

ALASKA MARITIME NATIONAL WILDLIFE REFUGE

Homer, Alaska

ANNUAL NARRATIVE REPORT

Calendar Year 1986

U.S. department of the Interior

Fish and Wildlife Service

NATIONAL WILDLIFE REFUGE SYSTEM



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AMNWR  
1986

REVIEW AND APPROVALS

HOMER OFFICE  
ALASKA MARITIME NATIONAL WILDLIFE REFUGE  
Homer, Alaska

ANNUAL NARRATIVE REPORT  
Calendar Year 1986

John L. Mat 1/20/88 Paul R. Schmidt 2/11/88  
Refuge Manager Date Refuge Supervisor Review Date

[Signature] 2/12/88  
Regional Office Approval Date



US FISH & WILDLIFE SERVICE--ALASKA



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ALASKA MARITIME NATIONAL WILDLIFE REFUGE  
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## INTRODUCTION

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

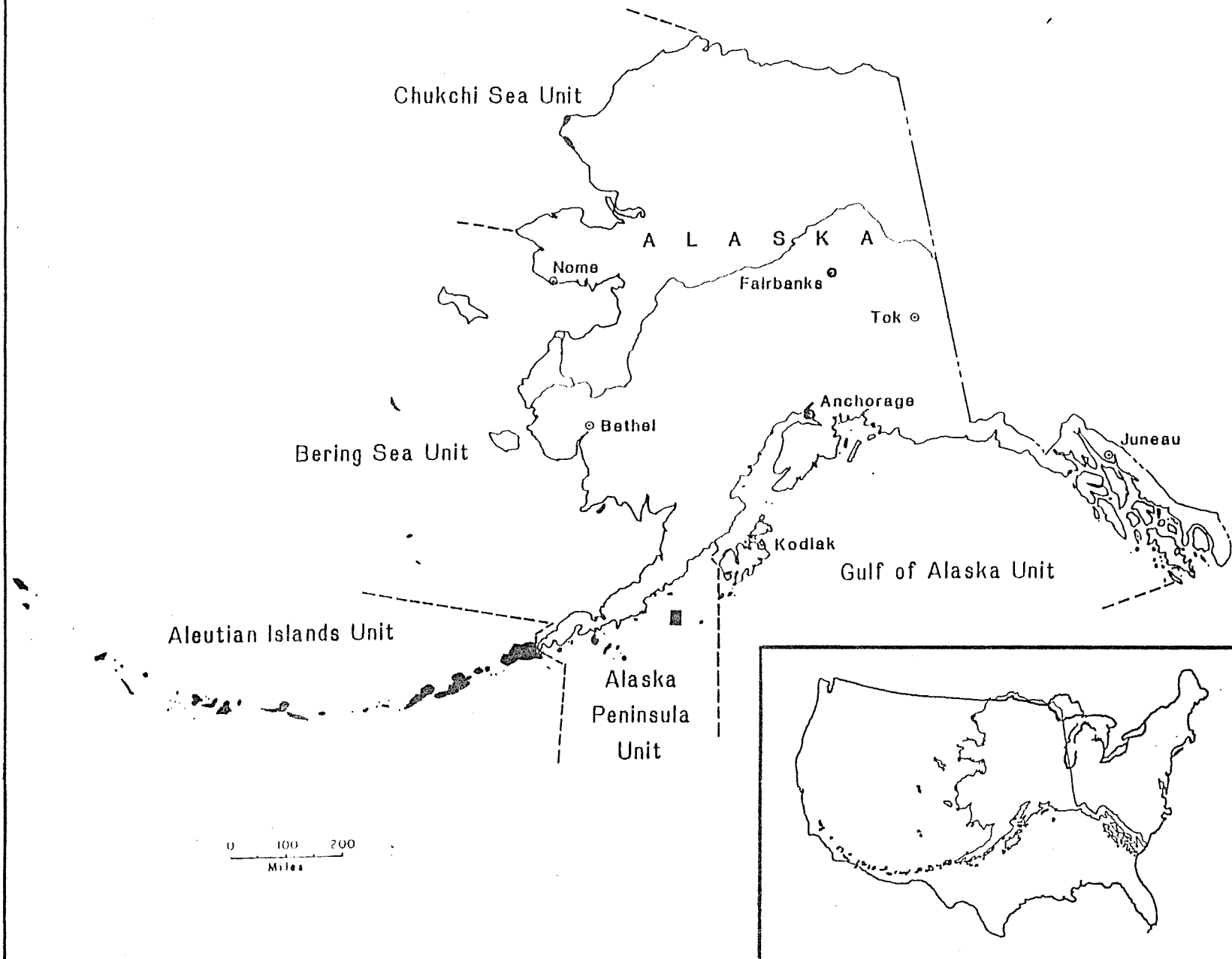
The five units which comprise the AMNWR complex have headquarters located in Homer, Alaska, situated on the south end of the Kenai Peninsula about 220 miles by road from Anchorage. There is a sub-headquarters at Adak which administers the AIU.

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 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.



# Units of the ALASKA MARITIME NATIONAL WILDLIFE REFUGE



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## A. HIGHLIGHTS

Construction of 120 ft. refuge vessel begins

Refuge staff expands

## D. PLANNING

### 1. Master Plan

The Alaska National Interest Lands Conservation Act (ANILCA) requires all Alaskan refuges to prepare a Comprehensive Conservation Plan (CCP). 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 CCP are to: (a) take 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 original schedule for the AMNWR CCP was accelerated and we plan to have the final published document out by the end of next year. In May a presentation of management alternatives was given to the Regional Director. A final draft of alternatives was developed by the end of the year with meetings set up with numerous villages for their input after the first of next year.

## E. Administration

### 1. Personnel

#### Permanent Full Time

1. John L. Martin, Refuge Manager, GS-13, EOD 12/21/81
2. Tom J. Early, Assistant Refuge Manager, GS-11, EOD 08/23/81.
3. David R. Nysewander, Wildlife Biologist, GS-11 EOD 09/28/86.
4. Edgar P. Bailey, Refuge Biologist, GS-11, EOD 10/01/81.
5. Mike Nishimoto, Wildlife Biologist, GS-11, EOD 4/15/84
6. Arthur L. Sowls, Wildlife Biologist, GS-11, EOD 09/28/86
7. Carol M. Hagglund, Budget Assistant, GS-7, EOD 08/21/83
8. Trina B. Fellows, Clerk-Typist, GS-3, EOD 11/28/83
9. Alvin D. Bayer, Ship Operator, WG-12 EOD 10/06/86

#### Permanent Intermittent

10. G. Vern Byrd, Wildlife Biologist, GS-11, EOD 4/29/84

#### Volunteers:

11. Jessica M. Abel, (SCA) EOD 06/04/86 Term 08/29/86



12. Colleen M. Baggot, (SCA) EOD 06/09/86 Term 08/25/86
13. K. Birgit Christiansen, (SCA) EOD 06/09/86 Term 08/25/86
14. Diane Debinski, (SCA) EOD 06/05/86 Term 08/20/86
15. Annette Emig, (SCA) EOD 06/05/86 Term 08/01/86
16. Brian Lance, (SCA) EOD 06/04/86 Term 06/11/86
17. Alan Storey, (SCA) EOD 07/01/86 Term 08/23/86
18. Kim Thounhurst, (SCA) EOD 05/01/86 Term 08/20/86
19. Gavin Wright, (SCA) EOD 06/09/86 Term 08/23/86
20. Donald Dragoo, EOD 06/07/86 Term 09/12/86
21. Ronald S. Hicks, EOD 01/08/86 Term 04/17/86
22. Steven Kirkhorn, EOD 06/20/86 Term 06/30/86
23. Edward C. Murphy, EOD 06/10/86 Term 06/17/86
24. Gretchen J. Murphy, EOD 06/10/86 Term 06/17/86
25. Kevin P. Rose, EOD 06/09/86 Term 08/12/86
26. Alan Springer, EOD 07/26/86 Term 08/15/86
27. Martha T. Springer, EOD 08/05/86 Term 08/15/86
28. Wayman Walker, II EOD 08/05/86 Term 08/15/86

YCC

29. John Libal, EOD 06/16/86 Term 08/20/86

Cooperators:

30. Wells Stephenson, ADC, Dept. of Agriculture

Four of the five units of the Alaska Maritime NWR (AMNWR) are supported by personnel located in the Homer office. Personnel, for the Aleutian Islands Unit (AIU) is presented in that section.

During 1986, the Homer staff increased from seven permanent employees to ten (Table 2). Biologists Nysewander and Sowls transferred from Wildlife Assistance in the Regional Office. They were picked up on the payroll September 28, but did not complete their moves until late December due to problems with the relocation services in completing the sale of their former residences.

Alvin Bayer was selected to fill the new Ship Operator position for the FWS vessel currently being built. He reported for duty in early October and shortly thereafter traveled to Escatawpa, MS to spend the next six months monitoring construction of the vessel.

Table 2. Staffing Pattern, FY 1983 to FY 1987

	<u>Permanent</u>	<u>Part Time</u>	<u>Temporary</u>	<u>Total FTE</u>
FY87	10	0	0	10.00
FY86	7	0	0	7.00
FY85	7	0	2	6.30
FY84	6	1	0	6.30
FY83	3	0	2	3.80

## 2. Youth Programs

John Libal was our only YCC student this year. John was a Junior at Homer High School and assisted in the Homer office with administrative duties as well as with the public use program.



The main office for the refuge is located in downtown Homer. The entire 4,000 sq ft Ross Duncan Building is leased for office and storage space.  
7/86 TJE





From left to right Mike Nishimoto, Trina Fellows, Ed Bailey, Carol Hagglund, Tom Early, Vern Byrd and John Martin. Dave Nysewander and Art Sowls not shown.



Ship Operator Alvin Bayer was hired October 6. As a well qualified seaman with past experience with Crowley Maritime; he has also been involved with vessel construction.



Volunteer Ronald Hicks assisted with office work as well as with several biological projects during the January-April period.

#### 4. Volunteer Program

A total of 18 volunteers were employed through the Homer office during the year. Nine volunteers were hired through the Student Conservation Association (SCA). One SCA volunteer decided he would rather spend time near his girl friend than in the field and was terminated within a week (without cost to us). Several other volunteers were on full-time status while others contributed only several hours per day, depending on the assignment. Most volunteers worked with projects on specific units of the refuge. Their assignments are discussed in more detail in specific unit reports. The volunteer program provided a positive aspect to our refuge operations as well as a positive image to the local people. Most worked exclusively in the field following some initial work preparing for the field season at Homer.

Ron Hicks volunteered during the winter period and was involved in several mini-field assignments in the Bering Sea and Aleutian Islands units. He assisted primarily with the administrative chores and was also a great asset in preparing

gear and supplies for field use. Ron left for a temporary (paying) assignment at Medicine Lake NWR.

## 5. Funding

Funding for the entire refuge is through the Homer headquarters office. Funds internally distributed to the Aleutian Islands Unit (AIU) are discussed in that unit's section.

Table 3. AMNWR Funding, FY 1983 to FY 1987

	<u>1260*</u>	<u>1400/ 1480/1113</u>	<u>1520</u>	<u>1994/ 8610</u>	<u>6850</u>	<u>Totals</u>
FY87	1,154,000	346,000	-	-	-	1,500,000
FY86	882,000	476,000	1,975	26,781	2,380	1,389,136
FY85	1,100,000	239,000	3,010	24,500	1,500	1,368,010
FY84	858,560	245,000	1,875	7,000	-	1,112,435
FY83	730,000	250,000	-	26,375	-	1,006,375

\*Includes 1210, 1220, and 1240 funding for FY 83. This also includes ARMM funds.

The Alaska Maritime National Wildlife Refuge is headquartered in the Ross Duncan building located on Pioneer Avenue in downtown Homer. A total of \$59,400 (which includes utilities, snow and refuse removal) was paid for approximately 4,032 sq ft of leased office/storage space in FY85.

The Homer office funded the charter vessel Maritime Maid for two periods this year in support of the fox eradication effort on Kiska Island (AIU). The first charter was 21 days in March and April and the second for a 30 day period in June and July. Biologists from the APU used the charter to drop off and pick up personnel and supplies in the Shumagin Islands. Total charter costs were \$61,464.50 for the spring period and \$78,423.63 for the summer period. The total costs were \$139,888.13 or almost \$2,743 per use-day. Higher per day charter costs usually occur with short term contracts. The costs for chartering, including fuel, for the past five years are presented below.

<u>Charter Year</u>	<u>Vessel Name</u>	<u>Charter Days</u>	<u>Total Cost</u>	<u>Cost/Day</u>
1982	Sea Spray	103	\$231,773.59	\$2,250.23
1983	Western Pacific	109	\$192,872.97	\$1,769.48
1984	Vestfjord	122	\$220,223.00	\$1,805.11
1985	Norpac	122	\$236,752.10	\$1,940.59
1986	Maritime Maid	51	\$139,888.13	\$2,742.90

We also chartered a Bell 412 helicopter through OAS from ERA Helicopters, Inc., for the spring work on Kiska. Total contract costs for this amounted to an astounding \$97,790.86!



The copter had to be flown from Anchorage out to Kiska and return to conduct the work. More information on this work is included in the AIU's report.

## 6. Safety

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

The following is a list of the monthly meetings:

<u>Month</u>	<u>Subject</u>
January	- ATV Safety
February	- General Safety Discussion Session
March	- Mental/Physical Fitness
April	- Wood Stove Use and Safety
May	- Boating Safety & Comprehensive Session on CPR/First Aid/Defensive Driving.
June	- Hiking, Bear, and Back Country Safety
July	- Office Safety and Hazards
August	- Hunting Safety
September	- Fire Prevention
October	- Winter Driving Safety
November	- Open Subject/or General Safety Discussion
December	- Drinking/Driving

We purchased a VHF radio and depth recorder to improve the safety features of a 25-foot Whaler used in Kachemak Bay and Cook Inlet. WB Nishimoto attended the regional dive board meeting in Anchorage. The staff completed CPR training given by the RO safety office.

The four part video and workbook series entitled "Sea Survival", "Shore Survival", "Hypothermia", and "Cold Water Near Drowning" is required to be completed by all personnel planning to use boats. The series is produced by the University of Alaska, Cooperative Extension Service, the U.S. Coast Guard, and the Kodiak Community College.

## H. Public Use

### 1. General

The present location of the Homer office affords an ideal opportunity for the refuge to establish a viable interpretive and information center. Visitor use in the Homer office was well ahead of last year due to staffing the Visitor Contact Station on the lower floor with a volunteer interpreter. A total of approximately 800 people visited the Homer office during the 1986 period.

## 7. Other Interpretive Programs

Work continued on the refuge display for an interpretive outdoor kiosk in Seward which will be located adjacent to the Kenai Fjords National Park headquarters. This will be combined with an indoor exhibit in the park headquarters.

## 17. Law Enforcement

Only ARM Early has law enforcement authority on the Homer staff. All incidents were off-refuge and turned over to the FWS agent in Soldotna. We do respond directly to animal pick-up with species under our jurisdiction. Logistical support and minor assistance was given to agent Soroka to the south side of Kachamek Bay to check waterfowl hunts in December.

## 18. Cooperating Associations

The Alaska Natural History Association (ANHA) outlet opened on March 28, 1984 in our Homer headquarters building at 202 Pioneer Avenue. We offered 15 publications for sale to the visiting public. Gross sales were: \$52 in 1984; \$120.15 in 1985; and \$304.47 in 1986. Despite efforts to increase visitors, the low sales volume continued. At the end of the year, a decision was made to place the outlet in an inactive status. We hope to re-open sometime in the future when full-time personnel can be employed to handle the interpretive work.

# I. EQUIPMENT AND SUPPLIES

## 1. New Construction

A total of \$5,904,000 was allocated last year for the design and construction of a vessel to be used primarily to support the Alaska Maritime National Wildlife Refuge. After the preliminary design and needs work was completed in 1985, a final design contract was awarded to Jensen Maritime Consultants of Seattle, WA. The vessel will be 121 ft long with a beam of 33 ft and a draft of 14 ft. The construction contract was awarded to Moss Point Marine, Inc., of Escatawpa, Mississippi on May 29. Construction began on July 7 and Ship Operator Al Bayer was temporarily detailed to the ship yard beginning October 14 to monitor construction of the vessel along with a representative from Jensen Maritime. Completion of the vessel is scheduled for spring of 1987.



Construction of the new refuge vessel began on July 7 in Escatawpa, Mississippi. The 121 ft by 33 ft. boat will be used to support refuge operations along coastal Alaska. Basic hull framing and skin were put in place while the boat was inverted. 11/86 ADB



The vessel hull was righted using three cranes. The bulbous bow has yet to have the nose attached. Shortly after the bulbous bow was completed and the house attached, the boat was placed in the water. 12/86 ADB





The house was constructed on a separate jig then hoisted into position on the vessel by crane.  
12/86 ADB

#### 5. Communications Systems

A new ICOM-MC700 SSB radio was purchased for the Homer office. This radio provides vital communications during the field season. Our main limitation on communication is the limited area available for the antenna system at the office.

New ICOM-MC5 VHF hand-held radios were purchased for field use. These marine type radios are water resistant. Also an ICOM M-55 VHF radio was installed on the 25' Boston Whaler.

#### 6. Computer System

Several new portable computers were purchased for field use. These are used extensively in the Pribilofs to store and analyze data and are fully utilized.

A 10mb hard disc was installed on the IBM-PC used primarily for word processing. This helps speed up many functions and allows a much greater storage capacity.

The Data General 10 SP will be used primarily for financial tracking. This system is to become operational early next year.

## J. OTHER ITEMS

### 3. Items of Interest

RM Martin is a member of the Kachemak Bay Rotary Club, the Homer Yacht Club, the Kachemak Bay Conservation Society, the Coast Guard Auxiliary, Rescue 21, the Kachemak Gun Club, the Alaska Natural History Association, and on the Board of Directors for the Kachemak Bay Ski Club. ARM Early is also a member and on the Board of the Kachemak Bay Rotary Club, a member of Homer Winter Carnival Committee and a member of the Kachemak Bay Conservation Society. WB Bailey is on the Board for the Kachemak Bay Conservation Society, member of the Kachemak Bay State Parks Advisory Committee, and serves on the city's 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 on the Board of Directors for the Kachemak Bay Lioness Club, a member of the Kachemak Bay Conservation Society, a Foster Mother, a School Boarding Mother for bush children, the Homer Society of Natural History, and the Alaska Natural History Association.

### 4. Credits

This report was written and edited by ARM Early. Trina Fellows produced the report.



ALASKA PENINSULA UNIT  
ALASKA MARITIME NATIONAL WILDLIFE REFUGE  
Homer, Alaska

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HOMER, ALASKA

John L. Muth  
Refuge Manager

2/8/88  
Date

Paul R. Schmidt 2/11/88  
Refuge Supervisor Review Date

Regional Office Approval

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## 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 460,000 additional acres resulting in a 35,000,000 acre refuge. Although relatively small in land mass, its lands are scattered through most of coastal Alaska and extends from Forrester Island in Southeast Alaska along the Gulf of Alaska to the Aleutian Islands and northward until near Barrow in northwest Alaska. There are over 2,500 islands, islets, and pinnacle rocks within the refuge which are used annually by millions of seabirds of at least 30 species. The AMNWR has five units with all former refuges designated subunits.

The Alaska Peninsula Unit (APU) is the second largest unit of the Alaska Maritime National Wildlife Refuge (AMNWR). Over 800 islands, totaling 600,000 acres comprise this unit, which incorporated two refuges established before designation of the AMNWR. The Semidi Islands, designated a refuge in 1932, and Simeonof Island, a refuge since 1958, also are the only areas in the APU which extend beyond mean high tide.

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

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

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. Eggging and hunting of seabirds is generally negligible in this region where most residents derive their livelihoods from commercial fishing. The first contact between Russians and Alaska Natives occurred in 1742 in the Shumagin Islands. The islands have been little affected by offshore oil exploration and development, but exploration has begun in Shelikof Strait to the north and is planned elsewhere off the Peninsula. Human competition for fish relied upon by marine birds and mammals probably poses their greatest potential threat.

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- K. FEEDBACK.....Nothing to report

## A. HIGHLIGHTS

Additional red fox removed from Big Koniuji Island in the Shumagins, but some still remain because of the inability to use any form of poison.

Monitoring of crested auklets began at Yukon Harbor. Birds displayed atypical activity patterns at the colony.

Geoarchaeological research project initiated in the Shumagins with 34 prehistoric Aleut sites located on five islands in the outer Shumagins.

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

## B. CLIMATIC CONDITIONS

Cold Bay provides the only long-term weather records available for the south side of the Alaska Peninsula. Intermittent records are available from Sand Point in the Shumagin Islands and from Chignik, which lies 100 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.

According to records at Cold Bay (Table 1.), temperatures in the region averaged above normal the last half of the year and below average between January and June. Precipitation was below average in all months, except September, November, and December, though the overall total for the year was barely below average. Though Cold Bay meteorological data reflect conditions elsewhere along the eastern end of the Alaska Peninsula, variability is great, and weather along the upper Peninsula and sometimes in the Shumagins more closely reflects records at Kodiak. For example, in June while in the Shumagins we experienced a very stormy month despite Cold Bay's reporting below average rainfall. This was revealed by rainfall records in Kodiak during the same period which were almost 10 inches above normal. June 1986 was the wettest June on record at Kodiak. If storms track predominantly into the Bering Sea, areas like the Shumagins receive less precipitation than when they move south of the Alaska Peninsula into the Gulf of Alaska. The latter was generally the case during the summer of 1986. The Sandman Reefs and islands west of Cold Bay in the eastern Aleutians, however, apparently were drier than usual, as evidenced by the drying up of streams on some islands.

Table 1.

Climatological data for Cold Bay, Alaska - 1986.

Month	<u>Temperature ( F)</u>				Monthly mean	Departure from mean (40 yrs.)	<u>Precipitation (in)</u>		Departure from mean	<u>Wind velocity</u>
	Ave. Max.	Extreme	Ave. Min.	Extreme			Water equivalent	Snow		Mean (mph)
Jan.	29.0	40	19.7	05	24.4	-3.9	2.05	24.2	-0.65	17.8
Feb.	32.7	41	24.1	01	28.4	+0.9	2.23	11.3	-0.04	18.1
Mar.	32.2	41	21.7	0	27.0	-1.6	0.55	6.1	-1.76	14.9
Apr.	36.8	48	27.5	11	32.2	-0.8	1.12	5.3	-0.83	13.2
May	43.1	54	32.8	25	38.0	-1.5	2.02	6.2	-0.45	12.9
June	48.9	58	40.5	33	44.7	-0.7	1.91	0	-0.25	16.4
July	56.2	69	47.2	39	51.7	+1.4	2.48	0	-0.02	14.2
Aug.	55.1	62	47.2	42	51.2	0.0	2.63	0	-1.07	15.7
Sept.	53.6	59	46.0	38	49.8	+2.3	7.37	0	+3.60	19.2
Oct.	47.6	57	36.8	27	42.1	+2.7	3.03	T	-1.26	15.1
Nov.	41.6	59	32.3	13	37.0	+2.7	5.08	7.6	+1.04	18.2
Dec.	38.6	44	30.0	02	34.3	+4.8	4.94	6.9	+2.09	18.9
Total	43.0	69	33.6	0	38.4	+0.4	35.41	67.6	-0.18	16.2

1. Master Plan

The Alaska National Interest Lands Conservation Act (ANILCA) requires all Alaskan refuges to prepare a Comprehensive Conservation Plan (CCP). These plans are to serve as the station master plan and will be initiated by special planning team from the regional office. The primary objectives of the CCP 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 original schedule for the AMNWR CCP was accelerated and we plan to have the final published document out by the end of the year. In May a presentation of management alternatives was given to the Regional Director. A final draft of alternatives was developed by the end of the year with meetings set up with numerous villages for their input after the first of next year.

2. Management Plan

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

5. Research & Investigations

AMNWR NR86AKM-06-86-People in a Tectonically Unstable Environment Vassar College - New York University.

Drs. L. Lewis Johnson and Margaret A. Winslow conducted geoarchaeological research in the Shumagin Islands under a grant from the National Geographic Society. Their principal objective was to locate prehistoric Aleut sites and analyze uplifted marine terraces. Their team of two archaeologists and two geologists arrived at Big Koniuji at the end of June and joined our field camp in Flying Eagle Harbor. We assisted them with gear and logistics and provided information on the likely whereabouts of midden sites. They circumnavigated Big Koniuji, Little Koniuji, Simeonof, and Chernabura and briefly stopped with us on Bird Island.

A total of 34 prehistoric and 9 historic sites was discovered or confirmed, and 21 geological sites were sampled. The 1986 survey added 25-26 prehistoric sites to the total known for the four islands visited, bringing the site inventory for the Outer Shumagins, excluding Nagai, to 49. The number of sites per island ranges from 4 to 21. The largest Aleut site, measuring 40,000 square meters, exists on Chernabura. Up to 28 barabaras were found at one site.

Samples from most sites were collected for radio-carbon dating. Of the 15 samples analyzed thus far, 10 are in the range of 3000 - 4000 years old. These are unexpectedly early dates. Barabaras near shore appeared to be older than those further inland, suggesting that Aleuts settled closest to the beach first. The earliest occupants probably were on Little Koniuji, Chernabura, and Bird islands; people then moved to Big Koniuji Island. Numerous artifacts were collected at various sites confirming that the outer Shumagins were Aleut but with their own particularities within that tradition. The Shumagins constitute the easternmost known limit of Aleut migrations.

Geological observations included much evidence of uplift, tilting, fault movements, and subsidence of the Shumagins. Since rising sea level in the last 14,000 years following recession of glaciers probably destroyed most older sites before they were uplifted seismically, it is unlikely that older sites will be found, except perhaps on Nagai. Simeonof and Chernabura islands are rising about 16 mm a year, approximately twice the uplift rate of the inner Shumagins and Alaska Peninsula. Big and Little Koniuji have uplifted about 3.5 mm/year for the last 5000 years, the lowest rate of any of the Shumagins thus far studied. There is clear evidence that major fault boundaries separate groups of islands into several fault blocks. The Shumagins lie on the edge of the Pacific plate which is rapidly underthrusting the North American plate and causing general uplifting. Hence, this area has undergone major earthquakes which have uplifted these islands as much as 10m in a single event. Evidence of tsunami damage in the Shumagins has been detected as much as 100 m above sea level and several kilometers inland. Seismic uplift has been occurring about every 200 years. Adding to the challenge of reconstructing Aleut migrations in these seismically active islands, identification of paleo - sea levels must take into account post-glacial sea level rise of 100 m in the last 14,000 years.

In 1987 Drs. Johnson and Winslow plan digs at several of the sites discovered in 1986. They also plan to search for possible older sites in more inland areas in the outer Shumagins which have been uplifted more rapidly. In addition, they plan a reconnaissance of Bendel, Turner, Spectacle and Nagai islands. Nagai is the second largest in the Shumagins, and with excellent harbors and apparent marine terraces, this island offers the best possibility of locating Aleut sites older than 4000 years.

AMNWR NR86 - Ecology and reproductive success of seabirds in the Semidi Islands and comparison of food habits of puffins at different colonies south of the Alaska Peninsula, Alaska Fish and Wildlife Research Center, Anchorage.

Personnel of the Alaska Fish and Wildlife Research Center (Scott Hatch, Mike North, Lori Terwilliger) visited the Semidi Islands during June and August 1986. The first visit (3 June - 1 July) encompassed the egg-laying period of several species, and information was obtained on the breeding times and early nesting activity of thick-billed murres, common murres, black-legged kittiwakes, and northern fulmars. Time-lapse cameras were deployed on Suklik Island and Chowiet Island to record diurnal attendance patterns of horned puffins and common murres, respectively. Forty-eight nest boxes for horned puffins were constructed and installed on Suklik Island. While the 10 boxes installed in 1985 showed no positive signs of use this year, by August, many of the newly installed boxes had obviously been entered. A new design was used which may be more attractive to the puffins.

The second visit (9-15 August) yielded information on the annual productivity of several species. Seventy-two percent of horned puffin burrows on Suklik Island contained chicks ( $n=100$ ), as did 39 (78%) of 50 tufted puffin burrows. Productivity of black-legged kittiwakes was only 0.05 young per breeding pair in study plots on Chowiet Island, whereas fulmars were estimated to have raised 0.19 young per breeding pair. While most seabird populations on the Semidis appear to have remained fairly stable since intensive studies were discontinued in 1981, a complete recensus of red-faced and pelagic cormorants this year revealed their numbers to be down by 43% since 1979 (933 nests counted on all nine islands in the Semidis, compared with 1650 nests in a 1979 census). Also, a complete count of sea lions in the Semidis came to 1495 animals, a decline of 76% since the 1977-78 period, when 6310 animals were counted on approximately the same dates.

Center biologists also conducted studies of puffin diets during the nesting period at three sites in the region south of the Alaska Peninsula: Suklik Island in the Semidis, Egg Island in Popof Strait (Shumagin Islands), and Midun Island in the Sandman Reefs. This work was part of a larger survey of puffin diets throughout the Gulf of Alaska and eastern Aleutian Islands to document the use of commercial fishes by puffins. Sand lance comprised the bulk (about 90% by weight) of the nestling diets of both tufted and horned puffins in the Semidis; capelin was the principal prey of tufted puffins at Egg Island (70%), and pollock was the tufted puffin's main food item at Midun (70%). The finding that puffins rely heavily on pollock at some colonies is important because a major fishery for the same species has developed in the western Gulf of Alaska in recent years. Further studies are planned for 1987 to determine whether prey use is consistent between years.

## E. Administration

### 1. Personnel

#### Permanent Full Time

1. John L. Martin, Refuge Manager, GS-13, EOD 12/21/81
2. Tom J. Early, Assistant Refuge Manager, GS-11, EOD 08/23/81.
3. David R. Nysewander, Wildlife Biologist, GS-11 EOD 09/28/86.
4. Edgar P. Bailey, Refuge Biologist, GS-11, EOD 10/01/81.
5. Mike Nishimoto, Wildlife Biologist, GS-11, EOD 4/15/84
6. Arthur L. Sowls, Wildlife Biologist, GS-11, EOD 09/28/86
7. Carol M. Hagglund, Budget Assistant, GS-7, EOD 08/21/83
8. Trina B. Fellows, Clerk-Typist, GS-3, EOD 11/28/83
9. Alvin D. Bayer, Ship Operator, WG-12 EOD 10/06/86

#### Permanent Intermittent

10. G. Vern Byrd, Wildlife Biologist, GS-11, EOD 4/29/84

#### Volunteers:

11. Jessica M. Abel, (SCA) EOD 06/04/86 Term 08/29/86
12. Colleen M. Baggot, (SCA) EOD 06/09/86 Term 08/25/86
13. K. Birgit Christiansen, (SCA) EOD 06/09/86 Term 08/25/86
14. Diane Debinski, (SCA) EOD 06/05/86 Term 08/20/86
15. Annette Emig, (SCA) EOD 06/05/86 Term 08/01/86
16. Brian Lance, (SCA) EOD 06/04/86 Term 06/11/86
17. Alan Storey, (SCA) EOD 07/01/86 Term 08/23/86
18. Kim Thounhurst, (SCA) EOD 05/01/86 Term 08/20/86
19. Gavin Wright, (SCA) EOD 06/09/86 Term 08/23/86
20. Donald Dragoo, EOD 06/07/86 Term 09/12/86
21. Ronald S. Hicks, EOD 01/08/86 Term 04/17/86
22. Steven Kirkhorn, EOD 06/20/86 Term 06/30/86
23. Edward C. Murphy, EOD 06/10/86 Term 06/17/86
24. Gretchen J. Murphy, EOD 06/10/86 Term 06/17/86
25. Kevin P. Rose, EOD 06/09/86 Term 08/12/86
26. Alan Springer, EOD 07/26/86 Term 08/15/86
27. Martha T. Springer, EOD 08/05/86 Term 08/15/86
28. Wayman Walker, II EOD 08/05/86 Term 08/15/86

#### YCC

29. John Libal, EOD 06/16/86 Term 08/20/86

#### Cooperators:

30. Wells Stephenson, ADC, Dept. of Agriculture

Four of the five units of the Alaska Maritime NWR (AMNWR) are supported by personnel located in the Homer office. Personnel, for the Aleutian Islands Unit (AIU) is presented in that section.

During 1986, the Homer staff increased from seven permanent employees to ten (Table 2). Biologists Nysewander and Sowls

transferred from Wildlife Assistance in the Regional Office. They were picked up on the payroll September 28, but did not complete their moves until late December due to problems with the relocation services in completing the sale of their former residences.

Alvin Bayer was selected to fill the new Ship Operator position for the FWS vessel currently being built. He reported for duty in early October and shortly thereafter traveled to Escatawpa, MS to spend the next six months monitoring construction of the vessel.

Table 2. Staffing Pattern, FY 1983 to FY 1987

	<u>Permanent</u>	<u>Part Time</u>	<u>Temporary</u>	<u>Total FTE</u>
FY87	10	0	0	10.00
FY86	7	0	0	7.00
FY85	7	0	2	6.30
FY84	6	1	0	6.30
FY83	3	0	2	3.80

#### 4. Volunteer Program

We were fortunate in having an exceptional crew this summer. All three volunteers working with this unit were outstanding, and having Wells Stephensen join us from the USDA was invaluable assistance.

#### 5. Funding

Funding for the entire refuge is through the Homer headquarters office. Funds internally distributed to the Aleutian Islands Unit (AIU) are discussed in that section.

