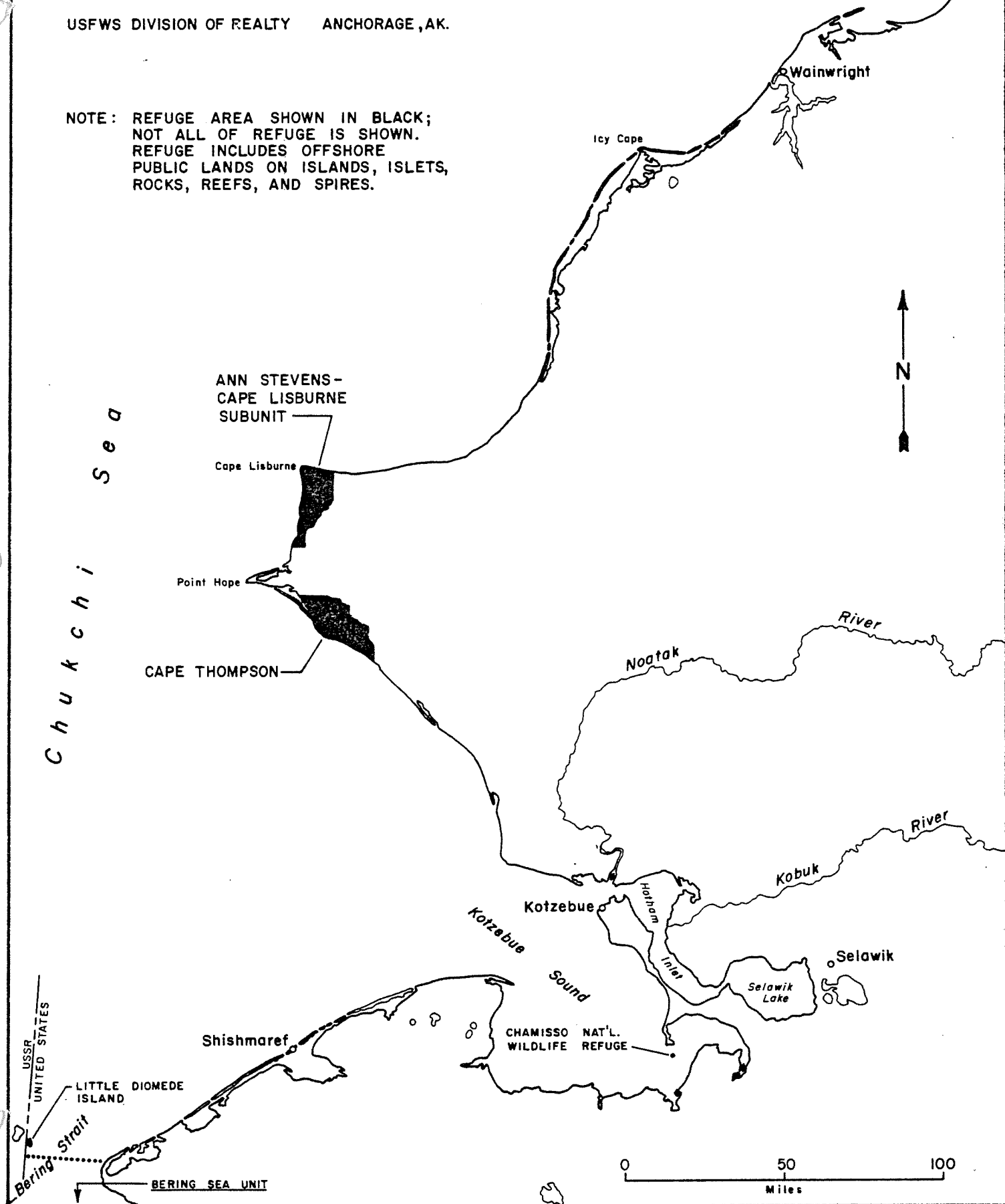
Up to several hundred walruses haul out annually at Cape Lisburne as the sea ice recedes far offshore. In winter, polar bears occur at Cape Lisburne. Caribou are found in the thousands near Cape Lisburne in a summer post-calving aggregation. Other terrestrial mammals include grizzly bear, muskox, and wolverine.

The primary objectives for management of the unit include monitoring seabird populations, most frequently at Cape Lisburne, but also periodically elsewhere, and cooperating with the North Slope Borough on projects of mutual interest.

ALASKA MARITIME NATIONAL WILDLIFE REFUGE CHUKCHI SEA UNIT

USFWS DIVISION OF REALTY ANCHORAGE, AK.

NOTE: REFUGE AREA SHOWN IN BLACK;
NOT ALL OF REFUGE IS SHOWN.
REFUGE INCLUDES OFFSHORE
PUBLIC LANDS ON ISLANDS, ISLETS,
ROCKS, REEFS, AND SPIRES.



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A. HIGHLIGHTS

Black-legged kittiwakes experienced an almost total breeding failure at Cape Lisburne.

The North Slope Borough requested that we cooperate with them in a study of the use of artificial nest structures to enhance breeding populations of common eiders on barrier islands.

B. CLIMATIC CONDITIONS

Ice remained nearshore relatively late in 1984 in both the Chukchi and Bering seas. Since Bering Sea water is transported into the Chukchi via the Bering Strait, conditions in the Bering have a strong influence on the biological oceanography of the Chukchi. Therefore, it was a biologically "late" spring.

D. PLANNING

1. Master Plan

The Alaska National Interest Lands Conservation Act (ANILCA) requires all Alaskan refuges to prepare a comprehensive plan. These plans are to serve as the station master plan and will be initiated by a special planning team from the Regional Office. The primary objectives of the comprehensive plans are to (a) inventory and describe the resources and values of the refuge, (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.

The revised AMNWR schedule is as follows:

<u>Activity</u>	<u>Date</u>
Initiate discussions with refuge staff	5/84
Prepare planning directives	9/85
Hold scoping meetings	3/86
Collect and document data	4/86
"Affected Environment" section draft completed	6/86
Review data	6/86
Identify resource potentials	8/86
Formulate alternatives	11/86
Finalize alternatives	2/87
Assess impacts and effects	6/87
"Alternatives and Effects" section draft completed	6/87
Identify preferred alternative	8/87

Publish draft	11/87
Public review	1/88
Publish final	5/88
Protest period	6/88

On February 16 the planning team met for the first time with the staff. A large list of refuge "resource issues" was worked up by the staff at that meeting and enlarged on during the following several weeks. On August 28, the planning team biologist met with the staff to discuss preferences for methods and objectives of mapping this somewhat complex and confusing refuge.



View of the Cape Lisburne area from the east. The Air Force site is visible at the base of the hills. The distant point is the Cape; seabirds and marine mammals are concentrated just east of the point.

#30034 8/84

G.V.B.

5. Research and Investigations

Kittiwake and murre population monitoring at Cape Lisburne--Data have been gathered on kittiwakes and murres at Cape Lisburne almost annually since 1975 by Alan Springer, Univ. of Alaska, Fairbanks, and others. As a result, excellent baseline data on "normal" population fluctuations are beginning to accumulate (see Springer, A. et al. 1982). Population status, reproductive ecology and trophic

relationship of seabirds in northwestern, Alaska. (LGL Alaska, Fairbanks, AK). Past work has been funded by agencies other than the Service, but these funds were no longer available in 1984, the first year the refuge became involved. As a result, investigations had to be restricted to a single, one-week trip (August 2-8, 1984). The purpose was to gather as much comparative data as possible on factors indicating and affecting reproductive success and population change in kittiwakes and murres (Byrd, G.V. 1984. A visit to Ann Stevens-Cape Lisburne sub-unit of Alaska Maritime National Wildlife Refuge in early August 1984. Admin. Rep. USFWS, Anchorage, AK). Fortunately, Alan Springer volunteered to accompany WB Byrd to Cape Lisburne to insure comparable techniques were employed.

Kittiwake numbers were similar to past counts, nevertheless a check of 176 nests in established "productivity" plots revealed two nests with one chick each, four nests with one egg each, and the remainder were empty! Indeed, kittiwakes suffered a nearly-total breeding failure in 1984.

Murres were counted at 10 previously established sample plots, and the 1984 results were similar to past years; approximately 16,000 murres occurred in the plots (Springer et al. 1983. Population and trophic studies of seabirds in the northern Bering and eastern Chukchi seas, 1983. Final Report. OCSEAP). Most murres were still incubating eggs when we arrived on August 2, but hatching apparently began by August 6-8. This phenology is relatively late, a factor which may have caused chick survival to be relatively poor.

In order to try to explain the kittiwake breeding failure and to better understand the condition of murres at Cape Lisburne in 1984, environmental conditions were monitored during our stay: ocean water samples were collected for primary productivity analyses (chlorophyll extraction); vertical tows were made for plankton, another measure of productivity; ocean water temperatures were taken at various depths, an important indicator of suitability of the environment for some seabird prey items and plankton blooms; a sample of murres and kittiwakes were collected to determine stomach contents, a measure of the presence or absence of favored food items (known from previous studies). Data have not yet been completely analyzed, and results will be reported later.

E. ADMINISTRATION

1. Personnel

1. John L. Martin, Refuge Manager, GS-13, EOD 12-21-81, PFT
2. Tom J. Early, Assistant Refuge Manager, GS-11, EOD 8-23-81, PFT
3. Edgar P. Bailey, Refuge Biologist, GS-11, EOD 10-1-81, PFT
4. Mike Nishimoto, Refuge Biologist, GS-11 EOD 4-15-84, PFT
5. G. Vernon Byrd, Refuge Biologist, GS-11, EOD 4-29-84 Perm. Int.
6. Carol M. Hagglund, Budget Assistant, GS-7, EOD 8021-83, FPT
7. Trina B. Fellows, Clerk-Typist, GS-3, EOD 11-28-83 PFT
Volunteer
8. Alan Springer, Volunteer, FT, 7-13-84/7-20-84, 8-2-84/8-9-84

4. Volunteer Program

Alan Springer, a PhD candidate at the University of Alaska volunteered to census seabirds with WB Byrd at Cape Lisburne in August 1984 (see Research and Investigation).

5. Funding

Funding for the Alaska Maritime National Wildlife Refuge complex is through the Homer headquarters. The funds are then internally distributed between Adak and Homer. The funding for the Aleutian Islands Unit is discussed in that unit's section. All other unit funds, including Chukchi Sea Unit are distributed from the Homer office. Following is a summary of the total refuge funding.

	1260	1480	
	Wildlife Resources	Endangered Species	Total
FY82	346,000	75,000	421,000
FY83	730,000	250,000	980,000
FY84	1,124,000	245,000	1,369,000
FY85	1,105,000	245,000	1,350,000

In FY82 the vessel charter costs came out of the Regional Office budget. Since then all charter costs have come from the refuge budget.

A comparison of FY82 to FY85 Homer funding is as follows:

	1260 Wildlife Resources	1480 Endangered Species	Total
FY82	230,000	31,000	261,000*
FY83	462,200	155,400	617,600
FY84	502,500	140,000	642,500
FY85	615,000	140,000	755,000

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

The Alaska Maritime National Wildlife Refuge is headquartered in the Ross Duncan building located on Pioneer Avenue in downtown Homer. All administrative activities of the Chukchi Sea Unit are accomplished from this office. A total of \$37,120 (which includes utilities, snow and refuse removal) was paid for lease of office/storage space in FY84. An additional 77 sq m (827 sq ft) of space was added bringing the total leased space to approximately 333 sq m (3587 sq ft). The entire building is comprised of approximately 375 sq m (4,032 sq ft). Beginning in FY85 the current rental rate of this building is at \$4950 per month.

FY84 salary and travel costs for the Homer office totaled \$240,000 and \$60,000 respectively. The largest single equipment purchase was a 10SP Data General Computer system for \$13,600.

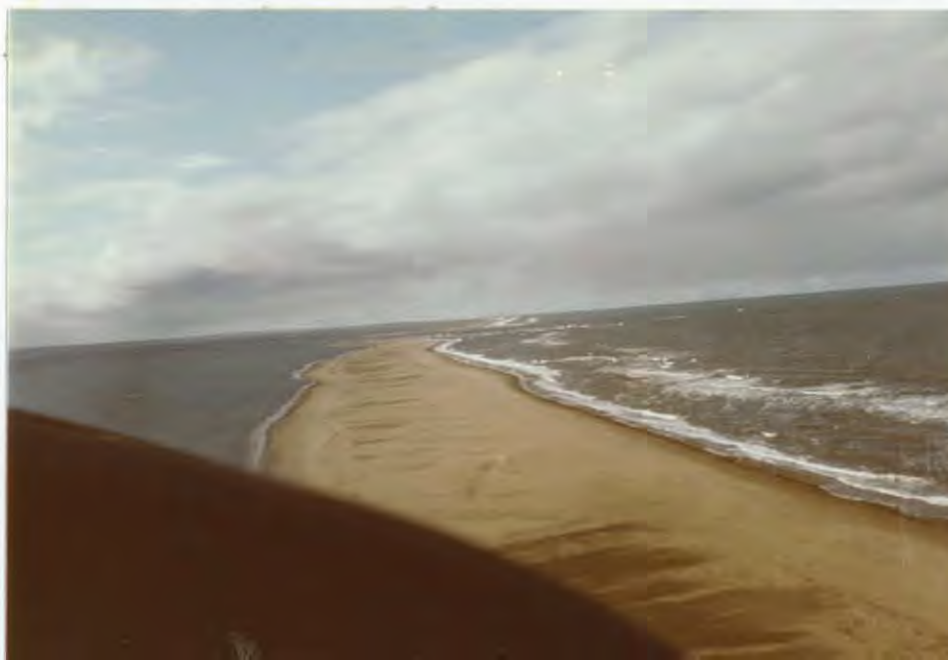
7. Technical Assistance

ARM Early and WB Byrd met with Dr. Tom Albert. Senior Scientist, Environmental Protection Division of North Slope Borough to discuss areas of mutual interest (Byrd, V. and T. Early. 1984. Trip report for a visit to Alaska Maritime NWR areas in the vicinity of Barrow. Admin. Rep. USFWS, Anchorage, Alaska). We were asked to consider a cooperative study of the potential use of artificial nest structures by common eiders. The North Slope Borough is interested in recommending that oil companies erect nest structures for eiders on gravel pads they use and then abandon. Also, the Borough wants to initiate a management project which the residents of the area will consider "positive". The people have come to think of wildlife management as just another restriction on their activities. The best place for the study would be Solivik Island on the refuge, where the largest eider colony in the Chukchi Sea occurs.

8. Other

Special Use Permits were issued to Digicon and Western Geophysical Corporations to install navigation towers near the U.S. Geological survey marker "Sharpy" on the Ann Stevens-Cape Lisburne subunit. An inspection of the site in August by WB Byrd revealed that only the Digicon tower was in place. The site was generally neat and little damage to the tundra had occurred.

SOHIO Alaska Petroleum Company was issued a Special Use Permit to conduct surficial geological reconnaissance at Cape Thompson and Cape Lisburne.



Solivik Island, is the area where large numbers of common eiders nest. The nearly flat barrier island may be the site of a cooperative eider study with the North Slope Borough.
 #300035 8/84 G.V.B.

G. WILDLIFE

3. Waterfowl

Although some brant nest on refuge barrier islands, most of the use occurs during fall migration. On August 21, 1984 ARM Early and WB Byrd counted over 2,000 brant on barrier islands of Peard Bay and Kasegaluk Lagoon (Byrd and Early op. cit.).

5. Shorebirds, Gulls, Terns, and Allied Species

Kittiwakes and Murres--At Cape Lisburne, observations indicated that black-legged kittiwake and murre populations were similar to past years, but that kittiwakes experienced a breeding failure. Murres seemed to have the normal number of eggs, but we were not able to check the area during chick-rearing to determine what percentage might have fledged (see Section D.5 for more details).

6. Raptors

A pair of gyrfalcons successfully nested at Cape Lisburne again this year as one or two pairs have done since at least the mid-1970's (Alan Springer pers. comm.). An adult golden eagle was seen in the same general area as the gyrfalcons during the first week of August. Several pairs of eagles probably nest on the subunit.

8. Game Mammals

The western arctic caribou herd migrates from calving grounds southwest of Barrow to a post-calving aggregation area which traditionally includes the Ann Stevens-Cape Lisburne subunit. In 1984 the movement was somewhat more dispersed than normal, but several thousand animals still used inland areas of the refuge subunit (John Trent, Alaska Dept. of Fish and Game, and reports from RCA personnel stationed at Cape Lisburne AFS). Grizzly bears are frequently seen near the Cape Lisburne AFS, but garbage disposal is excellent, and no human-bear problems have occurred this year.



An inland area near Cape Lisburne typical of habitats used by post calving caribou.

#300036

8/84

G.V.B.

9. Marine Mammals

Beaches within one mile of Cape Lisburne are used by walruses in late summer when the ice pack is at its greatest distance from the area. In early August 1984 up to 30 animals were observed, but in some years peak counts exceed 300 (Alan Springer pers. comm.). Air Force personnel saw several polar bears near the station during winter as usual, but no problems were reported.

14. Scientific Collections

Although no birds were collected on the refuge, 25 murres and 20 kittiwakes were shot just offshore for food habits studies at Cape Lisburne.



Cape Lisburne Air Force Station. This is an inholding in the Ann Stevens-Cape Lisburne Subunit.

#30037 8/84

G.V.B.

H. PUBLIC USE

7. Other Interpretive Programs

In early August, a slide presentation was given to 22 personnel stationed at Cape Lisburne Air Force Station. The program generally described the entire refuge program and highlighted the Cape Lisburne area. In addition, volunteer

Alan Springer presented a slide show on the biology of murres and kittiwakes at Cape Lisburne.

8. Hunting

In 1984 less than five caribou were reportedly taken by personnel at Cape Lisburne AFS.

10. Trapping

Personnel at Cape Lisburne AFS reportedly trapped one wolverine and about 10 red foxes on the refuge in 1984.

17. Law Enforcement

Information was gathered on an illegal gravel removal from the refuge near Cape Lisburne. The activity was reported when an Air Force equipment operator noticed that he had uncovered human skeletons. The Park Service was notified, and an archaeologist was dispatched to the site. The skeletons were remains of three eskimos that may have been buried in a rock slide many years ago. After consulting with elders in the nearest village, Point Hope, the skeletons were buried in an old eskimo village near the Air Force station. It was in the process of the Park Service investigation, that it was discovered the site was on the refuge, just off the Air Force road right-of-way. Little damage was done to the scree and tundra area, since the discovery of the skeletons occurred soon after gravel removal started. The Air Force was contacted to clearly delineate refuge boundaries and refuge regulations.

Alaska Department of Fish and Game cited the guide Phil Driver who has a refuge SUP for a same-day-airborne take, but the case was dropped because Mr. Driver's German client could not return to Alaska to testify.

J. OTHER ITEMS

2. Other Economic Uses

A Special Use Permit was issued to SOHIO Alaska Petroleum company to conduct a surficial geological reconnaissance at Cape Lisburne and Cape Thompson in the Chukchi Sea Unit.

4. Credits

The report was written by WB Byrd and typed by CT Fellows. ARM Early edited the report. BA Hagglund provided data on funding.

GULF OF ALASKA UNIT
ALASKA MARITIME NATIONAL WILDLIFE REFUGE
Homer, Alaska

ANNUAL NARRATIVE REPORT
Calendar Year 1984

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

REVIEW AND APPROVALS

GULF OF ALASKA UNIT
ALASKA MARITIME NATIONAL WILDLIFE REFUGE
HOMER, ALASKA

ANNUAL NARRATIVE REPORT
CALENDAR YEAR 1984

John L. Muntz 3/4/85 _____
Refuge Manager Date Refuge Supervisor Review Date

Regional Office Approval Date

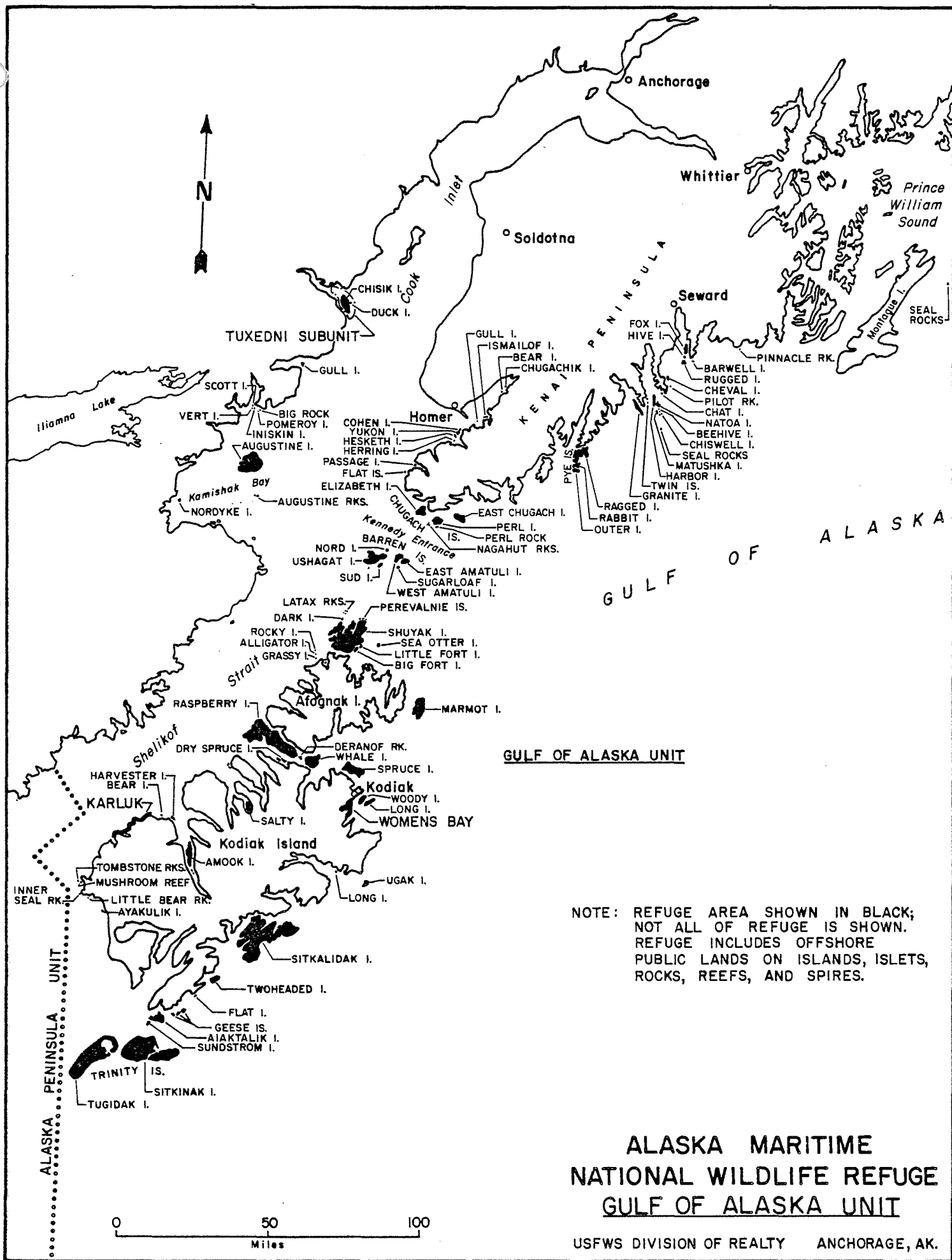
INTRODUCTION

The Alaska Maritime National Wildlife Refuge (AMNWR) was created by the Alaska National Interest Lands Conservation Act in 1980. It was established to conserve fish and wildlife populations and habitats in their natural diversity, fulfill international fish and wildlife treaty obligations, provide opportunities for continued subsistence uses by local residents, provide a program of national and international scientific research on marine resources and ensure water quality and necessary water quantity within the refuge. This Act consolidated management of eleven existing refuges with 186,000 additional hectares (460,000 ac) resulting in a 141,643,000 hectare (3,500,000 ac) refuge. Although relatively small in land mass, its lands are scattered through most of coastal Alaska and extend from Forrester Island in Southeast Alaska along the Gulf of Alaska to the Aleutian Islands and northward until near Barrow in northwest Alaska. There are over 2,500 islands, islets, and pinnacle rocks within the refuge which are used annually by millions of seabirds of at least 30 species. The AMNWR has five units with all former refuges designated subunits.

The Gulf of Alaska Unit extends from Alaska's southcentral coast near Kodiak Island then eastward to Southeast Alaska and includes four former refuges, Tuxedni, St. Lazaria, Hazy and Forrester islands. Major seabird colonies occur on the following islands or island groups within the Unit: Chisik, Barren, Gull, Pye, Chiswell, Middleton, St. Lazaria, Hazy and Forrester.