Table 3. AMNWR Funding, FY 1983 to FY 1987

	<u>1260*</u>	<u>1400/ 1480/1113</u>	<u>1520</u>	<u>1994/ 8610</u>	<u>6850</u>	<u>Totals</u>
FY87	1,154,000	346,000	-	-	-	1,500,000
FY86	882,000	476,000	1,975	26,781	2,380	1,389,136
FY85	1,100,000	239,000	3,010	24,500	1,500	1,368,010
FY84	858,560	245,000	1,875	7,000	-	1,112,435
FY83	730,000	250,000	-	26,375	-	1,006,375

\*Includes 1210, 1220, and 1240 funding for FY 83. This also includes ARMM funds.

#### 6. Safety

No lost time accidents were reported for the year. Assistant



Manager Early is the Station Safety Officer. Monthly safety meetings are scheduled the first Monday of each month with most permanent staff members attending.

The following is a list of the monthly meetings:

<u>Month</u>	<u>Subject</u>
January	- ATV Safety
February	- General Safety Discussion Session
March	- Mental/Physical Safety
April	- Wood Stove Use and Safety
May	- Boating Safety & Comprehensive Session on CPR /First Aid/Defensive Driving.
June	- Hiking, Bear, and Back Country Safety
July	- Office Safety and Hazards
August	- Hunting Safety
September	- Fire Prevention
October	- Winter Driving Safety
November	- Open Subject/or General Safety Discussion
December	- Drinking/Driving

## 7. Technical Assistance

Wells Stephensen, ADC, Dept. of Agriculture, provided technical expertise in hunting and trapping foxes. Wells was a tremendous asset to the program during his tenure in the Shumigan Islands from early June to mid-July.

## 8. Other

A Special Use Permit (SUP) was issued to the U.S. Geological Survey to continue studies under the Alaska Mineral Resource Assessment Program in the Shumagin Islands. A permit was issued to a professor from Vassar College to conduct archaeological research in the outer Shumagin Islands. The Lamont-Doherty Geological observatory of Columbia University was issued a permit to maintain their seismic stations in the Shumagin Islands.

## F. Habitat Management

### 7. Grazing

We have concluded that cattle grazing is not compatible with refuge objectives on island situations in this unit because of the delicate habitat and inability to manage the animals by permissess.

Last year we made major efforts to eradicate cattle on Caton, Chernabura, and Simeonof islands which were entirely refuge owned areas. During the summer of 1986 we had reports several animals still roamed Chernabura and Simeonof islands.

In late October of this year ARM Early verified eradication on Caton Island. One bull was found on rugged Chernabura Island and six yearlings were found on Simeonof Island. All were dispatched from a chartered Bell 206 helicopter. The Shumagin Native Corporation (60 miles distant) on Popof Island was upset that they weren't informed of the operation and therefore closed to FWS access all of their lands. This edict, however, will have negligible effects on us.

Two cattle grazing permits are in effect on the Alaska Peninsula Unit. Both of these areas are either partially or wholly selected by the Natives or the State. Wosnesenski Island has 50 cattle and both the animals and the island are in good condition. Chirikof Island has about 800 cattle and has a permanent caretaker living on the island. This island has been grazed for many years and shows signs of severe erosion and overgrazing in some areas.

## G. Wildlife

### 2. Endangered and/or Threatened Species

Using mitochondrial DNA sequence analysis Dr. Gerald Shields, University of Alaska, Fairbanks, demonstrated that the Canada geese nesting on Kaliktagik Island in the Semidi Islands are genetically indistinguishable from those breeding on Chagulak and Buldir in the Aleutians. The Semidi geese like their counterparts to the west are distinct from races on the mainland. The peak count reported for the Semidi geese, which winter in a discrete area in coastal Oregon, increased from 85 birds in 1985 to 136 in the fall of 1986. Since it is unlikely that natality alone could account for so large an increase, it appears that a few Aleutian Canada geese from Buldir or Chagulak intermingled with wintering birds from the Semidi Islands.

### 3. Waterfowl

Spring waterfowl surveys along the south side of the Alaska Peninsula have been conducted for 6 years by Migratory Bird Management personnel to monitor the status of declining populations of emperor geese.

### 5. Shorebirds, Gulls, Terns, and Allied Species

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

Auklets. On 2 to 12 July, volunteers Diane Debinski and Annette Emig camped below the auklet colony at Yukon Harbor and made observations of auklets in an effort to assess population levels. Despite the limited counts obtained due to weather, observations at Yukon Harbor divulged that behavior at this colony is somewhat different than that observed in the Pribilofs and other islands where crested auklet nesting populations have been monitored. Unlike elsewhere where monitored, the auklets at Big Koniugi exhibit much more irregular colony attendance (Table 4). On other mixed auklet colonies studied, such as in the Pribilofs, these alcids display a fairly regular bimodal activity pattern with morning and late evening peaks in numbers. As Table 4 indicates on at least three, and probably four, of the 10 nightly observations that were made at the colony, auklets did not fly up to the talus after their usual congregation and displays in Yukon Harbor. As darkness approached, auklets on those nights flew back out to sea rather than to the colony. On the other hand, at Buldir Island and at other study areas these birds regularly flew to their nesting areas every night during incubation and chick rearing.

Because of protracted fog and rain, counts of auklets present on plots at 15 minute intervals were done only on 10 and 11 July. Bad weather prevented any additional quadrats from being established in 1986. The 10 x 10 m plots selected last year proved to be fairly centralized in the colony and were in areas believed to represent medium to high density portions of the colony. Delineation of the colony boundaries revealed it to be more extensive than assumed in 1985. Polaroid prints were made of all colluvium used by auklets, and an attempt was made to stratify nesting density.

For the limited counts of the plots, numbers of birds ranged from 0 to 110, with no birds usually being present on the rocks. On 11 July, 14 counts were made between 0945 and 1300 hr; birds were present only four and three times, respectively, with a maximum of 38 present. No birds were present on plots after 1215 hr, and counts stopped at 1300 hr. Birds also loitered on rocks three and four times on 16 counts at other plots during the same general time frame. One plot had almost no birds on 10 July and up to 110 the next morning.

Auklets at Yukon Harbor began descending from the colony at about 0630 hr. ADT (0430 h solar time). Some began returning to the scree about 0900 hr.. Before landing in the rocks flocks would circle the colony repeatedly, each time getting closer and dropping off more birds with each pass. After landing, auklets simply sat on the rubble for approximately 10 minutes and then flew back to the water. Some birds did enter the boulders, but most remained on the surface. It was not known whether birds entering crevices were exchanging incubation shifts or feeding chicks. When one to several

birds took flight nearly all others on the surface joined them.

It appears that breeding birds at this colony exchange incubation duties chiefly in the morning, and the erratic flocks of birds in or near the colony during evening hours may be primarily composed of non-breeding birds. More observations, will be required to verify this, and color-marking some individual birds may be needed to ascertain breeding status because non-breeding auklets more than 2 years of age cannot be recognized by plumage characteristics. The fact that areas of dense concentrations of crested auklets are attractive to large numbers of immature birds which attempt to engage in courtship with adults has been documented by others elsewhere. Marked and banded birds also are needed to understand the high variability in the distribution of auklets on the talus, particularly in different plots at subsequent times. Only then will we know whether the tremendous variability in numbers of birds in adjoining plots is mainly attributed to the same birds moving about or to entirely different individuals.

The estimated number of crested auklets at Yukon Harbor in 1976 was 30,000 birds. A total of only 10,000 birds were estimated in 1986. The reason for the decrease in population may be the result of several factors including, but not limited to, prey availability, habitat change, net entanglement, and predation at the colony site.

Though not censused, parakeet auklets appeared more abundant at Big Koniuji in 1986 than in previous summers.

Figure 1. Big Koniuji and ambient islands in the Shumagins

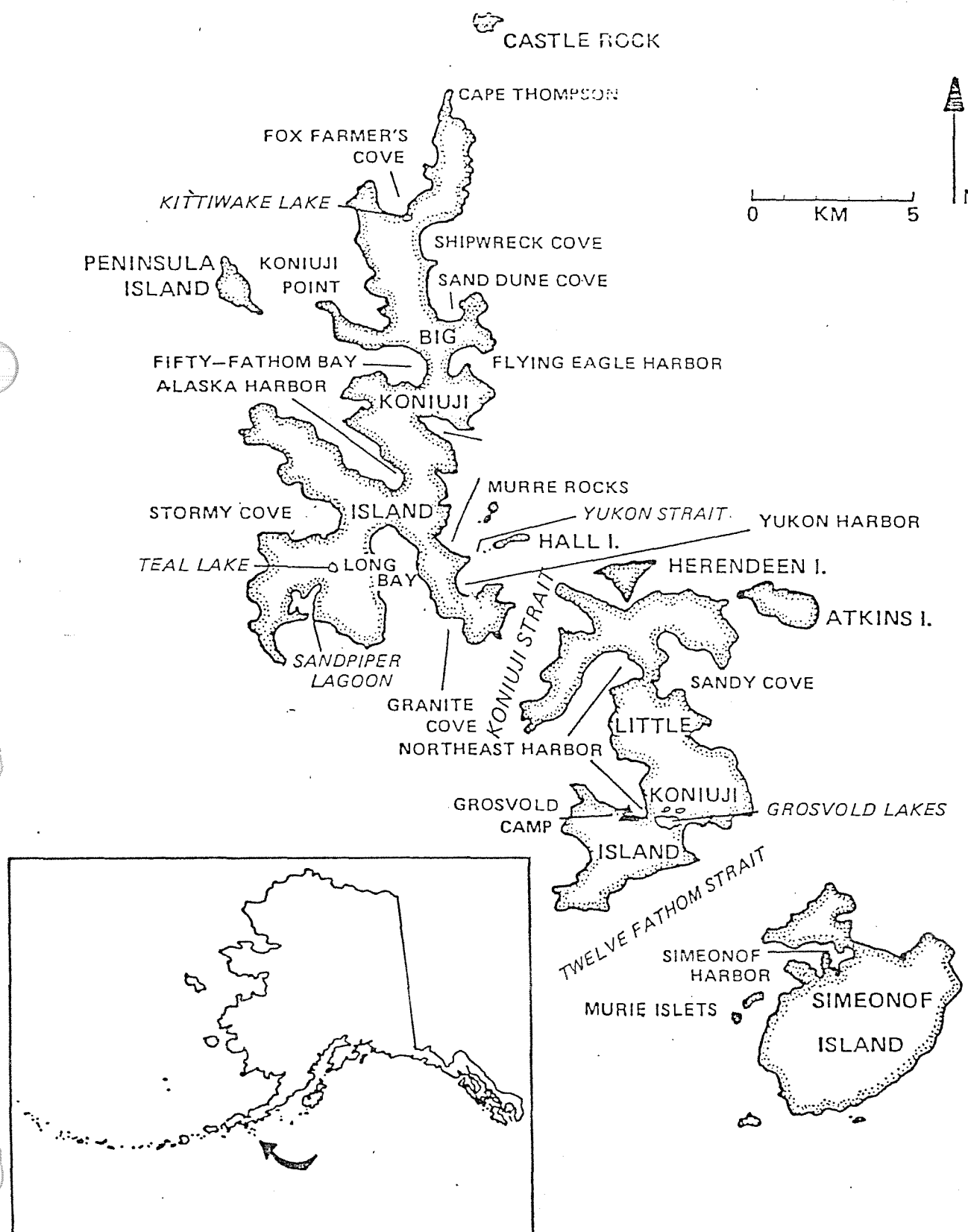


Table 4. Daily activity patterns of crested auklets at Yukon Harbor, Big Koniuj Island.

Date	Time (ADT) onset of audible morning activity	Time return to colony	Time evening congregation of 1000's of birds	Destination	Time flew to colony	Time last seen active	Evening weather
7/2	0600		2122	O		2322	foggy & calm
7/3	0600	0939	2133	C ?	2120		drizzle, fog, breezy
7/4	0720	0730 ?	2136	O		2315	fog
7/5	0630	<1000	2100	L	2255		foggy & misting
7/6	0730	?	>2100	O		2325	90% cloud cover, foggy
7/7			>2130	L	2251		100% cloud over, foggy
7/8			>2045	L	2310		500 ft ceiling till 2000
7/9			>2030	L, O	2139	<2345	100% cloud cover
7/10	0730	0805	<2100	C, O	2100		fog, no precipitation
7/11				C	1830*		occasional drizzle, 98% cloud cover

## Key:

O - birds went out to the ocean

C - Birds went to colony

L - birds flew over land and may have stopped at colony, but often it was difficult to determine.

\* Small group of 30 birds rather than large group of 100's or 1000's.



The auklet colony at Yukon Harbor lies on rugged slopes at roughly 300m (1000 ft) and consequently is usually shrouded in fog. Winds exceeding 40 knots are common. Most of the colony is hidden or below the descending finger of fog.  
7/86 E.B.



When weather permitted, auklets using 10 x 10 m plots were recorded. Note orange stakes denoting quadrat boundaries.  
7/86 D.D.





Crested auklets engaged in spectacular aerial displays above and near colonies.  
7/86 A.E.



Auklets were counted on plots on only two of 11 days at the colony because of fog and extreme winds.  
7/86 A.E.





Hall Island in Yukon Harbor is fox-free and thus has a large gull colony. Kittiwakes nesting on the north side of the island (facing viewer) appear to be increasing and regular monitoring is planned.

6/86

EPB



Crested auklets flying over their colony above Yukon Harbor at Big Koniuji Island.

7/86

D.D.

Kittiwakes. Albeit we had intended to establish census plots for black-legged kittiwakes near Cape Thompson, the northern tip of Big Koniuji, the exceptionally poor weather and shortened duration of our stay on the island allowed the census of kittiwakes only at Hall Island in Yukon Harbor. Since this kittiwake colony is small, we were able to census the entire colony, located on the island's north side. On 21 June we counted 377 nests (structures containing nest material added during the current season); we were unable to return and again count nests and adult birds as planned. This colony has increased since 1976, when 155 nests were counted here. That year no chicks were fledged at Hall Island, while nesting success at Cape Thompson was 36% (n=150 nests). In 1985 kittiwakes virtually failed to reproduce at Big Koniuji presumably because of the extremely cold spring. Though not censused because of insufficient time and poor weather, casual observation revealed "normal" numbers of nest at Cape Thompson in 1986. Unfortunately we were unable to estimate reproductive success in 1986. Curiously, we also spotted 33 kittiwake nests below cormorants nesting near the entrance to Flying Eagle Harbor. Kittiwakes never have been sighted nesting here before.

Gulls In 1985 only 39 glaucous-winged gull nests and approximately 300 adults were counted on the western third of Hall Island. We intended to census gulls in the same part of the island in 1986 but were repeatedly thwarted by fog.

A new colony of glaucous-winged gulls has been established along cliffs south of the mouth of Flying Eagle Harbor. A small cormorant colony was at this site in 1976, but no gulls were recorded. A few gulls were observed roosting on these cliffs in 1985, and this year we estimated about 100 pairs of gulls, judging from actual nests sighted and evident pairs on ledges. Some evident nest sites also appeared to be accessible to foxes. If foxes are eliminated from Big Koniuji, a major expansion of this colony can be expected.

Cormorants A large increase in all three species of cormorants also has occurred at the Flying Eagle Harbor colony. We counted approximately 270, 70, and 30 red-faced, pelagic and double-crested cormorant nests, respectively, at this site in 1986, compared to counts of only 21, 8, and 9 nests of these respective three species 10 years ago. Though cormorants are not philopatric, it appears that this colony is definitely expanding. A colony of 110 pairs previously reported on the west side of the island was gone in 1986.

Puffins. Several visits were made to the horned puffin colony south of Yukon Harbor. We saw the largest number of birds on 10 July, when about 2000 were swirling above the colluvium. This estimate represents more birds than seen in 1985, but the population apparently still is far lower than

the 60,000 birds reported 10 years ago. The seeming decline of this colony is even greater during the past decade than for the crested auklet colony. Unfortunately there has been no satisfactory way yet devised to accurately census horned puffins, and even if there were, the practically inaccessible location of this colony makes monitoring it unfeasible.

#### 6. Raptors

Six bald eagle and one peregrine falcon eyrie were observed on Big Koniuji in 1986. One eagle nest was abandoned. In 1976 at least 10 eagle eyries were located on this island and 11 others were suspected. The apparent decline in nesting eagles, and probably falcons as well, may reflect the evident decrease in crested auklets and horned puffins.

#### 7. Other Migratory Birds.

Only one new species, the pine siskin, was discovered on Big Koniuji this year. Two were seen at Flying Eagle Harbor. Siskins have never been reported in the Shumagin Islands or at Cold Bay on the Alaska Peninsula. Pine grosbeaks, first seen in 1985, were again sighted at different locations and undoubtedly have become established breeders. A pair of belted kingfishers was present in Flying Eagle Harbor and in another bay. Though not reported on Big Koniuji until 1984, this species also probably is now a regular breeder.

#### 9. Marine Mammals

According to consultants from Envirosphere who have flown aerial surveys of sea otters and whales off the Alaska Peninsula for the Minerals Management Service, sea otter populations have declined in this region compared to numbers observed on Kenyon's surveys in 1962. In 1986 they covered 12,000 nm of trackline for sea otters on both sides of the Peninsula and in the Fox Islands (eastern Aleutians). They also conducted over 36,000 nm of surveys for whales in the Shumagin Islands area and found up to 200 humpback and fin whales feeding mainly in the Shumagin Banks south and east of these islands. This area also is in the heart of the proposed Shumagin oil lease sale, shelved temporarily because of low oil prices. Endangered whale numbers in this area may be greater than in the Glacier Bay region in southeast Alaska.

#### 10. Other resident wildlife

The ground squirrel population on Big Koniuji appeared higher than in 1985. Whether this was a real increase or whether it was mainly a reflection of a warmer spring this year plus our later arrival on the island is unknown.

## 15. Animal Control

Wells Stephenson, ADC Specialist from the regional office; Wildlife Biologist Edgar Bailey; and volunteers Kevin Rose, Diane Debinski, and Annette Emig spent the period from 11 June through 12 July on Big Koniui Island. This was the second consecutive year we have been intensively trapping foxes on the island in an effort to eradicate this introduced species.

After arrival on Big Koniui on 11 June, evidence indicated that few foxes had survived following 2 months of intensive trapping the previous summer, when 69 animals were removed. Fox signs were encountered only in the expected few areas where activity persisted at the end of June the previous year. Of the approximate 250 traps left in 1985 which we were able to relocate, fox remains were found only in three. Surprisingly, bits of survey tape remained near most traps, enabling us to find them. Four days after our arrival the first fox was trapped at Sand Dune Cove (Figure 1), the most troublesome locale in 1985. This male had been trapped the previous year, as evidenced by a missing foot. The tracks of another three-legged fox also were detected on the nearby sand beach in Shipwreck Cove. The tracks of another fox were found in Sand Dune Cove, and this animal consistently avoided all traps. Seventeen foxes were caught at the above mentioned two locations in 1985.

No additional foxes were trapped until 29 June when a three-legged female inadvertently stepped in a trap while responding to hand-held calls of a distressed pup near her den located in Long Bay. Three male, one female, and one pup of unknown sex subsequently were captured at this den, which was well concealed in a brush-covered ravine about 1 km from the beach. These pups were believed to be about 6 weeks old and already were being fed ground squirrels. In 1985 tracks were regularly seen on this long sandy beach, but no foxes were trapped here. However, five foxes were trapped within 2 km of this beach the previous summer. The male fox associated with this den disappeared, and no additional sign was noted in this area after destruction of the vixen and her five pups. The eviscerated remains of an apparent male fox was discovered in a trap on a ridge above Yukon Harbor on 10 July; since this site is only about 5 km from the den, it possibly was the dog associated with this den.

The only other adult fox presumably killed was the vixen from a den discovered at Sand Dune Beach on 2 July. This animal was shot among boulders and alders at nearly 300 m elevation above the beach but was never found. It was believed to be the same large fox sighted on 25 June. Five approximately month-old pups (3 males and 2 females) were trapped among the rocks at this den site. It appeared that the vixen had

recently moved her pups from the original den, perhaps in response to the frequent trapping activity in this location. The three-legged male caught earlier in this area probably was the mate of this individual, for finally no more fox sign was detected at Sand Dune Cove.

Besides the four adults and 10 pups which were exterminated, three fox carcasses were found in traps left set last summer; hence, a total of 76 adult foxes was removed from the island during 1985 and 1986. At least one fox remained in the vicinity of Shipwreck Cove; several month-old scats also were found about 2 km north of this beach which may have been left by the same animal. One set of indistinguishable tracks was found on a beach in Sandpiper Lagoon, the location where two carcasses from last year's sets existed. A third carcass was in Flying Eagle Harbor.

If the male from the den at the south end of the island is still at large, a minimum of two foxes remain on the island, and another two still may be roaming the Cape Thompson and Sandpiper Lagoon areas. In addition, the possibility exists that several other scattered foxes, or even a den, are present in rocky, brushy areas of the island where sign is difficult to find.

Ground squirrels hampered trapping more this year because of the late trapping effort when these rodents were thus more active with warmer weather. Young ground squirrels also were out in July, and the overall population seemed higher. A third of the traps often had squirrels in them or were sprung. Use of M-44's would largely negate this serious problem. Attempts are being made to secure zinc phosphide-or strychnine-treated grain to remove these rodents near traps when we return in 1987.

In an attempt to trap the few remaining foxes unsuccessfully captured in 1985, some new lures, scents and four electronic predator calls were tried. The "Squeakers" placed in cans and powered by lantern batteries appeared ineffective, though with only three foxes adult trapped on the entire island in a month, the usefulness of these devices did not really get a fair test. The extremely wary fox which eventually was shot at Sand Dune Cove was attracted near the device, but her tracks veered away from traps set around it. Two of the units failed to operate after a short while, and another was flooded out by excessive rain. Taped recordings of bird distress calls and fox pups yelping broadcast with two speakers set apart in sand dunes failed to visibly attract any foxes in the two areas used. Sets with pheromone scents also failed to catch any foxes, but again too few foxes remained to yield a valid test of different attractants. Despite extreme care in avoiding sets where river otters were active, three otters unfortunately were found dead in traps. Also, two other skeletons were found in traps set in 1985. Hence, at least 15 otters have been





One of the two fox dens found was in a brush-covered ravine far from the beach. The vixen was missing a foot from an encounter with a trap in 1985. No obvious trail led to this den.

6/86 E.B.



Five pups were found in this den which had several burrows near the top of the ravine.

6/86 E.B.





The south end of Big Koniuji has some good marsh habitat used by teal and other waterfowl.  
7/86 E.B.



The long sand beach at the head of "Big Bay" provides ideal scavenging habitat for fox. A fox "freeway" crossed the island in the low pass to the left.  
7/86 E.B.



killed in the past two summers while attempting to rid Big Koniuji of fox. Proper placement of M-44's would result in less mortality to otters and other non-target species than using traps.

With only a few wary foxes left it is obvious that the survivors probably can not be trapped. The need for M-44 cyanide projectiles or some other toxicant as an alternative to traps and snares is critical on a such large rugged island; 13 person-months have been expended here, and still not all foxes have been eliminated. When compared to the apparent successful fox eradication on Kiska by dispersal of "1080" baits with a helicopter, spending three months on Big Koniuji with up to five people to eliminate a much smaller number of foxes than on Kiska Island illustrates how inefficient trapping alone is on large islands. The outlook for getting authorization to use M-44's in 1987 is bleak.

On 12 July roughly 4 hours were spent ashore on Bird Island to verify whether arctic fox were completely eradicated in 1984. A major fox trail crossing the island from the fox farmer's cabin located in the west bight revealed no tracks or scats. This trail appeared somewhat overgrown, though there had been some use, probably by river otters. On the long sand beach on the east side of the island we found a single set of old, indistinct tracks which appeared to have the pattern of a fox. This disturbing observation necessitates further checking in 1987 and reinforces the need for using M-44's. In 1984 the density of foxes was very low, as only 13 adults were trapped during a month's stay on the island. Hence, it will be difficult to ascertain whether any foxes remain, and if they do, it will be even more difficult to eliminate the few survivors with only traps. No fox sign was seen on Bird Island when briefly visited in 1985.

## H. Public Use

### 1. General

Very little recreational use takes place in this remote unit. The only monitoring conducted for public use takes place during the summer biological field season.

### 18. Cooperating Associations

The Alaska Natural History Association (ANHA) outlet opened on March 28, 1984, in our Homer headquarters building at 202 Pioneer Avenue. We offered 15 publications for sale to the visiting public. Gross sales were: \$52 in 1984; \$120.15 in 1985; and \$304.47 in 1986. Despite efforts to increase visitors, the low sales volume continued. At the end of the year, a decision was made to place the outlet in an inactive status. We hope to re-open sometime in the future when full-

time personnel can be employed to handle the interpretive work.

### I. Equipment and Facilities

A 15 ft. and a 17 ft. Avon inflatable boat was used to access areas of the islands. The chartered F/V Maritime Maid provided logistic support for the biologists from Homer to Big Koniuji Island.

### J. Other Items

#### 3. Items of Interest

The group of archaeological researchers from Vassar College met the FWS crew at the Big Koniuji field camp. They were unprepared and unequipped for the boat work and weather conditions they would certainly encounter. Several survival suits and an ELT (which they inadvertently turned on) were left for their use. The US Coast Guard initiated a search and spent a portion of several days on this costly "dry run".

#### 4. Credits

This report was written and edited by Edgar Bailey. Tom Early wrote sections on grazing, permits, and law enforcement. Carol Hagglund wrote the administrative portion. Martin, Early, and Hagglund also edited, and Fellows typed the report.

ALEUTIAN ISLANDS UNIT  
ALASKA MARITIME NATIONAL WILDLIFE REFUGE

Adak, Alaska

ANNUAL NARRATIVE REPORT

Calendar Year 1986

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 1986

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## INTRODUCTION

### The Aleutian Islands Unit Alaska Maritime National Wildlife Refuge

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

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

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

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



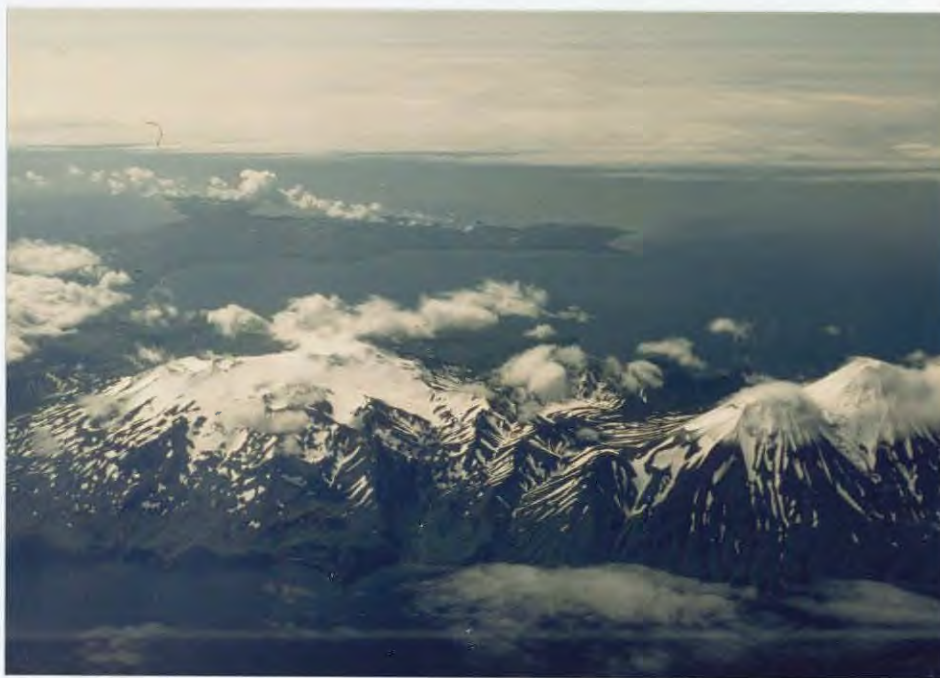
The Aleutian Islands are rich in wildlife. A total of 260 species of birds have been recorded on the AIU and adjacent waters west of Unimak Island. At least 21 species of mammals, mostly cetaceans, occur regularly. New species of birds, primarily Asiatic migrants, are added to the AIU list almost annually. Bird species composition and density vary significantly from island to island, depending on the island's size, the presence of introduced predators, and the island's location within the Chain. One of the most interesting features of the Aleutian Islands is the unique combination of plant and animal species from both the North American and the Asian continents. Olaus J. Murie aptly described the Aleutians as a "melting pot for faunal elements from two continents not yet reaching an equilibrium."

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

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

Winter wrens, rosy finches, song sparrows, snow buntings, and lapland longspurs are among the most common of the small passerines. All but the latter are permanent residents in the chain. Adjacent waters contain large fish populations which are harvested primarily by the fishing fleets of Japan, Russia and South Korea. Island streams support several species of salmon and the Dolly Varden.

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



Mountainous northern Tanaga contrasts with the rolling, lake dotted tundra of the southern part. #018601, 8/11/86, CFZ.

## INTRODUCTION

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## A. HIGHLIGHTS

More Asiatic species added to refuge unit bird list which now totals 260 species (Section G. 1).

Adak Wildlife Inventory Plan implementation continued through summer with mixed results (Sections G. 3 through G. 7).

Several whale strandings were recorded through the chain this year (Section G. 9).

Experimental use of Compound 1080 to rid Kiska Island of introduced arctic fox appeared completely successful (Section G. 15).

Considerable wildlife surveys were accomplished at Kiska in March and June to support experimental fox work there (Section G. 15).

A very successful teacher and youth leader Environmental Education workshop was conducted by Regional Office and refuge unit staff at Adak (Section H. 3).

Videotapes on the Alaska Maritime Refuge, Aleut history and natural resources of the Aleutians were supplied to the Adak Navy Exchange for free loan to island residents as part of a video rental program. The tapes were constantly checked out (Section H. 7).

Japanese World War II veterans and surviving family members conducted memorial services for Japanese and American casualties at Attu and Kiska islands in June (Section H. 7).

The Adak fall caribou harvest approached the management objective despite loss of Navy tug support for active duty military personnel (Section H. 8).

A U.S. Army Corps of Engineers contractor cleaned up World War II debris at Atka and Amchitka islands. The final Amchitka tally was 4,037 building and facility sites (Section J. 1).

The U.S. Navy selected Amchitka Island as the site of a Relocatable Over the Horizon Radar Facility to be constructed in 1987 and 1988 (Section J. 3).



## B. CLIMATIC CONDITIONS

The complex, highly irregular Aleutian weather is a frequent subject of discussion in and away from the islands. Conditions vary greatly from year to year, month to month, day to day, hour to hour and even minute to minute. Individual islands have their unique micro-climates based upon storm tracks and topography. Weather data for 1986 were available from Attu, Shemya, Adak, Dutch Harbor/Unalaska, and Akutan. The Akutan station was established for the first time this year.

Comparisons of weather for 1985 and 1986 at Attu indicate that winter (January - April) weather between the two years was very similar (Table 1), except that nearly double the snow was received in 1986. Spring (May - June) was drier in 1986, resulting in an earlier than normal snow melt, which allowed Asistic migrant landbirds an opportunity to disperse more widely over the island than is normally the case (a bother for late May-early June birders). The 1986 average spring temperatures were slightly warmer than in 1985. Summer (July-August) weather was a continuation of the warm and dry trend set in the spring. Fall (September-November) 1986 was wetter than the corresponding period in 1985, but the temperatures continued to be warmer. December 1986 was nearly twice as wet as December 1985, although slightly less snowy, and, once again, temperatures averaged warmer in 1986.

Due to the lack of nearby mountains to snag passing clouds, Shemya receives considerably less precipitation than other Aleutian weather stations. Like Attu, Shemya weather was similar between 1985 and 1986 (Table 2). There was seven percent less rain and 19 percent less snow in 1986, still 6 percent above the long term averages. Winter 1986 averaged 1.7 degrees warmer than winter 1985. Spring weather was 1.5 to 3 degrees warmer in 1986 than in 1985 and 1 to 2 degrees warmer than "normal". Precipitation was 12 percent less for the period this year compared to last year and 26 percent less than "normal". No snow occurred during the spring 1986 period. Summer weather continued the warmer, drier trends. The trend of the previous nine months continued through the fall, although it wasn't exactly hot and dusty. December 1986 at Shemya was nearly twice as wet as December 1985 and "normal" with near normal (and 1985) temperatures being recorded.

Adak weather data indicate that winter was 10 percent wetter in 1986 than in 1985, but was still 22 percent drier than normal (Table 3). January through April snowfall in 1986 was only two-thirds the amount received during the same months in 1985 and nearly 30 percent below "normal". January temperatures averaged 3.2 degrees below "normal", 5.5 degrees below 1985, but March temperatures averaged 2.4 degrees above "normal", 5.7 degrees above March 1985. Spring was about 20 percent drier than in 1985 and 23 percent drier than "normal", a condition greatly appreciated by those refuge staff in residence at the

Table 1. 1986 Attu, Alaska, weather summary with comparisons to 1985 data

	<u>Inches of precipitation</u>		<u>Inches of snow</u>		<u>Days of measurable precipitation</u>		<u>Degrees fahrenheit</u>					
	<u>1986</u>	<u>1985</u>	<u>1986</u>	<u>1985</u>	<u>1986</u>	<u>1985</u>	<u>Maximum</u>		<u>Minimum</u>		<u>Average</u>	
	<u>1986</u>	<u>1985</u>	<u>1986</u>	<u>1985</u>	<u>1986</u>	<u>1985</u>	<u>1986</u>	<u>1985</u>	<u>1986</u>	<u>1985</u>	<u>1986</u>	<u>1985</u>
JAN	7.21	6.29	23.6	21.4	25	19	32	39	16	15	31.6	32.8
FEB	3.29	4.53	9.2	16.1	17	16	38	43	10	17	29.1	32.1
MAR	6.74	5.98	42.9	6.0	24	26	43	42	15	-5	31.3	28.4
APR	5.33	5.33	4.0	3.0	17	21	47	52	25	17	35.3	35.7
MAY	2.25	3.16	T	0.1	10	13	55	52	27	22	39.0	38.6
JUN	2.37	3.57	0	T	10	12	64	57	32	19	42.5	42.4
JUL	3.96	3.52	0	0	8	9	64	72	26	24	52.6	47.3
AUG	3.20	4.73	0	0	5	12	62	62	35	35	54.8	49.0
SEP	11.20	9.86	0	0	18	14	60	62	25	29	46.9	45.4
OCT	7.62	9.67	0	T	19	18	59	61	30	30	47.1	42.2
NOV	10.30	8.04	4.1	3.5	18	22	54	49	24	23	36.1	37.3
DEC	10.10	5.31	30.7	33.6	25	24	42	44	10	15	36.1	31.0
Totals:	73.57	67.98*	114.5	83.7	196	206						
Extremes:							64	72	10	-5		
Averages:											40.2	38.5
Dates:							7/7	7/22	2/14	3/21		

Table 2. 1986 Shemya, Alaska, weather summary with comparisons to 1985 and normal data

	<u>Inches of precipitation</u>			<u>Inches of snow</u>		<u>Days of measurable precipitation</u>		<u>Degree fahrenheit</u>						
	<u>1986</u>	<u>1985</u>	<u>NORM</u>	<u>1986</u>	<u>1985</u>	<u>1986</u>	<u>1985</u>	<u>Maximum</u>	<u>Minimum</u>		<u>Average</u>			
								<u>1986</u>	<u>1985</u>	<u>1986</u>	<u>1985</u>	<u>1986</u>	<u>1985</u>	<u>NORM</u>
JAN	2.72	2.53	2.31	24.4	17.6	20	28	36	36	24	20	30.9	31.5	31.3
FEB	1.37	1.89	1.85	11.6	9.5	22	24	38	39	20	23	32.1	31.5	30.2
MAR	2.48	2.60	1.82	8.0	20.3	23	24	38	39	25	19	33.7	29.2	31.7
APR	1.72	1.96	1.82	2.1	9.8	14	21	42	42	31	22	36.8	34.5	34.6
MAY	1.18	0.90	1.73	T	2.6	13	17	48	45	31	24	39.2	36.9	38.3
JUN	1.29	1.91	1.65	0	0	16	16	50	49	36	37	43.3	41.8	42.2
JUL	4.18	1.38	2.68	0	0	16	16	54	57	40	41	48.5	45.4	46.6
AUG	0.74	3.73	3.64	0	0	12	12	61	53	46	44	52.8	47.8	48.9
SEP	2.29	3.68	3.16	0	0	17	22	58	56	42	38	51.0	47.8	47.5
OCT	2.57	4.35	4.03	T	T	24	23	52	50	36	31	40.1	45.1	41.3
NOV	4.47	3.94	3.96	9.1	2.3	29	26	45	47	27	32	38.2	39.0	35.3
DEC	4.94	2.74	2.87	17.9	14.4	29	26	40	38	24	26	32.8	33.0	32.4
Totals:	29.95	31.61	31.52	73.1	76.5	235	255							
Extremes:								61	57	20	19			
Averages:												40.0	38.6	38.3
Dates:								8/19	7/22	2/2	3/16			

time. Summer was dry and warm at Adak in 1986. Fall moisture was slightly above "normal" and slightly below 1985 levels. Fall snowfall was below "normal" for the second consecutive year. Fall temperatures were higher than "normal" but cooler than in 1985 at Adak. December moisture was near "normal", but it was warmer than usual, as was the case in 1985. Overall, the year was drier and warmer than "normal". It is interesting to note that the annual average temperature in 1986 matched that recorded in 1985.



If one desires a change in the Adak weather, just  
 "wait a minute." #028601, 11/14/86, EVK

Dutch Harbor/Unalaska weather was relatively dry through the first four months of the year (Table 4), with only 60 percent of the 1985 moisture received in 1986. Average January temperatures were 10.6 degrees below the 1985 average. Spring 1986 brought even drier conditions, but average temperatures between the two years were quite similar. A virtual drought set in during the summer months. Dutch Harbor received a mere 0.20 inch of precipitation in July, the least amount for the month anywhere in Alaska; quite a feat for an Aleutian Island. August was equally dry. Average temperatures in the summers of 1985 and 1986 were nearly identical. September, October, and November 1986 were again much drier than the same three months of 1985. December 1986 finally was wetter than December 1985, reversing a trend that had persisted since April. Total precipitation for 1986 at Dutch Harbor was only 40 percent of the amount recorded in 1985.

Table 3. 1986 Adak, Alaska, weather summary with comparisons to 1985 and normal\* data

	<u>Inches of precipitation</u>			<u>Inches of snow</u>			<u>Days of measurable precipitation</u>		<u>Degrees fahrenheit</u>						
	<u>1986</u>	<u>1985</u>	<u>NORM</u>	<u>1986</u>	<u>1985</u>	<u>NORM</u>	<u>1986</u>	<u>1985</u>	<u>Maximum</u>		<u>Minimum</u>		<u>Average</u>		
									<u>1986</u>	<u>1985</u>	<u>1986</u>	<u>1985</u>	<u>1986</u>	<u>1985</u>	<u>NORM</u>
JAN	3.38	3.43	6.20	25.7	6.4	19.5	24	24	43	47	10	19	30.0	35.5	33.2
FEB	3.04	2.96	4.67	12.9	13.5	18.3	23	19	45	46	15	22	34.1	34.5	32.9
MAR	4.42	4.77	6.01	7.4	41.6	20.6	27	24	47	46	27	12	37.0	31.3	34.6
APR	6.00	3.65	4.66	2.4	11.0	8.5	20	26	49	48	26	30	38.7	37.6	37.3
MAY	3.60	3.71	4.28	T	0.3	1.5	23	21	53	52	33	32	41.9	41.8	40.8
JUN	2.14	3.37	3.17	T	0	T	19	22	57	61	34	29	44.8	45.4	44.9
JUL	0.71	1.34	2.98	0	0	0	12	14	71	68	41	41	51.5	50.0	49.1
AUG	1.35	7.32	4.13	0	0	0	15	20	64	66	40	38	52.0	50.8	51.2
SEP	5.03	4.66	5.37	0	0	.01	20	21	58	63	38	33	50.0	48.8	48.0
OCT	8.39	11.20	6.86	0	0	1.9	24	25	52	60	28	30	45.0	46.0	42.5
NOV	8.84	8.01	8.03	3.7	0.1	12.0	22	23	50	55	23	32	39.0	42.0	37.1
DEC	7.43	5.87	7.50	23.1	12.7	22.1	29	27	45	43	24	18	36.0	37.1	33.9
Totals:	54.33	60.29	63.86	75.2	85.6	104.4	258	266							
Extremes:									71	68	10	12			
Averages:													41.7	41.7	40.5
Dates:									7/18	7/10	1/13	3/19			

\* Average of data from the past 10 years

The weather station at Akutan Village was established in January 1986. We have no data to compare the climatological events of the year with (Table 5). November and December 1986 weather data were not available for inclusion in this report.

### C. LAND ACQUISITION

#### 3. Other

Another year passed without completion of the proposed U.S. Fish and Wildlife Service (USFWS) - Ounalashka Corporation land exchange. The FWS proposes to relinquish the subsurface estate to 195 acres on Amaknak Island adjacent to expanding Dutch Harbor in exchange for about 380 acres of important offshore seabird islands and islets. Some lack of agreement between native corporations is believed to be holding the process up.

### D. PLANNING

#### 5. Research and Investigations

Aleutian Canada goose investigations: U.S. Environmental Protection Agency (EPA) Experimental Compound 1080 use permit G704-EUP-28, USFWS, AIU-AMNWR.

The continuing Aleutian Canada goose (ACG) Compound 1080 program consisted of Kiska pre-baiting surveys in March, bait placement 24 March to 04 April 1986. Post-baiting surveys in March and April and the continuation of summer wildlife surveys 18 June to 01 July. Detailed discussions are contained in section G. 15.

Sea otter study in the central and western Aleutians.

James A. Estes, USFWS (Santa Cruz, California) and Charles A. Simenstad, University of Washington, continued studies of sea otter and their habitat composition and food/habitat requirements at Adak, Amchitka, Shemya and Attu islands throughout the summer. Also, specific bird species were collected for diet composition and tissue sampling/carbon isotope analysis. A summary is in section G. 9.

Census of northern sea lions in the eastern Aleutians.

Dr. Thomas R. Loughlin, National Marine Fisheries Service, Marine Mammal Laboratory, Seattle, Washington. A population study and net entanglement mortality assessment were conducted on Ugamak Island. A summary is in section G. 9.

Maintenance and upgrade of seismic telemetry stations.

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

Table 4. 1986 Dutch Harbor/Unalaska, Alaska weather summary with comparison to 1985 data

	<u>Inches of precipitation</u>		<u>Inches of snow</u>		<u>Days of measurable precipitation</u>		<u>Degrees fahrenheit</u>					
	<u>1986</u>	<u>1985</u>	<u>1986</u>	<u>1985</u>	<u>1986</u>	<u>1985</u>	<u>Maximum</u>		<u>Minimum</u>		<u>Average</u>	
							<u>1986</u>	<u>1985</u>	<u>1986</u>	<u>1985</u>	<u>1986</u>	<u>1985</u>
JAN	2.35*	10.76*	24.7*	1.0*	18*	9*	45	46	-8	20	26.1*	36.7
FEB	6.01*	6.48	9.3	M**	14	M	48	M	9	M	27.5*	31.8
MAR	2.44	3.63	7.1	M	13	12	43	61	10	13	29.6*	29.6*
APR	2.15	0.57	9.1	M	9	M	49	M	18	M	35.6*	33.2
MAY	0.96	0.93	0	0	9	18	54	51	24	32	40.6*	40.4
JUN	0.85	3.28	0	0	9	12	58	73	35	34	45.0	45.4
JUL	0.20	2.19	0	0	3	18	66	73	38	38	49.8*	50.3
AUG	0.21	5.39	0	0	3*	21	65	74	35	35	50.6*	50.0*
SEP	1.71	5.43	0	0	11	15	63	74	35	25	49.6	50.2*
OCT	1.85	7.46	0	0*	14	26	57	58	24	25	42.6	40.8*
NOV	1.16	10.56*	3.0	0.1*	11	13*	65	52	23	16	M	M
DEC	3.63	2.05*	1.0	14.0*	18	12*	47	46	17	23	M	M
Totals:	23.52*	58.73*		M		156+*						
Extremes:							66	74	-8	13		
Averages:											39.7*	40.8*
Dates:							7/20	9/6	1/22	3/26		

\* Incomplete data

\*\* Missing data (M)



Table 5. 1986 Akutan, Alaska, weather summary

	<u>Inches of precipitation</u>		<u>Inches of snow</u>		<u>Days of measurable precipitation</u>		<u>Degrees fahrenheit</u>					
	<u>1986</u>	<u>1985</u>	<u>1986</u>	<u>1985</u>	<u>1986</u>	<u>1985</u>	<u>Maximum</u>		<u>Minimum</u>		<u>Average</u>	
	<u>1986</u>	<u>1985</u>	<u>1986</u>	<u>1985</u>	<u>1986</u>	<u>1985</u>	<u>1986</u>	<u>1985</u>	<u>1986</u>	<u>1985</u>	<u>1986</u>	<u>1985</u>
JAN	4.28	N	21.4	N	20	N	41	N	19	N	30.5*	N
FEB	3.16	E	0.6	E	18	E	46	E	16	E	32.8	E
MAR	3.06	W	1.1	W	20	W	43	W	13	W	31.4*	W
APR	4.07		4.5		19		49		19		35.2	
MAY	5.46	S	T	S	14	S	56	S	32	S	41.1	S
JUN	6.38	T	0	T	25	T	58	T	38	T	45.4	T
JUL	3.76	A	0	A	17	A	66	A	44	A	51.1	A
AUG	5.20	T	0	T	20	T	62	T	41	T	51.6	T
SEP	6.42	I	0	I	16	I	60	I	39	I	50.4	I
OCT	10.31	O	T	O	26	O	54	O	38	O	45.0	O
NOV	M	N	M	N	M	N	M	N	M	N	M	N
DEC	M		M		M		M		M		M	
Totals:	M	--	M	--	M	--						
Extremes:							66	--	13	--		
Averages:											M	--
Dates:								--		--		

\* Incomplete data  
 \*\* Missing data (M)

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

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

Site inventory and sampling for hazardous and toxic wastes.

Department of the Army. Field investigations of World War II and postwar DOD sites on Agattu, Tanaga, Great Sitkin, Kiska, Little Kiska, Attu, Adak and Oglinga islands were conducted to determine site inventory and sampling requirements for toxic and hazardous materials under the Defense Environmental Restoration Account program (PL 98-212). A continuing study that will ultimately result in clean up programs on several of the islands.

Geological survey of Umnak Island.

John T. Galey, AMAX Exploration and Technical Services. Surveys were conducted to examine the mineral prospects of three sites on the north-central side of Umnak Island. Surveys included rock/soil sampling and mapping.

Hydrologic monitoring of Amchitka Island.

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

Archeological survey of Unalaska Island.

Dr. Douglas W. Veltre, Anchorage Community College. Visits were made to the western portion of Unalaska Island, while conducting continuing archeological surveys in the eastern Aleutian Islands.

Cadastral survey of Unalaska Island.

Stanley E. King, International Technology. A complete cadastral survey of Unalaska Island is being conducted to delineate the regional, village, state and federal lands according to the Alaska Claims Settlement Act (ANCSA) interim conveyances. This is the second year of land surveys contracted by the Bureau of Land Management, Anchorage.

6. Other.

Refuge Manager Zeillemaker is leader of the Aleutian Canada Goose Recovery Team. Several items were considered through the mail and by telephone during the year. A disease contingency plan was nearing completion as the year ended.

E. ADMINISTRATIONPERSONNEL

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-9, PFT
- 5a. Sonja M. Boss, Clerk-Typist, GS-4 PFT (EOD 1/23/86)
- 5b. Janice M. Meindl, Clerk-Typist, GS-4, PFT (Resigned 3/1/86)
- 6a. Cynthia L. Malcolm, Clerk-Typist, GS-3 PFT (EOD 11/30/86)
- 6b. Susan C. Beard, Clerk-Typist, GS-3, PFT (Resigned 8/16/86)
7. Robert P. Schulmeister, Maintenance Worker, WG-8, PFT
8. Greg T. McClellan, Biological Technician, GS-5 TFT Local Hire
9. Johnnie J. Curcuru, Laborer, WG-2, Intermittent (EOD 1/23/86)



Permanent Personnel: 8, 1, 2, 3, 6a, 4, 7, 9.  
2/6/87, #088601, GTM.

10. James P. Fuller, SCA Biological Aid (5/15/86 - 8/8/86)
11. Joseph J. McGrody, SCA Biological Aid (5/15/86 - 8/8/86)
12. Rebecca L. Geisen, SCA Naturalist Aid (5/27/86 - 8/22/86)
13. Kaye (NMN) Boehlein, SCA Biological Aid (5/27/86 - 8/8/86)
14. Rebecca S. Benge, Biological Volunteer (Departed 8/22/86)
15. Davey Adams, Biological Volunteer (6/10/86 - 7/2/86)
16. Melly G. Zeillemaker, Biological Volunteer, (6/5/86)
17. Ellen (NMN) Deines, Biological Volunteer (3/15/86-7/2/86)
18. Cathy G. Edgerton, Biological Volunteer (6/1/86 - 7/1/86)
19. David W. Sonneborn, Biological Volunteer (5/21/86-5/28/86)





Seasonal Personnel: 10, 13, 12, 11, 14.  
8/4/86, #088602, GTM.



Permanent Personnel: 5a.  
2/6/87, #088603, GTM.



Seasonal Personnel: 15.  
6/23/86, #038601, FGD.

The AIU staff remained at seven permanent full time personnel in 1986 (Table 6).

Table 6. AIU staffing, FY-1980 to FY-1987

Year	Permanent		Temporary all categories	Total FTE's	Volunteers	
	full time	part time			SCA	Other***
FY-87	7	0	2*	9.6	?	?
FY-86	7	0	2*	7.1	4	3
FY-85	7	0	5**	10.8	4	3
FY-84	7	0	7**	10.5	3	5
FY-83	6	2	5**	11.0	4	5
FY-82	5	1	1	7.0	0	0
FY-81	7	1	1	9.0	0	0

\* 1 local hire, 1 intermittant.

\*\* 1 local hire, 1 intermittant, 3-5 seasonal bio-techs.

\*\*\* long term, multiple hours

### 3. Other Manpower Programs

One naturalist and three biologists worked on the AIU during the 1986 field season. The four individuals were selected and assigned through an agreement with the Student Conservation Association (SCA), of Charlestown, New Hampshire. The summer field season could not have been successfully completed without the dedicated efforts of these people and other volunteers. SCA aides contributed many hours to the Kiska field study, Adak wildlife surveys, a variety of environmental education programs, Adak visitor center operation, and various other refuge programs.

### 4. Volunteer Programs

Two local volunteer biologists worked on the AIU during the 1986 field season. One participated in the Kiska field study, providing invaluable technical expertise on the use of time lapse cameras in the Sirius Point auklet colony. The other volunteer participated in the Kiska field study and Adak wildlife surveys. Two refuge staff wives provided volunteer assistance with radio operations to field camps. One refuge wife assisted with the Adak Breeding Bird Survey. In addition, an Anchorage doctor and birding enthusiast conducted voluntary bird surveys for the refuge during his two one week medical clinics for the U.S. Air Force at Shemya Island in May and September.

### 5. Funding

Funding for the AIU is included in the AMNWR budget. AIU

funding was received from wildlife resources (1260), endangered species (1480), YCC (1520) and Accelerated Refuge Maintenance Management (ARMM) in 1986 (Table 6). Funding in 1986 was adequate due to the expeditious use of volunteers and SCA aides and a one-time endangered species add on for fox work at Kiska Island. The future (1987 and beyond) is difficult to predict.

Table 7. AIU funding, FY-1981. to FY-1987 (in thousands of dollars)

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

## 6. Safety

Refuge Outdoor Recreation Planner Edgerton served as station safety officer from 01 January through 30 September. Refuge Biological Technician McClellan assumed safety officer duties on 01 October.

Safety meetings were held monthly except for December, with nine movies being shown. Meeting topics included boating, use of seat belts, office safety, earthquakes, safety attitudes and back problems. May's safety meeting was a lively discussion of things we learned from experience: the 7.7 earthquake and tsunami warnings on 07 May. No meeting was held in December, as several staff members were away on business or leave.

A variety of safety training was received by refuge personnel during the year. Thirteen permanent, seasonal and volunteer employees were certified for CPR. A week long spring training session for field personnel included viewing of U.S. Coast Guard cold weather/cold water training films, use of personal floatation devices and survival suits, the care of use of outboard motors and inflatable boats, radio operation and communication procedures, the operation and maintenance of the "Kittiwake", a 26 ft Boston Whaler used around Adak, and weather forecasting (provided by the U.S. Navy forecaster).

Safety related purchases included four outboard motors and two 13 foot inflatable boats. New batteries were also purchased for all EPIRB'S.

Manager Zeillemaker prepared the annual list of Alaska FWS



permanent and temporary radio stations, frequencies and radio check times for most refuges and other field offices/stations for the 1986 field season. Copies were provided to all participants. The effort provides information to field camps for reference during possible emergencies. A multifrequency antenna and HF radio were installed in Biologist Deines' quarters to allow 24 hour emergency monitoring of AIU field camps and other Alaska camps. Two radios were taken to each AIU field camp in 1986. One served as the primary communication unit and the other served as a backup in the event of failure by the primary unit. Multifrequency whip antennas (5907.5, 3215.0, 4125.0 and 2182.4) also were used in all field camps. They performed very well and eliminated use of cumbersome inverted V "hotstick" antennas.



SCA and volunteer biologists receiving inflatable boat operations training. 6/6/86, #038602, FGD

## F. HABITAT MANAGEMENT

### 1. General

The AIU contains at least 200 named islands totalling 2.7 million acres. These islands stretch over 1,100 mi from the tip of the Alaska Peninsula to within 500 mi of the Soviet Union's Kamchatka Peninsula. Commonly 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 (1.0 million ac) and Amak islands are administered by the Izembek National Wildlife



Refuge, headquartered at Cold Bay, Alaska. The Sanak Islands south of the Alaska Peninsula are managed from the AMNWR headquarters at Homer, Alaska. Except for the Aleut village at Atka, the navy bases 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 World War II.



The Aleutians contain thousands of acres of willow which may not be marketable, but are a major component of the upland flora with the catkin being the tallest part of the "tree."  
6/14/86, #018602, CFZ.

## 2. Wetlands

Many of the islands have numerous freshwater "potholes", some areas even superficially resembling the prairie pothole country of the Midwest. A few areas at lower elevations produce aquatic growth and support modest waterfowl populations. This is especially true at Amchitka, Kanaga and Agattu islands. Current management efforts include orienting military development away from lowland wetlands and lagoons. The AIU staff monitors most construction projects on all military installations at Adak and Attu and provides recommendations on proposed activities by Native corporations on the refuge as well. The military, especially at Adak, was quite cooperative and sensitive to our suggestions throughout the year. We hope to increase coordination at Shemya (U.S. Air Force) in 1987.

This year the refuge assisted in several activities that



involved wetlands, including planning for the U.S. Navy \$92 million Relocatable Over The Horizon Radar facility at Amchitka Island, alerting the U.S. Army Corps of Engineers of U.S. Navy Contractor construction of a temporary pier in Sweeper Cove, Adak that required a Section 10 permit before completion, U.S. Navy road work and culvert replacement at Adak, U.S. Army Corps of Engineers/U.S. Air Force surface cable replacement at Attu, U.S. Navy TACAN Hill, Adak, removal adjacent to a stream, U.S. Navy Adak rock crusher/washer relocation, U.S. Army Corps of Engineers cleanup on two islands and planning for future U.S. Navy fuel tanks at Adak.



Atka village is the western most Aleut community remaining in the Aleutians. 8/13/86, #048601, TRE.

#### 7. Grazing

Refuge grazing problems have still not been resolved. All three grazing operations had appealed 1985 grazing rates as 1986 began. Considerable time was then spent trying to establish a "local rate" as specified in 50 CFR 29.5. In lieu of a local rate, it was decided that all permittees would be charged a \$100 administrative fee for annual Special Use Permits. The fee would cover the costs of administering paperwork and collecting funds. Each permit would continue to be for a period of one year (October through September). The Regional Director passed the decision to the three permittees in late September. A \$100.00 check was received from one permittee in mid-November to cover his 1985 grazing operation. All permittees were then billed for grazing activities from the time of their last payment (1984 in two cases) through



September 1987. No additional payments had been received by the end of the year. Follow up contacts are planned for early 1987.

#### 9. Fire Management

A tundra fire occurred at the NAS Adak rifle range on 23 April. The local U.S. Marine Corps detachment was conducting gunnery practice at the time and a mortar round ignited the dry vegetation. Through inaction, the fire increased beyond the size that it could be controlled by the Marines on hand. To keep it from spreading out of control, a recall of all off duty Marines occurred. Assistance was rendered by U.S. Navy personnel. The fire was under control within 10 hours of discovery and was then allowed to burn itself out. Approximately 200 acres were burned. Due to the location (within a gunnery range) no significant impacts occurred to any wildlife species. The area fully greened up by August. Fire is an unusual event in the Aleutians, as our normally perpetually wet tundra usually will not burn. However, in 1985 we also had a fire in the same area. White phosphorous will do it every time!



April



August

The 200 acre April tundra fire site was fully green by August. 4/23/86-8/9/86, #018603/#018604, CFZ.

#### 12. Wilderness and Special Areas

The Alaska National Interest Lands Conservation Act (ANILCA) designated approximately 1.3 million ac of the Aleutian Islands

Unit as Wilderness. Notable areas of the refuge unit excluded from the designation include 127,870 ac on Shemya, Attu, Adak, Amchitka and Ugamak islands for military and lighthouse purposes or World War II debris and approximately 200,000 ac selected by Native corporations under ANCSA.

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

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



Great Sitkin Island, 25 miles east of Adak, has an active volcano, one of 27 suspected in the "Chain."  
11/24/86, #028602, EVK.

#### G. WILDLIFE

##### 1. Wildlife Diversity

Birdlife of the central and western Aleutian Islands has been

adversely impacted through the introduction of arctic and red foxes beginning in 1836 and continuing through the 1920's for fur farming purposes. The once abundant Aleutian Canada goose was dangerously close to extinction during the 1960's due to fox predation and hunting on its California wintering grounds. As a result of fox eradication success, the ACG is gradually being reintroduced to islands near two remaining traditional nesting grounds at Buldir and Chagulak islands. Continuing fox removal efforts are leading toward restoration of the endangered goose and benefiting numerous other tundra and burrow nesting bird species. Nesting seabirds have already begun to increase on Agattu, Alaid, Nizki, Amchitka and Amukta islands which are once again free of foxes. Another endangered bird species, the short-tailed albatross, is a migrant, through Aleutian waters. It has suffered from human impacts and introduced rats on its nesting island near Japan. With increased protection, the species is now being recorded in Aleutian waters with regularity once again.

In separating the North Pacific Ocean from the Bering Sea and bridging North America to Asia, the Aleutian Islands offer refuge to an international variety of birds. Migrants converge from all points of the compass. Nearly 100 Asiatic species have been observed in the Aleutians, primarily from Adak to Attu. Several have been reported nowhere else in North America and observations of new species occur almost annually. Asiatics include whooper swan, bean goose, the Asian form of green-winged teal, common pochard, tufted duck, smew, white-tailed eagle, common greenshank, wood sandpiper, Far Eastern curlew, common sandpiper, long-toed stint, eye-browed thrush, olive tree-pipit and rustic bunting. A large variety of seabirds nest on island cliffs, talus slopes and tundra covered slopes in dense, noisy colonies. Their rookeries vary in size and composition, but some of the more numerous species include northern fulmar, fork-tailed and Leach's storm-petrels, red-faced and pelagic cormorants, glaucous-winged gull, black-legged kittiwake, thick-billed and common murres, pigeon guillemot, ancient murrelet, least and crested auklets and horned and tufted puffins.

Three new bird species were observed this year in the Aleutians causing the list of avifauna to grow to 260 species. Knowledge of the Aleutian avifauna has increased considerably in recent years due to numerous field investigations by non-refuge as well as refuge personnel. Attour, Inc., continued spring surveys at Attu for the tenth year. Dr. Dave Sonneborn, a private birder from Anchorage, once again conducted spring surveys at Shemya while conducting medical clinics there for the Air Force. He also repeated the effort in September Refuge and other FWS personnel conducted surveys at Attu, Kiska, Adak, and other islands during the year. New species added to the American list in 1986 were the gray heron, great spotted woodpecker and greenish warbler all from Asia. Several second refuge records were also documented (details can be



observed there (a new Alaska high count) on 31 March, and five remained on 04 April. An adult was at Clam Lagoon and Andrew Lake, Adak, at different times on 29 November. Six frequented the same two Adak habitats on 07 December. Four (3 Adult, 1 juvenile) were at Amchitka on 14 December.

Snow Goose - Three were reported to be near the edge of the Atka airport runway on 17 November.

Brant - One was at Shagak Bay, Adak, on 10 May. Three were at Clam Point, Amchitka, on 15 December.

Garganey - A high plumaged male was at Clam Lagoon, Adak, 11-17 May. Two female plumaged birds were at Cooter Cove, Shemya, on 03 September.

Eurasian Wigeon - Two drakes and a hen were on the Clam Lagoon, Adak, tidal flats on 15 February. Up to 16 were at Attu between 19 May and 07 June. Two were at Shemya 21-24 May. Up to 4 were at Shemya 04-08 September. One was at Adak 18 September and six were there 27 October. Fifteen were at Jones Lake and a nearby pond, Amchitka, on 03 September.

Common Pochard - One was at Attu 18-19 May. Three were at Shemya 21-28 May. One drake was at Casco Cove, Attu, on 12 June and three drakes were at Barbara Point, Attu, on 14 June.

Canvasback - Two were at Clam Lagoon, Adak, on 08 February, two pair were at Clam Lagoon on 15 and 20 February. A drake was with greater scaup at Andrew Lake, Adak, on 29 November.

Tufted Duck - The maximum Attu count from 18 May to 07 June was 15 on 02 June. Up to 4 were at Lower Lake, Shemya, 22-26 May. A pair was at Haven Lake, Adak, on 09 June. Two drakes were on Clevenger Lake, Amchitka, on 26 June. One was at Adak on 18 September. Two were at Jones Lake, Amchitka, on 23 September.

Lesser Scaup - A male observed with greater scaups on a pond near Andrew Lake, Adak, 26 April to 26 May furnished the second Aleutian record for the species (the first was at Amchitka in 1977).

King Eider - A high plumaged drake courted a hen common eider at Casco Cove, Attu, on 12 June.

Steller's Eider - A male, presumed to be the same individual that has wintered with harlequin ducks at Adak since 1982-1983, was present once again off Zeto Point as the year began. On 13 March a hen was discovered accompanying the drake. Both were sighted regularly together through 28 April. The birds vanished by spring. A female plumaged bird was found off Zeto Point on 19 November, and a drake was located in rough seas

during the 31 December Christmas Bird Count.

Barrow's Goldeneye - One was observed at Attu 23, 24, 26 and 31 May. A female plumaged bird was at Jones Lake, Amchitka, on 23 September.

Smew - An immature male was on ponds near Andrew Lake, Adak, 14-17 May.

General Adak wildlife surveys consist of vehicle, beach walk and nearshore boat routes conducted throughout the year to provide seasonal bird and mammal population and distribution information. The vehicle survey is conducted along a prescribed route with designated stops over the roaded portion of the northeastern quarter of the island.

The beach survey is composed of foot routes covering 5 separate beaches on the northeastern portion of Adak. The nearshore boat survey is conducted using a 25-foot Boston Whaler and follows a prescribed route along the shores and coves of Kuluk Bay and adjoining open waters. All surveys are conducted following the draft Wildlife Inventory Plans. The vehicle and beach surveys are conducted twice a month. The nearshore boat survey is conducted once a month as time and weather permit. Due to staff limitations and weather, no surveys were conducted in December, only one beach survey was completed in June, and only three nearshore boat surveys were completed during the year.

Twenty-one waterfowl species were observed during the general Adak wildlife surveys (Table 8). The harlequin duck was the most numerous species observed with an average of 169 observations during each vehicle survey and an average of 116 observations during each beach survey. Even though the harlequin duck is not known to nest on Adak (or anywhere in the Aleutians), it is the most common duck species observed year around.

Other common year around nesting species include the Aleutian green-winged teal, mallard, greater scaup and red-breasted merganser. Both the northern pintail and common eider also nest at Adak. Wintering waterfowl populations include the emperor goose, oldsquaw, black scoter, common goldeneye and bufflehead. Although the emperor goose usually arrives off Adak in December, large numbers are not observed until after hunting season closes on January 22. Larger and more representative numbers are subsequently observed in February and March. For the past four winters a single male or pair of Steller's eiders has been observed off the Zeto Point Seawall with large numbers of harlequin ducks. These birds are the only ones that have ever been observed on Adak, and they are always off the Zeto Point Seawall.



Table 8. Waterfowl observed during the Adak general wildlife surveys 1986.  
VEHICLE SURVEY

<u>Waterfowl Species</u>	<u>JAN</u>	<u>FEB</u>	<u>MAR</u>	<u>APR</u>	<u>MAY</u>	<u>JUN</u>	<u>JUL</u>	<u>AUG</u>	<u>SEPT</u>	<u>OCT</u>	<u>NOV</u>	<u>DEC</u>	<u>TOTAL</u>
Emperor Goose	125	271	247	6	-	-	-	-	-	-	-	-	649
Green-winged Teal	28	108	177	237	196	-	105	1	83	19	53	-	1007
Mallard	7	69	103	133	55	-	2	3	27	26	37	-	462
Northern Pintail	68	36	73	237	9	-	-	-	112	11	-	-	546
Garganey	-	-	-	-	1	-	-	-	-	-	-	-	1
Northern Shoveler	-	-	-	-	1	-	-	-	-	-	-	-	1
Eurasian Wigeon	3	-	-	-	5	-	-	-	1	6	-	-	15
American Wigeon	-	-	-	-	2	-	-	-	-	-	-	-	2
Canvasback	-	6	8	-	-	-	-	-	-	-	-	-	14
Tufted Duck	-	-	-	14	-	-	-	-	1	-	-	-	15
Greater Scaup	146	35	86	95	108	-	51	10	12	96	95	-	734
Common Eider	17	-	-	-	-	-	16	42	17	-	-	-	92
Steller's Eider	-	-	2	4	-	-	-	-	-	-	1	-	7
Harlequin Duck	366	346	469	696	529	-	118	54	138	405	382	-	3503
Oldsquaw	91	33	47	10	-	-	-	-	-	-	42	-	223
Black Scoter	11	23	73	5	19	-	-	-	-	-	-	-	131
White-winged Scoter	-	6	10	-	-	-	11	7	-	-	-	-	34
Common Goldeneye	187	162	251	318	78	-	-	-	-	15	192	-	1203
Bufflehead	64	38	33	61	9	-	-	-	-	4	49	-	258
Common Merganser	-	-	-	-	2	-	-	-	-	-	-	-	2
Red-breasted Merganser	152	60	103	132	97	-	56	1	31	16	61	-	709
	(1)*	(1)	(1)	(2)	(2)	(0)	(2)	(1)	(1)	(1)	(1)	(0)	

BEACH SURVEY

Emperor Goose	49	25	-	22	-	-	-	-	-	-	-	-	96
Green-winged Teal	-	-	-	-	2	1	3	-	-	-	-	-	6
Mallard	-	-	-	-	-	4	1	-	-	-	-	-	5
Eurasian Wigeon	-	-	-	-	1	-	-	-	-	-	-	-	1
Common Eider	-	-	-	-	-	-	10	54	16	-	1	-	81
Harlequin Duck	220	164	131	359	226	123	117	77	294	216	273	-	2200
Oldsquaw	-	58	9	-	-	-	-	-	-	-	-	-	67
White-winged Scoter	-	6	-	-	-	-	13	-	-	-	-	-	19
Common Goldeneye	47	17	17	6	-	-	-	-	-	1	43	-	131
Common Merganser	-	-	-	2	-	-	-	-	-	-	-	-	2
Red-breasted Merganser	11	11	1	12	72	24	-	4	22	69	56	-	282
	(2)*	(2)	(1)	(2)	(2)	(1)	(2)	(2)	(2)	(1)	(2)		

\* indicates number of surveys conducted each month.