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

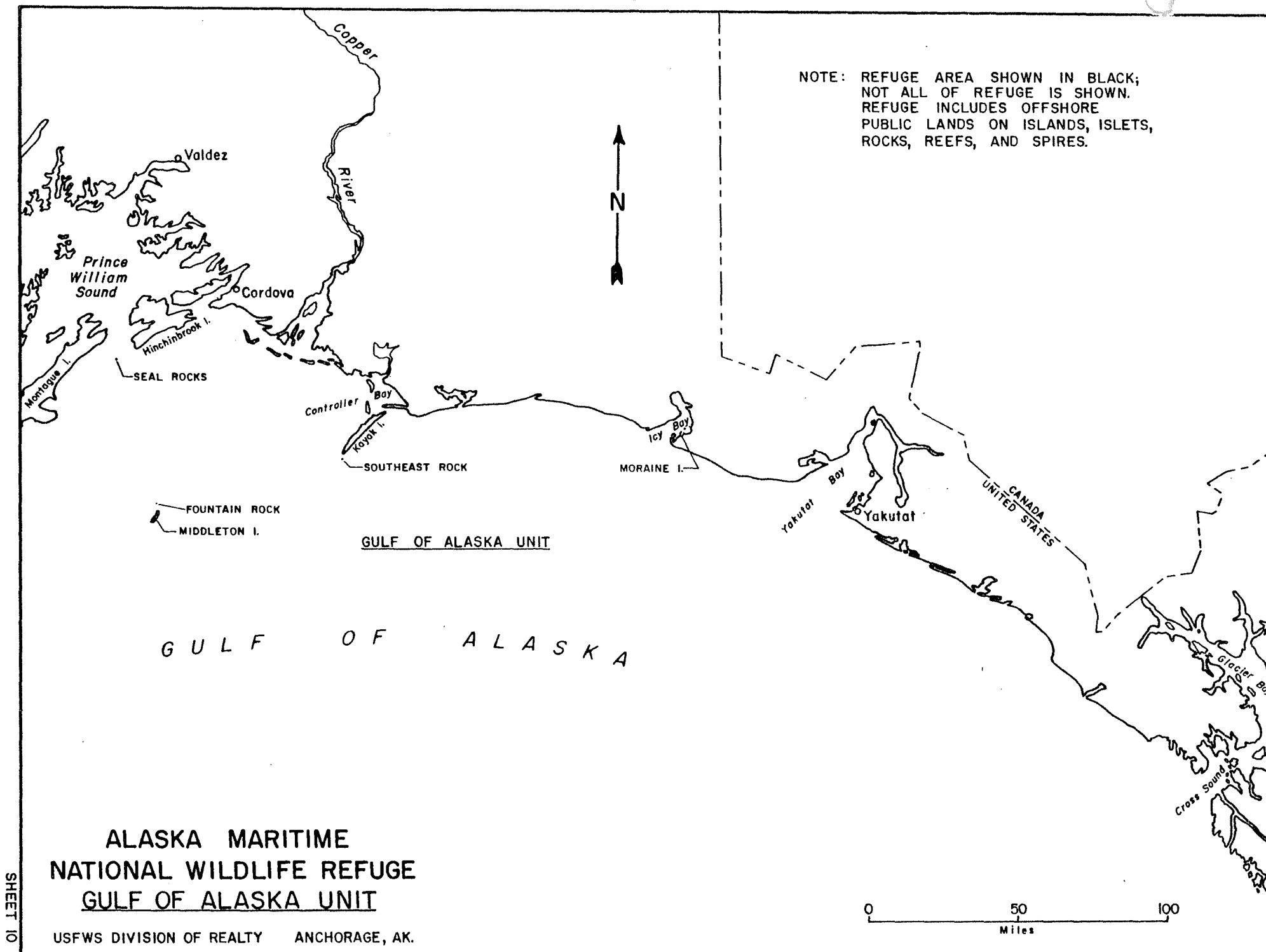
Seabird colonies in this Unit are probably the most visited in Alaska. Unlike most units, three colonies are readily accessible by charter boat or pleasure craft. St. Lazaria Island is 24 km (14.9 mi.) from Sitka; the Chiswell Islands are 55 km (34.2 mi.) from Seward and Gull Island is 2 km (1.2 mi.) from Homer.

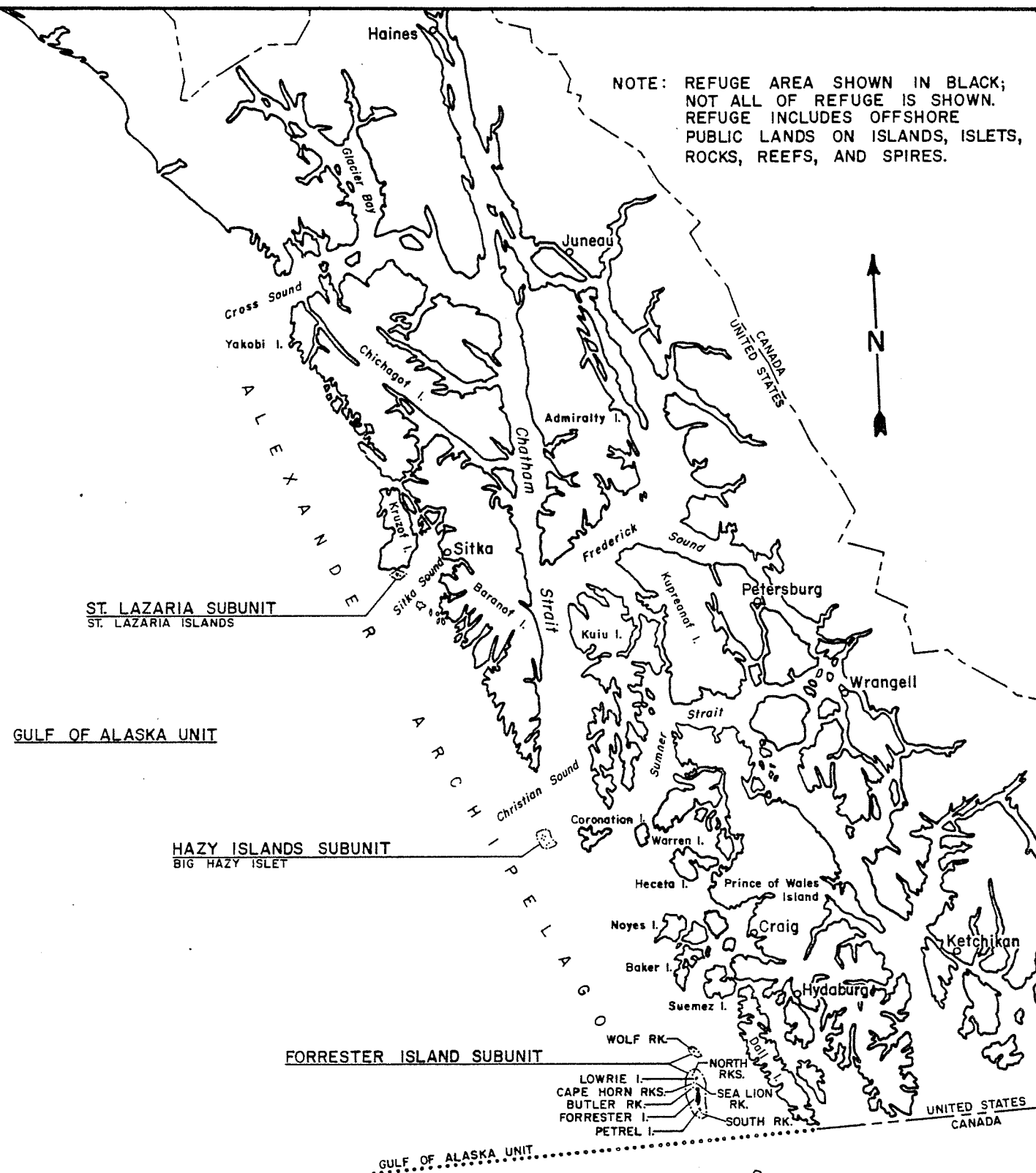


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NOT ALL OF REFUGE IS SHOWN.
REFUGE INCLUDES OFFSHORE
PUBLIC LANDS ON ISLANDS, ISLETS,
ROCKS, REEFS, AND SPIRES.

ALASKA MARITIME NATIONAL WILDLIFE REFUGE GULF OF ALASKA UNIT

USFWS DIVISION OF REALTY ANCHORAGE, AK.





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A. HIGHLIGHTS

The refuge recruited a wildlife biologist for the Unit (Section E).

The seabird colony at Gull Island, Kachemak Bay, was censused and productivity plots were established (Section G).

Interpretive tours to Gull Island were initiated (Section H).

B. CLIMATIC CONDITIONS

Although it does not extend as far south as the Aleutians, the Gulf of Alaska probably has the most moderate climate among units of the Alaska Maritime National Wildlife Refuge. Winter temperatures normally remain above freezing except for lands adjacent to the Kenai Peninsula. The climate is most temperate in Southeast Alaska where it is often overcast, but seldom experiences the wind and summer fog of the other units. Temperatures were a few degrees warmer than normal throughout the Unit in 1984, but precipitation was near the long term average. In Homer, we had heavy precipitation during the winter and relatively dry weather the remainder of the year, giving us a near normal 22.83 inches of precipitation.

This year we obtained data from two more National Weather Service stations and two Arctic Environmental Information and Data Center stations. The stations should detect major weather patterns and provide us with a reasonably accurate weather picture for most areas in the Unit.

Meteorological Data - Homer 1984

Month	Ave. Temp. (F)				Precip. (in.)		Ave.(mph)	
	Max.	Min.	Ave.	Norm.	Total Water	Snow	Wind	Sp.
Jan.	31.4	21.7	26.6	20.8	4.81	8.3		9.2
Feb.	26.3	16.9	22.6	24.3	2.24	32.2		9.5
Mar.	44.2	32.0	38.1	26.9	1.22	0.6		8.0
Apr.	41.8	31.1	36.5	35.1	1.59	7.1		8.3
May	50.3	37.5	43.9	42.2	0.42	-T-		7.3
Jun.	58.5	46.0	52.3	48.8	0.87	-0-		9.0
Jul.	59.3	49.9	54.6	56.4	1.02	-0-		7.2
Aug.	61.1	48.7	54.9	52.8	3.67	-0-		8.5
Sep.	55.2	42.9	49.1	47.3	3.86	-0-		6.8
Oct.	45.3	33.8	39.6	37.3	1.21	-0-		8.0
Nov.	35.6	24.9	30.3	28.9	0.88	0.9		8.4
Dec.	36.2	25.2	30.7	21.8	1.98	5.5		8.1

Seward

Month	Ave. Temp. (F)				Precip. (in.)		Ave.(mph)	
	Max.	Min.	Ave.	Norm.	Total Water	Snow	Wind	Sp.
Jan.	33.3	23.1	28.2	23.7	11.22	6.2	---	---
Feb.	32.6	20.4	26.5	27.1	3.96	41.5	---	---
Mar.	43.0	32.3	37.7	30.0	11.68	2.2	---	---
Apr.	44.7	31.5	38.1	37.7	6.92	7.0	---	---
May	53.8	38.6	46.2	44.8	2.47	-0-	---	---
Jun	60.3	47.0	53.7	51.6	0.78	-0-	---	---
Jul.	62.5	50.5	56.5	56.2	0.69	-0-	---	---
Aug.	63.9	49.8	56.9	55.6	6.38	-0-	---	---
Sept.	55.8	44.1	50.0	49.5	10.51	-0-	---	---

Kodiak

Month	Ave. Temp. (F)				Precip. (in.)		Ave.(mph)	
	Max.	Min.	Ave	Norm.	Total Water	Snow	Wind	Sp.
Jan	38.5	26.9	32.7	31.9	10.11	19.2	12.2	
Feb	32.4	18.6	25.5	29.4	5.75	38.8	16.1	
Mar.	42.9	34.1	38.5	32.7	9.94	2.0	12.6	
Apr.	42.9	30.5	36.7	38.0	6.27	9.0	13.8	
May	50.1	37.3	43.7	43.2	4.90	T	11.2	
June	56.6	45.7	51.2	49.7	5.15	-0-	10.6	
July	60.8	50.6	55.7	53.7	3.04	-0-	10.5	
Aug.	64.3	50.6	57.5	54.8	1.39	-0-	9.9	
Sept.	57.1	45.5	51.3	49.9	8.37	-0-	12.4	
Oct.	49.0	34.2	41.6	41.2	3.15	T	13.5	
Nov.	40.8	26.9	33.9	34.7	4.98	2.9	10.4	

Yakutat

Month	Ave. Temp. (F)				Precip. (in.)		Ave.(mph)	
	Max.	Min.	Ave.	Norm	Total Water	Snow	Wind	Sp.
Jan.	35.5	26.5	31.0	23.2	17.65	39.9	6.5	
Feb.	36.7	29.7	33.2	27.7	16.61	68.6	8.7	
Mar.	43.4	32.1	37.8	29.7	12.04	2.5	6.5	
Apr.	46.2	31.0	38.6	36.0	7.25	4.5	6.1	
May	51.1	36.1	43.6	42.8	4.92	-0-	6.5	
Jun.	55.1	41.9	48.5	49.4	4.15	T	6.3	
Jul.	57.1	47.9	52.5	53.5	10.73	-0-	6.8	
Aug	60.8	47.2	54.0	53.1	11.12	-0-	6.2	
Sept.	57.7	39.5	48.6	48.2	14.14	-0-	5.6	
Oct.	47.2	34.2	40.7	40.8	15.90	8.6	7.6	
Nov.	36.3	26.9	31.6	32.5	12.01	30.1	6.3	

Sitka

Month	Ave. Temp. (F)				Precip. (in.)		Ave.(mph) Wind Sp.
	Max.	Min.	Ave.	Norm.	Total Water	Snow	
Jan.	41.4	35.0	38.02	32.5	14.71	0.9	---
Feb.	42.2	34.8	38.5	35.8	10.42	15.3	---
Mar.	46.7	38.2	42.5	37.0	7.51	T	---
Apr.	49.8	38.2	44.0	41.6	2.75	0.3	---
May	54.1	42.6	48.4	47.1	3.19	-0-	---
Jun.	57.0	47.4	52.2	52.0	5.59	-0-	---
Jul.	59.5	50.6	55.1	56.1	4.39	-0-	---
Aug.	62.2	51.9	57.1	56.9	10.29	-0-	---
Sept.	58.3	47.7	53.0	53.0	6.15	-0-	---

C. LAND ACQUISITION2. Easement

The 1982 Chugach Natives, Inc. (CNI), Settlement Agreement gives the refuge the right to regulate entry, use and occupancy by others as on other refuge lands. CNI is restricted from conducting activities that disturb the land or vegetation within the easement area without prior written permission from the Fish and Wildlife Service.