#### 4. Marsh and Waterbirds

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

Pacific loon - Three were observed on Adak during the annual Christmas Bird Count on 31 December. Two were noted off the Lake Andy Seawall and the third was observed in Sweeper Cove.

Fork-tailed Storm-Petrel - Two were picked up from beneath Adak street lamps during the early morning hours of 08 October. The only later records are from the large Buldir colony 10 October 1975 and 07 November 1976.

Double-crested Cormorant - One was with pelagic and red-faced cormorants at Head Rocks, Adak, on 21 April.

Gray Heron - A bird carefully observed at Attu in early May was identified to this species by an experienced observer. Due to the lack of photographs or a specimen, the species is considered "unsubstantiated" by the Alaska records committee. The species is also new to North America.

Sandhill Crane - One was at Shemya 22-27 May. The species had not been previously recorded on the island.

A description of general Adak wildlife surveys is in Section G. 3. Three loon species and two grebe species were observed during the general Adak wildlife surveys in 1986. Loons and grebes are not observed on the Adak surveys in large numbers except for the wintering horned grebe (Table 9). An average of 5 horned grebes was observed during each beach survey and an average of 3 was found during each vehicle survey. The common loon is the only member of its family known to nest on Adak. It is usually observed in low numbers in the summer, although it can be observed occasionally year around. The red-throated loon, pacific loon and red-necked grebe are normally winter visitors to Adak.

#### 5. Shorebirds, Gulls, Terns and Allied Species

Seven species of plovers, 46 species of snadpipers, three species of jaegers, a skua, 13 species of gulls, four species of terns and 15 species of alcids have been recorded in the

Table 9. Marsh and waterbirds observed on the Adak general wildlife surveys, 1986.

VEHICLE SURVEY

<u>Marsh and Waterbirds</u>	<u>JAN</u>	<u>FEB</u>	<u>MAR</u>	<u>APR</u>	<u>MAY</u>	<u>JUN</u>	<u>JUL</u>	<u>AUG</u>	<u>SEP</u>	<u>OCT</u>	<u>NOV</u>	<u>DEC</u>	<u>TOTAL</u>
Red-throated Loon	-	1	-	-	-	-	-	-	-	-	-	-	1
Pacific Loon	3	3	-	-	4	-	-	-	-	-	1	-	11
Common Loon	-	-	-	-	-	-	1	-	-	-	-	-	1
Loon, species	-	3	-	-	-	-	-	-	-	-	-	-	3
Horned Grebe	8	2	5	2	-	-	-	-	-	6	16	-	39
	(1)*	(1)	(1)	(2)	(2)	(0)	(2)	(1)	(1)	(1)	(1)	(0)	

BEACH SURVEY

Common Loon	-	-	-	-	-	-	1	1	-	-	-	-	2
Loon, species	-	-	-	1	-	-	-	-	-	-	-	-	1
Horned Grebe	7	9	-	-	-	-	-	-	-	27	42	-	85
Red-necked Grebe	-	-	-	1	-	-	-	-	-	-	-	-	1

\* indicates number of surveys conducted each month.

Aleutian Islands. Of those, five species of plovers, 26 species of sandpipers, five species of gulls and two species of terns are Asiatic in origin. The rock sandpiper and the glaucous-winged gull are year-round residents. The following listing includes occurrence information for unusual North American and Asiatic species:

Black-bellied Plover - One was at Attu on 28 May. One was at Shemya on 07 September. A lone bird was at Clam Lagoon, Adak, 27-29 October.

Mongolian Plover - Four were at Attu 01-03 June and one remained until 06 June. The species usually is recorded there in May.

Common Ringed Plover - One was at Shemya on 21 May.

Semipalmated Plover - An adult bird apparently defending a territory was discovered along the shore of Andrew Lake, Adak, on 19 July. The site could not be visited the following day due to inclement weather, but the area was revisited on 16 July. The adult bird could not be located, but four fledglings were observed and photographed. The only previous confirmed record for Adak was of an adult bird along the shore of Andrew Lake in July 1984.

Little Ringed Plover - One was discovered at Alexai Point, Attu, on 18 May. It was subsequently well observed several times through 30 May. Alaska's only prior record was of one bird at Burdir in June 1974.

Eurasian Dotterel - Two were at Shemya on 05 September.

Common Greenshank - One was at Attu 22 May - 05 June.

Greater Yellowlegs - One was at Sweeper Cove Creek, Adak, on 28 October.

Spotted Redshank - One was at Attu on 25 May.

Wood Sandpiper - Up to 15 (22 May) were at Attu 19 May to 07 June, with at least two pairs on territory through early June. Up to 7 were at Shemya 21-27 May.

Gray-tailed Tattler - Up to 11 were at Attu 29 May to 06 June. One to three were at Shemya 23-27 May. Two were at Kuluk Beach, Adak, and one was at Sweeper Cove, Adak, on 04 June. There are no previous Adak records. Up to 7 were at Shemya 03-10 September.

Common Sandpiper - Up to 12 were at Attu 22 May to 01 June.

Terek Sandpiper - Up to 4 were at Attu 29 May to 05 June. One was at Clam Lagoon, Adak, on 04 June, a first for the island.

Whimbrel (Asiatic subspecies) - One to two were at Attu 26 May to 06 June. Up to 3 were at Shemya 22-29 May and 4 were there on 10 September. One was at Kuluk Beach, Adak, on 01 and 02 June.

Bristle-thighed Curlew - Two were at Zeto Point, Adak, on 12 and 13 May. Four were heard overhead at Attu on 29 May.

Far Eastern Curlew - Two were at Clam Lagoon, Adak, on 31 May and at Kuluk Beach, Adak, on 01 June. Single birds tarried at Kuluk Beach through 06 June.

Bar-tailed Godwit - One was at Clam Lagoon, Adak, on 01 June.

Rufous-necked Stint - Up to five were at Attu on 20 May to 02 June. Up to 6 were at Shemya 05-09 September.

Long-toed Stint - One was at Attu 23 May to 06 June, with two present on 03 June. Two were at Shemya on 06 September.

Sharp-tailed Sandpiper - One was at Attu 25-26 May and 07 June. One was at Shemya 03-08 September. Seven were observed at Adak 27 October. Four remained on 29 October.

Spoonbill Sandpiper - Two were observed and photographed at close range at Casco Cove, Attu on 30 and 31 May. Only one was there 01 June, when a presumed third bird was found several miles away at Alexai Point. At least one remained on 02 June. There are two other Alaska records in the last 72 years, including one at Buldir in 1977. There is also one record for British Columbia.

Broad-billed Sandpiper - One was photographed at the Lower Lake outlet, Shemya, on 03 September.

Ruff - A reeve (female of species) was at Clam Lagoon, Adak, on 31 May. Up to 3 males were at Shemya 03-10 September.

Long-tailed Jaeger - Two were at Attu 26 May and 07 June, with 13 reported there 28 May. Three were at Shemya on 23 May.

Common Black-beaded Gull - One appeared at Clam Lagoon, Adak, on 14 May. Two were there on 17 and 28-31 May. Singles were at Kuluk Beach, Adak, 05-06 May. An immature was at Clam Lagoon on 09 June and two birds were there on 15 June. One was at Attu 25 May - 05 June. A flightless (molting) bird was at Shemya 03-08 September.

Slaty-backed Gull - One was at Attu 24-29 May. Another was at Shemya on 25 May.

Common Tern (Asiatic subspecies) - Up to 6 were at Attu 29 May to 05 June. One was found at Clam Lagoon, Adak, during the Breeding Bird Survey. There are no previous Adak records.



The rare spoonbill sandpiper breeds on the north-east Siberian Coast and winters in southeastern China. This was one of three that appeared at Attu in 1986. 5/30/86, Robert Mumford.

Marbled Murrelet - A total of 132 were found on Clam Lagoon, Adak, under ideal viewing conditions on 07 July.

Least Auklet - At least eight were on Sweeper Cove, Adak, on 29 January. Two were there on 02 February. One was found at the same location during the Christmas Bird Count on 31 December.

A description of Adak general wildlife surveys is in section G. 3. Twenty-seven species of shorebirds, gulls, terns and allied species were observed during the 1986 general wildlife surveys, (tables 10 and 11). The glaucous-winged gull was the most numerous species observed with an average of 229 observations during each vehicle survey and an average of 50 observations during each beach survey. The high gull population is due to human inhabitation of the island and resultant available food resources (garbage). Several nesting colonies of glaucous-winged gulls are found on and near Adak. Other year round residents include the pelagic cormorant, red-faced cormorant, black oystercatcher, rock sandpiper and pigeon guillemot. Seabirds which visit Adak waters, but nest only on offshore rocks or other nearby islands, include the black-legged kittiwake, common murre, thick-billed murre, marbled murrelet (may nest on Adak), ancient murrelet, and tufted puffin (may nest on Adak) and horned puffin.



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

Aleutian and arctic tern nesting survey plots were established in 1986 at two locations on Adak in compliance with draft AIU wildlife inventory plans. The Aleutian tern colony is normally located on the flats at the southwest portion of Clam Lagoon, while the arctic tern colony is located in the hills west or southwest of the southwestern portion of Clam Lagoon. Surveys were conducted on 10, 15, 21, 22, 28, and 30 July.

Tern nesting normally occurs in late June and early July, with fledging occurring in late July and early August. Due to higher priority field work off Adak, the surveys were not conducted at the best time. No nests or nestlings were found. Also, no adults were observed carrying any food to what might have been nest sites. The actual major concentration of nest sites will have to be determined during an earlier time frame next year.

The objectives of the surveys were to: 1) delineate the boundaries of the nesting colonies, 2) determine the activity periods of the colonies and 3) estimate the nesting populations. Surveys were conducted from 0830 to 1600 using two to four observers. The observers were stationed at separate locations within the colony area. Counts of all terns flying above the colony were made and recorded every 15 minutes. Counts were made with the unaided eye and 10 X 40 binoculars. The boundaries of the colony were determined by walking the periphery of the area that the terns were flying and circling over.

There were two peak periods of Aleutian tern activity: 1100 hours and 1215 hours. The mean number of Aleutian tern observations gradually increased throughout the morning and hit the first peak of 25 Aleutian terns (average) at 1100. Then there was a gradual decline to 15.7 Aleutian terns (average) at 1145. The second peak ascended and descended very quickly in a 45 minute period (1200 to 1245) with the peak of 24.3 Aleutian terns (average) occurring at 1215. The number of Aleutian tern observations then fluctuated over the rest of the afternoon, but generally decreased. Data from the arctic tern surveys were incomplete, but indicated a peak activity period from 1300 to 1400. This information will aid next years tern surveys.

One potential impact on the tern surveys was construction occurring on the NSGA Adak road that runs along the western edge of the Aleutian tern colony area and below and east of the arctic tern colony area. It is thought that road work may have disturbed the birds and caused lower numbers to be present at the colony this year than have historically been observed

Table 10. Shorebirds, gulls, terns and allied species observed during Adak vehicle surveys, 1986

	<u>JAN</u>	<u>FEB</u>	<u>MAR</u>	<u>APR</u>	<u>MAY</u>	<u>JUN</u>	<u>JUL</u>	<u>AUG</u>	<u>SEP</u>	<u>OCT</u>	<u>NOV</u>	<u>DEC</u>	<u>TOTAL</u>
Pelagic Cormorant	17	10	5	35	21	-	-	-	2	63	51	-	204
Red-faced Cormorant	-	-	-	-	1	-	-	-	3	-	15	-	19
Cormorant species	76	50	98	88	32	-	50	16	37	27	53	-	527
Black-bellied Plover	-	-	-	-	-	-	-	-	-	1	-	-	1
Black Oystercatcher	-	-	-	-	2	-	1	1	1	-	2	-	7
Greater Yellowlegs	-	-	-	-	-	-	-	-	-	1	-	-	1
Bristle-thighed Curlew	-	-	-	-	2	-	-	-	-	-	-	-	2
Ruddy Turnstone	-	-	-	-	-	-	-	81	25	-	-	-	106
Sharp-tailed Sandpiper	-	-	-	-	-	-	-	-	-	7	-	-	7
Rock Sandpiper	-	-	19	3	-	-	5	-	2	14	17	-	60
Red-necked Phalarope	-	-	-	-	3	-	-	-	2	-	-	-	5
Parasitic Jaeger	-	-	-	5	21	-	26	10	-	-	-	-	62
Glaucous-winged Gull	61	96	289	397	488	-	378	351	479	325	110	-	2974
Black-legged Kittiwake	-	-	-	-	-	-	-	100	503	1	-	-	604
Arctic Tern	-	-	-	-	-	-	13	-	-	-	-	-	13
Aleutian Tern	-	-	-	-	-	-	3	-	-	-	-	-	3
Tern species	-	-	-	-	82	-	-	80	-	-	-	-	162
Common Murre	-	-	-	1	1	-	-	-	-	-	-	-	2
Thick-billed Murre	4	-	-	-	-	-	-	-	-	-	-	-	4
Murre species	-	-	-	-	26	-	7	1	-	1	1	-	36
Pigeon Guillemot	38	10	38	91	69	-	128	60	36	12	26	-	508
Marbled Murrelet	-	-	3	-	14	-	3	1	-	-	-	-	21
Ancient Murrelet	-	-	1	2	174	-	29	-	-	-	-	-	206
Murrelet species	4	-	-	2	-	-	3	3	-	-	-	-	12
Tufted Puffin	-	-	-	-	-	-	195	23	13	-	-	-	231
Horned Puffin	-	-	-	-	-	-	84	61	34	-	-	-	179
	(1)*	(1)	(1)	(2)	(2)	(0)	(2)	(1)	(1)	(1)	(1)	(0)	

\* number of surveys conducted each month

Table 11. Shorebirds, gulls, terns and other allied species observed during Adak beach surveys, 1986

	<u>JAN</u>	<u>FEB</u>	<u>MAR</u>	<u>APR</u>	<u>MAY</u>	<u>JUN</u>	<u>JUL</u>	<u>AUG</u>	<u>SEP</u>	<u>OCT</u>	<u>NOV</u>	<u>DEC</u>	<u>TOTAL</u>
Pelagic Cormorant	-	-	-	1	4	2	1	-	2	-	72	-	82
Red-faced Cormorant	-	-	-	-	-	-	-	-	-	-	1	-	1
Cormorant, species	3	11	6	9	4	2	5	3	20	14	4	-	81
Black Oystercatcher	-	2	-	2	6	4	5	14	-	1	10	-	44
Whimbrel	-	-	-	-	-	1	-	-	-	-	-	-	1
Far Eastern Curlew	-	-	-	-	-	1	-	-	-	-	-	-	1
Ruddy Turnstone	-	-	-	-	1	-	41	50	9	4	1	-	106
Sanderling	31	55	38	43	-	-	-	-	22	37	83	-	309
Rock Sandpiper	25	35	2	12	2	-	6	4	3	13	29	-	131
Red-necked Phalarope	-	-	-	-	-	-	4	-	-	-	-	-	4
Parasitic Jaeger	-	-	-	-	4	-	9	1	-	-	-	-	14
Glaucous-winged Gull	42	117	57	81	161	38	103	108	133	41	75	-	956
Glaucous Gull	-	-	-	-	-	1	-	-	-	-	-	-	1
Black-legged Kittiwake	-	-	-	-	-	-	-	-	24	17	-	-	41
Arctic Tern	-	-	-	-	1	9	11	2	-	-	-	-	23
Aleutian Tern	-	-	-	-	-	1	2	-	-	-	-	-	3
Tern, species	-	-	-	-	104	28	25	-	-	-	-	-	157
Murre, species	1	-	-	-	-	3	5	6	-	-	-	-	15
Pigeon Guillemot	-	-	-	-	21	10	21	12	10	-	-	-	74
Marbled Murrelet	-	-	-	-	-	-	1	-	-	-	-	-	1
Ancient Murrelet	-	-	-	-	6	1	30	-	-	2	-	-	39
Murrelet, species	-	-	-	-	2	-	-	-	1	-	-	-	3
Tufted Puffin	-	-	-	-	-	29	47	54	-	-	-	-	130
Horned Puffin	-	-	-	-	-	-	47	36	-	-	-	-	83
	(2)*	(2)	(1)	(2)	(2)	(1)	(2)	(2)	(2)	(1)	(2)	(0)	

\* number of surveys conducted each month

there. Road construction was completed in 1986.

Glaucous-winged gull nesting survey plots were established in 1985 at two locations on Adak as possible monitoring sites in the central Aleutians. One plot is at Gull Island in Clam Lagoon. The other consists of 4 islets in Lake Betty. The surveys were conducted on 8, 9 and 11 July per methods described in the AIU draft wildlife inventory plans. No active gull nests or nestlings were found in 1986, as was the case in 1985. Gull Island in Clam Lagoon has supported an active eagle aerie in 1985 and with one nestling during the 1986 surveys. The island was, therefore, not surveyed for gull nests to eliminate any disturbance to the nesting eagles; however, twenty-one glaucous-winged gulls were observed flying around the island. No glaucous-winged gulls were observed around Gull Island during the 1985 survey. Several empty gull nests and pieces of eggshell were found on the Lake Betty Islets and 31 gulls were observed flying above the islets. A total of 58 gulls were observed at the site in 1985. The peak hatching period for glaucous-winged gulls is 20 June to 01 July. Due to the higher priority field work off Adak in June, however, the glaucous-winged gull nesting surveys were not conducted until mid-July. The surveys were conducted when nestlings are active and out of the nest. Also, by mid-July the vegetation had become dense, making it very difficult to locate any nests. The surveys should be conducted during the peak hatching period (June) to obtain better results.

Adak pigeon guillemot surveys were established on the north side of Sweeper Cove per draft AIU wildlife inventory plans in July. Objectives were to check for possible nesting beneath the Navy Air Station (NAS) Adak piers and tally birds using the cove. Biologists were unsuccessful in documenting guillemot nesting beneath the two major piers in 1985 by inflatable boat and walking catwalks. Most of the numerous small spaces in the pier framework could be viewed from the catwalk, but not all could be checked. There were no nests found, although a few birds were noted roosting there. On 10 July 1986 a 16 foot extendable fiberglass "hotstick" (or radio antenna pole) with a vehicle door mirror mounted to the tip was successfully used from the catwalks below the pier decks to check all potential nest sites. No nests were found. Once again, several pigeon guillemots were observed roosting in the small spaces in between the support beams. Nine guillemot surveys were conducted on the north side of Sweeper Cove, Adak, from 08 July to 18 July by SCA biologist aides. The first and last surveys were incomplete. The guillemot surveys began at 0600 and ended from 0830 to 1000 each day. The length of survey time increased as the surveys were developed. Observations were made from a vehicle using 8 x 40 binoculars and a 25X spotting scope. The numbers of guillemots observed at each of six points were recorded. Survey times required 20 to 35 minutes (normally 30 minutes). The cycle was then repeated one or more times.

The mean number of pigeon guillemots observed during the survey period varied from a low of 13.5 birds on 09 July (incomplete survey) to a high of 32.8 birds on 16 July (Table 12). The mean number of birds observed during the survey period gradually increased to 32 birds on 16 and 17 July. The mean number of birds for the seven days of complete survey was 23. The highest numbers of birds were recorded at survey points 1 and 5, with means of 40.7 and 46 respectively. Survey point 3 had the lowest mean number of guillemots observed (4.6). As shown in Figure 1, the number of pigeon guillemots observed each morning generally increased to the 0830 to 0900 time period. When a mean of 25.5 birds was recorded. The mean number of guillemots observed after that survey period gradually declined. The lowest mean number of birds was observed during the 0600 to 0630 time period (1.5 birds). The 1986 pigeon guillemot survey produced good baseline data that will provide a foundation for future investigations. Next year the guillemot surveys will begin earlier in the month and be conducted into late July. We will also extend some of the time periods during the initial surveys through the entire day to obtain more complete activity patterns. Pier nest checks will be continued.

## 6. Raptors

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

White-tailed Eagle - At least one was observed at Attu on 20, 22, 25, and 26 May and 3, 4, and 7 June. The species has not nested on the island since one of the adult pair died in late 1984 or early 1985.

Short-eared Owl - One was at Shemya on 24 May and another was at Attu on 31 May. One was near Clam Lagoon, Adak, on 23 July and a weakened bird was delivered to the office on 26 September. The bird was found by construction workers in a trench at a Navy housing site. It had no external injuries, but was too weak to fly. The western edge of the species' known Aleutian breeding range is Umnak Island. The bird was thought to be a wandering non-breeder that was starving to death due to the absence of prey (ground squirrels, voles, etc.) in the central and western Aleutians. Adak's introduced Norway rats are too large for a small owl to handle. After regaining its strength on baby food and Gatorade, the owl began to feed on dead Norway rats supplied by Navy refuse personnel. When sufficiently recovered, the owl was shipped to RO Law Enforcement personnel in Anchorage and placed in a raptor rehabilitation program. It was subsequently released back to the wild near Palmer, Alaska. Another bird was later observed near the Naval Facility, Adak, on 14 December.

Table 12. Total and mean number of Pigeon Guillemots observed at six survey points, Sweeper Cove, Adak, 1986

DATE	7/8*	7/9	7/10	7/11	7/14	7/15	7/16	7/17	7/18*	TOTAL*	MEAN*
SURVEY POINT											
1	19/6.3**	5/1.0	20/3.3	22/3.1	67/8.4	45/5.6	53/5.9	73/9.1	0/0	285	40.7
2	7/2.3	12/2.4	14/2.3	15/2.1	32/4.0	33/4.1	39/4.3	29/3.6	36/9.0	174	24.9
3	2/0.7	1/0.2	8/1.3	1/0.1	4/0.5	4/0.5	9/1.0	5/0.6	0/0	32	4.6
4	6/2.0	24/4.8	4/0.7	4/0.6	10/1.3	6/0.8	23/2.6	12/1.5	0/0	83	11.0
5	15/5.0	29/5.8	39/6.5	35/5.0	48/6.0	42/5.3	68/7.6	61/7.6	10/2.5	322	46.0
6	3/1.0	10/2.0	10/1.7	15/2.1	8/1.0	3/0.4	5/0.6	13/1.6	2/0.5	66	9.0
7***	2/0.7	-	-	-	-	-	-	-	-	-	-
TOTAL	54	81	95	92	169	133	197	193	48	960	137.0
MEAN	7.7	13.5	15.8	15.3	28.2	22.2	32.8	32.2	8.0	160.0	23.7

\* Surveys conducted on 7/8 and 7/18 were incomplete and therefore not used in calculating the totals and means.

\*\* Total observed each count/mean of all counts.

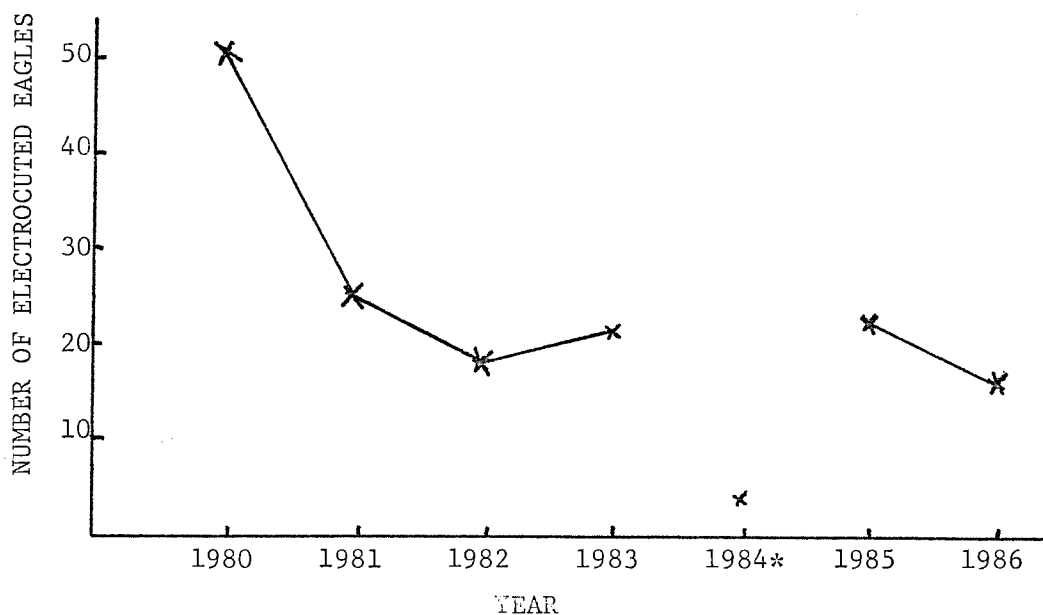
\*\*\* Survey point discontinued after 7/8.



is delivered there to be compressed and baled in preparation for transportation to the land fill. The problem will not ultimately be solved until the Navy buries all power lines (which is planned for the future). As shown in Figure 2, the incidence of electrocuted eagles, while still high, has shown considerable improvement since 1980.

Carcasses of all eagles were weighed, measured and necropsied to determine sex. Of the 20 carcasses, 19 were immatures and 1 was an adult. Five were positively sexed as females and 8 as males. The other seven could not be positively sexed. The primary tail and wing feathers were removed and shipped to RO Law Enforcement personnel in Anchorage for eventual distribution to Native Americans through Pocatello, Idaho.

Figure 2. Number of eagle electrocutions per year on Naval Air Station, Adak 1980-1986.



\* Incomplete data was recorded in 1984.

The bald eagle and peregrine falcon are normally observed during the Adak general wildlife surveys (Table 13). An average of 9 adult and 5 immature bald eagles were observed during each vehicle survey, and an average of 4 adult and 2 immature bald eagles were observed during each beach survey. It should be noted, however, that the vehicle and beach surveys cover only a small portion of the north east quarter of Adak. Several of the adult bald eagle observations were recorded at the same location on each survey while the birds were at their nests.

The numbers recorded represent trends throughout the year for a small portion of the Adak population. The thirteen immature eagles observed during the beach survey in October were feeding on a single whale carcass. Peregrine falcons also nest on Adak.

#### 7. Other Migratory Birds

The only true nonmigratory bird in the Aleutian Islands west of Unimak pass is the rock ptarmigan; however, several so-called "migratory" species do not migrate out of the chain. 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. That leaves 83 "other" migratory species including species added to the Aleutian list in 1986, for this section. Many of these species have been recorded as they pass through the Aleutians between wintering grounds (North America, Asia, Hawaii, Japan, or elsewhere in the Pacific) and breeding grounds (mainland Alaska or eastern Russia). The apparent exceptions are American dipper, water pipit, savannah sparrow and lapland longspur, which remain through the summer to nest on the islands. No one knows what Aleutian redpolls do, as they have been sporadically recorded during all months of the year and have at least occasionally nested on some of the islands. Of those species covered in this section, at least 46 are Asiatic in origin. The information that follows covers unusual North American and all Asiatic species recorded during the year:

Common Cuckoo - One was at West Henderson Valley, Attu, on 29 May, two were at Attu 06-07 June, another was at Casco Beach, Attu, on 12-15 June. A single bird, representing Adak's first record for the species, was at the Small Boat Basin 13-17 June.

Great Spotted Woodpecker - This species moved from the hypothetical ("unsubstantiated") list (Attu in October 1985) to an indisputable North American and refuge record when a female was collected at Attu in April. The specimen is in the University of Alaska Museum at Fairbanks.

Eurasian Skylark - One was at Attu 19-20 May.

Bank Swallow - One was at Attu on 06 June. One was at Shemya 03-04 September.

Arctic Warbler - Eleven were at Attu on 07 June, the highest count ever for the Aleutians. Only one other was observed the previous day.

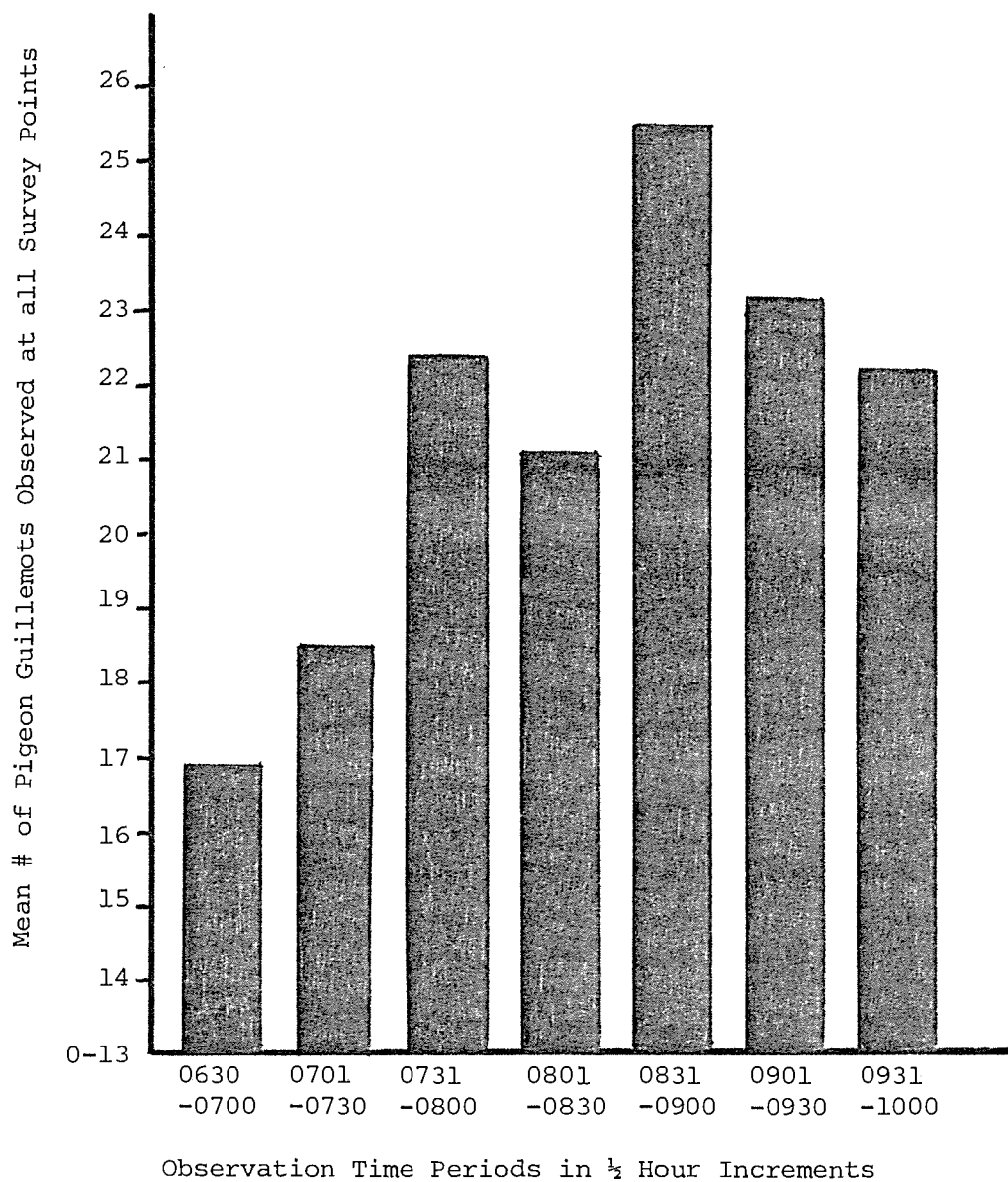
Greenish Warbler - A single singing bird was studied at Siddens Valley, Attu, on 15 June. The distinctive song was well heard, but no photographs were obtained and a specimen was not

Table 13. Raptors observed during Adak general wildlife surveys, 1986.

VEHICLE SURVEYS													
	<u>JAN</u>	<u>FEB</u>	<u>MAR</u>	<u>APR</u>	<u>MAY</u>	<u>JUN</u>	<u>JUL</u>	<u>AUG</u>	<u>SEP</u>	<u>OCT</u>	<u>NOV</u>	<u>DEC</u>	<u>TOTAL</u>
Bald Eagle (Adult)	9	2	22	8	15	-	17	8	12	9	12	-	119
Bald Eagle (Imm.)	5	5	7	6	3	-	12	5	6	5	11	-	65
Peregrine Falcons	-	-	-	1	-	-	-	1	-	-	1	-	2
	(1)*	(1)	(1)	(2)	(2)	(0)	(1)	(1)	(1)	(1)	(1)	(0)	
BEACH SURVEY													
Bald Eagle (Adult)	3	11	3	5	8	4	5	11	4	6	8	-	68
Bald Eagle (Imm.)	1	3	-	1	4	-	-	2	-	13	8	-	32
Peregrine Falcon	-	-	-	-	-	-	-	1	1	-	-	-	2
	(2)*	(2)	(1)	(2)	(2)	(1)	(2)	(2)	(2)	(1)	(2)	(0)	

\* number of surveys conducted each month

FIGURE 1. Mean Number of Pigeon Guillemots Observed at all Survey Points in Sweeper Cove, Adak, Alaska by Observation Period.





A short-eared owl in temporary quarters at refuge unit headquarters. 9/28/86, #088604, GTM

Snowy owl - A snowy owl was officially recorded on the Christmas Bird Count (CBC) on 31 December. Although they are observed occasionally in the winter on Adak, this was the first time this species has been found during a CBC.

Bald eagle surveys were conducted at Kiska Island in March and June as part of bird and mammal surveys and monitoring there per an EPA Compound 1080 experimental use permit (G704-EUP-28). A detailed description of the results of the eagle surveys is contained in Section G. 15.

It was another rough year for Adak bald eagles, although an improvement over 1985. A total of 20 eagle carcasses were retrieved in 1986, sixteen were electrocuted, 2 died of unknown causes and 2 died under unusual circumstances (from a head on collision with an ambulance and crushed by a large bale of garbage). The 20 eagle deaths in 1986 compares to 36 recorded in 1985. Six of the electrocutions took place around the NAS Adak Baler Building compared to 18 in 1985. This decline can partially be contributed to changes made to the power poles and lines in the area. Longer, raised perches were placed atop the poles, allowing more than one eagle to perch on them at a time. This reduced aggressive fighting for perch sites. Most of the power lines around the Baler Building were covered with PVC pipe to further reduce the chances of electrocution. Eagles congregate around the Baler Building because all island garbage





The second Adak common cuckoo occurrence was in June at the Small Boat Basin. 6/1/86, #038603, FGD.

collected. The species has not been previously recorded in North America, but this record will remain unconfirmed and is considered questionable by some due to the difficulty in identifying Phylloscopus warblers.

Red-breasted Flycatcher - One was at Attu 06-07 June, the fifth consecutive year the species has been recorded in Alaska.

Siberian Flycatcher - One was collected at Attu in June.

Gray-spotted Flycatcher - The species not only put in its annual spring appearance to the western Aleutians, but provided a new high count when 14 were counted at Attu on 06 June. Singles were there 01 and 05 June and 7 were found on 07 June. A courting pair remained at Siddens Valley, Attu, as late as 15 June.

Siberian Rubythroat - After arriving on 30 May, 12 were tallied at Attu on 31 May and 05 June. A singing, apparently territorial, male was still at Siddens Valley, Attu, on 15 June and one was at Kiska on 21 June.

Eye-browed Thrush - One was along the base of Gilbert Ridge, Attu, on 30 May, remaining through 06 June.

Yellow Wagtail - Up to three were at Attu 20 May to 02 June.

Gray Wagtail - Singles were at Attu 31 May, 01 June and



06 June.

Black-backed Wagtail - Four were on Attu on 19 May with one or two remaining through 06 June.

Red-throated Pipit - Singles were at Attu 19-31 May.

Northern Shrike - One was at Clam Lagoon, Adak, on 15 March.

Rustic Bunting - A male arrived at Attu on 31 May. One or two remained through 06 June.

Brambling - The species arrived at Attu on 20 May with a maximum count of 14 occurring on 05 June.

White-winged Crossbill - A tired immature plumaged bird was discovered at our headquarters parking lot on 10 November. The bird allowed close approach, was photographed and well observed by the refuge staff. The only previous Aleutian record was of a female at Earle Valley, Attu, on 30 July 1983.

Oriental Greenfinch - Two were at Attu on 07 June.

Hawfinch - At least two were seen well at Attu 02-07 June.

The fourth annual Adak Breeding Bird Survey was conducted on 05 June by Refuge Manager Zeillemaker, assisted by Refuge Biologist Deines, Biological Technician McClellan and volunteer Melly Zeillemaker. The count, performed in conjunction with the nationwide Office of Migratory Bird Management program, had a new twist in 1986. The vehicle used at the beginning of the survey had to be swapped for another vehicle due to an impassable stream at the outlet of Andrew Lake. The crews forded the stream by jumping from rock to rock. Highlight of the 25 species observed was a common tern (Asiatic subspecies) found near Clam Lagoon. A total of 767 birds were tallied during the 50 stop, 25 mile route (Table 14).

The 19th annual Adak Christmas Bird Count (CBC) was conducted on 31 December 1986. It was one of the more challenging CBC's held at Adak in recent years because of intermittent heavy snows and high seas along some of the unprotected shorelines which in combination made bird observation interesting. A triple celestial phenomenon also occurred on the count day as the earth was nearest the sun in its annual orbit (called perihelion), the moon was closest to the earth in its orbit (called perigee) and the sun, moon and earth were all aligned. This triple whammy of nature meant stronger-than-normal gravity pull causing tides a foot or more above normal (normal Adak range 1-4 feet). In spite of this, a total of 36 species and 3,397 individual birds were recorded on the count (Table 15). A least auklet and a snowy owl were recorded for the first time during the count. The 494 greater scaup observed on the count is a record high number for that species. Two species which

Table 14. Adak Breeding Bird Survey, 05 June 1986, compared to the 20 June 1985 and 21 June 1984 counts.

<u>Species</u>	1986		1985		1984	
	<u>Number</u>	<u>Stops</u>	<u>Number</u>	<u>Stops</u>	<u>Number</u>	<u>Stops</u>
Pelagic Cormorant	3	2	6	4	1	1
Green-winged (Com.) Teal	74	12	76	11	69	11
Mallard	26	6	12	8	9	6
Northern Pintail	4	2	5	2	11	2
Tufted Duck*	-	-	-	-	1	1
Greater Scaup	54	3	26	6	24	2
Harlequin Duck	5	3	9	4	30	1
Red-breasted Merganser	4	2	14	6	5	2
Bald Eagle	10	7	18	14	21	10
Rock Ptarmigan	10	6	20	12	19	11
Black Oystercatcher	2	1	3	1	-	-
Rock Sandpiper	2	2	-	-	-	-
Red-necked Phalarope	5	2	10	4	7	3
Parasitic Jaeger	10	4	13	5	12	8
Glaucous-winged Gull	92	18	90	20	50	13
Black-legged Kittiwake	-	-	2	1	6	2
Common Tern (Asiatic)*	1	1	-	-	-	-
Arctic Tern	9	3	12	2	6	1
Aleutian Tern	40	2	29	6	54	9
Marbled Murrelet	32	4	2	2	4	1
Tufted Puffin	20	1	10	1	-	-
Horned Puffin	11	1	29	1	1	1
Common Raven	10	4	6	5	3	3
Winter Wren	-	-	-	-	1	1
Song Sparrow	19	11	13	8	19	13
Lapland Longspur	309	48	230	48	283	48
Snow Bunting	8	5	6	5	4	3
Rosy Finch	7	6	13	9	5	4

\* Not known to nest in Aleutians

are normally seen on the count, but were missed this year, are the common eider and winter wren.

#### 8. Game Mammals

Caribou calves were introduced to Adak in 1958 and 1959. The herd grew rapidly due to mild winters, lush vegetation, and the lack of disease, predators and biting insects. Within ten years many islanders were hunting caribou and the world's record bull, weighing over 700 pounds, 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 postseason population of 150-250 animals. The danger of overpopulation is very real and a major concern to the AIU staff, since no natural predators or disease exist on the island. Population control is accomplished through sport hunting. Continued U.S. Navy support in the form of tug

Table 15. Adak Christmas Bird Count, 31 December 1986.

<u>Species</u>	<u>No.</u>	<u>Species</u>	<u>No.</u>
Pacific Loon	3	Bald Eagle	168
Horned Grebe	2	Peregrine Falcon	3
Red-necked Grebe	3	Rock Ptarmigan	52
Pelagic Cormorant	81	Black Oystercatcher	4
Red-faced Cormorant .	2	Sanderling	47
Cormorant, species	79	Rock Sandpiper	52
Emperor Goose	207	Mew Gull	22
Green-winged Teal (Eur)	26	Glaucous-winged Gull	197
Mallard	96	Thick-billed murre	3
Eurasian Wigeon	2	Pigeon Guillemot	9
Greater Scaup	494	Marbled Murrelet	11
Steller's Eider	1	Least Auklet	1
Harlequin Duck	657	Alcid, species	5
Oldsquaw	87	Snowy Owl	1
Black Scoter	17	Common Raven	198
White-winged Scoter	10	Song Sparrow	38
Common Goldeneye	288	Snow Bunting	161
Bufflehead	45	Rosy Finch	91
Red-breasted Merganser	167	Common Redpoll	59

Total 36 species, 3397 individuals

boat transportation for active duty military hunters and refuge monitors is essential to proper management of the herd. Due to limited personnel and higher priority work, no specific caribou management effort was attempted in 1986. The annual pre-harvest aerial caribou survey could not even be conducted. Herd management this year concentrated on working with the registration hunt permit system and maintaining harvest statistics. One hundred and one caribou were reported harvested from 01 September to 31 December 1986, compared to 116 in 1985 and 119 in 1984. A primary reason for the lower harvest total this year was the lack of Navy tug support. Normally, the Navy tugs provide free transportation for military personnel to the south side of Adak weekly. The vast majority of the caribou are usually found there and over 65 percent of the annual harvest occurs on those portions of the island farthest away from the military base. In August, however, one of the two Navy tugs ran aground on an offshore rock causing serious damage. The tug had to be towed to the "Lower 48" for major repairs. A replacement tug didn't arrive on Adak until late September. During September, the one remaining tug was kept busy with normal Navy operations and was not able to transport any hunters to the south half of Adak. The replacement tug was not operational as the year ended due to continuing re-training and recertification of all crew members. The other tug was once again kept busy with normal Navy operations. There was one charter boat available, however, through the Naval Security Group Activity Adak Recreation Department. That vessel was kept operational throughout the hunting season to transport hunters to and from

the south half of Adak. The "Kuluk Clipper," could be chartered for \$350.00 round trip. The vessel crew and command did an excellent job of delivering hunters to the south end of the island to hunt caribou.

The third largest recorded Adak bull was taken in late 1986 on the south half of the island by Marine Staff Sergeant Maurice McGreehan. The trophy rack measured an unofficial 414.5 on the Boone and Crockett point system.

Last season's final harvest 01 September 1985-31 March 1986 totaled 153 animals compared to the 1984-1985 season total of 143. The current season goal is a harvest of 170 to 270 animals by 31 March 1987 to allow achievement of the management objective. We believe the objective will not be met.

#### 9. Marine Mammals

The National Marine Fisheries Service (NMFS) conducted a northern sea lion population study and net entanglement mortality assessment on Ugamak Island in the eastern Fox Islands from 16 June to 26 July. They documented a continuing decline in sea lion numbers in excess of 84% since 1965 and 15% between 1985 and 1986 (from 10,995 to 2,068 to 1,751 adult and subadult sea lions, pups are not included in the counts). The 1986 adult male and subadult numbers were unchanged from 1985 with the entire decline concentrated in the adult female population. As a result, there has also been a decrease in the number of pups (from 1,694 in 1985 to 1,386 in 1986). The adult females have also disappeared entirely from one rookery. Pupping rates, however, were high (1.06 in 1986 versus 0.97 in 1985), pup mortality was low (4.5%) and the male to female ratio among pups was within the normal range. Thirteen pups were tagged and blood was successfully drawn from eleven of them. Two pups tagged in 1985 were observed in 1986. Both appeared healthy and robust.

Three sea lions with neck wounds caused by prior net entanglement were observed. None of the three sea lions, however, had any netting wrapped around them. The behavior of all three appeared normal. The scientists also watched a fishing vessel crew fire numerous shots at sea lions on two haul out areas in Ugamak Bay. At least one sea lion was injured during the incident. The event was reported to the NMFS enforcement division and legal action has been taken.

This was not a good year for whales in the Aleutians. Nine whale strandings (3 sperm whales, 1 gray whale, 1 minke whale, 3 Pacific (Stejneger's) beaked whales, and 1 Baird's beaked whale) were reported to the refuge staff. Refuge personnel were able to investigate only five of the strandings. The first three were sperm whales (Physeter catodon). Two occurred on Shemya Island in February and one was at Lief Cove, Kiska, in March. The two whales at Shemya were approximately 11.7 m and

16.1 m in length. The larger animal had numerous lacerations and grooves in the skin and was wrapped in cables. The refuge staff was unable to visit Shemya to investigate either of the strandings. The Kiska sperm whale was discovered by refuge staff while conducting the March Compound 1080 project on the island. The whale was approximately 14.7 m in length and had been on the beach for a considerable amount of time. There was a large hole (99 cm X 111.8 cm) in one side, suggesting injury prior to death. All of the animal's teeth were missing and the outer skin of the body was gone, exposing a white layer of blubber. Glaucous-winged gulls and arctic fox had been feeding extensively on the carcass. The animal was a great asset to our fox poisoning program, as large numbers of fox were concentrated in a small area.

Two whale strandings were reported by the National Marine Fisheries Service while conducting northern sea lion surveys on Ugamak Island. A male gray whale (Eschrichtius robustus) was discovered on 05 July. The head and most of the right side of the animal were missing, but there were no obvious signs as to the source of the damage. The second stranding occurred on Avatanak Island and involved a minke whale (Balaenoptera acutorostrata) that was approximately 6-9 m long. The carcass was in good condition. Refuge personnel were unable to investigate either of those strandings. Three male Pacific (Stejneger's) beaked whales (Mesoploden stejnegeri) strandings occurred at Kuluk Bay, Adak, in September. The animals ranged in length from 5.15-5.45 m. The first two were stranded together on 11 September during a major storm with unofficial sustained winds of 60 mph and gusts to 100 mph. Due to the high seas and weather, the whales were not examined until the following morning. No obvious external injuries were observed on either animal. The third Pacific beaked whale was reported on 13 September, but was not examined until 15 September. That animal had been dead for some time, as most of the skin had been peeled off and there were numerous signs of bird feeding activity. The animal also had a broken beak and left flipper when found. Numerous external measurements and tissue and stomach samples were taken from each whale. The primary item found in the stomachs was squid beaks. The tissue samples were frozen and the stomach samples preserved and sent to the Smithsonian Institution for analysis. The male Pacific beaked whale has a large single tusk approximately 10-12.7 cm above the gum line on each side of the lower jaw. The skulls from the two animals stranded on 11 September were removed and cleaned. One skull will be displayed at the Adak Refuge visitor center and the other will be displayed at the main refuge office in Homer.

The final whale stranding occurred in October at Shagak Bay on the west side of Adak. A male Baird's beaked whale (Berardius bairdii) approximately 8.3 m in length was still floating on its right side in about one meter of water when found. The whale had been dead for some time as there were several areas

where birds had picked through over 5 cm of blubber. Also, the umbilicus was open and some of the internal organs had fallen out. Several external measurements were taken, but due to the depth of the water, a complete set of measurements could not be taken. No external injuries were evident. When the refuge staff reached the carcass, the lower jaw had been sawed off about 20.3 cm from the tip, presumably to extract the pair of teeth on each side of the lower jaw.

It may not have been a good year for whales in the Aleutians, but it was an excellent opportunity for refuge staff to gather valuable information on two little known species.

Marine mammal surveys were conducted on Kiska Island in March and June as part of the bird and mammal surveys there in conjunction with the Compound 1080 project. A detailed synopsis of the results of the surveys is contained in section G. 15. A brief description of the general wildlife surveys conducted on Adak, can be found in section G. 4. Four different species of marine mammals were observed during the general Adak wildlife surveys (Table 16). The sea otter was the most numerous species observed with averages of 143 and 32 observed on each vehicle and beach survey, respectively. Sea otters have pups throughout the year, but pupping is normally concentrated in the late winter-early spring months as shown in the results from the vehicle survey, with 27, 30 and 40 sea otter pups observed in March, April and May, respectively. Averages of 23 and 11 harbor seals were observed in 1986 during vehicle and beach surveys, respectively. Harbor seals are the second most abundant marine mammal observed around Adak.

Northern sea lions and whales are only rarely observed during the Adak surveys. Observations of single minke whales occurred on 21 April and 23 July nearshore boat surveys. Twelve northern sea lions were observed on 21 April during a nearshore boat survey. Other marine mammal observations included 75 northern sea lions 25 November on an offshore rock at Kagalaska Island, four sightings 14 to 20 October of a single minke whale at Three Arm Bay, Adak, a pod of 6 killer whales on 01 July off Sirius Point, Kiska Island; and several observations from March through June of Dall porpoises riding the bow waves of the charter vessel and around inflatable boats during Kiska surveys.

#### 10. Other Resident Wildlife

The rock ptarmigan is the only resident bird species present in the Aleutian Islands west of Unimak Island. Permanent ptarmigan transects were established at Adak in 1981, but were not monitored this year due to other obligations. Judging from the number of ptarmigan bagged by hunters, however, it appears that the birds had another productive year.





Harbor seals at low tide in Clam Lagoon, Adak  
10/1/86, #038604, FGD.

#### 11. Fisheries Resources

Pink salmon are the most numerous and heavily harvested of the four anadromous fish species utilizing Adak streams. Dolly Varden and small kokanee salmon are harvested to a lesser extent, while halibut is available to "salty dogs." Reasonable red and silver salmon runs also occur at Adak, although the numbers have always been less in odd years than in even years for any salmon species. Even though 1986 was an even year, it seemed like an odd year, as all salmon runs appeared to be small. No specific salmon spawning counts were completed this year due to higher priority work.

#### 14. Scientific Collections

A refuge special use permit issued to the University of Alaska Museum at Fairbanks resulted in the collection of the following specimens at Attu: great spotted woodpecker, in April, Mongolian plover, one; red-breasted flycatcher, one; whimbrel (Asiatic), one; Siberian flycatcher, one; terek sandpiper, one; arctic warbler, one; rufous-necked stint, one; eye-browed thrush, one; rock sandpiper, two; rustic bunting, one; marbled murrelet, two; hawfinch, one and common cuckoo, three, in June.

Jim Estes (USFWS) collected the following specimens under refuge permits: pelagic cormorant, 1; red-faced cormorant, 4; and pigeon guillemot, 5 at Attu; pelagic cormorant, 5 at Shemya and pelagic cormorant, 4; red-faced cormorant, 1; pigeon guillemot, 5 and common eider, 1 at Amchitka.

Table 16. Marine mammals observed during general wildlife surveys at Adak, 1986.

VEHICLE SURVEY													
	<u>JAN</u>	<u>FEB</u>	<u>MAR</u>	<u>APR</u>	<u>MAY</u>	<u>JUN</u>	<u>JUL</u>	<u>AUG</u>	<u>SEP</u>	<u>OCT</u>	<u>NOV</u>	<u>DEC</u>	<u>TOTAL</u>
Sea Otter (Adult)	127	78	114	182	260	-	302	114	239	131	148	-	1,695
Sea Otter (pup)	10	18	27	30	40	-	6	5	11	6	20	-	173
Harbor Seal	4	3	86	8	58	-	65	29	28	18	5	-	304
Minke Whale	-	-	-	-	-	-	-	1	-	-	1	-	2
Northern Sea Lion	-	-	-	5	-	-	-	-	-	-	-	-	5
	(1)*	(1)	(1)	(2)	(2)	(0)	(2)	(1)	(1)	(1)	(1)	(0)	
BEACH SURVEY													
Sea Otter (Adult)	17	22	13	37	26	45	139	84	95	55	45	-	578
Sea Otter (pup)	0	1	4	4	1	0	6	4	1	1	3	-	25
Harbor Seal	4	44	2	18	19	11	10	35	47	16	5	-	211
Northern Sea Lion	-	-	-	-	2	1	-	-	-	-	-	-	3
	(2)*	(2)	(1)	(2)	(2)	(1)	(2)	(2)	(2)	(1)	(2)	(0)	

\* number of surveys conducted each month

The specimens will be used for ongoing taxonomic and biogeographic studies being conducted by Dr. Brina Kessel and Dan Gibson of the museum staff.

Twenty bald eagles carcasses were retrieved at Adak in 1986. All were measured and necropsied. The primary tail and wing feathers were removed for shipment to Law Enforcement personnel in Anchorage and subsequent processing at Pocatello, Idaho, for Native Americans.

Seven specimens of six seabird species were shipped to Dr. David F. Parmelee of James Ford Bell Museum of Natural History, University of Minnesota for study skins in November:

Short-tailed shearwater, one	Pigeon guillemot, one
Aleutian tern, one	Thick-billed murre, one
Cassin's auklet, one	Fork-tailed storm-petrel, two

The specimens were picked up on various islands over the past three summers.

#### 15. Animal Control

An Experimental Use permit (EUP) was granted in November 1985 by the U.S. Environmental Protection Agency (EPA) to benefit the endangered Aleutian Canada goose. The permit allowed the FWS to evaluate the effectiveness of Compound 1080 for eliminating introduced arctic fox from Kiska Island. The ultimate goal is registration of the Compound for use elsewhere in the Aleutians. Specifically, the EUP allows for the use of up to 50,000 baits per year to be distributed on the island by air for two years (1986 and 1987). The end result is expected to be the complete eradication of fox from Kiska. Eradication of fox from Kiska cannot be economically accomplished through the use of conventional mechanical means (traps, snares, guns, etc.) because the island is too large (69,598 acres) and rugged. It would require several years of considerable effort by numbers of personnel using conventional means to even approach success. The island also has an excellent food source for the fox in the form of the largest known crested and least auklet colony in the world (1.4 million birds) and extensive high quality scavenging beaches. If the eradication effort on Kiska is successful, authorization for the use of Compound 1080 on other large islands in the Aleutians to benefit the endangered Aleutian Canada goose and other migratory birds will be sought.

As part of the EUP, a pre- and post-fox eradication inventory of wildlife populations at Kiska Island are required. The surveys are to allow evaluation of treatment effects on the target species (arctic fox), monitor the impact of the treatment on non-target wildlife species (in particular raptors and avian scavengers), and evaluate and document the recolonization and population trends of other avian species



whose breeding populations have been suppressed or eliminated by the foxes. Initial pre-eradication wildlife surveys were conducted at Kiska in June 1985. The 1986 surveys were conducted in March and June. March work consisted of aerial pre- and post- Compound 1080 baiting surveys for arctic fox, bald eagles and northern sea lions, and the placement of over 48,000 single dose baits (SDB's) of Compound 1080. June work consisted of a replication and slight expansion of wildlife surveys established the previous summer. Budget restrictions limited the June survey work to one half of the time planned (two weeks vs. four) and eliminated all other animal control and field work scheduled for the summer.

Three refuge unit biologists and one U.S. Department of Agriculture animal damage control specialist were on Kiska from 22 March to 04 April 1986. The charter vessel "Maritime Maid" provided lodging and meals for personnel while at the island and transported personnel from Adak to Kiska and return. The vessel also provided fuel storage for the helicopter. The Bell 412 helicopter was flown from Anchorage to Kiska (with stops at Cold Bay, Dutch harbor and Adak enroute). While on island the large accessory fuel tanks used for the flight from Anchorage were removed from the helicopter and seats were installed for use during the wildlife surveys. The helicopter provided an excellent platform for all March Kiska surveys, as well as the means for placing the SDB's.



The charter vessel "Maritime Maid" approaching the Kiska Harbor dock. 3/26/86, #088605, GTM.

Winter wildlife surveys were conducted on Kiska Island from 24 March 1986 to 04 April. The surveys concentrated on arctic



fox, bald eagle, and northern sea lion. They were conducted prior to and immediately after the placement of the Compound 1080 on the island. The helicopter was also used to retrieve fox carcasses after baiting.

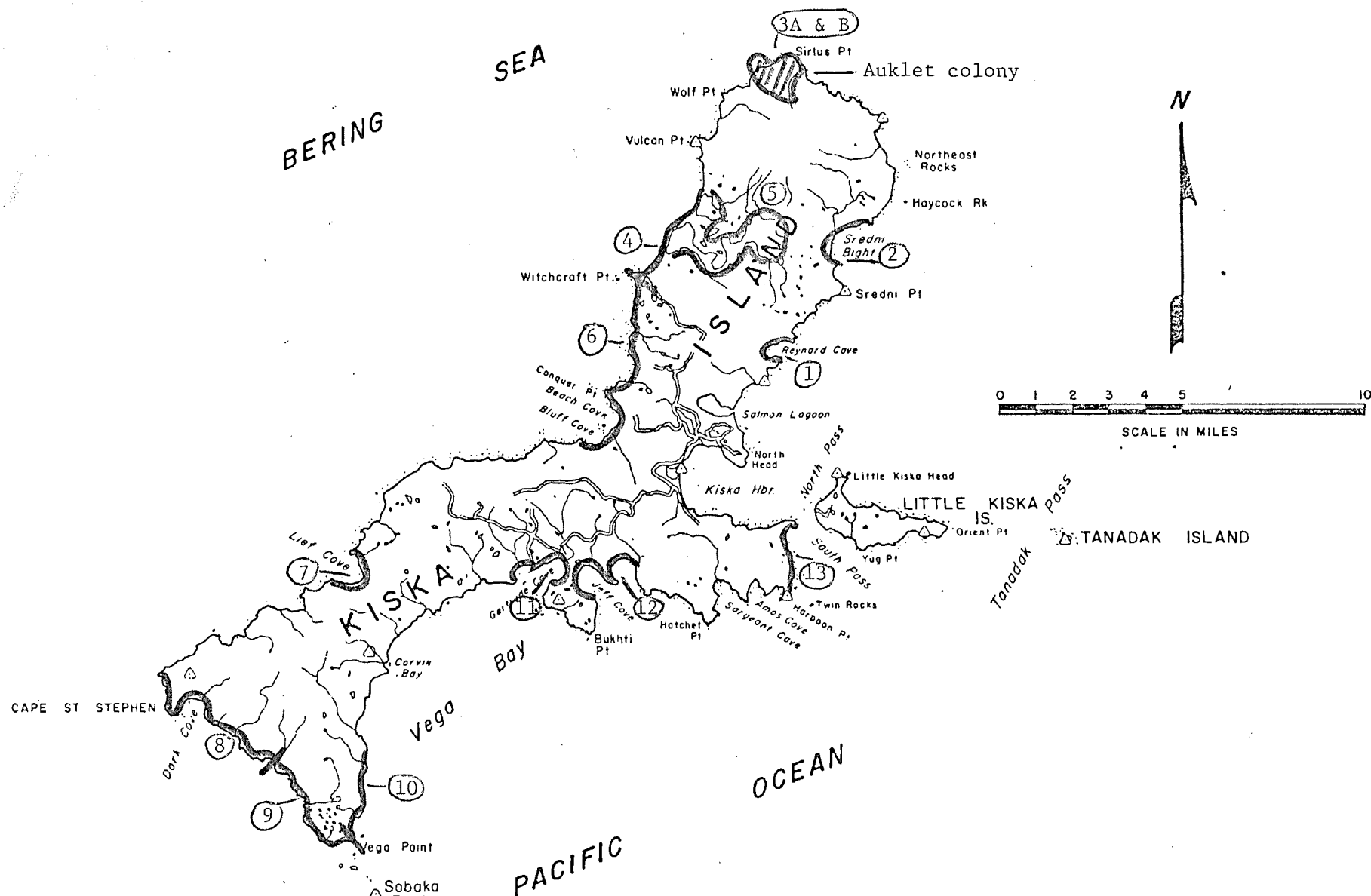


The Bell 412 helicopter used for Kiska wildlife surveys, baiting and fox carcass retrieval.  
3/24/86, #088606, GTM.

Work began on Kiska Island with a complete flight of the island perimeter on 24 March. The flight allowed both the helicopter and biological crews to become familiar with the island. It also allowed the biological crew to revise the plan of operations based on specific conditions found on the ground and survey bald eagles and arctic foxes. In addition, a rough count of northern sea lions was accomplished. A total of 43 bald eagles, 144 arctic fox and an estimated 3,100 northern sea lions were observed during the flight. Of the three species recorded, the sea lion was most prone to disturbance by the helicopter. Several fox transects were also tentatively delineated. Thirteen fox transects were initially established. Eleven of the transects covered coastline areas. Transect number 5 covered inland habitat around the perimeter of the lakes on the northwest side of the island (Figure 3). Transects 3 A and B passed through the auklet colony lava flows on the north side of the island (Sirius Point). Transects were located on all four sides of the island and were placed in the better fox scavenging or habitat areas. The transects were intentionally established in areas where a greater number of arctic fox would be expected to be found and allow better comparison between pre- and post-baiting populations.



FIGURE 3: Location of Arctic Fox Survey Transects Established on Kiska Island, March 1986



Note: Transect #'s 1, 2, 11, 12, & 13 were discontinued after the first day due to bald eagle nest disturbance problems and/or low fox numbers.

Transects 1, 2, 11, 12, and 13 were discontinued after the first day due to the presence of bald eagle nests and low observed fox numbers. The east and southeast sides of the island were adequately covered by other transects which caused less disturbance to bald eagles. The nine remaining fox survey transects varied in length from 1.6 to 7 m with a mean length of 3.6 m. The shortest and longest transects were located on the west side of the island at Lief Cove and Kiska Lakes, respectively. The nine working fox transects total 32.3 m in length. All of the fox transects were conducted using the helicopter. Three or four observers were used. When four observers were present, two sat in the rear seat looking forward and one sat in the middle seat looking toward the rear. One additional observer sat amidships somewhat between the pilot and co-pilot looking forward. When using three observers, the interior seat position was vacant. All observers and the pilots functioned as one team and visually searched all habitat. All fox survey flights started from Kiska Harbor and proceeded north to the auklet colony. The colony transects were the first ones conducted on each run, followed by the Boulder Beach and Kiska Lakes transects. The helicopter would then continue on to the Witchcraft Point transect, then proceed counterclockwise around the island. The barometric pressure, time of high and low tides, general weather conditions and starting/ending times for each transect were recorded during each flight. All fox surveys were conducted in the late afternoon or early evening, except one. The fox surveys were flown at 75 to 100 knots airspeed at approximately 150 to 300 ft offshore and generally at 100 to 200 ft in altitude.

Four pre-baiting arctic fox surveys were flown during the early evenings from 26 to 29 March. The first fox survey entailed 13 separate transects. Transects 1, 2, 11, 12, and 13 were dropped and others were modified to minimize the impact on nesting bald eagles after the initial effort. All fox surveys were then conducted on the remaining nine transects. The remaining transects provided adequate pre- and post-baiting fox data. A morning survey was attempted on 27 March in hopes that fox surveys could be accomplished twice a day. Only 43 fox were observed on this survey, compared to an average of 101 during the afternoon/evening surveys, so the morning survey program was discontinued. The low number of fox observed in the morning was probably due to nocturnal fox at the end of the night activity period rather than at the beginning of the nocturnal activity period when most hungry. The three evening pre-baiting fox surveys produced good results, with numbers ranging from 87 to 114 and a mean of 101 fox observed for all 9 transects each day (Table 17). Transect 5 around Kiska Lakes had the lowest mean number of fox observed each day with 0.7 animals. This is understandable, since the lakes probably have little winter food to offer. Transect 8 at Cape Stephen had the highest mean number of fox observed each day with 30.3 animals. Transects 7, 8, and 10 produced mean densities of 6.1, 7.6, and 6.2 fox/m of shoreline. All of the transects are

located in excellent fox habitat with good food resources. Transect 7 had a dead beached sperm whale in it and transect 8 had a northern sea lion haulout area in it. Transect 10 was located on the southeast corner of the island in a mixture of sand and gravel beaches where the prevailing SW storm winds wash food ashore.

Pre-treatment bald eagle surveys were flown in a manner similar to the fox surveys except at an altitude of 300 to 400 ft. The locations of all aeries were mapped and the number of adult and juvenile birds observed were recorded. The bald eagle survey was generally conducted in the late morning or early afternoon and covered the entire shoreline of the island. As the location of each aerie was documented, additional care was taken in later flight patterns to minimize disturbance to attending birds. The same number of observers and seating arrangement used during the fox surveys were used for the eagle surveys. Six surveys were conducted between 24 and 29 March 1986. An attempt was made during the 26 March survey to run two simultaneous surveys by organizing the observers into two separate groups. However, the observers ability to see the birds was dependent upon their seating arrangement in the helicopter and the results of this survey were quite variable. A large discrepancy between the number of adult and immature eagles seen by the two separate groups resulted (Table 18). Therefore, it was decided that this method was not feasible. All the remaining surveys were conducted by all crew members including the pilots as one team. During the last 3 days of surveys, Little Kiska island was also inventoried.

The total number of eagles observed on Kiska during the surveys ranged from 43 to 50. The mean number of adult eagles was 38 with a mean of 7 immatures and 2 unknowns. The observations compare favorably with the June 1985 island-wide boat circumnavigation surveys when 34 adult and 8 immature eagles were observed. Little Kiska Island produced an average of seven adult bald eagles and one immature during the three surveys there. Two aeries (or four adult bald eagles) were recorded on Little Kiska Island in 1978. A total of 19 bald eagle aeries were located on Kiska Island during the surveys. This compares very favorably to the 16 aeries located in 1985 and the 17 aeries located in 1978. In addition, three eagle aeries were located on Little Kiska Island, which compares favorably to the two found there in 1978.

One specific survey for northern sea lions was completed on 29 March. The survey was conducted from Northeast Rocks west and then south to Vega Point from 0842 to 0950. The survey was flown at 1,200+ ft to minimize disturbance to the sea lions. Two observers conducted separate counts using 10x40 binoculars. Total counts ranged from 1,299 to 1,393 with a mean of 1,347. Forty-seven percent of the sea lions were observed between Cape St. Stephen and Vega Point, including Sobaka Rock. The other two areas of sea lion concentration were north of Lief Cove and

Table 17. Pre-baiting arctic fox transect surveys at Kiska Island, March 1986.