D. PLANNING1. Master Plan

The Alaska National Interest Lands Conservation Act (ANILCA) requires all Alaskan refuges to prepare a comprehensive plan. These plans are to serve as the station master plan and will be initiated by a special planning team from the Regional Office. The primary objectives of the comprehensive plans are to (a) inventory and describe the resources and values of the refuge, (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.

The revised AMNWR schedule is as follows:

<u>Activity</u>	<u>Date</u>
Initiate discussions with refuge staff	5/84
Prepare planning directives	9/85
Hold scoping meetings	3/86
Collect and document data	4/86
"Affected Environment" section draft completed	6/86
Review data	6/86
Identify resource potentials	8/86

Formulate alternatives	11/86
Finalize alternatives	2/87
Assess impacts and effects	6/87
"Alternatives and Effects" section draft completed	6/87
Identify preferred alternative	8/87
Publish draft	11/87
Public review	1/88
Publish final	5/88
Protest period	6/88

On February 16 the planning team met for the first time with the staff. A large list of refuge "resource issues" was worked up by the staff at that meeting and enlarged on during the following several weeks. On August 28, the planning team biologist met with the staff to discuss preferences for methods and objectives of mapping this somewhat complex and confusing refuge.

4. Compliance with Environmental and Cultural Resources Mandates

Towards the end of the year a draft environmental assessment was prepared on a proposal to eradicate foxes from nearly all refuge lands on which they were not indigenous. Ushagat Island in the Barrens would be the only island in the Gulf of Alaska affected by this proposal.

5. Research and Investigations

AMNWR NR84 Reproductive Ecology of Seabirds at Middleton Island (74500-GAU-01)

Patrick J. Gould, Alaska Wildlife Research Project, Denver Wildlife Research Center; David R. Nysewander, Wildlife Assistance, U.S. Fish and Wildlife Service; Bay Roberts, Institute of Arctic Biology, University of Alaska-Fairbanks and Kathy Omura, unaffiliated; continued seabird monitoring studies on Middleton Island.

AMNWR NR84-Marine Birds and Mammals on Gull Island and Adjacent Waters (74500-GAU-02)

Alaska Maritime National Wildlife Refuge staff. Several thousand seabirds breed on Gull Island in Kachemak Bay. Its access to the refuge headquarters and the public (less than 2 km from Homer) and the relatively protected waters of the bay provide an ideal setting for public education and seabird studies. In this first year of study we censused the colony, monitored reproductive success and ran transects within the bay. An administrative report is in preparation.

AMNWR NR84 Nesting Ecology of fork-tailed Storm-Petrels in the Barren Islands (74500-GAU-08)

Dr. P.D. Boersma, Institute of Environmental Studies-University of Washington. Research continued on fork-tailed storm-petrels. Notes on the nesting success of other seabirds also were obtained. Approximately 650 permanently marked fork-tailed storm-petrel burrows, including 130 nest boxes established in 1980, were checked. Information on mate fidelity and burrow and egg size was obtained on nearly 500 birds banded in previous years.



The seabird colony on East Amatuli Island in the Barren Islands is one of a few sites in the Unit with long term monitoring data.

#40101 7/84

E.P.B.

E. ADMINISTRATION

1. 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. Mike Nishimoto, Refuge Biologist, GS-11, EOD 4-15-84, PFT

5. G. Vernon Byrd, Refuge Biologist, GS-11, EOD 4-29-84, Perm. Int.
6. Carol M. Hagglund, Budget Assistant, GS-7, EOD 08-21-83, PFT
7. Trina B. Fellows, Clerk-Typist, GS-3, EOD 11-28-83, PFT
YCC
8. Kathy Libal YCC, FT, 6-10-84/8-10-84
Volunteer
9. Laura Hoffman, Volunteer 5-18-84/8-3-84 Ref. Vol. 9-1-84/10-13-84
10. Clark Richins, Volunteer, FT 6-11-84/7-20-84
11. Dee Boersma, Volunteer, FT, 6-24-84/7-9-84
12. Emily Davies, Volunteer, FT 6-24-84/7-9-84

2. Youth Programs

Kathy Libal our YCC working out of the Homer Office gave interpretive talks on-board the M/V Sizzler which had three daily tours to the Gull Island seabird colony. She also assisted in our Gull Island and Kachemak Bay surveys (Section G).

4. Volunteer Program

After helping survey islands in the Bering Sea, Student Conservation Association Volunteer Laura Hoffman did interpretive work on the M/V Sizzler and helped in our Kachemak Bay surveys.

Dr. P.D. Boersma of the University of Washington also volunteered to continue work on fork-tailed storm-petrels at East Amatuli Island in the Barrens. This colony has been monitored since 1976 and is one of very few colonies in the Unit with long term monitoring data. Dr. Boersma has been unable to analyze data of the past several years since the research was unfunded (Section D).

5. Funding

Funding for the Alaska Maritime National Wildlife Refuge complex is through the Homer headquarters. The funds are then internally distributed between Adak and Homer. The funding for the Aleutian Islands Unit is discussed in that unit's section. All other unit funds, including Gulf of Alaska Unit, are distributed from the Homer office. Following is a summary of the total refuge funding.

	1260	1480	
	Wildlife Resources	Endangered Species	Total
FY82	346,000	75,000	421,000
FY83	730,000	250,000	980,000
FY84	1,124,000	245,000	1,369,000
FY85	1,105,000	245,000	1,350,000

In FY82 the vessel charter costs came out of the Regional Office budget. Since then all charter costs have come from

the refuge budget.

A comparison of FY82 to FY85 Homer funding is as follows:

	1260	1480	
	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
FY85	615,000	140,000	755,000

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

The Alaska Maritime National Wildlife Refuge is headquartered in the Ross Duncan building located on Pioneer Avenue in downtown Homer. All administrative activities of the Gulf of Alaska Unit are accomplished from this office. A total of \$37,120 (which includes utilities, snow and refuse removal) was paid for lease of office/storage space in FY84. An additional 77 sq m (827 sq ft) of space was added bringing the total leased space to approximately 33 sq m (3587 sq ft). The entire building is comprised of approximately 375 sq m (4,032 sq ft). Beginning in FY85 the current rental rate of this building is at \$4950 per month.

FY84 salary and travel costs for the Homer office totaled \$240,000 and \$60,000 respectively. The largest single equipment purchase was a 10SP Data General Computer system for \$13,600.

6. Safety

All permanent and temporary staff are involved in monthly safety meetings while at the Homer office. In addition, prior to field activities all participate in a series of First Aid, CPR, Defensive Driving, and Sea/Land Survival Safety sessions.

7. Technical Assistance

Twice this year we were asked to provide technical assistance on a bald eagle nest and wetlands near Beluga Lake in Homer. Early this spring the Alaska Department of Transportation and Public Facilities (ADOT/PF) proposed to kill aquatic plants in the lake with the herbicide Watrol. The lake has been designated for float plane use by the State. Recently, some pilots have complained that vegetation in the lake was creating a hazardous condition when it gets caught on airplane floats. The project was opposed by environmental groups. Among their concerns were impacts to the bald eagle nest during the application of Watrol. ADOT/PF requested our assistance in locating the nest. Although this was an unmarked nest, we were able to locate it with assistance from a local birder. The project was not implemented due to insufficient analyses of mechanical alternatives.

This nest tree received attention again when a developer applied for a U.S. Army Corps of Engineers permit to construct a trailer court on wetlands near the nest. The Western Alaska Ecological Services office in Anchorage asked us to determine the distance between the project site and the nest tree. We informed them that the nest was beyond a mile from the project and a safe distance from disturbance according to guidelines developed by the U.S. Fish and Wildlife Service Raptor Management Studies.

Due to the potential threats on this nest we worked with Raptor Management Studies in Juneau to place a bald eagle nest tree marker on this tree as well as others in the Homer area. This fall the tree was marked and requested data on the nest was submitted to Juneau. Next spring we plan to resurvey this nest and mark several other trees in the Homer area.

F. HABITAT MANAGEMENT

2. Wetlands

Although wetlands are one of the dominant habitat types in Alaska, they mostly occur in isolated pockets in the Gulf of Alaska Unit. A potentially productive lagoon/marsh complex exists on Ushagat Island in the Barrens, but waterfowl use is being restricted by introduced foxes.

3. Forests

Forested islands exist only in the Gulf of Alaska Unit, with Ragged Island (2185 ha or 5,400 ac) in the Pye Islands being the largest island totally covered by spruce. Except for Forrester and St. Lazaria in southeast Alaska, all forested islands including Discoverer and Delphin islands near Afognak island were created by the Alaska Lands Act. Though more desirable timber exist on other Federal, State and Native lands, ANILCA provides the Koniag Native Corporation use of timber on both Discoverer and Delphin islands. Both islands are heavily used by Sitka black-tailed deer and brown bear, and Delphin also has a small seabird colony and nesting eagles. Delphin Island is particularly important to wildlife and has magnificent trees up to 1.5 m (5 ft) in diameter.



Delphin Island located in the former Afognak Forest and Fish Culture Reserve is heavily used by Sitka black-tailed deer and brown bear. The Alaska Lands Act provides the Koniag Native Corporation the use of timber on all islands within the former reserve.

#40098 7/83

N.H.F.



Typical understory of the spruce/hemlock forest on Discoverer Island, another island within the former Afognak Forest and Fish Culture Reserve. These islands provide the only known black-tailed deer habitat on the AMNWR.

#40098 7/83

N.H.F.

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

Lands owned by Ouzinkie Natives and Natives of Kodiak on Afognak Island are being logged and transferred through a barge loading facility at Perenos Bay. Next year their operations will expand to the south side of the island and enter refuge waters when they construct an A-frame log transfer facility that would discharge logs in Afognak Bay. Discoverer and Delphin islands may be threatened by similar logging operations after timber has been removed from Afognak.



This barge loading facility for timber at Afognak Island in Discoverer Bay was constructed prior to the creation of the AMNWR. Submerged lands in the Forest and Fish Culture Reserve also became part of the AMNWR. Construction of future log dumps would require refuge authorization.

#40100

7/83

N.H.F.

7. Grazing

There is only one grazing permittee on the Gulf of Alaska Unit. The permit covers two small islands, Bear and Harvester, near Kodiak. This is a very unusual situation at present in which there are no on-going appeals, the bills are

paid in full, and the number of head of cattle grazed are below the maximum allowed. This entire area has been selected by both the State and a Native corporation.

12. Wilderness and Special Areas

Only Forrester, Hazy, St. Lazaria and Chisik (Tuxedni subunit) islands are designated Wilderness areas in the unit.

Below is a breakdown of these areas:

<u>Island</u>	<u>Hectares</u>	<u>Designation Date</u>
Forrester	1,146 (2,832 ac)	10/23/70
Hazy	13 (32 ac)	10/23/70
St. Lazaria	26 (65 ac)	10/23/70
Tuxedni	2,245 (5,548 ac)	10/23/70

Presently Kenai NWR is handling the Tuxedni Subunit area. The transfer of management for this island from Kenai NWR to the Alaska Maritime NWR has been locked up in litigation over trespass cabins on the island.

G. WILDLIFE

1. Wildlife Diversity

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

2. Endangered and/or Threatened Species

Occasional individuals of the endangered or threatened 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 Ushagat Island in the Barrens. Many such birds winter around the Pyes, Chiswells, Barrens, and off Kodiak.