Transect Name	Transect Length Miles	Date:		3/26	3/27	3/28	3/29	Total	Mean	Mean Density
		Starting Time:	Ending Time:	1720	0855	1812	1811			
				1908	1013	1914	1909			
				<u>Fox Obs.</u>	<u>Fox Obs.</u>	<u>Fox Obs.</u>	<u>Fox Obs.</u>	<u>Total</u>	<u>Mean</u>	<u>Density</u>
		<u>Transect</u>								
		#								
Reynard Cove	1.7	1	2	-**	-	-	-	-	-	-
Sredni Cove	2.0	2	0	-	-	-	-	-	-	-
Old Lava	2.4	3A	12	5***	2	3	17	5.7	****	-
New Lava	1.6	3B	0	2	1	2	3	1.0	-	-
Boulder Beach	2.9	4	2	3	6	9	17	5.7	2.0	-
Kiska Lakes	7.0	5	2	0	0	0	2	0.7	0.1	-
Witchcraft Pt	6.4	6	8	6	21	15	44	14.7	2.3	-
Lief Cove*	1.6	7	9	4	15	5	29	9.7	6.1	-
Cape Stephen	4.0	8	23	13	31	37	91	30.3	7.6	-
SW Vega Pt.	3.6	9	20	3	15	3	38	12.7	3.5	-
N Vega Pt.	2.8	10	16	7	23	13	52	17.3	6.2	-
Gertrude Pt.	3.6	11	6	-	-	-	-	-	-	-
Matt & Jeff										
Cove	3.7	12	1	-	-	-	-	-	-	-
Harpoon Pt.	2.6	13	1	-	-	-	-	-	-	-
TOTALS			102	43	114	87				

\* Lief Cove is site of beached sperm whale

\*\* Transect 1, 2, 11, 12, 13 discontinued after first day to minimize impacts on nesting eagles

\*\*\* Observations on the morning of 3/27 not used to compute total, mean or mean density

\*\*\*\* Not computed because transect length shown is a measure of perimeter of area, not actual corkscrew type flight pattern flown.

Table 18. Kiska and Little Kiska bald eagle surveys,  
March 1986.

## KISKA ISLAND

<u>Date</u>	<u>Observers</u>	<u>Eagle Adults</u>	<u>Eagle Immature</u>	<u>Eagle Unknown</u>	<u>Eagle Total</u>	<u>Peregr. Falcon</u>
3 24	Greg and Ron	25	15	3	43	8
3 26	Greg, Fred, Ron	37	11	1	49	9
3 26	Wells, Pilots	43	5	-	48	-
3 27	Everyone	41	4	-	45	3
3 28	Everyone	43	4	3	50	6
3 29	Everyone	<u>42</u>	<u>3</u>	<u>4</u>	<u>49</u>	<u>10</u>
Mean		38	7	2	47	6

## LITTLE KISKA ISLAND

<u>Date</u>	<u>Observers</u>	<u>Eagle Adults</u>	<u>Eagle Immature</u>	<u>Total</u>	<u>Peregrine Falcon</u>
3 27	Everyone	6	2	8	2
3 28	Everyone	6	1	7	2
3 29	Everyone	<u>9</u>	<u>1</u>	<u>10</u>	<u>1</u>
Mean		7	1	8	2

at the north end of Kiska. A total of 6,066 sea lions was observed at Kiska in 1978 during island circumnavigation surveys via inflatable boats. The lower numbers observed in March 1986 may be attributed to the moving helicopter causing binocular vibrations, helicopter disturbance of sea lions (causing them to flee into the water), time of day surveys were conducted, part of the overall decline in sea lion populations throughout the Aleutians, and/or the month of the survey.

A beach survey was conducted on a segment of the previously established north beach survey route to and around Salmon Lagoon on 29 March. Eleven bird species and two mammal species were observed. Of the total number of birds observed, 259 common goldeneyes, 12 mallards, 10 red-breasted mergansers and 4 northern pintails were on the lagoon itself. These numbers further indicate that Salmon Lagoon is important to migratory birds. No live foxes were observed during the survey, but fox tracks were found all along the north side of the lagoon.

Prior to baiting the entire island perimeter with Compound 1080 pellets a small bait acceptance test was conducted to check palatability or acceptance. On 29 March the partial bait acceptance test was conducted in Kiska Harbor using 59 baits placed at 20 locations from the stream at the north end to the stream at the south end of the harbor. Each location was baited with one to five baits (average two) along fox trails or at scent post sites. The sites were checked the following day



and all baits were gone. From tracks and other signs, it appeared that 38 baits (64 percent) were taken by foxes. One three-bait station located near the south stream had fox and rodent tracks around it. Another three-bait station had gull and fox tracks around it. The remaining 15 baits were assumed to have been taken by heavy storm waves the previous night. From these positive results, baiting began. In addition to checking the results of the pre-baiting test, three fox were collected in the Kiska Harbor area to allow a check of their general condition. All three appeared to be in excellent condition, which was somewhat surprising considering the time of year. One of the fox collected at the south end of the harbor appeared to be somewhat lethargic and confused as though it had ingested some of the Compound 1080 poison from the pre-baiting test. The other two animals appeared to be in good health. All three were to be sent to the Denver Wildlife Research Center (DWRC), Denver, Colorado, for analysis.

Compound 1080 SDB's were distributed around the perimeter of Kiska Island by hand placement from the helicopter in 4 days during period 30 March to 04 April. On 30 March, 33,450 baits were placed on Kiska beaches. The 31 March baiting covered areas that had not been treated the previous day and rebaiting of hot spots at Lief Cove and at the southwest end of the island (6,800 baits). The third effort was accomplished in conjunction with picking up fox carcasses (1,927 baits). Baits were dropped whenever a live fox was observed. The final day of extensive baiting concentrated on the uplands (6,400 baits) to allow coverage of all access routes that fox might use between beaches. A few final baits (150) were dropped on the southwest end of Kiska after observing three live fox during the last two post-baiting fox surveys 03 and 04 April. A total of 48,727 baits were dropped or placed, with concentrations along the shorelines, upland fox trails, and the auklet colony at Sirius Point (Figure 4). To lessen the potential impact of secondary poisoning problem with bald eagles, all accessible fox carcasses were picked up beginning on 31 March when twelve carcasses from several locations were retrieved. In total, 132 arctic fox carcasses were retrieved. Fifty-four additional fox carcasses were observed in inaccessible areas. In addition to the fox carcasses, two glaucous-winged gull carcasses, one glaucous-winged gull wing, and one sea lion pup carcass were retrieved for secondary poisoning analysis. DWRC subsequently analyzed the gull and sea lion carcasses and found traces of Compound 1080 in the two gull carcasses. This was not surprising since glaucous-winged gulls were found to be concentrating in the Lief Cove area near the dead sperm whale. This area was also a concentration point for arctic fox and was heavily baited. Of the 132 fox carcasses retrieved, 81 were weighed and sexed. Forty-six (57 percent) were female and 35 (43 percent) were male. Weights of the foxes ranged from 2.8 to 6.4 kg, with the heaviest male 1 kg heavier than the heaviest female. The mean weight of male foxes was 4.57 kg, which was 0.91 kg heavier than the mean weight for the female

foxes at 3.66 kg. The remaining carcasses were not weighed or sexed due to time limitations. The hindquarters were removed from 66 fox carcasses for shipment to DWRC for analysis. These samples were subsequently analyzed and concentrations of Compound 1080 ranged from 0.09 ppm to 2.80 ppm. All 132 fox carcasses were buried in a collapsing World War II tunnel located in the Kiska Harbor area. The area was marked with two Carsonite posts and Compound 1080 poison warning signs.

Three post-baiting fox surveys were flown on 1, 3 and 4 April. The first survey was accomplished over an entire day while picking up fox carcasses. The final two surveys were conducted in the early evenings in a similar time period as the pre-baiting fox surveys. During the first survey, 7 live fox were observed in the transect areas (Table 19) with 12 live fox observed outside transect areas. The 19 live foxes observed during the survey was considerably below the 144 fox seen during the familiarization flight on 24 March. Compound 1080 baits were dropped in each area a live fox was observed. Only two live foxes were observed on the second survey and only one on the third and final post-baiting survey. Again, Compound 1080 baits were dropped in areas that live fox were observed. Twenty-seven percent of the live fox were observed in transects 8, 9, and 10 located on the southwest end of Kiska. In addition, the last 3 observed live foxes were in transects 8, 9 and 10. A comparison of pre- and post-baiting fox observations indicates some dramatic changes. Pre-bait fox observations on transect 8 (with the greatest number of observations) averaged 30.3 animals, but post-bait surveys on the same transect averaged only 1.0 animal. The highest means were on transects 7, 8, and 10 with 6.1, 7.6, and 6.2 fox per mile of habitat in pre-baiting conditions. Post-baiting fox surveys found densities of only 0.43, 0.25, and 0.10, respectively. The average number of fox observed on all daily pre-baiting surveys was 101. Post-baiting arctic fox surveys averaged only 3.3 live animals. If the first island-wide survey is not included in the calculations, the average was only 1.5 live arctic fox observed on the post-baiting surveys.

Since the majority of arctic fox carcasses were retrieved and buried, no post-baiting surveys were conducted for bald eagles. Any potential secondary poisoning effects on the birds would not manifest itself during the period the field crew was on the island anyway. In addition, disturbance to nesting eagles by additional flights would not be worth the results. No apparent change in the bald eagle population was observed while picking up carcasses or conducting post-baiting fox surveys, and no eagles exhibited any apparent signs of possible secondary poisoning effects and no dead eagles were found.

Three bait weathering stations were established in the Kiska Harbor area containing 24 Compound 1080 SDB's each. One station was placed in a sandy Elymus-grass habitat about 20 meters above the outflow of the stream at the north end of

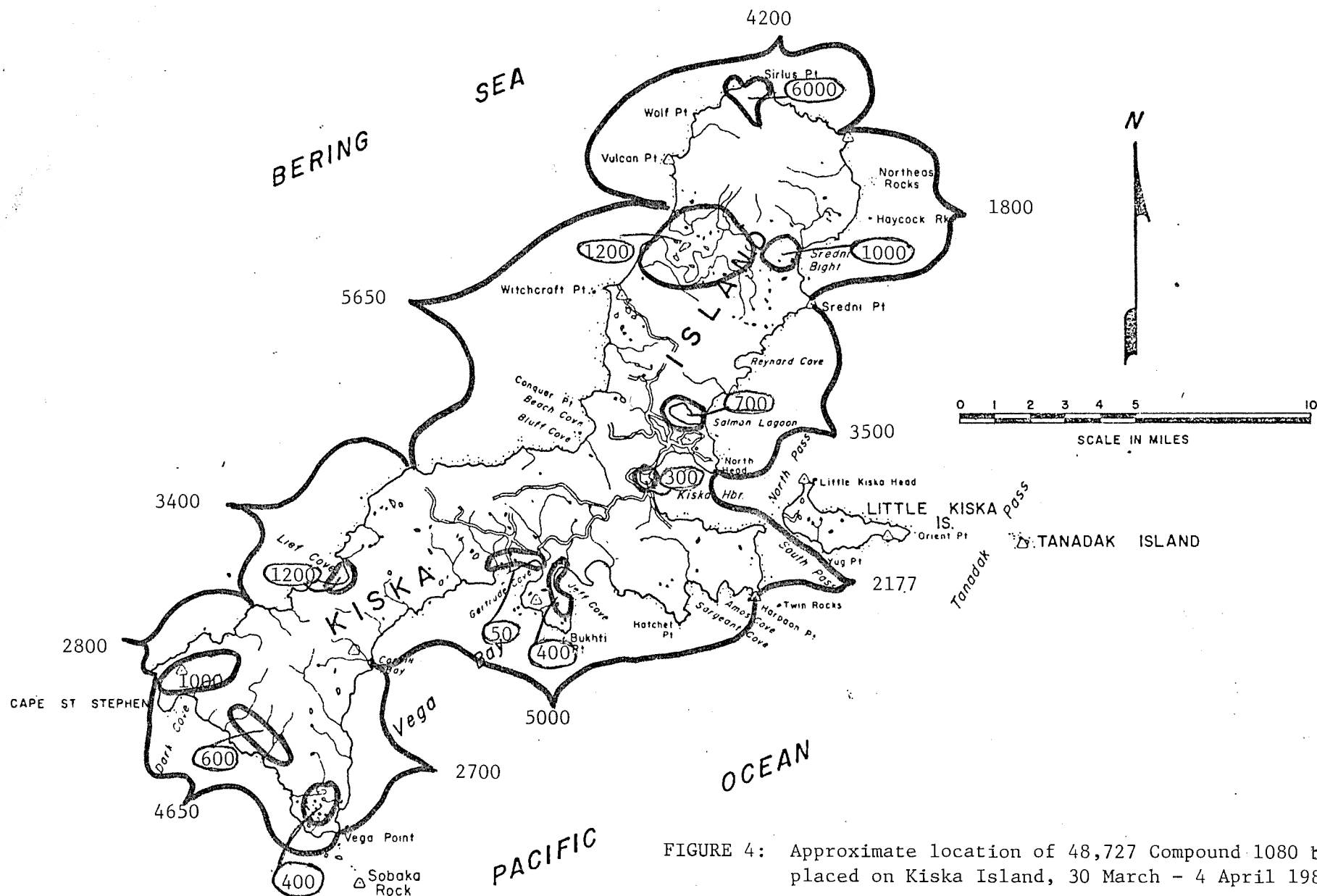


FIGURE 4: Approximate location of 48,727 Compound 1080 baits placed on Kiska Island, 30 March - 4 April 1986

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



Kiska bait weathering station, March 1986.  
6/19/86, #088607, GTM.

Six baits will be taken from each station each time a field crew returns over the following 18 months. The sample baits will be sent to DWRC for analysis. Each bait weathering station was marked with a Carsonite post and Compound 1080 poison warning sign.

Norway rats had not been previously documented on Kiska. During the 1985 summer study, a set of possible rat tracks was found in windblown sand in the harbor area. While checking the bait acceptance test in the harbor area, a set of rat tracks was found around one of the bait stations. The presence of rats was confirmed on 01 April when a single Norway rat was observed at Cape St. Stephen while the crew was picking up fox carcasses. Although it is not surprising to finally verify a rat population on Kiska following the intense World War II effort on and around the island, it is surprising that it has taken so long to document. The few individuals observed and scattered signs indicate a low population. Compound 1080 has previously been used as a rodenticide, so there is a possible that Kiska rats could be eliminated with the fox. If not, the population is expected to expand after fox eradication.

Table 19. Post-baiting arctic fox transect surveys Kiska Island, April 1986.

Transect Name	Transect Length in Miles	Date: Starting Time: Ending Time: Transect #	**		4/3		4/4		LIVE FOX		
			4/1	4/1	4/3	4/3	4/4	4/4	T	M	Mean
			1206	1206	1759	1759	1811	1811	O	E	
			1743	1743	1905	1905	1910	1910	T	E	
			Live	Dead	Live	Dead	Live	Dead	A	A	Mean
			Fox	Fox	Fox	Fox	Fox	Fox	L	N	Density
Reynard Cove	1.7	1	-	-	-	-	-	-			
Sredni Cove	2.0	2	-	-	-	-	-	-			
Old Lava	2.4	3A			0	0	0	0	0	0	0
New Lava	1.6	3B			0	1	0	3	0	0	0
Boulder Beach	2.9	4	2	1	0	1	0	0	2	0.7	0.24
Kiska Lakes	7.0	5			0	0	0	0	0	0	0
Witchcraft Pt	6.4	6	0	18	0	0	0	0	0	0	0
Lief Cove*	1.6	7	2	1	0	0	0	0	2	0.7	0.43
Cape St Stephen	4.0	8	2	16	1	0	0	0	3	1.0	0.25
SW Vega Pt.	3.6	9	1	3	1	0	0	0	2	0.7	0.19
N Vega Pt.	2.8	10	0	10	0	1	1	0	1	0.3	0.10
Gertrude Pt.	3.6	11	-	-	-	-	-	-			
Matt & Jeff Cove	3.7	12	-	-	-	-	-	-			
Harpoon Pt.	2.6	13	-	-	-	-	-	-			
TOTAL			7***	49	2	3	1	3	10	0.4	0.13

\* Transects 1, 2, 11, 12, and 13 discontinued after first day.

\*\* Survey conducted during the day carcasses were picked up.

\*\*\* Twelve additional live fox were seen outside the transects: 1 at Reynard Cove, 2 at W Sea Lion Beach, 6 at SE Kiska shore, 1 at Gertrude Cove, 2 at East Kiska shore.



The crew was able to fly to Rat Island on 04 April and conduct a final verification of fox-free status for the island. The island perimeter was thoroughly scrutinized using the helicopter. No fox or fox sign were observed. In contrast, numerous rat sign was observed on the beaches. The helicopter landed near a dead sea lion and a dead sea otter at the western end of the island. No signs of fox or fox activity were observed near either carcass.

Kiska Island summer work basically consisted of replicating surveys established in June 1985. One major difference between 1985 and 1986 was the establishment of two independent camps this year. One camp was located in Kiska Harbor (as it was in 1985) and the other was established at Sirius Point (instead of working out of the harbor by vessel). The arrangement allowed all tasks to be conducted simultaneously. The time spent on Kiska was severely reduced in 1986 due to budget constraints, further necessitating a division of tasks. In 1985 a total of 29 days were spent on Kiska. Only 14 days were available on the island in June 1986. With the operation of two camps, unusually good weather, and long, intense days, the minimal number of surveys were accomplished in the time available. The original intent was to conduct a maximum number of survey replications. The 1986 surveys are being considered a second set of baseline data. Because June 1986 Kiska bird populations had not reacted to March arctic fox population reductions and populations or activity/colony attendance patterns change dramatically from year to year, no significant differences between the two years can be attributed to our activities.

June work began with set up of the Kiska Harbor camp. A complete island circumnavigation survey was conducted over a two day period. The survey began on the morning of the 18th in Kiska Harbor with the charter boat proceeding northward around North Head. With calm seas and very little wind, a decision was made to suspend the survey at Sirius Point and offload material for the second camp there. The circumnavigation survey was then completed on the 19th. The charter vessel again started from Kiska Harbor, heading south. The area covered during the previous effort on the northeast side of the island was not resurveyed. The survey was conducted primarily for raptors. Observations of one or more defensive adult bald eagles near land were considered indicative of a potential nest or aerie location. A total of fifteen eagle aeries were located during the survey. The count compares favorably with the 16 aeries found during 1985 survey and 17 during the 1978 survey. Eleven of the fifteen aeries located in June 1986 had been active during the March/April 1986 surveys, and nine of the 15 aeries located in 1986 were active in 1985. Seven of the aeries tallied during June 1986 were in the same locations as in June 1985 and March/April 1986. Thirty-three adult eagles and one immature were observed during the 1986 circumnavigation survey, which compares to 34 adult and 8 immature eagles observed in June 1985. The circumnavigation

survey results also compare favorably with the 38 adult eagle average recorded during the March/April 1986 helicopter surveys. The difference in the number of immature eagles is considered inconclusive due to the blending of immature birds with the cliffs or tundra and their tendency not to readily fly upon the approach of a distant vessel. When the results for the bald eagle aeries from the 1978, 1985 and March/April 1986 work are combined into pre-baiting baseline data, the number of aeries range from 16 to 19 with an average of 17.3. When the number of adult eagle observations for the 1985 and the March/April 1986 work are combined the number of observations range from 34 to 38 with an average of 36 (1978 results were not included because age classes were not delineated). The eagle results from the June 1986 work are not included in the baseline range and average data because of the remote possibility that the birds were impacted by Compound 1080 baiting. June 1986 surveys indicate 15 aeries and 33 adult bald eagle which is just below the baseline data range, but compare favorably to the baseline averages of 17.3 aeries and 36 adult bald eagle observations.

Six peregrine falcons and one falcon aerie were observed during the June 1986 circumnavigation. The aerie was in the same cove as the one recorded in 1978 and 1985. The number of peregrine falcons observed in June compares favorably with the average of 6 recorded during the eagle helicopter surveys in March/April 1986. A minimum of 10 peregrine falcons were recorded on Kiska during the 1978 surveys.

To supplement the island circumnavigation survey and provide more detailed information about wildlife along the shoreline, four partial circumnavigation surveys and four beach walk transects established in 1985 were also conducted. Both survey techniques were conducted following procedures specified in the AIU Wildlife Inventory Plans. The partial circumnavigation surveys of Kiska were conducted simultaneously in both directions from Kiska Harbor utilizing two crews and inflatable boats. The partial circumnavigation surveys were conducted on 24 and 28 June as far north and south as could be accomplished in a single day of safe travel and allow return to the main camp at Kiska Harbor before dark. The north transect ran from the harbor to Northeast Rocks. The south transect ran from the harbor to near Bukhti Point. The south transect was divided into four segments and the north route into 5 segments. The segments were determined by headlands to allow future scrutiny of results in distinct areas within the transects. The results obtained from the nearshore boat surveys for the three species of special interest (arctic fox, glaucous-winged gull and bald eagle) were encouraging. No live arctic fox were observed on either the north or south nearshore boat surveys in 1986 which compare to an average of 8 fox observations on the north survey and 16.5 on the south survey in 1985. The north transect produced 150 and 174 (average 162) glaucous-winged gulls in 1986 compared to 151 and 172 (avg. 161.5) in 1985. Only 182

and 117 (average 149.5) glaucous-winged gulls were observed on the south nearshore boat survey, however, compared to 501 and 514 (average 507.5) gulls in 1985. The results obtained in the 1986 south survey (and in total) show a significant decrease from 1985. The decrease of gulls could represent some secondary poisoning effects or simply changes in distribution since fox reduction. If poisoning was the cause, the decrease should have also occurred on the north nearshore boat transect. Bald eagle observations during the nearshore boat surveys were slightly lower in 1986 than in 1985. Eight and 6 (average 7) eagles were observed in 1986 south survey compared to 10 and 12 (average 11) in 1985. Five and 13 (average 9) eagles were observed in 1986 north survey compared to 10 and 10 (average 10) in 1985. The bald eagle numbers islandwide did not change (based on the circumnavigation survey), so the decrease on the south transect probably once again represented a distribution change.

Beach surveys were conducted on 21 and 23 June. The south transect runs from the stream at the east side of the harbor along the beach west and south including Trout Lagoon to a bald eagle nest on a sea stack at the southwest side of the harbor. The north transect runs from the sandy beach north of North Head including Salmon Lagoon to about two-fifth's of a mile east of a lake outlet stream at map coordinates 40.4/61.8. Both transects were divided into segments (five segments for the north route, four segments for the south route). As was the case with the nearshore boat surveys, the results obtained from the beach surveys included no live arctic fox. The 1985 averages were 8 fox on the north survey and 2.5 on the south survey. One fox carcass (just the hide and bones) was found during one of the north surveys. Glaucous-winged gull observations on the beach surveys were less variable in 1986 than in 1985. In 1986, only 22 and 18 (average 20) glaucous-winged gull observations were recorded on the north survey and only 74 and 70 (average 72) were tallied on the south survey. Larger numbers were observed in 1985 with 38 and 75 (average 56.5) during the north route surveys and 209 and 24 (average 116.5) on the south surveys. One glaucous-winged gull carcass was observed during a south beach survey. The decline in numbers of glaucous-winged gulls observed during the beach surveys once again may indicate a possible impact by Compound 1080 baiting in March/April 1986 (when 2 gull carcasses were picked up while retrieving fox carcasses), but the actual cause of the decline in gull observations is unknown. In 1986, 2 and 2 (average 2) bald eagles were observed on the north and 3 and 5 (average 4) on the south survey in 1986. In 1985, 7 and 0 (3.5) bald eagles were observed on the north and 2 and 2 (average 2) on the south survey. The overall results were very similar. A pair of Siberian rubythroats was also recorded on a south beach survey in 1986.

Six passerine transects were established in the Kiska Harbor area in 1985 based on methods developed by Emlen. The length

of a transect was determined by the availability of homogenous habitat (disturbed lowlands, undisturbed lowland, disturbed upland, undisturbed uplands, and alpine areas). Transects are 825 feet wide with subdivisions of 0-50, 51-99, 100-198, and 199-413 feet strips on either side of the center line. Although 413 ft visibility from the center line was sometimes obscured by terrain or fog, counts were made by song as well as by eye. Lateral distance from the center line, species, number of birds, and sex were recorded for each bird. Time of day and weather conditions at the beginning and ending point were also recorded. Transect #1 in the lowland habitat again had the highest number of observed lapland longspurs of all transects with the highest estimated mean density of 28 birds and 473.1 birds/100 ha compared to 1985's results of 30 birds and 178.7 birds/100 ha. When the results for both years are combined for baseline data, the estimated mean longspur density ranged from 178.7 birds/100 ha to 473.1 birds/100 ha with an average of 325.9 birds/100 ha. Transect 3 in the alpine habitat was not conducted this year due to usually foggy conditions encountered there and confusion with the layout/marking of the transect. Transect 3 was subsequently re-posted with Carsonite posts and the beginning pole was marked with the proper compass bearing. Three species of birds (lapland longspur, rock sandpiper, snow bunting) were recorded on transect 3 in 1985. The lapland longspur was the only species observed in large numbers, with an estimated mean density of 129.4 birds/100 ha. Transects 4 and 5 in the disturbed upland habitat yielded 5 and 7 different bird species, respectively. The 7 species recorded on transect 5 were the most recorded for any transect in 1986. The rosy finch was the most abundant species observed this year on transect 4, while, the lapland longspur, last years most abundant species, was only the fourth most abundant species observed. On transect 5, the snow bunting and lapland longspur were again the most abundant species observed, with estimated mean densities of 180 buntings/100 ha and 84 longspurs/100 ha compared to 1985's figures of 164 buntings/100 ha and 69.7 longspurs/100 ha. Both transects showed a marked increase in observations over 1985. When the results of 1985 and 1986 are combined for the rosy finch and the lapland longspur on transect 4, the estimated mean density for rosy finches ranged from 79.3 birds/100 ha to 159.7 birds/100 ha, with an average of 119 birds/100 ha. The estimated mean density for lapland longspurs ranged from 76.1 birds/100 ha to 123.4 birds/100 ha with an average of 99.75 birds/100 ha. When the snow bunting and lapland longspur results for both years are combined for transect 5, the estimated mean density for snow bunting ranged from 164 birds/100 ha to 180 birds/100 ha with an average of 172 birds/100 ha. The estimated mean density for lapland longspurs ranged from 69.7 birds/100 ha to 84 birds/100 ha with an average of 76.85 birds/100 ha. Transects 2 and 6 were in undisturbed upland habitat near Trout and Salmon Lagoons. The lapland longspur was again the most abundant species observed on both transects. Transect 2 results indicated a marked increase in longspur observations with an estimated mean

density of 226.2 birds/100 ha compared to 1985's figure of 141.5 birds/100 ha. Transect 6 yielded the fewest number of bird species recorded in 1986, with only the lapland longspur and the rosy finch being observed. When transect 2 and 6 longspur results for both years are combined, the estimated mean density for longspurs ranged from 141.5 birds/100 ha to 226.2 birds/100 ha with an average of 183.8 birds/100 ha on transect 2 and 118.7 birds/100 ha to 129.4 birds/100 ha with an average of 124 birds/100 ha on transect 6. Unlike 1985, no winter wrens were observed on any of the passerine transects in 1986. Winter wrens were very abundant, however, on the two beach transects. The change could have occurred as a result of fox removal from the coastal scene (or entire island), allowing the winter wren to return to its preferred beach habitat.

Although no live arctic fox or fresh fox sign were observed on any surveys, several sets of canine tracks were observed during the nearshore boat surveys at the sandy beach of Mutt and Jeff Cove. The tracks appeared to be larger than those of an arctic fox, however. Larger canine tracks were also recorded on the beach survey near the World War II one man Japanese submarine. Two instances of fresh canine sign were also found along passerine transects in the Kiska Harbor area. Two different fresh canine scat sets were found on an World War II road that is within passerine transect #2. As was the case with the tracks found during the south nearshore boat and south beach surveys, the scat appeared to be larger than that made by arctic fox. At least one crab boat, known to have a dog aboard, was in Kiska Harbor and around the island prior to and during the beginning of the survey period. All sign was assumed to be from that dog, but as a precautionary measure, Compound 1080 baits were placed around each set of sign. A total of 130 Compound 1080 SDB's were placed around the canine sign along the World War II road and the Japanese sub pen area. A total of 14 SDB's were placed on the beaches in Mutt and Jeff Cove. One fox carcass was found in a World War II tunnel by North Head near the Kiska Harbor camp. The carcass was greatly decayed and had not been scavenged upon.

Camp setup at the Sirius Point auklet colony was considerably easier this year as a result of experience from last year and having double the number of people (8) to assist. A 16 foot, 2" X 6" wood crane was erected atop the cliff and fitted with a single pulley and 1/4" poly rope to lift all gear to the top of the cliff from the beach. A section of fish net with a draw string around the perimeter was used to encapsulate all gear prior to lifting with the "crane." The net eliminated the need to tie all boxes and gear together before hauling up the cliff. Four by four stakes were used to anchor the dismantled "crane" after all gear was lowered from the cliff following completion of work. It will hopefully still be there next year.

Additional gear and storage space was required this year because four biologists resided at Sirius Point during the two week camp. Additional tents were necessary to accommodate the



extra gear. Five Omnipotents and one large dome tent were used. The dome tent and one Omnipotent were used solely for equipment storage and a cook tent while the other Omnipotents were used for berthing. The tents were placed in the same site as last year. Good weather, hard work and long hours allowed all the auklet surveys to be duplicated this year in spite of the extremely condensed schedule.



Kiska Volcano from Sirius Point showing the light colored Old Lava Flow (left) and darker New Lava Flow (right) auklet colonies. 6/26/86, #038605, FGD.

Initial efforts in the Sirius Point auklet colony included setting up time lapse cameras, relocating and marking surface count plots and establishing an improved trail marking system through the colony (for safety). This was followed by mapping all the plots and time lapse camera sites, landing rocks, identifying vegetation within plots, establishing an additional surface plot and establishing a new photo plot.

On 20 June, two time lapse (T/L) cameras were set up in the old lava flow at the same location as in June 1985 (camera site X-C1 and X1-C2). The two T/L cameras were the same type as those used last year (8 mm movie camera with batteries, intervalometer, housed in a waterproof box with a solar panel on top). Unlike last year, the intervalometers were set for one frame every two minutes. This change was possible due to the presence of an observer to change the film while conducting the surface plot counts. This allowed an increase in the amount of data recorded by the cameras. Film was replaced in

the cameras about every two and one half days. The cameras used three rolls of film each with the last roll ending on 19 June when the cameras were picked up. This year, two additional T/L cameras were placed at new survey sites on the fringe of the New Lava Flow. T/L camera C3 was set and operated in the same manner as the original two in the Old Lava Flow (2 frames/minute). The T/L camera system for site C4 did not function properly. The external intervalometer did not work and the clock minute hand broke off. This camera was, therefore, set to take a photograph each minute with its internal intervalometer. Only one roll of film was placed in T/L camera C4. Camera C3 used two rolls of film with the last roll being completed on 29 June. All of the T/L camera equipment was loaned to us once again by the Regional Office.

The results of the T/L camera photography for least and crested auklets on plots X-C1 and X1-C2 in the Old Lava Flow are shown in Figures 5, 6, 7, and 8. Results for least auklets on plot C3 in the New Lava Flow are shown in Figure 9. Analysis of the data from T/L camera C4 was not possible due to the broken clock. The auklet numbers from plot C4, however, did appear to be larger than on any of the other three T/L camera plots. The attendance pattern for both species of auklets was generally the same as in 1985 with three peak activity periods. The first major activity period was from sunrise to approximately 1000 and consisted almost solely of birds leaving the colony. The second peak occurred from 1300 to 1600 with birds entering and leaving the colony. The third and final period was from 2300 to 2400 in the evening. The mean number of least and crested auklets recorded in the main afternoon activity period on T/L camera plot X-C1 was 2.86 and 0.12 birds respectively. This is the first data for this plot, since the camera and clock malfunctioned in 1985. The mean number of least and crested auklets on T/L camera plot X1-C2 in June 1986 was 1.87 and 0.24 birds, respectively, during the peak of the afternoon activity period. This compares with 3.30 least auklets and 1.60 crested auklets recorded on this plot in 1985.

T/L camera plot C3, established this year in the New Lava Flow, recorded a higher mean number of least auklets at the peak of the afternoon activity period than all other plots with 3.35 birds. It was not possible to analyze the data from T/L camera C4 in the New Lava Flow because the minute hand on the clock was broken. cursory review of the film, however, appeared to show greater numbers of least auklets than was even recorded on plot C3. There were no measurable numbers of crested auklets recorded by either of the T/L cameras in the New Lava Flow.

Each of the eleven surface count plots established in the Old Lava Flow in June 1985 were located. All existing posts within the plots and along the upper access trail were recoated with blaze orange paint. Several flagging ribbons were also attached to the posts to facilitate their relocation in fog. All surface plot corners which were marked on rocks or

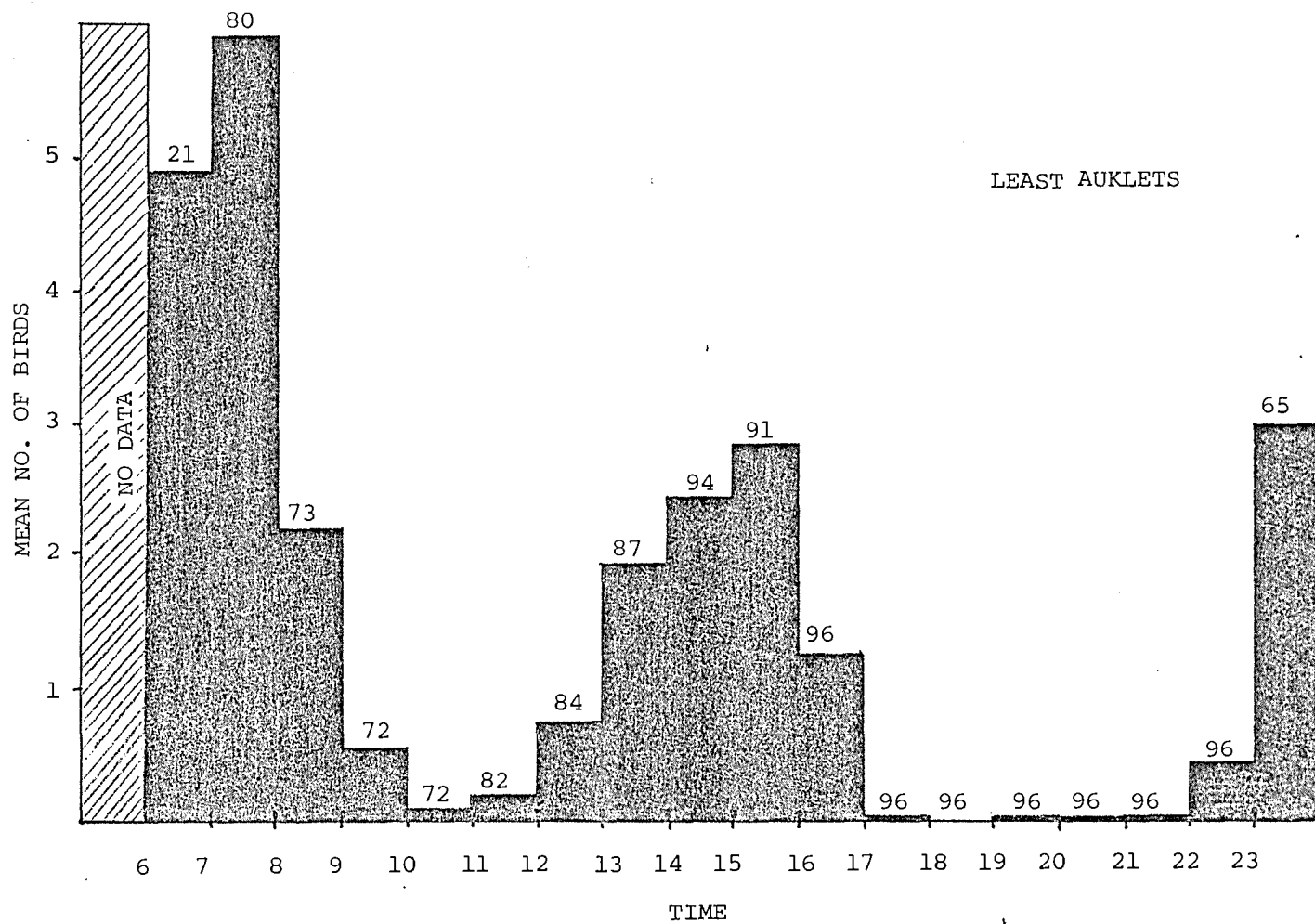


Figure 5. Daily attendance pattern of birds at Kiska Island from time-lapse photography on Plot X-C1, June 20 - 23, 23 - 25, and 25 - 28. Total number of 5-minute intervals per hour during which counts were made is indicated above each bar.

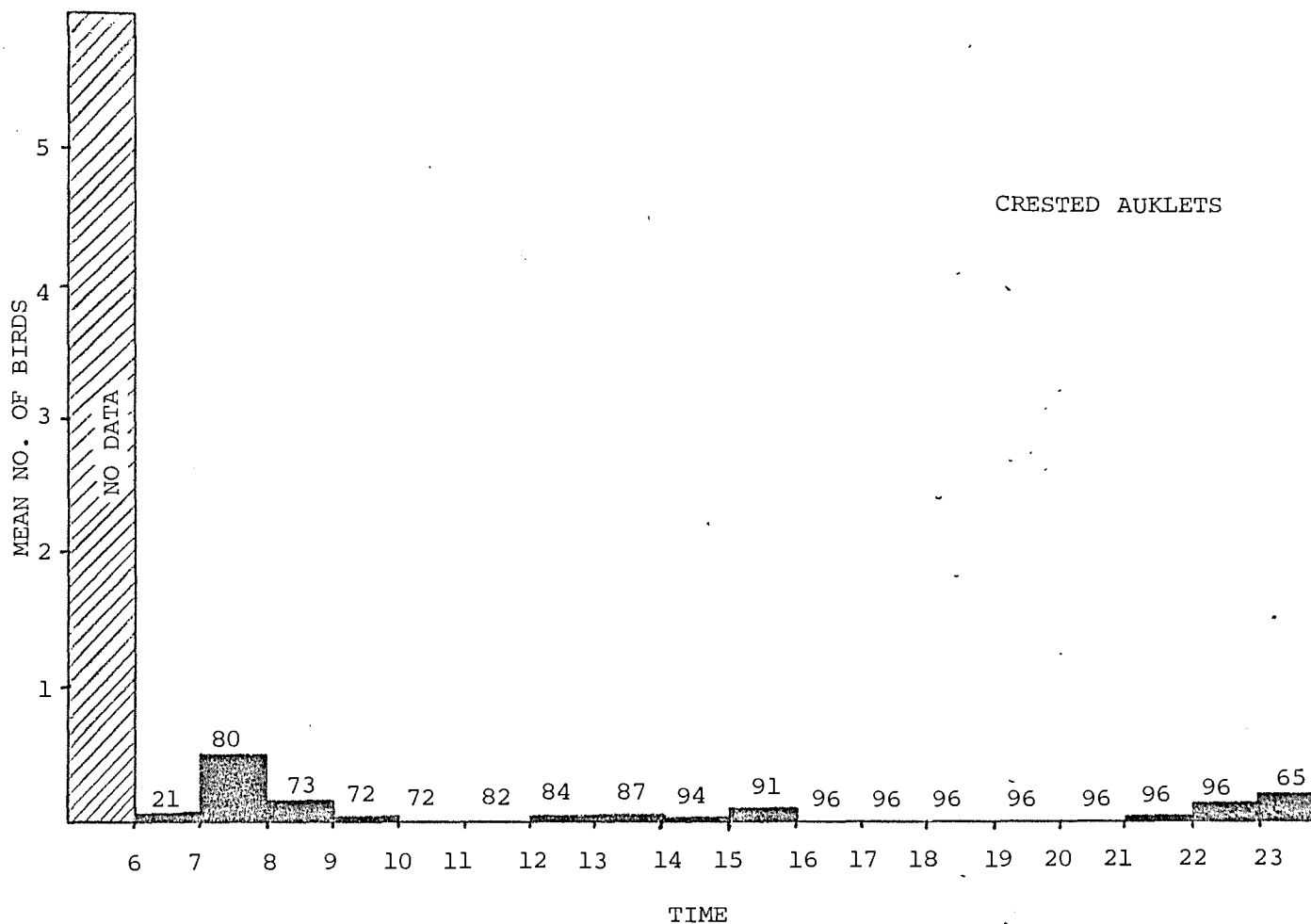


Figure 6. Daily attendance pattern of birds at Kiska Island from time-lapse photography on Plot X-C1, June 20 - 23, 23 - 25, and 25 - 28. Total number of 5-minute intervals per hour during which counts were made is indicated above each bar.

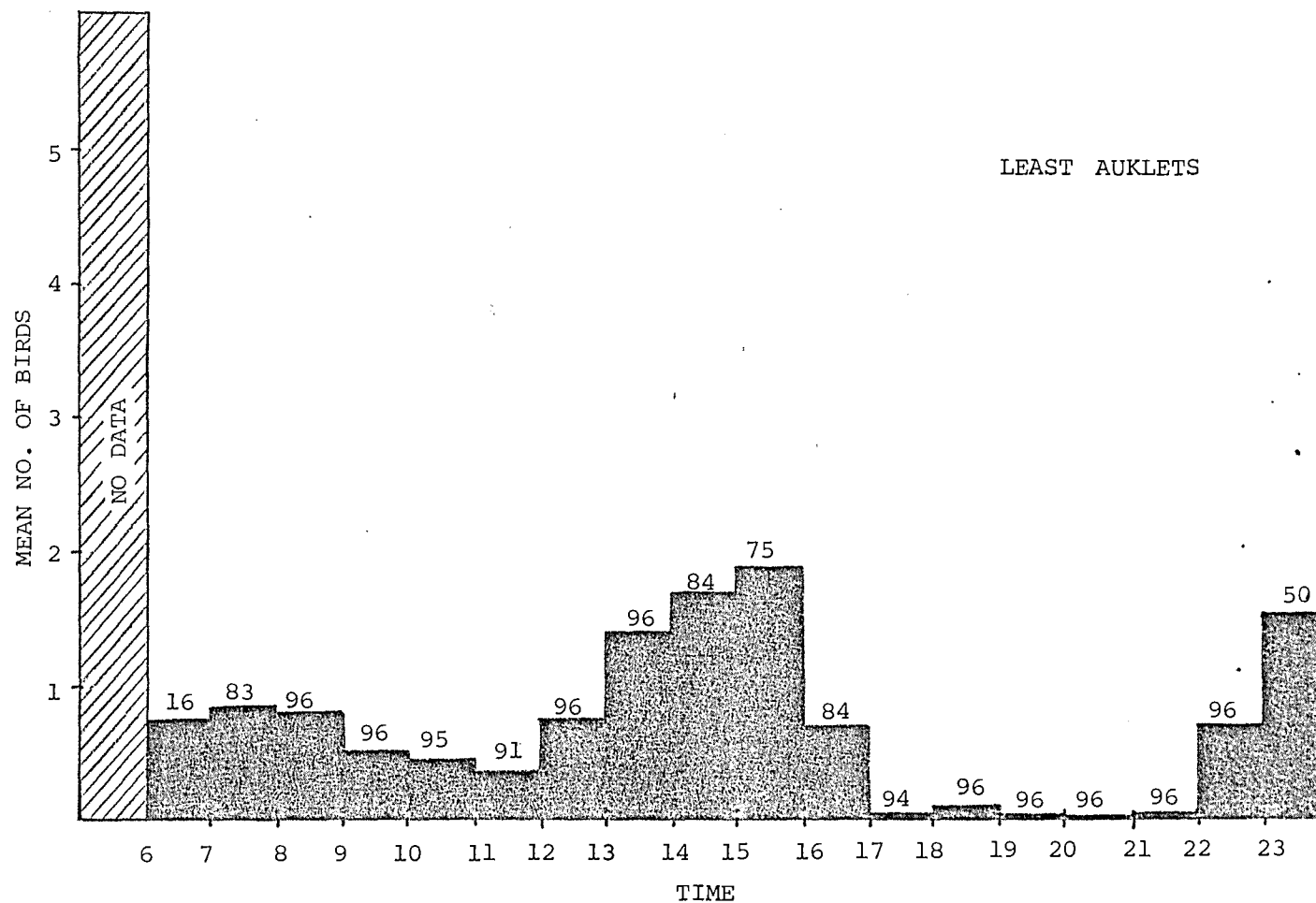


Figure 7. Daily attendance pattern of birds at Kiska Island from time-lapse photography on Plot X1-C2, June 20 - 23, 23 - 25, and 25 - 28. Total number of 5-minute intervals per hour during which counts were made is indicated above each bar.



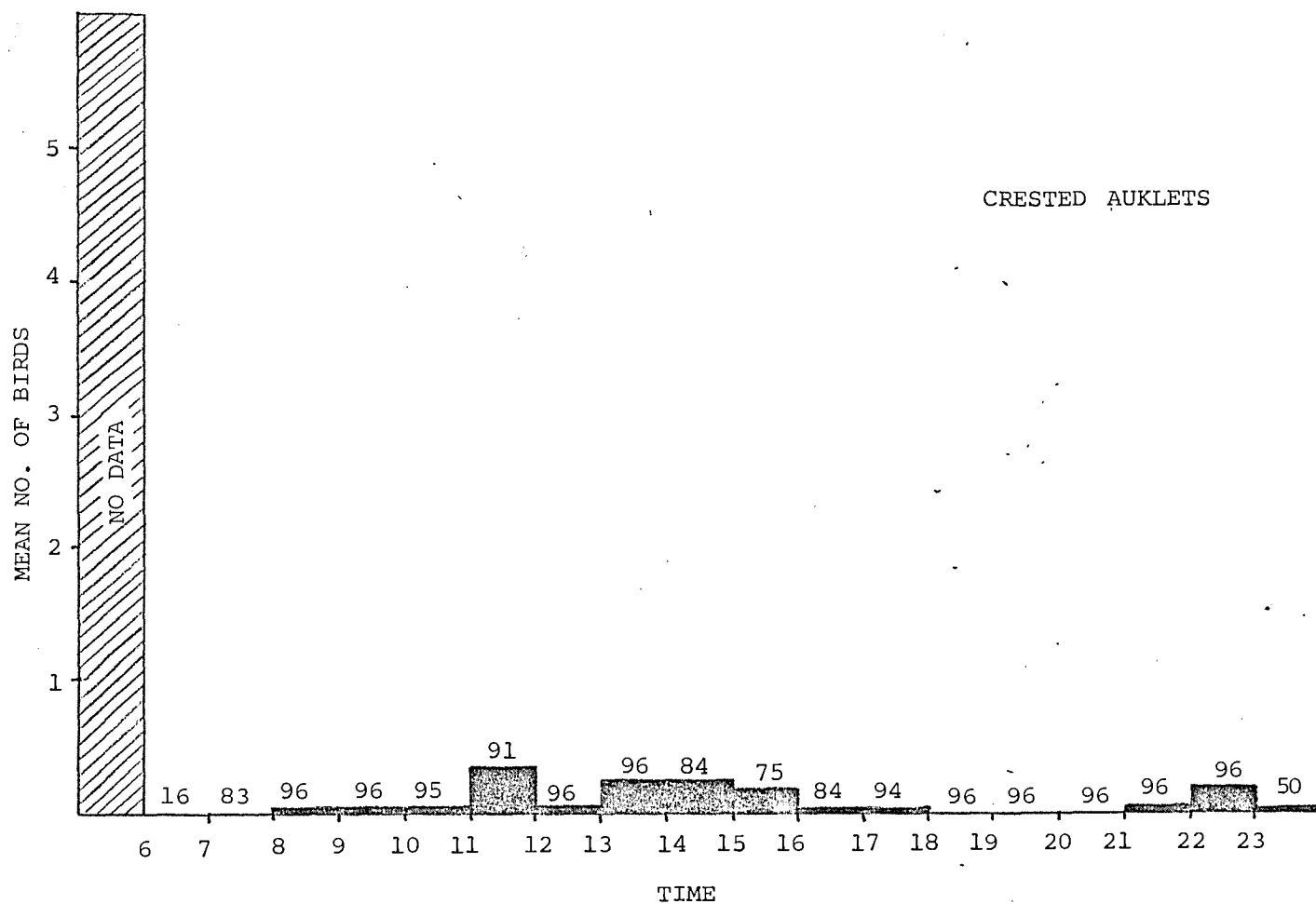


Figure 8. Daily attendance pattern of birds at Kiska Island from time-lapse photography on Plot X1-C2, June 20 - 23, 23 - 25, and 25 - 28. Total number of 5-minute intervals per hour during which counts were made is indicated above each bar.

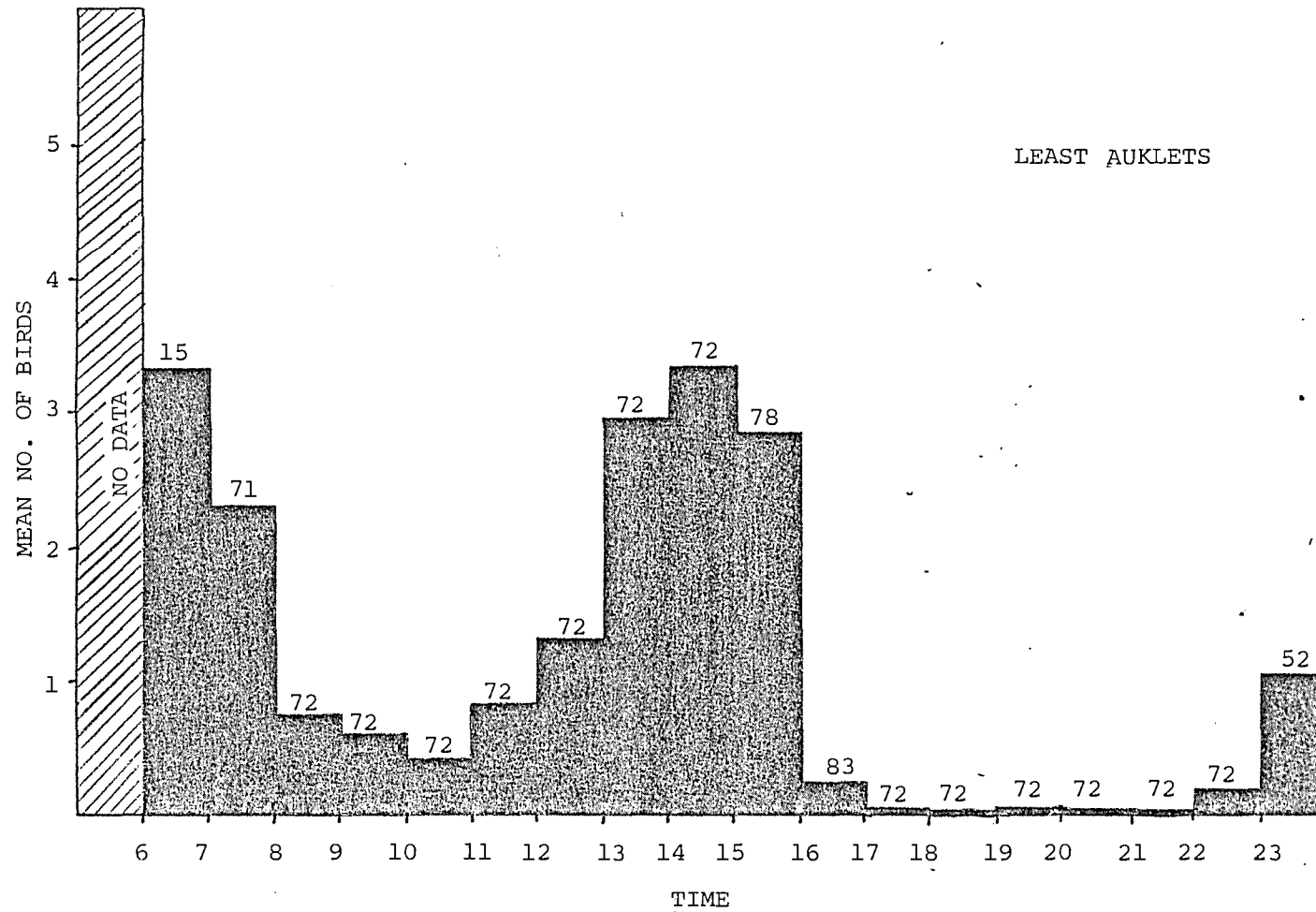


Figure 9. Daily attendance pattern of birds at Kiska Island from time-lapse photography on Plot C3, June 6 - 12. Total number of 5-minute intervals per hour during which counts were made is indicated above each bar.

vegetation in 1985 were remarked this year with either a half length or full length post as needed to allow viewing from the observation point. Also, at least two new posts were installed along trails between the surface plot groups. All trails were marked with temporary surveyors flags between posts. A new trail from the ridge above camp to the lower plot group and on to the New Lava Flow was also established and marked with posts and surveyors flags. Establishing the new trail from camp to the lower plot group resulted in shorter and safer access for biologists working the two lower plot groups. In 1985, Old Lava Flow surface counts were conducted on 27, 28, and 29 June. In 1986, counts were conducted on 24, 25, 26, 28, 29 and 30 June. No counts were conducted on 27 June due to weather. All 1985 survey techniques were duplicated in 1986. The first day of surface plot counts concentrated on the eleven plots surveyed in 1985. On 25 June one additional plot (#12) was established near plots 4 and 5. The boundary for plot 12 was readjusted after the first count on 26 June because one corner of the plot could not be viewed from the observation point. Peak activity periods observed on the twelve surface count plots were generally the same as in 1985. The range for the five highest counts taken each day on the plots for least auklets in 1986 had a low of 0-10 on plot 9 on 25 June and a high of 22-45 on plot 1 on 29 June. In 1985, the low count was 0-5 least auklets on plot 11 and the high count was 55-83 on plot 4. Although occurring on different specific plots in 1985, the higher number ranges of least auklets occurred on the upper two plot groups and the lower number ranges on the lower two plot groups for both years. The range for the five highest counts taken each day on the plots for crested auklets in 1986 is considerably lower than for least auklets. Crested auklets had a low of 0-1 recorded on all plots at least once and a high of only 3-7 and 3-5 recorded on plots 3 and 4 on 30 June and 24 June, respectively. The range of the five highest count days for least auklets in 1986 is lower than in 1985 and, although low, about the same in both years for crested auklets. The average of the five highest counts for all plots censused each of the six days was 17.5, 16.5, 12.1, 18.4, 17.6 and 17.2 birds respectively for least auklets crested auklets was 0.6, 0.3, 0.1, 0.6, 0.4 and 0.85 birds for crested auklets, respectively. The 1986 averages for all the plots were considerably lower than the three days of survey in 1985 (23.4, 34.2 and 32.5 for least auklets and 0.7, 1.0 and 1.1 for crested auklets). The difference in numbers, although significant, probably is due to some difference in the nesting phenology between the two years and/or normal annual variation. With only two years of survey data, it is difficult to determine if either year is unusually high or low. The question, however, becomes somewhat of a mute point when the two years of data are combined to provide baseline information to eventually compare pre- and post- fox eradication auklet populations. For 1986 the combined average for all days of auklet observation on all plots is 16.5 least auklets and 0.5 crested auklets. For 1985 was is 30.0 least auklets and 0.9

crested auklets. Combining both years data as baseline information produces a population index of 23.2 least auklets and 0.7 crested auklets for all the other plots surveyed.

Additional surveys conducted both years while surveying the auklet surface plots were the presence of natural avian predators (glaucous-winged gulls, bald eagles and peregrine falcons) and introduced terrestrial predators (arctic fox). The presence of any of these predators in or near a plot affects the numbers of birds counted. A simple fly by for any of the three avian predators caused all of the auklets within the general area to leave.

In 1986 a total of 254 auklet disturbances caused by predators were observed. The two most common sources glaucous-winged gulls and "unknown disturbance" which accounted for 95 (37%) and 123 (48%) disturbances to the auklets respectively (Table 20).

Table 20. Auklet predator disturbance during surface plots in Old Lava Flow, Sirius Point, Kiska, on 24-26 and 28-30 June 1986.

Plots	Glaucous-winged gull	Peregrine Falcon	Bald Eagle	Arctic Fox	Unknown Disturbance*	Total Events
1, 2, 3	15	0	12	0	11	38
4, 5, 12	23	2	13	0	69	107
6, 7, 8	20	0	5	0	17	42
9, 10, 11	37	0	4	0	26	67
Total	95	2	34	0	123	254

\* Some undetected source caused the birds to fly.

Bald eagles were the next most prevalent disturbance cause with 34 (13%) events. Peregrine falcons only accounted for two disturbances. All three avian predators were observed taking auklets out of the air. In 1985 the most common avian predator disturbance was also the glaucous-winged gull. Gulls accounted for 46% of the observed disturbances in 1985 compared with 37% in 1986. Bald eagles caused a 8% of the disturbance in 1985 and 13% in 1986. The most important difference between 1985 and 1986 was the total absence of fox in 1986. In 1985 (prior to baiting with Compound 1080), arctic fox accounted for 37% of the disturbances within the plots. If the surrounding areas were also considered, the fox was the most prevalent predator observed in the colony in 1985, accounting for 65% of all disturbances. It should also be noted that an average of 18 individual fox were observed each day by all observers in the auklet colony in 1985. The complete absence of fox, fresh fox sign, or dens in June 1986 speaks well of the potential success of the Compound 1080 baiting in March 1986.



A Least Auklet warily searches the sky for avian predators. 6/24/86, 038606, FGD.

As in 1985, the ration of juvenile (1 or 2 year old) to adult least auklets was observed at least once an hour during the surface counts using plumage characteristics. The percentage of juvenile least auklets on the surface plots ranged from a low of zero to a high of about 300 percent. The least auklet average for all of the plots surveyed during each of the six days was .47, .63, 1.03, .50, 1.55 and .75 juveniles/adult. The average for all six days was .41. In 1985 the average of all the plots surveyed during each of the three days was .13, .09 and .14 juveniles/adult least auklet. The average for all three days was .12. The 1986 juveniles/adult ratio of least auklets was considerably higher than in 1985. Combining the data for both years an overall average of .27 juvenile/adult least auklet on all the plots surveyed is realized. This particular survey, however, was the most difficult attempted in the auklet colony. There was again great variability in the ability or perceived ability to recognize the age classes of least auklets. The results, therefore, should be considered somewhat skeptically.

The major vegetational components of all the surface plots were identified and their extent of coverage of each plot was visually estimated. Lichens and moss are the two dominant vegetation types in the upper two groups. Calamagrostis grass is the dominant species on the lower plot groups. The grass would suggest that the lower plot groups are in a more mature area of the lava flow (better soil). The lower numbers of auklets observed in the two lower plot groups would also suggest this. The limited time available in 1986 precluded a



more detailed evaluation of the vegetation within the surface point plots.

While conducting surface counts on plots 4, 5 and 12 in the Old Lava Flow, a 35 mm camera equipped with black and white ASA-25 film pushed to ASA-400 and a 80-200 zoom lens was used to document the number of auklets on a major landing rock due south of the observation point. Photographs were taken every 5 minutes to function similar to a T/L camera. The results were evaluated for least auklets only. The numbers of crested auklets were too low to allow meaningful analysis. Least auklet attendance began on the target rock at 1100 with an average of 2.3 birds, followed by a dramatic increase at 1300 to an average of more than 6 birds and peaking at 1600 with an average of 7.4 birds. A similar attempt to survey plot 5 using this method failed because of too great a distance to the landing rock and the resultant small size of the subject matter (it was impossible to accurately discern the difference between birds and rocks).



Twenty-four least auklets are on this large landing rock, an example to data collected with time lapse cameras at Sirius Point, Kiska. 6/29/86, 038607, FGD.

After disassembling and loading the Sirius Point Camp, the vessel stopped at Sredni Bight to investigate the nearby Mature Lava Flow for any auklet and/or fox activity. Auklets were thought to have been observed flying over that area during their afternoon and evening activity periods in June 1985.

The lava flow was mapped from the helicopter during March and April 1986 work, but no auklets are on the island during those

months. On 02 July 1986 all eight crew members landed ashore and split into two equal groups. The Sirius Point crew searched the northside of the lava flow up to the base of Kiska Volcano. The Kiska Harbor crew searched the southside of the lava flow and the west end of East Kiska Lake. The Mature Lava Flow is overgrown with a thick mat of vegetation which also covers most crevices. No sign of auklet or fox activity was found. It has probably been many years since this lava flow has had any major auklet activity. The 1985 afternoon and evening auklet flights were obviously coming from or going to another location.

## H. PUBLIC USE

### 1. General

Most of the people living in the Aleutian Islands are active duty military personnel, their dependents, civilian military employees, and their dependents. A Naval Air Station and other Navy commands are located on Adak Island where approximately 6,000 people reside. The average tour of duty for Adak military personnel is one and a half to two years, providing the refuge unit staff a unique opportunity to contact a continually changing population with interpretive, educational and informational resources. Shemya Air Force Base and a U.S. Coast Guard LORAN Station on Attu Island add 1,000 military personnel to the population of the Chain. Native villages on Atka, Umnak, Unalaska, and Akutan islands and a fishing community at Dutch Harbor account for another 1500-2000 individuals. The AIU staff attempts to visit Shemya, Attu and each of the Native villages at least once annually, although weather and logistical problems often prevent success. The visits give us the opportunity to discuss refuge programs and objectives with the people, present films, conduct slide programs for interested residents, and provide environmental education activities for students. Attu, Shemya and Atka were visited during 1986.

Visitation to the Adak Fish and Wildlife Center during the year increased by 56% over 1985 and totaled 5,632 persons. Refuge personnel also handled nearly 1,300 public inquiries. Adak public use surveys recorded an estimated 18,411 recreational visits. Consumptive use totaled 25,247 activity hours and nonconsumptive use was estimated at 22,119 activity hours. Until December, nature films were shown every Sunday evening at 7 p.m. Due to increased interest and special requests, we expanded the Sunday visitor center hours on 07 December to 1 pm thru 9 pm with natural resource films being shown at 1, 4, and 7 pm. The move definitely increased our visibility in the community as well as visitation to the center. Nature films are obtained from the Alaska State Film Library, the National Park Service, the FWS Public Affairs Office in Anchorage and the AIU film library. A variety of films are presented to give Adak

residents an opportunity to learn more about Alaska and its natural resources. This year, 51 different films were shown to a total of 1,311 people.

Approximately 15 news articles were published in the Adak "Eagles' Call" (weekly NAS Adak newspaper) during the year. This number, which is a substantial decrease from past years, is largely a result of the whims of the current editor who has not been at all supportive of our efforts or programs. One of those articles, however, was a two-page photo spread on our summer environmental education program with elementary school age children. On the other hand, the local Navy Broadcasting Service detachment was extremely supportive and helpful to us all year. In fact, personnel there checked in with us almost weekly for news notes. At least 25 television spots were taped with refuge staff on topics such as the Kiska fox eradication program, refuge activities, hunting and fishing regulations, beached whales, wild edible plants, a rehabilitated owl, the Adak oil spill, the Christmas Bird Count and our "don't feed the eagles" problem.

In June, Outdoor Recreational Planner (ORP) Edgerton began a series of bi-weekly two-minute television spots on refuge programs and natural history. Unfortunately, this series lasted only two months because Navy command directives and programming changed. The television station broadcast a two-part spot on our visitor center featuring ORP Edgerton discussing future displays, the Alaska Natural History Association (ANHA), AIU programs and other services we offer. Throughout the year the local radio station regularly aired refuge news and program notes. Finally, the Unalaska "Aleutian Times" newspaper published a couple of our news releases as well as press releases from the regional office on our comprehensive conservation planning process.

Refuge Manager (RM) Zeillemaker and Assistant Refuge Manager Klett attended 38 Navy command staff meetings on Adak during the year. These meetings keep island commands informed of refuge operations and programs and keep the refuge unit staff abreast of Adak Navy activities.

Beginning in August the NAS Adak "Blue Card" lectures were once again taught by Navy personnel in our conference room. Local Navy regulations require that all personnel on Adak attend one of the lectures and receive a hunting/hiking permit (the "Blue Card") prior to hunting or hiking away from established roads. The lectures contain information on the dangers of World War II debris (ordnance and antipersonnel devices), sudden weather changes, clothing for cold and wet weather, hypothermia, and recreational opportunities (including hunting and fishing information). The card serves as a small game hunting license for active duty military personnel on the Adak Naval Reservation lands. The new volunteer instructor, a knowledgeable outdoorsman, proposed that our conference room



was a better place to hold the lectures than the small meeting room previously used in the NAS Adak Security Building and that participants would appreciate exposure to our wildlife displays and sales outlet. We agreed. The twice monthly event draws more people into our visitor center and allows us to present refuge objectives and natural history information to them. People learn that there is more to our headquarters building than just business offices.

## 2. Outdoor Classrooms - Students

The AIU summer environmental education program was scaled down somewhat this year from the 1985 level. A six week "Junior Naturalist" program was organized and conducted for children in grades K-6. Wildflowers, birds, mammals, food webs, habitats, intertidal animals, adaptations and salmon were some of the topics covered in the program. A total of 17 indoor and outdoor sessions were conducted for a total of 119 children. A special trip was also made to Atka Village to conduct activities for the children on that island. While on Atka, refuge personnel presented programs on refuge management programs and activities. Refuge staff members conducted eleven visitor center tours and nature talks to a total of 213 students and Girl/Brownie Scouts.



SCA volunteer naturalist Rebecca Geisen helps five "Junior naturalists" explore the rich Adak tundra. 7/18/86, #048602, TRE.

ORP Edgerton gave five one-hour talks on refuge history and programs to a total of 64 Adak high school students in Alaskan Studies, Consumer/Lifestudies and English classes. He also completed an environmental education worksheet for use with our present displays by elementary students in grades 4-6. Similar worksheets will eventually be developed for use with our planned new visitor center displays by students in almost every grade level.