5. Shorebirds, Gulls, Terns, and Allied Species

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

Middleton Island, a 2 km (1.2 mi) wide and 8 km (5.0 mi) long island located about 130 km (180.7 mi) south-southwest of Cordova provides a staging point for birds migrating across the Gulf and often attracts accidental migrants. Breeding colonies of seabirds include black-legged kittiwakes, pelagic cormorants, common murres, thick-billed murres, rhinoceros auklets, tufted puffins and glaucous-winged gulls. The colonies of kittiwakes and cormorants are the largest in the Gulf of Alaska representing 16 and 30 percent of the breeding population in the Gulf respectively.

This year Wildlife Research and Wildlife Assistance (FWS, Anchorage) continued to monitor the Middleton colony. A count of 66,253 black-legged kittiwake nests was made reflecting a 16 percent increase over last year. There was an average of 0.75 prefledging chicks/nest compared to 0.03 in 1983. The productivity of 1984 was the highest ever recorded on Middleton Island. There were 2,774 active pelagic cormorant nests in 1984, an increase of 3 percent over last year. However, productivity was low with an average of 1.44 young/nest. This was lower than the mean of 1.87 in 1983 and the lowest recorded since 1978. The count of glaucous-winged gulls was 1,133 adults and less than the 1983 count of 1,507. The count of murres was 5,832 and similar to previous years except 1983 when 7,500 were counted. For more details see Gould, P.J., B. Roberts, D.R. Nysewander and K. Omura. 1984. Reproduction Ecology of Seabirds at Middleton Island, Alaska. Unpubl. admin. rpt., U.S. Fish and Wildlife Service.

Another colony was monitored by refuge staff at Gull Island located within 2 km (1.2 mi) of Homer and adjacent to the State designated critical habitat of Kachemak Bay. Several thousand black-legged kittiwakes and common murres breed here along with red-faced and pelagic cormorants, horned and tufted puffins, pigeon guillemots, and glaucous-winged gulls. This is probably the most visited seabird colony in Alaska. In the summer, three tour boats conduct daily trips to the island. Many more visits are made by boats returning from fishing trips. Its accessibility and the relatively protected waters of the bay provide an ideal setting for public education and seabird studies.

Our primary objectives in this first year of the study were to census the major species of seabirds of Gull Island and evaluate the feasibility of collecting a variety of reproductive data. Gull Island as discussed here consist of the main island and two smaller islets hereafter referred to as Murre and Gorilla Rock respectively (Figure 1).

Black-legged kittiwakes nest throughout the colony, but are most dense on the sheer cliffs on the south side of the island. Common murres are concentrated on the top of inaccessible Murre Rock. Cormorants favor nest sites on the south facing cliffs. Puffin burrows fringe the top of the

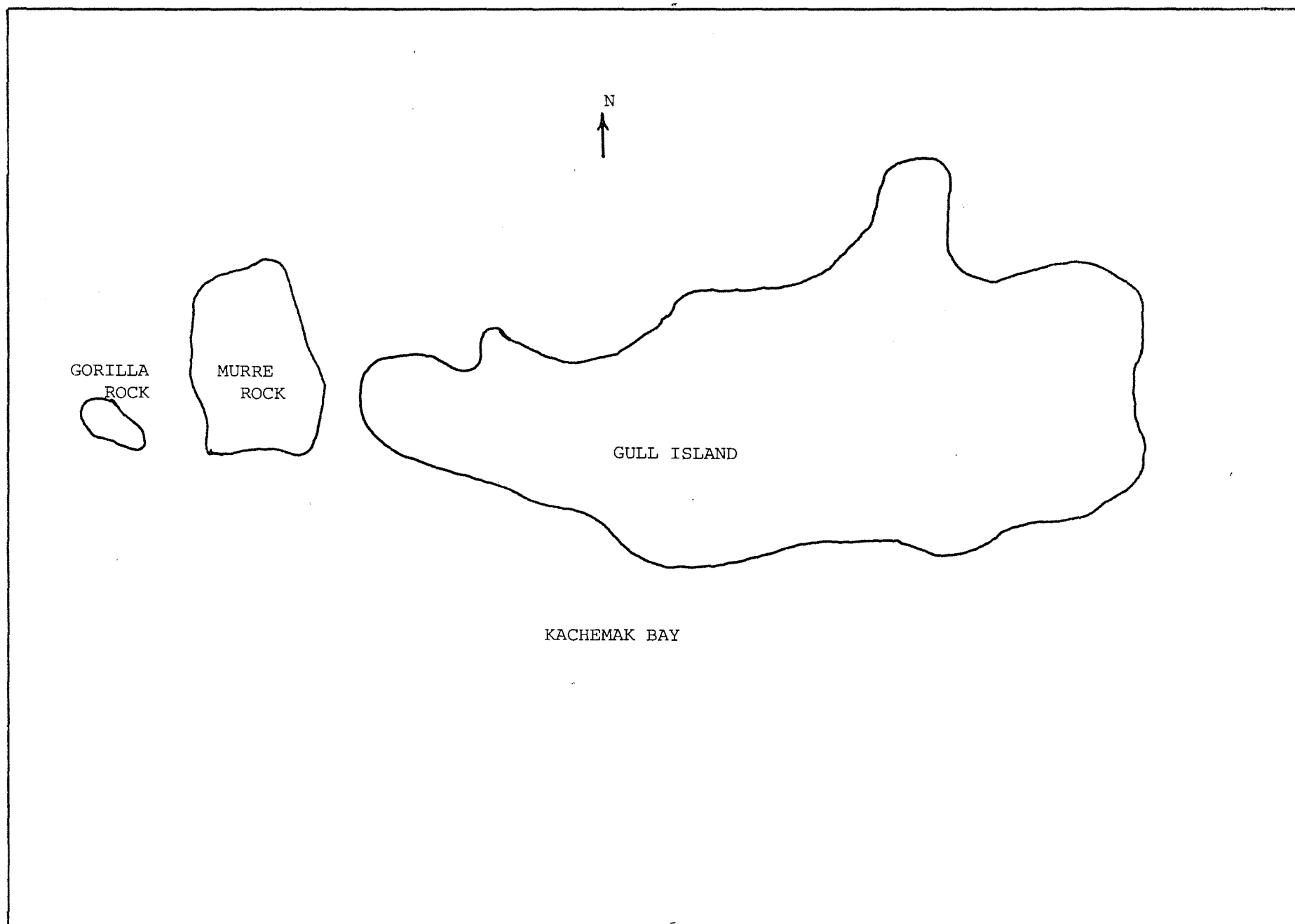


Figure 1. The Gull Island seabird colony in Kachemak Bay consist of the main island and two rocky islets.

main island whereas gulls nest on its vegetated interior.

On June 29, we made the following nest counts: 4,204 black-legged kittiwakes, 4 red-faced cormorants and 54 pelagic cormorants. Other species could be censused only by landing on the island. We chose not to land on that date to avoid disturbing the colony when most species were still incubating their eggs. About a month later, on July 31, we landed on the main island and made an estimate of 2,300 common murres. We located 71 tufted puffin burrows 5 of which were active, but the others were too deep to make a determination. The gull colony could not be censused since they had already fledged. Only the phenology of black-legged kittiwakes was consistently followed throughout the breeding season. They had already arrived and were observed bringing in nest material by the time of our first visit on May 18. By June 12 most kittiwakes were sitting on their nest. Hatching occurred by July 13 and was nearly complete by the end of the month. On August 29, fledglings were encountered on our transects.

Three productivity plots were established which had an average of 0.80 prefledging chicks/nests. Productivity was similar to the Middleton Island colony, but sharply contrasted the nearly complete reproductive failure experienced by kittiwakes in the Bering Sea Unit. Additional plots will be used next year to enhance analyses of population permutations.

Ten boat transect routes were also established in Kachemak Bay to complement our Gull Island data. They began in June and then terminated in December when our 25-foot Boston Whaler developed engine problems. We attempted to run each transect twice per month, but they were often done less frequently due to weather or lack of observers. The data showed that common murres remain in Kachemak Bay at least through our last sampling period in the fall and black-legged kittiwakes began to leave in October and are essentially gone by November. No additional trends were obvious due to the high variability in observations between seasons and transects. An administrative report is currently in preparation.

A birder reported sighting 20 Brandt's cormorant nests on St. Lazaria Island. This species has previously been recorded breeding only on Seal Rock in Prince William Sound and Hazy Island.

6. Raptors

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

8. Game Mammals

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

9. Marine Mammals

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



We began to monitor the seabird colony on Gull Island in Kachemak Bay for the first time this year. Black-legged kittiwakes had a good year with an average of 0.80 prefledging chicks/nest.

#50198 7/84

L.A.H.



The Gull Island colony, Kachemak Bay, is one of the most visited seabird colonies in Alaska. This year interpretive talks were given from the M/V Sizzler as it toured Gull Island.

#40103

7/84

M.L.N.



Sea lions haul out at Latax rocks near Shuyak Island.

#40105

7/84

N.H.F.



Black-legged kittiwakes and sea lions at the Chiswell Islands highlight the Kenai Fjords tours that originate from Seward.
 #40143 6/84 M.L.N.

14. Scientific Collections

A special use permit was issued to Dr. Tom G. Schwan, Yale Arbovirus Research Unit, Yale University School of Medicine to collect parasitic lice found on seabird colonies on St. Lazaria Island. Only one tick, a nymph of Ixodes uriae was collected.

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. The M/V Sizzler operating out of Homer had 2,656 people on-board tours to Gull Island. This year we also began to give interpretive talks on the M/V Sizzler through the summer.



Gull Island is easily accessible even by Kayak.
#40104 7/84

T.J.E.



The colony of over 8,000 black-legged kittiwakes is the main attraction at Gull Island.
#40106 7/84

C.M.H.

A slide talk was given by ARM Early to the Sitka Chamber of Commerce concerning St. Lazaria Island near Sitka, a subunit within the AMNWR. It was well received with much interest and concern expressed for the island. While there, St. Lazaria Island was visited with Southeast Alaska Ecological Services biologist Bill Hughes who operates a one person substation in Sitka.



St. Lazaria Island is only 23 ha, but there are populations of over 262,000 fork-tailed and 243,000 Leach's storm-petrels.

#40101

7/84

T.J.E.

I. EQUIPMENT AND FACILITIES

4. Equipment Utilization and Replacement

A 25-foot Boston Whaler used to survey Gull Island and Kachemak Bay developed a problem with its piston on one of the outboard motors. Since cost of its repair would have been more than new motors, it was decided to order two new 120 horsepower engines which are due to arrive in early 1985.

6. Computer Systems

An IBM PC 256K computer is used for word processing and tracking our budget. Biological data have not been stored on the PC since the IRM division in the Regional Office has recommended use of the Data General 10SP which was recently purchased.

J. OTHER ITEMS

2. Other Economic Uses

U.S. Geological Survey was issued a special use permit to conduct geological studies on Forrester Island in support of the Alaska Mineral Resource Assessment program (section 1010 ANILCA). Unsuitable weather and heavy seas prevented work on the island this year.

ARCO Alaska, Inc., was issued a special use permit to conduct surficial geological reconnaissance on Gull Island in Chinitna Bay, Cook Inlet.

Maritime Helicopters, Inc., was issued a special use permit to provide helicopter access for recreation on East Amatuli and Ushagat islands, Barren Islands.

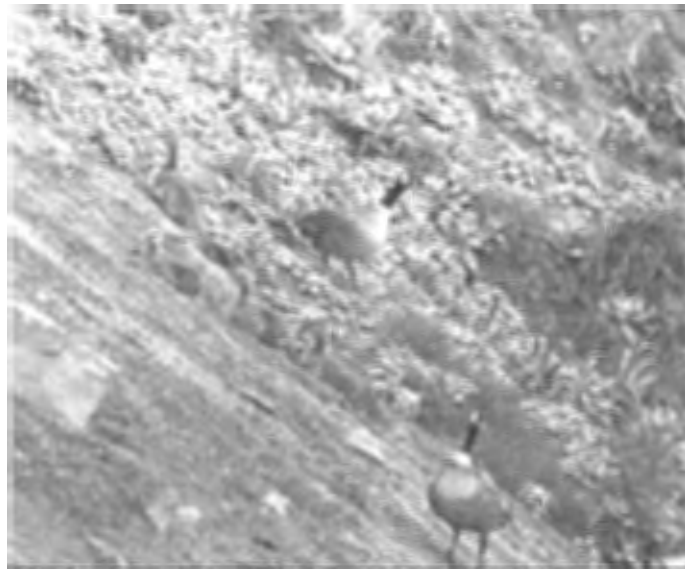
Nature Alaska Photographic was issued a special use permit to photograph wildlife on St. Lazaria Island.

Mr. DeWitt Fields was issued a special use permit to graze cattle on Bear and Harvester Island near Kodiak Island.

Ecosummer Canada, Expeditions Ltd. was issued a special use permit for commercial non-consumptive recreation - birding and sightseeing at Forrester Island. The trip was later canceled due to a boat accident.

3. Credit

Sections A,B,C,D. 4, E.2-7, F. 1,2,3,12; G and H were written by WB Nishimoto. Sections D.1, E.1,6 and F.7 were written by ARM Early. The report was edited by ARM Early. Clerk/Typist Fellows typed the narrative.



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.

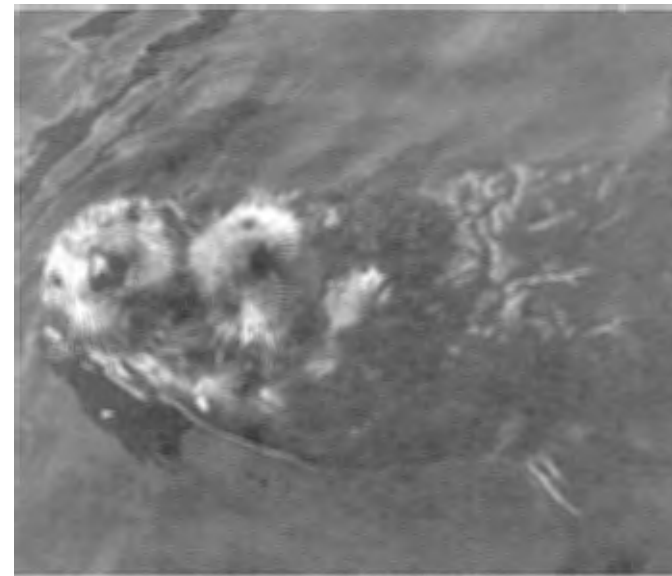
The most obvious feature of Aleutian wildlife is the large quantities of colonial sea birds. Hundreds of thousands, perhaps millions, congregate in vast nesting rookeries — fulmars, two species of petrels, three species of cormorants, black-legged kittiwakes, glaucous-winged gulls, guillemots, murrelets, 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 Eurasian bird), mallards, pintails, greater scaups, mergansers, and common

eiders nest on the islands. Formerly the Aleutian Canada goose lived on all the islands from Amliak 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 Thick-billed murrelets are among the sea birds that nest abundantly on the Aleutian Islands.



Sea otter mother and pup.

valuable food fish.

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.



ALEUTIAN ISLANDS UNIT ALASKA MARITIME NATIONAL WILDLIFE REFUGE



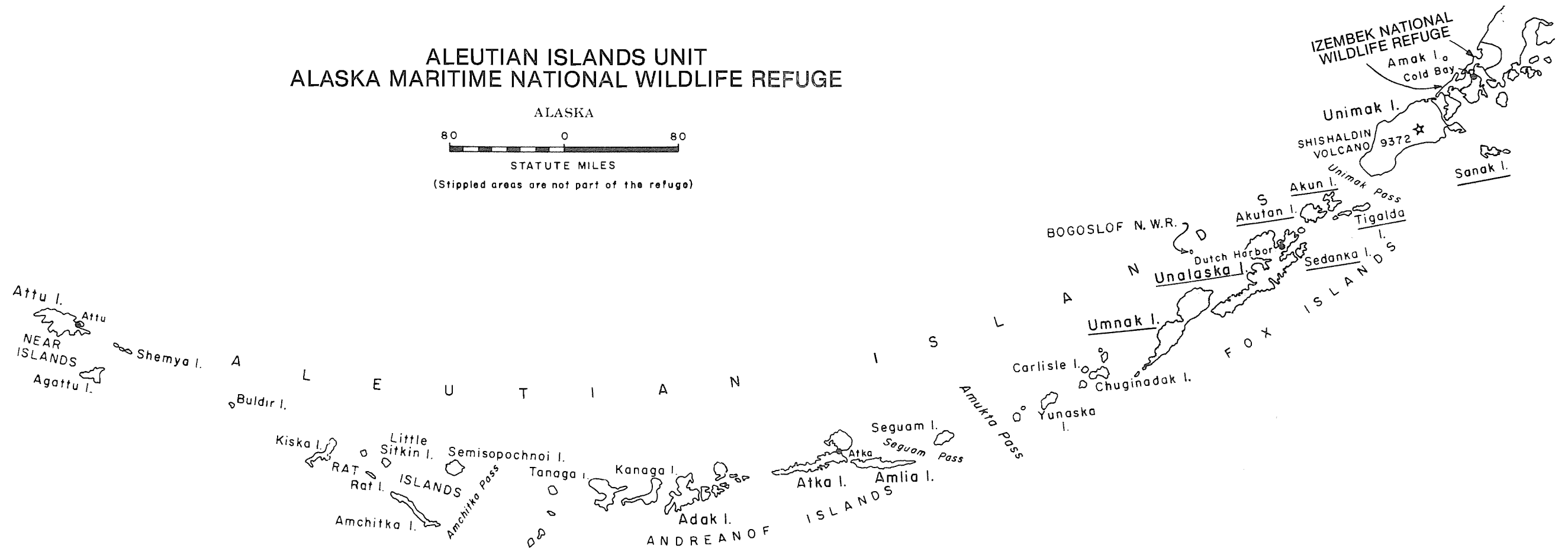
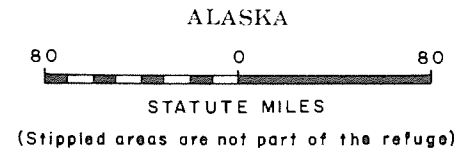
Upper—Mount Gareloi, an active volcano on Gareloi Island (west of much larger Tanaga Island).

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

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."

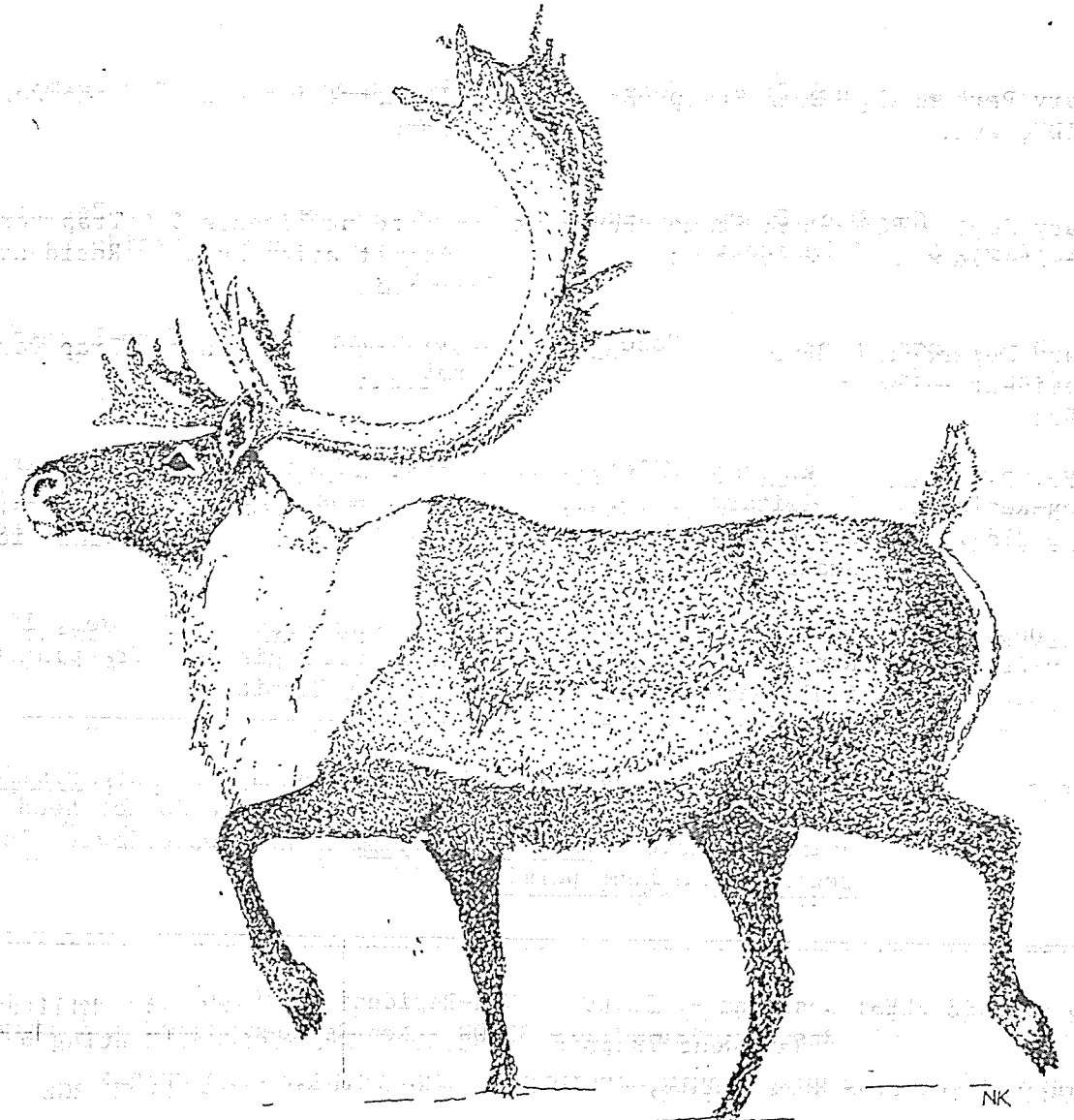
The sea otter, a marine mammal that bears the world's most valued fur, makes its principal home in the waters off islands in the chain. Once almost extinct from years of overhunting, strict protection has brought its numbers back to nearly 20,000. Another and much larger sea mammal, the northern sea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

A RESIDENT IS:

- a) A person who for 12 consecutive months has maintained a permanent place of abode within the state who has continually maintained their voting residence in the state or
- b) any member of the military services who has been stationed in the state for the immediately preceding 12 consecutive months or
- c) any dependent of (b) who has been living in the state for the immediately preceding 12 consecutive months or
- d) a person who is an alien; but who for 3 years maintained a permanent place of abode within the state.

ADAK HUNTING LICENSE REQUIREMENTS



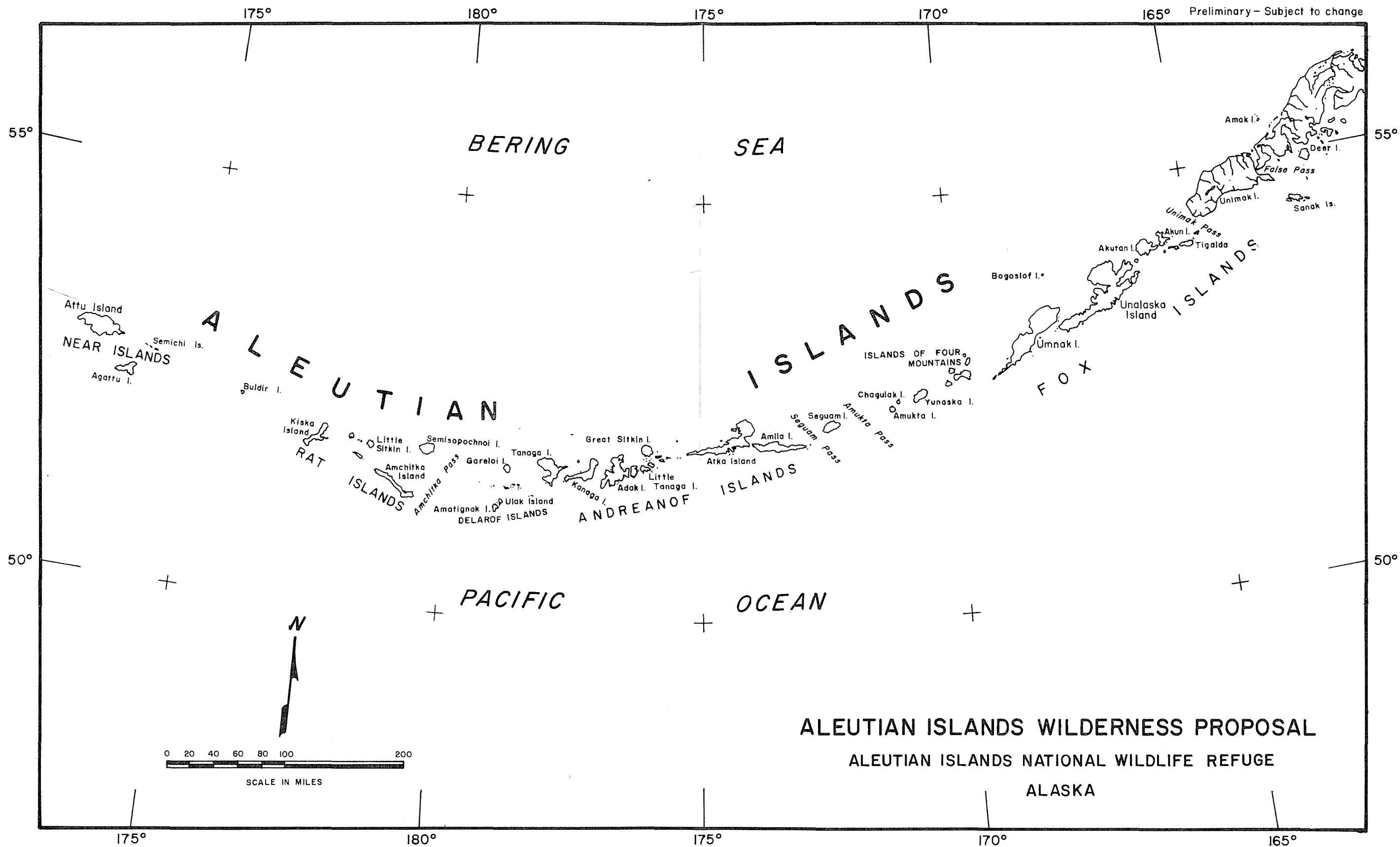
ADAK HUNTING LICENSE REQUIREMENTS

ON MILITARY RESERVATION					OFF MILITARY RESERVATION			
STATUS	WATERFOWL	PTARMIGAN	CARIBOU	FOX	WATERFOWL	PTARMIGAN	CARIBOU	FOX
Military Personnel PCS - Resident	Duck Stamp	None	Registration Hunt Permit	Trap Permit	Duck Stamp & Resident	Resident License	Registration Hunt Permit and Resident License	Trap Permit & Resident
Military Personnel PCS - Non-Resident	Duck Stamp	None	Registration Hunt Permit	Trap Permit	Duck Stamp & Military Non-Res. Small Game	Military Non-Res.	Non-Resident License & Registration Hunt Permit & Tag	Trap Permit & Non-Resident
Military Personnel TAD, TDY, etc.	Duck Stamp	None	Registration Hunt Permit	Trap Permit	Res. or Non-Res.	Resident or Non-Res.	Resident or Non-Resident License with tags & Registration Hunt Permit	Trap Permit & Res. or Non- Res. License
Military Dep. - PCS Res. - 16 Years & Older	Duck Stamp & Resident	Resident	Resident License & Registration Hunt Permit	Trap Permit & Resident	Duck Stamp & Res.	Resident	Resident & Registration Hunt Permit	Trap Permit & Resident
Military Dependents PCS Resident - Under 16 Years	None	None	Registration Hunt Permit	Trap Permit	None	None	Registration Hunt Permit	Trap Permit
Military Dependent PCS - Non-Resident 16 Yrs. & Older	Duck Stamp & Military Non-Res. Small Game	Military Non-Res. Small Game	Non-Res. License & tags & Registration Hunt Permit	Trap Permit Non-Res. Trap- ping license	Duck Stamp & Military Non-Res. Small Game	Military Non-Res. Small Game	Non-Resident License with tags & Registration Hunt Permit	Trap Permit & Non-Resident
Military Dependents PCS - Non-Res. Under 16 years old.	Military Non-Res. Small Game	Military Non-Res. Small Game	Non-Resident Lic. with tags & Registr- ation Hunt Permit	Non-Res. license & Trapping Permit	Military Non-Res. Small Game	Military Non-Res. Small Game	Non-Resident License with tags & Registration Hunt Permit	Trap Permit & Non-Res. License

CIVILIANS: All civilians are required to have the appropriate resident or non-resident license to hunt and trap in Alaska, except that residents under 16 years of age do not need a license. Everyone 16 years of age and older is required to have a valid duck stamp to hunt waterfowl. In addition all caribou hunters must have a valid caribou registration hunt permit.

HUNTING LICENSE FEES: Resident - \$12.00 Non-Resident - \$60.00 Military Non-Resident Small Game - \$12.00 Non-Resident Caribou Tag - each \$300.00
Resident Trapping - \$3.00 Non Resident Hunting & Trapping - \$200.00

*CARIBOU REGISTRATION HUNT PERMIT, RESIDENT & NON-RESIDENT - NO CHARGE



BIRDS OF THE ALEUTIAN ISLANDS, ALASKA

The Aleutian Islands Unit of the Alaska Maritime National Wildlife Refuge contains nearly 200 named islands totalling more than two million acres stretching over 1770 kilometers (1100 miles) from the tip of the Alaska Peninsula on the east to within 805 kilometers (500 miles) of the Soviet Union's Kamchatka Peninsula on the west. Commonly referred to as "The Chain", the Aleutian Islands are the emergent peaks of a submarine mountain range called the Aleutian Ridge. All but portions of seven of the larger eastern Aleutian islands are included in the refuge. Due to their close proximity to the Alaska Peninsula, Unimak and Amak islands are administered by the Izembek National Wildlife Refuge headquarters at Cold Bay, Alaska. The Sanak Islands south of the Alaska Peninsula are managed from the Alaska Maritime National Wildlife Refuge headquarters at Homer, Alaska. Except for the Aleut village of Atka, the U. S. Navy station at Adak, the U. S. Air Force base at Shemya, and the U. S. Coast Guard LORAN station at Attu, the only signs of recent human activities on the refuge unit are the unhealed scars and debris remaining from World War II activities throughout the chain.

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

In separating the North Pacific Ocean from the Bering Sea and bridging North America to Asia, the Aleutian Islands offer refuge to an international variety of birds. Migrants converge from all points of the compass. Over 70 Asiatic species have been found in the Aleutians, particularly from Adak west. Several have been reported nowhere else in North America and some, including whooper swan, bean goose, an Asian form of green-winged teal, common pochard, tufted duck, smew, white-tailed eagle, common greenshank, wood sandpiper, Far Eastern curlew, common sandpiper, long-toed stint, eye-browed thrush, olive tree-pipit and rustic bunting,

occur annually. A large variety of seabirds nest on island cliffs, talus slopes and tundra covered slopes in dense, noisy colonies. Their rookeries vary in size and composition, but some of the more numerous species include northern fulmar, fork-tailed and Leach's storm-petrel, red-faced and pelagic cormorant, glaucous-winged gull, black-legged kittiwake, thick-billed and common murre, pigeon guillemot, ancient murrelet, least and crested auklet, and horned and tufted puffin.

The following list of birds observed in the Aleutian Islands includes those 242 species recorded west of Unimak Island. Unimak Island, Amak Island and the Sanak Islands, although components of the Aleutian Islands Unit of the Alaska Maritime National Wildlife Refuge, have avifaunas more similar to the Alaska Peninsula and are managed through other U. S. Fish and Wildlife Service offices. Bird records for those units are not kept at Adak. Although some Aleutian records date from the late 1800's, most status determinations in this list are based on observations made since the mid-1960's. Habitat preferences, months of occurrence, seasons of occurrence, nesting status and estimations of abundance are indicated in the check list as follow:

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

1-12 - Months of recorded occurrence

* - Species nests (or has nested) in Aleutians

S - Spring (March-May/3-5)

s - Summer (June-August/6-8)

F - Fall (September-November/9-11)

W - Winter (December-February/12-2)

a - Abundant (very numerous species)

c - Common (certain to be seen in suitable habitat)

u - Uncommon (present, but not certain to be seen)

r - Rare (seen only a few times during the season)

o - Occasional (seen only a few times during the season over a two to five year period)

x - Accidental (has been recorded once or twice during the season since 1880's).

Slashes (/) separate periods or seasons of occurrence. The years of occurrence for accidental species are shown in parentheses.

Rev.12/31/84

C.F. Zeillemaker
Refuge Manager
Aleutian Islands Unit
Alaska Maritime National Wildlife Refuge
Box 5251 NAS Adak
FPO Seattle, WA 98791-0009

BIRDS OF THE ALEUTIAN ISLANDS, Page 1

	S	s	F	W		S	s	F	W
Red-throated Loon MEW 1-12 *	u	u	u	r	Oldsquaw MEWT 8-7	a	o	c	a
Arctic Loon MEW 9-5	u		r	u	Black Scoter ME 9-7	c	r	c	c
Common Loon MEW 1-12 *	u	u	u	u	Surf Scoter MEW 1-12	r		o	o
Yellow-billed Loon MEW 2-6/7-11	r	o	o	r	White-winged Scoter MEW 1-12	c	r	u	c
Horned Grebe MEW 9-7	u	o	r	u	Common Goldeneye MEWT 10-7	c	o	u	a
Red-necked Grebe 8-7	u	x	u	u	Barrow's Goldeneye MEW 5-7/11	o	x		
Western Grebe ME 12 (1980)				x	Bufflehead MEW 10-6	u	o	u	c
Short-tailed Albatross M 5-10	o	o	o		Smew EW 2-7/9-12	r	o	r	r
Black-footed Albatross M 5-11	o	u	c		Hooded Merganser MEW 3-5/11-12	o		x	x
Laysan Albatross M 2-11	u	u	u	u	Common Merganser MEW 1-12 *	u	o	u	u
Northern Fulmar M 4-11 *	c	c	c		Red-breasted Merganser MEWT 1-12 *	c	u	u	c
Mottled Petrel M 5-10	o	r	r		Osprey WT 5/10 (1957,70)	x		x	
Cook's Petrel M 6/8 (1933,75)		x	x		Bald Eagle MEWTA 1-12 *	c	c	c	c
Pink-footed Shearwater M 5-6/9	x	x	x		White-tailed Eagle MEWT 5-10 *	r	r	r	
Flesh-footed Shearwater M 5/7-9	x	x	o		Steller's Sea-Eagle MET 4-6	o	x		
Sooty Shearwater M 4-10		r	a	a	Northern Harrier EWT 1-7/9-11	o	o	o	o
Short-tailed Shearwater M 4-10	u	a	a		Northern Goshawk ET 8 (1946)		x		
Fork-tailed Storm-Petrel M 4-11 *	a	a	a		Common Buzzard T 5 (1983)	x			
Leach's Storm-Petrel M 5-11 *	c	c	c		Rough-legged Hawk T 5-12 *	o	o	o	x
Double-crested Cormorant MEW 4-12 *	u	u	u	o	Golden Eagle T 6-8		o		
Pelagic Cormorant M 1-12 *	c	c	c	c	Eurasian Kestrel ET 1-5/9-10	o	o	o	
Red-faced Cormorant M 1-12 *	a	a	a	u	Merlin MEWT 1-6/10-12	x	o	o	
Chinese Egret W 6 (1974)		x			Northern Hobby MEWT 5/10 (83,84)	x		x	
Black-crowned Night-Heron W 4	x				Peregrine Falcon MEWTA 1-12	u	u	u	u
Whooper Swan MEW 10-5	r		r	u	Gyr Falcon WT 1-12	r	r	r	r
Bean Goose MEW 5-6/10	r	o	x		Rock Ptarmigan TA 1-12	a	a	a	a
Gr White-fronted Goose EWT 5/9-2	x		o	x	Sandhill Crane MEWT 5-6/7-11	u	o	o	
Snow Goose MEWT 5/7-10	o	x	x		Black-bellied Plover ME 5-7/8-10	o	o	o	
Emperor Goose MEW 9-7	u	x	c	a	L. Golden Plover MEWT 4-6/7-11	u	o	c	
Brant ME 9-7	r	x	r	o	Mongolian Plover MEW 5-9	r	o	o	
Canada Goose MEWT 4-11 *	u	u	u		Common Ringed Plover E 5/8	o	x	x	
Green-winged Teal EWT 1-12 *	a	a	a	a	Semipalmated Plover MEW 5-9 *	r	r	x	
Baikal Teal ME 6 (1971,83)		x			Little Ringed Plover E 6 (1974)	x			
Falcated Teal WT 5-6/10-2	o	x	x	x	Eurasian Dotterel WT 9-10			o	
Mallard EWT 1-12 *	c	c	c	c	Black Oystercatcher ME 1-12 *	c	c	c	c
Spot-billed Duck EW 1-12	o	x	o	x	Common Greenshank EW 5-6/7-9	r		o	
Northern Pintail EWT 1-12 *	u	u	u	c	Greater Yellowlegs MEW 5/10	x		o	
Garganey WT 5-7/8-11	r	o	r		Lesser Yellowlegs MEW 5-6/7-10	o	o	o	
Blue-winged Teal EW 7/10 (1968,79)		x	x		Green Sandpiper E 5-6/8		o	o	
Northern Shoveler EWT 1-12	u	o	u	o	Marsh Sandpiper E 9 (1974)			x	
Gadwall MEW 10-6	u	o	r	r	Spotted Redshank E 5/8-10	o	r	r	
Eurasian Wigeon EWT 8-7	u	o	u	r	Wood Sandpiper EW 5-9 *	u	r	r	
American Wigeon EWT 9-6	r	o		r	Wandering Tattler MEW 5-10	u	r	u	
Common Pochard EW 4-6/10-12	u	x	x		Gray-tailed Tattler ME 5-6/7-10	r	r	r	
Canvasback MEW 10-7	o	o	o	r	Common Sandpiper EW 5-9 *	r	o	r	
Ring-necked Duck EW 4 (1977)		x			Terek Sandpiper ME 5-6/8-9	r	o	o	
Tufted Duck EW 1-12	u	o	u	r	Whimbrel MEWT 5-6/7-9	r	o	o	
Greater Scaup MEW 1-12 *	c	r	u	c	Bristle-thighed Curlew E 5-6	o	x		
Common Eider ME 1-12 *	a	a	a	a	Far Eastern Curlew E 5-7	o	r		
King Eider MEWT 11-6	o		x	o	Black-tailed Godwit E 5-6	r	x		
Steller's Eider ME 10-6	r	x	r	r	Bar-tailed Godwit ET 5-6/9-11	u	r	o	
Harlequin Duck ME 1-12	a	u	c	a	Ruddy Turnstone MEW 4-6/7-10	c	o	a	

BIRDS OF THE ALEUTIANS, Page 2

	S	s	F	W		S	s	F	W
Great Knot E 5-6 (1971,76,82)	x	x			Ancient Murrelet MT 1-12 *	c	c	u	o
Red Knot E 5-6/7-10	o	o	o		Cassin's Auklet M 1-12 *	u	u	u	u
Sanderling ME 8-5	u		u	u	Parakeet Auklet M 1-11 *	u	c	u	u
Semipalmated Sandpiper EW 9(77)			x		Least Auklet M 3-12 *	u	a	a	o
Western Sandpiper EWT 5-6/7-12	x	o	o	x	Whiskered Auklet M 2-11 *	u	u	r	o
Rufous-necked Stint E 5-6/7-9	r	x	r		Crested Auklet M 1-12 *	c	a	r	r
Little Stint EW 5-6/8-9	x	x	o		Rhinoceros Auklet M 6-10		r	r	
Temminck's Stint E 5-6/7-9	r	o	o		Tufted Puffin MT 1-12 *	a	a	a	o
Long-toed Stint EW 5-6/7-9	u	o	r		Horned Puffin M 1-12 *	c	c	u	o
Least Sandpiper EWT 4-8 *	r	r			Common Cuckoo T 5-7	o	x		
Baird's Sandpiper MEW 4-5/8-10	o	o	r		Oriental Cuckoo T 6 (1937)		x		
Pectoral Sandpiper EW 5-6/7-11	o	o	r		Oriental Scops-Owl T6(1977,79)		x		
Sharp-tailed Sandpiper EW5/9-11	x		r		Snowy Owl ETA 1-12 *	r	r	r	r
Rock Sandpiper MET 1-12 *	c	c	c	c	Short-eared Owl ET 5-6/8-10 *	o	r	o	
Dunlin MEWT 8-6	o	x	o	o	Jungle Nightjar T 5 (1977)		x		
Curlew Sandpiper E 5/9(1977,82)	x	x	x		White-throated Needletail T 5	o			
Spoonbill Sandpiper E 6 (1977)		x			Fork-tailed Swift T 5-6/9	x	x	o	
Broad-bill Sandpiper E8-9(77,78)	x	x			Rufous Hummingbird T 6 (1936)		x		
Buff-breasted Sandpiper E 9			o		Belted Kingfisher EW 6/7-9		o	x	
					Northern Flicker T 11 (1984)			x	
Ruff E 5-6/8-10	r	o	r		Eurasian Skylark T 4-6/7-10	o	o	o	
Long-billed Dowitcher MEW 6/9	x		o		Horned Lark ET 9 (1978)			x	
Pin-tailed Snipe W 5 (1984)		x			Tree Swallow EWT 6/7-11		o	o	
Common Snipe EW 5-10 *	u	r	r		Violet-green Swallow EW 9-10		o		
Red-necked Phalarope MEW 5-10 *	c	c	c		Bank Swallow EW 5-6/9	o	o	o	
Red Phalarope MEW 5-6/7-10	r	c	r		Cliff Swallow EW 6		o		
Pomarine Jaeger M 5-9	o	u	x		Barn Swallow EWT 5-6/7-9		x	o	x
Parasitic Jaeger MEWT 4-9 *	u	u	u		Common Raven MEWTA 1-12 *	c	c	c	c
Long-tailed Jaeger ME 5-6/8-9	o	o	o		Winter Wren ET 1-12 *	c	c	c	c
South Polar Skua MTA 7 (1969)		x			American Dipper W 1-12 *	u	u	u	u
Common Black-headed Gull ME4-10	r	o	r		Middendorff Grasshop Warb T 7-9	o	o		
Bonaparte's Gull MEWT 5/8-10	x	o	x		Lanceolated Warbler T 6-7 (1984)		x		
Black-tailed Gull ME 5-6(80,83)	x	x			Wood Warbler T 10 (1978)			x	
Mew Gull MEWT 8-5	r	x	r	r	Dusky Warbler T 9 (1978,83)			x	
Ring-billed Gull E 6 (1982)		x			Arctic Warbler T 5-6/9-10	x	o	r	
Herring Gull MEWT 2-6/9-11	o	o	o	o	Red-breasted Flycatcher T 5-6	o	o		
Slaty-backed Gull ME 2-6/8-10	r	o	o		Siberian Flycatcher T 9 (1977)			x	
Glaucous-winged Gull MEWT 1-12*	a	a	a	a	Gray-spotted Flycatcher T 5-6	o	o		
Glaucous Gull MEWT 11-6	r	o	o	r	Siberian Rubythroat T 5-6/9-10	r	r	o	
					Bluethroat T 9 (1984)			x	
Black-legged Kittiwake MEW1-12*	c	c	c	o	Northern Wheatear TA 8-11		x	o	
Red-legged Kittiwake M 5-10 *	u	u	u		Red-flanked Bluetail T 6 (82)		x		
Ross' Gull M 5 (1983)		x			Gray-cheeked Thrush T9 (78,83)			x	
Sabine's Gull MEWT 5/7-10	x	x	o		Eye-browed Thrush T 5-6/8-10	u	r	o	
Common Tern ME 5-6/7-8	o	o			Dusky Thrush T 5-6/10	o	x	x	
Arctic Tern MEWT 5-10 *	c	c	o		American Robin T 5 (1977)		x		
Aleutian Tern MEWT 5-8	u	u			Siberian Accenter T 9 (1978)			x	
White-winged Tern E 7 (1976)		x			Yellow Wagtail MEW 5-6/8-10	u	r	u	
Dovekie M 7 (1980)		x			Gray Wagtail T 5-6/10	o	o	x	
Common Murre M 1-12 *	a	a	u	o	White Wagtail ET 5-6/9	o	x	o	
Thick-billed Murre M 1-12 *	a	a	u	c	Black-backed Wagtail ET 5-9 *	r	r	r	
Pigeon Guillemot M 1-12 *	c	c	u	u	Olive Tree-Pipit T 5-6/9	r	o	o	
Marbled Murrelet MET 1-12 *	u	c	u	u	Pechora Pipit T 5-6		x	o	
Kittlitz's Murrelet MET 1-12 *	u	c	u	o	Red-throated Pipit ET 5-7/8-10	r	o	o	

BIRDS OF THE ALEUTIANS, Page 3

Water Pipit EWT 2-12 *	r	r	r	o
Bohemian Waxwing T 5-6/10	x	x	o	
Brown Shrike T 6/9-10 (1978, 84)		x	x	
Northern Shrike ET 7/10-3	x	x	x	o
Yellow Warbler T 9 (1984)			x	
Yellow-rumped Warbler T 5/10 (80,84)	x		x	
Townsend's Warbler T 10 (1977)			x	
Savannah Sparrow T 5-9 *	u	u	r	
Fox Sparrow T 6/9 (1894,1944,1984)		x	x	
Song Sparrow EWT 1-12 *	c	c	c	c
Golden-crowned Sparrow T 3/9-11	x		o	
White-crowned Sparrow T 9 (1984)			x	
Dark-eyed Junco T 1-4/11	x		x	o
Lapland Longspur EWT 4-12 *	a	a	a	o
Little Bunting T 5 (1977,1983,1984)	x		x	
Rustic Bunting T 5-6/9-10	r	r	r	
Gray Bunting T 5 (1977, 1980)	x			
Common Reed-Bunting T 5-6	o	x		
Snow Bunting EWTA 1-12 *	c	c	c	c
McKay's Bunting T 1-3 (1889, 1975)	x			x
Brambling T 5 5-6/9-10	r	o	r	
Rosy Finch ET 1-12 *	a	a	a	a
Common Rosefinch WT 5-6/8-9	o	o	x	
Red Crossbill T 10 (1899)			x	
White-winged Crossbill T 7 (1983)		x		
Common Redpoll T 1-12 *	r	r	o	r
Hoary Redpoll T 4-7/9-1 *	o	o	o	o
Pine Siskin T 3 (1977)	x			
Oriental Greenfinch T 5-6/8-9	o	o	o	
Pine Grosbeak T 5 (1983)	x			
Eurasian Bullfinch T 5/9 (1977, 78)	x		x	
Hawfinch T 5-6	o	o		

September 23, 1984

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Revised December 31, 1984

Table 1. Mammals of the Aleutian Islands, Alaska.

Species	Range
Arctic Ground (Parka) Squirrel....	Introduced to Unalaska, Umnak and Kavalga
Tundra Vole (Meadow Mouse).....	Fox Island Group
Greenland Collared Lemming.....	Introduced to Unalaska and Umnak
Norway Rat.....	Introduced to islands where human occupation occurs or has occurred
Killer Whale (Orca).....	All salt water areas
Northern Harbor (Common) Porpoise.	All salt water areas
Dall Porpoise.....	All offshore salt water
Sperm Whale.....	Offshore salt water areas
Baird's Beaked (Giant Bottle-nosed) Whale.....	Offshore salt water areas
Goosebeaked (Cuvier's Beaked) Whale.....	Offshore salt water areas
Pacific (Stejneger's) Beaked Whale	Offshore salt water areas
Gray Whale.....	Migrant through eastern island passes as far west as Unalaska
Minke Whale.....	All salt water areas
Sei Whale.....	Salt water between Akutan and Delarof Island Group
Fin Whale.....	Offshore salt water areas
Blue Whale.....	Salt water between Akutan and Buldir
Humpback Whale.....	Offshore salt water areas
Right Whale.....	Offshore salt water areas
Red Fox.....	Fox Island Group (west to Umnak)
Arctic Fox.....	Indigenous to Rootok. Indigenous or introduced to Attu. Introduced to all other islands except Bogoslof, Chagulak, Tanadak(E), Egg, Oglodak, Koniuji, Ulak(E), Anagaksik, Tanadak(C), Davidof, Pyramid, Kvostof, Tanadak(W) and Buldir. Has died off of Aiktak, Kaligagan, Sagchudak, Salt, Kanu, Tanaklak, Asuksak, Aziak, Ilak, Kavalga, Unalga and Little Kiska. Has been removed from Amukta, Tag, Skagul, Ogliuga, Amchitka, Nizki, Alaid and Agattu
Sea Otter.....	Salt water around most islands
Northern (Steller's) Sea Lion.....	All salt water areas, haul out sites throughout islands
Northern Fur Seal.....	Bogoslof islands, migrant through eastern island passes west to Islands of Four Mountains
Harbor (Common) Seal.....	All salt water areas, haul out sites throughout islands
Caribou (Reindeer).....	Introduced to Umnak, Atka and Adak

FILMS AVAILABLE ON LOAN FROM THE
U. S. FISH AND WILDLIFE SERVICE
Aleutian Islands Unit
Alaska Maritime National Wildlife Refuge
Box 5251 NAS Adak
FPO Seattle, WA 98791
(907) 592-2406/7

Chain of Life - The Aleutian Islands

28 minutes

The Aleutian Islands, paradise for millions of seabirds and thousands of marine mammals, have been set aside as part of the National Wildlife Refuge System. This film takes a look at the unique wildlife resources of the islands and tells the story of man's impact on them including Russian trapping, World War II and the introduction of foxes for fur farming. Also depicted is the work of refuge biologists to insure the survival of the endangered Aleutian Canada goose and other wildlife species.

Age of Alaska

30 minutes

Presents a good general overview of Alaska's natural resources and development with a look at the need for proper land management. Done in 1977, the film explains the Alaska Native Claims Settlement Act and how it pertains to the federal land selection of National Parks, Refuges, Forests, and Wild and Scenic Rivers.

Sea Otters of Amchitka

45 minutes

An entertaining film that describes the daily life of the sea otter around the island of Amchitka in the western Aleutians. It tells the story of the exploitation and subsequent protection of this remarkable animal. The film highlights the mother's devotion to her pup and the animals' habitual grooming and it takes a look at other wild creatures found in the Aleutians.

The Predators

26 minutes

Many large and small predatory animals are shown in their everyday natural situations trying to survive. These animals are portrayed as a vital part of a wilderness ecosystem rather than as enemies of man. The film is narrated by Robert Redford and presents some beautiful photography of animals interacting with each other.

Living With Wildlife

26 minutes

This film explains how we can best live with, preserve and benefit from our natural wildlife resource. Human attitudes and actions toward wild animals and their habitats are illustrated and discussed in some detail.