### 3. Outdoor Classrooms Teachers.

In May a meeting was held with the Adak Region Schools superintendent to garner support for an environmental education (EE) workshop we scheduled for the fall. He liked the idea and agreed to give interested teachers a Friday afternoon in October off to attend it. With this groundwork laid, Regional EE Specialist Janet Ady and refuge unit ORP Edgerton conducted a very successful one-credit EE course 23-25 October (Thursday evening to Saturday afternoon). The 17-hour course, entitled "Wildlife in your Curriculum," was attended by 12 elementary and high school teachers, the NAS Adak Child Care Center Director and two Girl/Brownie Scout leaders. The course was designed to review a variety of wildlife and resource education materials and train teachers to use them in their classrooms. Specific emphasis was given to Project Wild, Alaska Sea Week, Alaska Wildlife Week and Class Project materials. The course also provided a basic overview of wildlife biology and ecology



Adak's teachers exhibited considerable enthusiasm and interest in our first ever EE workshop.  
10/24/86, #028603, EVK.



and assisted teachers in developing wildlife and resource related lesson plans. Janet and Tom utilized a variety of teaching techniques, including lecture, group discussion, audiovisual programs, activity demonstration, activity planning and practice, and a field trip. Although the course was conducted over an intense, three-day period at a time when teachers had grade reports to get out, all participants stayed involved, interested and enthused and rated the course sessions very highly. Ten of the participants (all teachers) took the course for credit through the University of Alaska and met with Tom on 01 December to present their final oral and written reports on class activities. The three-hour session was filled with enthusiasm as the teachers shared a myriad of creative ideas and materials used and developed in their classrooms. We were extremely pleased with the results, especially considering many teachers did more than was required, and all expressed plans to keep using the wildlife-oriented curriculum materials in their classrooms. We estimated that in the month following the course teachers involved some 300 kids in EE activities with roughly 1,500 hours of instruction. We were very pleased by the success of the first time effort, the fact that it involved 25 percent of Adak's educators, and the knowledge that we now have an increased base of enthusiasm and support for EE on Adak.

The refuge staff supplied Adak teachers with National Wildlife Week packets for use in their classrooms. We also continued to encourage use of our environmental education resource/lending library by teachers. In addition, at least six teachers borrowed films, photographs and other resource-oriented materials for use in their classrooms during the year.

#### 6. Interpretive Exhibits/Demonstrations

In 1985 Accelerated Refuge Maintenance Management Program (ARMM) funds were made available to hire a contractor (Inside/Outside of Austin, Texas) to design new, permanent displays for the Adak Fish and Wildlife Center. Work on the project, which began in October 1985, was supposed to be finished in March 1986. Unfortunately, things did not turn out that way. The contractor was very difficult and inefficient to work with. The products we received from the firm were continually late, incomplete, or filled with errors. The result was that refuge and regional office personnel spent considerably more time on the project than should have been necessary. A significant amount of work that was required of the contractor was actually done by refuge personnel. Because of the many delays in this contract, the ARMM funds for fabrication of the designed displays were not authorized in FY-1986 as scheduled. At this time there is still some question as to whether the money will even be made available in FY-1987. Incredible as it may seem, by the end of 1986 this design contract still was not complete. Inside/Outside promised to submit final products (the items still have a number of

mistakes which we will correct) in January 1987 at which time they will be ten months late. The most significant impact of this delay was that the displays we hoped to have installed in the visitor center by 1987 won't be available until at least the fall of 1988. Obviously, we are disappointed because the new exhibits are sorely needed to enhance our interpretation, recreation, environmental education and law enforcement programs on Adak.

Due to the extended delays in completion of the ARMM project, we have continued to replace and improve old and outdated displays ourselves. Work was completed on the interpretive panels for a six-sided Aleutian Canada goose display begun in 1985. A new, vastly improved wildlife exhibit, which includes photographs of birds, fish, mammals and plants, was also built. The final three photographs with captions were added to our popular 18-foot Aleutian wall map display. An informative question/answer exhibit about Adak (called "Discover Adak") was also completed. In March a high school student loaned us an excellent volcano and seismic plate tectonics exhibit (his science fair project) which we displayed for about a month. Finally, in December work began on a new temporary display covering refuge history. It will cover the period from Aleut settlement through World War II and should be completed in early 1987.

In June RM Zeillemaker presented a live-mounted bald eagle (on permanent loan from the FWS) to the NAS Adak Public Works Department for display in their building. The loan was made in response to a long-standing request and as a gesture of appreciation for the department's construction of power-pole eagle perches and screening of island dumpsters which have helped reduce the number of electrocuted bald eagles at Adak.

Our System 70 Display, modified to show some Aleutian resources, was once again repaired and actively used at the elementary school and the Adak airport terminal building. In October and November our maintenance crew installed new housing, headquarters and directional signs that were authorized in the refuge unit sign plan and constructed in the Kenai Refuge sign shop (see photo in section I. 2.). By the end of the year the signs had already contributed considerably to increase awareness of our presence on Adak.

#### 7. Other Interpretive Programs

In March the refuge unit sponsored a series of special activities in observance of National Wildlife Week. On the 16 and 22 March we offered a total of 12 programs (5 films, 4 slide programs, 1 guest presentation on nature photography, 1 wildlife art activity for kids, and 1 birdwatching hike) which were attended by a total of 370 people. A coloring/activity table for kids, door prizes, and refreshments were also part of the special offerings. In addition, 6 classes (134

students and teachers) from the elementary school and 4 groups (73 kids and parents) from the Adak Child Care Center visited the center during the week to receive special programs, tours and talks. Students from one fifth grade class completed wildlife posters which were displayed in our visitor center.

A half-hour slide program on the refuge unit and Adak's wildlife oriented recreational opportunities was given three times to a total of 295 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 Adak and Naval Security Group Activity (NSGA) Adak security personnel on public use regulations, especially those relating to hunting and fishing, during the year. Two slide shows on Aleutian flora and fauna were shown to a total of 26 members of the Civilian Wives Club and a U.S. Marine Corps command borrowed our Attu and Kiska World War II slide programs to show to local troops. Finally, 26 members of a SeaBee reserve unit from Georgia were shown the video tape "Fight for the Sky - Report from the Aleutians," a World War II production on the Aleutian campaign.

RM Zeillemaker participated in a Japanese pilgrimage to Attu and Kiska islands 14-18 June to commemorate Japanese and American soldiers and sailors who lost their lives in the western Aleutians during World War II. The memorial services at Engineer Hill on Attu and at Kiska Harbor the Shinto Shrine, North Head gun emplacements, and at sea off Sobaka Rock, Kiska, were very emotional for the 42 passengers and 33 crew members of the 210 foot "Kakuyo Maru," as well as for the three Americans in attendance (RM Zeillemaker, a harbor pilot, and a State contract World War II photographer). Participants also accomplished day long hikes to Holtz Bay and Chichagof Harbor while on Attu. RM Zeillemaker showed the film "Chain of Life" to 50 persons aboard the vessel and pointed out various wildlife to the passengers. Sea otters were particularly popular.

RM Zeillemaker also assisted the crew of the British Ketch "Ashley St. Mary" plan a voyage through the western Aleutians by arranging for the vessel owner to call Adak when he reached Attu. The call was made, the plan was passed, and the vessel crew requested a rendezvous near Adak so they could express their gratitude. Fortunately, the twice monthly commercial Adak to Atka flights were scheduled at the right time and the rendezvous was accomplished through support of Peninsula Airways and Atka Village. A schedule for the remainder of the cruise through the eastern Aleutians was developed while RM Zeillemaker was briefly aboard the "Ashley St. Mary" in Nazan Bay, Atka.

VHS and Beta videotapes of three programs (The Chain of Life, America's Wetlands, and The Aleutian Story - World War II) were distributed to the Adak Navy Exchange video rental outlet in

April so that the tapes could be checked out by Adak residents free of charge. The service proved to be popular. The tapes were checked out constantly. We plan to continue this service and, if appropriate, expand the number of programs offered.



Members of the Japanese pilgrimage gathering at the Shinto Shrine, Kiska Island, prior to conducting memorial services. 6/17/86, #018603, CFZ.

Work continued this year on a new AIU brochure which we expect to have printed in early 1987. The project has taken a long time because all the graphics work was accomplished in the RO and competed with many other regional priorities. We also put together a package for the production of an Adak Bird Check List, but had to slip it back to 1987 due to a lack of funds. Our Adak Map and Recreation Guide was revised and sent to the RO Realty office for graphic changes in early 1987. The updated effort will result in our third printing of this popular ANHA sales item. Our Adak Hunting and Fishing brochure was also updated and photocopied for Adak-wide distribution.

ORP Edgerton served as the AIU representative to the Adak Community Education Advisory Committee and to the board of the Alaska Natural Resource and Outdoor Education Association (which met via teleconference). He was also asked to be the judge at the annual elementary school science fair in March.

In late December, the refuge unit staff organized and conducted the annual Audubon Christmas Bird Count. Eleven people divided into four groups participated in the event (see section G. 7.).

## 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 Attu, Shemya, Adak, Great Sitkin, Atka, Umnak, Unalaska, Akutan, Akun, Tigalda, and Sanak islands. Table 21 provides a breakdown of hunting and fishing visits and activity hours for Adak. Only waterfowl and ptarmigan hunting are authorized on Attu, Shemya, and Great Sitkin. The command at Shemya does not allow any hunting and the command at Attu allows waterfowl hunting only. On Adak those species and the caribou may be harvested. The waterfowl season opened on Adak on 08 October, but unlike past years, hunting pressure seemed to be a little bit more spread out through the season. As the only upland game bird on the island, rock ptarmigan received fairly heavy pressure throughout their season. The caribou hunting season ended on 31 March with a total 1985-86 harvest of 153 animals, short of the pre-season goal of 200. The season began again on 01 September and 370 hunters had received registration hunt permits from the refuge office by the end of the year. The registration system was streamlined again this year so that hunters were required to renew permits only once on 01 January or shortly thereafter. Naval Air Station Adak normally provides tug service to the public use cabins on the south half of Adak for active duty military personnel during the caribou hunting season except for December and January. This fall the tugs were not available due to several problems. Thankfully, the NSGA Adak Recreation Division charter vessel "Kuluk Clipper" filled the gap and helped our harvest stay close to what we expected and needed. Without that support, island hunters may have harvested only one-third of the number of animals taken by the end of the year. Caribou hunting is considered to be quite good on Adak and is extremely popular.

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Table 21. Adak consumptive use

	<u>Visits</u>		<u>Activity hours</u>	
	1985	1986	1985	1986
Hunting				
Caribou	1,110	871	14,336	10,768
Ptarmigan	764	919	2,768	3,527
Waterfowl	<u>221</u>	<u>265</u>	<u>800</u>	<u>878</u>
Total	2,095	2,055	17,904	15,173
Fishing	<u>3,500</u>	<u>5,317</u>	<u>7,262</u>	<u>10,074</u>
Total	5,595	7,372	25,166	25,247

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## 9. Fishing

Fishing continues to be the most popular consumptive use activity on the Unit (Table 21). Saltwater enthusiasts angle for halibut and set crab pots in nearby waters. Stream and lake fishermen concentrate on pink, red and silver salmon, and Dolly Varden. The 1986 pink salmon run was reasonably good, although not at the level expected. Even so, popular areas like Finger Bay and Airport Creek received heavy use. Finger Bay Stream has been designated "fly fishing only" by Naval Air Station directive to control fishing pressure in that popular spot. High quality wilderness fishing is also available for those interested in hiking. NSGA's "Kuluk Clipper" vessel ran daily halibut fishing trips for up to six fishermen, one of who must win a reservation through the lottery system of the Recreational Services Division. Demand for the trips is always high and many people put in for the monthly drawing with the hope of winning a chance to charter the boat.

All NSGA land, including Clam Lagoon (the island's clamming "hotspot"), remained closed to clamming this year due to the ever present uncertainty of the existence of red tide in Adak waters and the possibility of PSP poisoning.

## 10. Trapping

Trapping for arctic fox is allowed year-round at Adak. Free refuge permits were issued to 21 trappers during the season. Permits and forms for fox trapping were redesigned to make our permitting system operate more efficiently. Much of the trapping is at sites near personal or organization cabins on the north (Navy) portion of the island due to difficult access to much of the island. Few animals were taken this year.

## 11. Wildlife Observation

Landscape, wildflower and wildlife observers and photographers enjoy the many unique opportunities available on Adak. Bald eagles and sea otters are common and favorite subjects. Caribou and puffins, although a bit more difficult to see, are also highly sought with camera and binoculars (Table 22 ).

## 13. Camping

The entire AIU (except Buldir, Chagulak and Bogoslof islands) is open to camping. Most use, however, occurs on Adak where five FWS backcountry cabins are available on the south portion of the island on a first come, first served, reservation basis. As in past years, the cabins received moderate to heavy use by backpackers, fishermen and caribou hunters during 1986.

## 16. Other Non-Wildlife Oriented Recreation

Cross-country skiing, sledding, tubing and snowshoeing are



The variety of Aleutian wildflowers provides nature photographers a never-ending supply of beautiful subjects. 8/15/86, #048603, TRE.

Table 22. Adak selected nonconsumptive uses

	<u>Visits</u>		<u>Activity hours</u>	
	<u>1985</u>	<u>1986</u>	<u>1985</u>	<u>1986</u>
Hiking	3,258	4,444	9,411	15,524
Land Vehicle	4,881	4,938	4,881	4,938
Photography	<u>1,614</u>	<u>1,657</u>	<u>1,614</u>	<u>1,657</u>
TOTAL	9,753	11,039	15,906	22,119

extremely popular winter activities on Adak. Hiking and beachcombing are popular activities throughout the year and berry picking is done by many during the fall.

#### 17. Law Enforcement

ARM Klett and ORP Edgerton attended the 40 hour Refuge Law Enforcement Agent refresher training session in Anchorage in February. 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 lands are turned over to the appropriate navy command for prosecution. Military personnel

who violate regulations off the Naval Reservation and all civilians are issued FWS citations.

This summer, NAS Adak revived its Natural Resources Management Division (NRMD) within its 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 Navy regulations. The AIU retained control of fish and wildlife associated management activities when the Naval Reservation was established in 1959. Therefore, ARM Klett and ORP Edgerton conducted several training sessions with the Navy volunteers (12) and several Adak NAS Security personnel on fishing and hunting regulations and served as liaison officers with NRMD personnel. The assistance of the volunteers was greatly appreciated. During July and August NRMD officers were in the field almost every evening and weekend checking fishermen. Refuge Officers conducted some law enforcement patrols on fishermen, caribou, and waterfowl hunters also.

Persons often report fishing violations (i.e. snagging salmon in fresh water, keeping too many fish, or taking fish with illegal gear) to us. We respond to many of these calls. More often than not, however, we find no evidence of a violation or can not locate the alleged violator when we arrive. 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 or so "sportsmen" in compliance.

Last year a problem developed over the illegal removal of World War II airplane parts from some of the islands. During 1986 regional policy recieved an in depth review and a new statement was developed that contains very definite guidelines. After many hearings, accusations, letters, and telephone calls, it was decided that the Curtis P-40 Warhawk parts salvaged last year would not go to the museum that originally picked them up, but to the Museum of Alaska Transportation and Industry at Palmer, Alaska.

On 13 September two sailors were apprehended at the NAS Adak air terminal by NAS Adak Security personnel for selling salmon/halibut without commercial licenses to crew members of U.S. Air Force aircraft from Elmendorf Air Force Base and elsewhere. Information available before this incident occurred had been received by Refuge Officers Edgerton and Klett who notified the Commanding Officer and the Security Officer of the expected sale. The command preferred that the case be handled by fish and wildlife agents. Since halibut was involved in the sale, assistance was sought from NMFS agents. Copies of all background information was sent to the NMFS office at Kodiak, Alaska. Agents there initiated interviews with all transient

flight crews that had the opportunity to purchase fish at Adak in the August-September time frame. All flights had originated from California, so this would not be a relatively hard task. Investigations were still under way at year's end.

The NAS Adak Security Department turned an off-road vehicle case (involving a civilian dependent) over to us for prosecution. This case was an easy one, as the vehicle was stuck at the scene. A Notice of Violation (NOV) citation was issued in our office the next day. Three weeks later, we were notified by NAS Adak Security that while investigating another incident, a bald eagle foot was found in the same individual's vehicle. Further investigation revealed that the person took the eagle foot from our visitor center "Touch and Feel" table as he departed after receiving the off-road vehicle citation. After conferring with Law Enforcement, he was given another NOV for illegal possession of migratory bird parts. An illegal subsistence fish net was also picked up during the year. The owner was never located. The net remains in our possession.

A short workshop was conducted by ARM Klett to provide the entire refuge staff with basic law enforcement procedures, should they choose to use them, if and when they observe wildlife violations while afield. A wallet-sized information card was passed out as a future ready reference for discussed procedures.

#### 18. Cooperating Associations

Gross sales for our ANHA outlet totaled \$14,165.82 in 1986, up from \$13,027.51 in 1985 and \$7,735.00 in 1984. One hundred twenty-three memberships were sold during the year. Adak had the second highest sales total of the four FWS outlets in Region 7, but continues to sell far more memberships than any of the other 20 outlets in the state. Visitation to the Adak Fish and Wildlife Center increased by 56 percent over 1985. This was due in part to the quality and increasing popularity of our "Natural History Bookstore." Our sales rate was also much higher than any other Alaskan outlet, with an average sale of \$2.71 per visitor.

Again this year a FWS/ANHA sales booth was set up at the Adak "Spring Fling" in April and the "Fall Festival" in November. These one-day events are similar to arts and crafts fairs and are open to everyone on the island. This year the events drew smaller crowds than in the past, but our presence is always worthwhile in terms of contacts made and exposure for the FWS. The events will continue to be a regular part of our information and education (I and E) program.

Our sales increase was smaller than we had hoped for or expected for a number of reasons. First, man-hours (volunteer or otherwise) were not available to staff the visitor center on weekends for most of the year. In addition, the Adak public

buses were re-routed and no longer passes by our visitor center. This is important because we are located quite a distance from the "uptown" and "downtown" sections of the Adak community. Sales have also been hurt because the Adak Museum re-opened on weekends and sells a number of the same resources we do. There is also a continuing lack of Adak/Aleutian related resources available for sale, although in October we began carrying 12 new items that were produced by a local photographer. That was the first time that we have been able to offer items that focus specifically on the natural resources of Adak. Finally, a directional sign to our visitor center was not installed until November.

This year we offered a substantially increased number and quality of sale items. Fifty-two different publications and visual aids were available. Items included books on the Aleutian Islands, World War II, photography, cooking, and wildlife, plus field guides to birds, plants and seashores. Posters, notecards, maps, postcards, photographs and mobiles were also sold. To accommodate these new items, we had to completely reorganize our sales area. Additional construction and rearrangement will be necessary in the future.

Association aid to the AIU this year included photo prints and art supplies for display work, interpretive books and supplies, and a \$100 volunteer honorarium. We were also able to donate a variety of publications and visual aids to the small communities on Attu and Atka islands. Our ANHA outlet will continue to grow because our center is becoming better known, we have plans to stock new sales items and produce new educational resources, our member support is strong, and high quality interpretive displays worth over \$100,000 are planned for the center.

In January ORP Edgerton conducted a two-hour meeting with Adak ANHA members designed to garner more support and volunteer help as well as exchange ideas on how to best serve the Adak community. Expanded efforts such as this along with the regular turnover of island residents should help increase our steady year-round business. Our sales outlet is a very important part of our I and E program in the AIU.

## I. EQUIPMENT AND FACILITIES

### 1. New Construction

Exterior shells for three 10 X 14 ft arctic entrances were completed on Quarters 4A, 4B, and 5A late in 1985. This year the interiors of the entries were finished. They were wired for duplex receptacles and lighting. Walls and ceilings were insulated and sheetrocked. Vinyl tile was used as flooring. The additional storage space has been appreciated by quarters residents.



## 2. Rehabilitation

Weather seals were replaced on arctic entry doors and main entry doors of Quarters 1, 2, and 3 this year. Weather stripping and window seals were checked and replaced as needed on the remaining four residences and the headquarters office/shop building.

On three occasions of high tides with strong easterly winds and once during an earthquake, the ground fill around and under the refuge storage building at the NAS Adak Small Boat Basin was eroded away. Considerable time was spent filling the wash outs and repairing damages.

New storage cabinets for auto parts and accessories, a storage cart for batteries, and new bench working space were added to the auto shop. Pipe racks were also added for more efficient storage of pipe and steel stock.

One half inch mesh welded wire was placed in the ground to a depth of 18 inches and attached to the base of siding on Quarters 1 and 2. The wire was installed to prevent rats from digging under the houses to find warmer winter shelter. The same work will be completed on Quarters 3 in spring 1987.

The 25 foot Boston Whaler bottom was cleaned and sanded during the summer. Scratches, scrapes and holes were repaired with fiberglass and the bottom was painted with a new tin base antifouling paint. The paint is designed to retard growth on the underwater portion of the boat and at the same time help prevent accelerated electrolysis of outboards and outdrives that traditional copper base antifouling paints cause. There was no marine growth and very little electrolysis by winter when the boat was removed from the water.

The old headquarters sign that was made here at Adak in the 1970's was removed and replaced by a new sign built in compliance with the AIU sign plan by the sign shop at Kenai NWR. In addition, similar signs were installed at the FWS residence compound and along the main Adak road to indicate the route to our headquarters/visitor center. The Navy liked the signs so well they requested help from us in making signs for them.

## 3. Major Maintenance

Repairs and regular maintenance of furnaces are a constant workload due to year long use of Adak heating systems. Hot water circulating pumps run non-stop all year, fuel filters are constantly being filled with water from condensation. In addition, a major earthquake in May caused broken water lines and pump casings, resulting in drywall and ceiling panel damage in our headquarters building.



New Adak headquarters sign. 9/29/86, #018604, CFZ

In August, the Navy connected new power cables to FWS Quarters 1, 2, and 3 during one of their construction projects. In the process they crossed a neutral and hot lead. When the circuits were energized many electrical appliances such as microwave ovens, refrigerators, and stereos received 220 volts of current and were damaged or destroyed. Motor compressors, capacitors and fuses were also burned out. The process of repair/replacement compensation by the Navy had been completed for FWS residents by the end of the year.

#### 4. Equipment Utilization and Replacement

Standard preventative maintenance, scheduled tune ups, and lubrication were accomplished on all vehicles, boats and boat motors. Due to the continual use of boats and motors in a salt water environment, considerable extra time must be spent keeping them in safe working condition. Two 30 hp and two 15 hp Evinrude motors were purchased during the year for use on refuge inflatable boats.

A JCB 1400B front end loader/backhoe was purchased and received during the year. The 1400B has been given the test of digging holes and trenches, filling cave ins at the boat basin, moving boulders, moving rock, moving gravel and moving a lot of snow. The machine performs well, starts easily and the enclosed cab is very nice during winter snow removal operations. In addition to the loader, a 7 foot Meyers snow plow was purchased and installed on a Chevrolet Suburban. The plow is very



helpful in snow removal at the headquarters and housing parking areas.



The new ARMM front end loader. 9/29/87, 018605, CFZ.

A Jeep Cherokee 4 X 4 purchased with FY-1985 year end funds was received in October 1986. The unit is a replacement vehicle for one of the older and less economical Chevrolet Suburbans.

#### J. OTHER ITEMS

##### 1. Cooperative Programs

During spring and summer 1985 several Special Use Permits (SUP's) were requested by the U.S. Army Corps of Engineers, Alaska District, to allow inspection of World War II sites on Attu, Agattu, Aliad, Buldir, Kiska, Amchitka, Ogliuga, Tanaga, Atka, and Umnak islands prior to issuing contracts for cleanup as provided for in the Defense Environmental Restoration Account (DERA) section of Public Law 98-212 allowing environmental restoration of former Department of Defense lands within Alaska. We subsequently issued SUP's to cover Army contractor clean up operations on Amchitka and Atka islands in September 1985. Final stipulations were developed in January and February and accepted in March 1986. The work began this spring after Chris Berg, Inc., Anchorage, Alaska, was awarded the contract to conduct the work on both islands. Work was initiated at Atka on 01 May. The project was completed,



inspected and accepted by the government on 12 June. Over 400 structures and considerable miscellaneous debris were removed. Each site was graded and planted with indigenous grass seed. The intent was to stabilize the soil at each restored site with a seeded turf while allowing native vegetation to become established. The Amchitka project started on 23 May and was completed, inspected and accepted by the government during the week of 22 September. A total of 4,031 structures and numerous miscellaneous debris sites were removed and most sites revegetated. Reseeding efforts will be completed in 1987.



Some of the 4000+ World War II sites cleaned up by a U.S. Army contractor at Amchitka.  
6/26/86, #018606, CFZ.

We issued a SUP in 1985 to Aurora Films, (Mr. Lawrence A. Goldin, President) of Juneau, Alaska, to visit Kiska and Attu islands and film remains of Japanese/American World War II occupation and battle sites on those islands as part of a contract documentary film produced for the Alaska Historical Commission titled "World War II in Alaska." Mr. Golden was able to visit Attu Island in 1985, courtesy of the U.S. Coast Guard, but was unable to arrange transportation to Kiska. We granted him a permit to visit Kiska in 1986, but again transportation was a major concern. When arrangements were being made for the Japanese memorial group to visit Attu and Kiska we remembered that Mr. Golden may be able to work something out. He was informed of the trip and arranged to accompany the group to Kiska. The documentary was completed and received its "premiere" showing on Alaska television stations 18 October 1986. It is a very informative film. While

the Japanese Memorial Group was on Attu, bags of sand and gravel were unloaded and stored for construction of a concrete base for a new Japanese war dead memorial. Construction of the memorial is scheduled to start in the spring of 1987. The project calls for construction of a 18 ft diameter concrete ring base with an 18 ft high titanium starlike superstructure planted on the base and will rest directly over the present memorial honoring Japanese Colonel Yasuyo Yamasaki.

In June and August U.S. Navy carrier battle groups operated in Aleutian waters and the Bering Sea. The fleet tested a Tomahawk cruise missile on 30 June. The cruiser Long Beach fired the missile from a point 200 miles north of Attu and the Tomahawk flew successfully to a soft landing on Tanaga island.

During the five day period 08 to 12 December, refuge unit staff monitored and assisted in the clean up of a 28,000 gallon JP-5 fuel spill at the NAS Adak fuel farm. A valve on a storage tank wasn't closed during a pumping operation, causing the tank to overflow into a small creek that ran into the Small Boat Basin. The Navy used deflector booms, absorbent pads and pumper trucks in an attempt to cleanup the fuel. Three refuge unit staff members and vessel had to assist with installation of the deflection boom at the mouth of the Small Boat Basin on two occasions. The outboard motors on the two large NAS Adak Fuels Division boats were not operational. Installation of the boom on 08 December was delayed approximately 4 1/2 hours because a sufficient quantity of boom could not be located to completely block the basin. The boom then broke loose during gale force winds on 09 December, allowing backed up fuel to move into Sweeper Cove. A fuel plume 300 to 900 feet wide was later discovered extending from the Small Boat Basin along the south shore of Sweeper Cove to Hammerhead Cove, about 3/4 of a mile to the east. The refuge boat and crew was then used again to reinstall the boom. The spill was officially declared contained with minor cleanup still required in boat slips at the boat basin on 13 December. The spill site cleanup operation was then checked by Mr. Tom Beardsley, Environmental Sanitarian, Alaska Department of Environmental Conservation, Dutch Harbor, Alaska, on 13 and 14 December. The fuel spill cleanup operation was not an efficient operation. The NAS Adak 1983 fuel spill contingency plan was inadequate and not followed. Equipment that was supposed to be available for fuel spill cleanup was either not on island (small, medium and large fuel skimmers), in a state of disrepair (boats and motors at Fuels Division), or scattered at various unknown locations around the island (the deflector boom). Fortunately, however, due to the type and amount of fuel involved, weather, and clean up operations even as they existed, the environmental impacts of this spill were insignificant. Refuge monitors found only one male harlequin duck and several small Dolly Varden fish judged to be victims of the spill. All specimens were sent to Howard Metsker, Regional Pollution Response Coordinator (RPRC) who was to have them analyzed for JP-5 contamination. The RPRC



was kept up dated on the spill by daily phone contacts. We hope that many entities will learn from the mistakes and inadequacies and better prepare for any future spills. The Navy held a meeting on 29 December with all appropriate commands and agencies to discuss the spill and formulate planning to allow better coordination in the future. Funding and time for acquiring the proper equipment and conducting the proper training are still very much in question.

### 3. Items of Interest

RM Zeillemaker, RM Martin and RO personnel met on 10 March with representatives from the U.S. Navy and U.S. Department of Energy to finalize a Memorandum of Understanding (MOU) covering planned Navy activities on Amchitka island. The Navy will construct a relocatable over the horizon radar (ROTHR) facility on the island in 1987 and 1988. The installation will have a transmitter facility separated from the receiver facility by 25-30 mi. Signals will be bounced off the ionosphere to "see" targets out of sight over the horizon. The ROTHR system will be a major addition to the military early warning defence system in Alaska. A part of the MOU covers the cost involved with an Assistant Refuge manager or Biologist stationed at Amchitka throughout the two year construction period and serve as a FWS liaison officer for the AIU Refuge Manager and conduct various wildlife surveys.

RM Zeillemaker visited Attu Island in May and June via U.S. Coast Guard C-130 logistic flights to continue coordination with the U.S. Coast Guard LORAN Station command and the U.S. Army Corps of Engineers and contractor. Subjects discussed with the Coast Guard command included hunting and fishing regulations and licenses, off-road vehicle use, intent of a Coast Guard contractor to demobilize and remove his construction camp facilities from Attu following completion of Coast Guard building and facility rehabilitation work, and coordination of the Japanese Memorial tour. The route and progress of the roadway rehabilitation and electrical cable replacement as well siting an additional building at the U.S. Air Force remote seismic sensing station were discussed with the Corps representative and contractor. RM Zeillemaker also met with the Attour group and researcher George Wagner during the visits. Site visits and methodology decisions were also accomplished. The Corps and contractor accepted a recommendation to remove old wire only where it was routed over unvegetated ground and clip wires whenever the cable had been overgrown by tundra. By doing so, the government saved considerable costs and refuge tundra was not disturbed.

RM Zeillemaker traveled to Juneau on 03 February to attend a Juneau Audubon Society meeting where the Alaska Maritime National Wildlife Refuge was officially adopted by the club. Orientation Slide programs and discussions covering areas of concern were also conducted.

There was an important refuge first during the year. On 27 October, Ronald McDonald paid a surprise visit to the refuge unit office. We may be the only refuge that has received a visit from this notable person.



Ronald McDonald at the Adak Fish and Wildlife Center.  
10/27/86, #028604, EVK.

A commercial fishing vessel sank about 3 miles off Ilak Island (about half way between Amchitka and Adak islands) on 01 November. The F/V "Adronica" took the crew to Amchitka Peninsula Airways picked the crew up and took them to Cold Bay on 03 November. The vessel went down so suddenly, that the crew had little more than their survival suits on when plucked from the water. They wore the suits all the way to Cold Bay.

An investigation into the "missing" .50 caliber ammunition from Tanaga Island reported in the 1985 Narrative Report was closed early in 1986. The Adak Naval Investigative Service initiated the investigation and eventually contacted the Federal Bureau of Investigation; Bureau of Alcohol, Tobacco and Firearms; and then FWS Law Enforcement personnel at Anchorage after the other two agencies declined involvement. Several months were spent tracking down leads and interviewing suspects. The big break finally came in November when a subject involved in a felony case at Sitka, Alaska, attempted to bargain with the Sitka Police in exchange for information relating to the theft of ammunition in the Aleutians and implicating the major suspect. Personnel in the FWS Law Enforcement Division declined prosecution when the suspect would make no statement regarding his involvement in case.

The year 1986 will long be remembered by Aleutian residents for

the number of earthquakes and volcanic activity in and near the islands. Early 18 April an earthquake measuring 5.8 on the Richter scale rattled Unalaska and Dutch Harbor. No damage was reported. The quake was centered 60 miles southwest of the two communities. On 28 April 4,275 ft Akutan volcano erupted for the first time since 1980 shooting a plume of steam nearly 2 miles high. Akutan Village, about 8 miles from the volcano, had an often cloud obscured view of ash darkened snow on the peak. An earthquake measuring 7.7 on the Richter scale struck Adak on 07 May. Considerable damage resulted in some Navy structures, appliances such as televisions were tossed across rooms in some Navy two story residences, pictures fell from walls, fuel lines were ruptured, and a waterline burst in our headquarters building. The Atka runway buckled in several spots. Several rock falls occurred elsewhere on the island. A tsunami warning was passed around the Pacific and all Adak, Atka, and other Aleutian residents were evacuated to high ground. Some weird surging occurred in the Adak Small Boat Basin, but no tsunami formation developed. Several strong aftershocks occurred almost daily for several days afterwards. Some Adak military spouses and families permanently departed to escape the continuing experience. Early 17 May an earthquake measuring 6.9 struck Atka. Folks there became concerned that similar inconveniences were going to be a monthly event. By mid-July Adak had received over 100 aftershocks following the 07 May earthquake. Two quakes measuring 5.4 on the Richter scale occurred 70 miles southeast of Adak on 25 July.

### 3. Credits

The 1986 Narrative Report was authored by the following:

- Introduction - Fred Zeillemaker
- A. Highlights - Fred Zeillemaker
- B. Climatic Conditions - Fred Zeillemaker
- C. Land Acquisition - Fred Zeillemaker
- D. Planning - 4 Fred Zeillemaker, 5 Fred Deines,  
6 Fred Zeillemaker
- E. Administration - 3 Fred Zeillemaker, 4 Fred Deines/  
Tom Edgerton, 5 Fred Zeillemaker, 6 Fred Deines
- F. Habitat Management - Van Klett, Fred Zeillemaker
- G. Wildlife - 1 Fred Zeillemaker, 2 Fred Zeillemaker/  
Fred Deines/Greg McClellan, 3 Fred Zeillemaker/  
Greg McClellan, 4 Fred Zeillemaker/Greg McClellan,  
5 Fred Zeillemaker/Fred Deines/Greg McClellan,  
6 Fred Zeillemaker /Fred Deines/Greg McClellan/  
Van Klett, 7 Fred Zeillemaker/Fred Deines,  
8 Greg McClellan. 9 Greg McClellan/Fred Deines,  
10 Fred Zeillemaker, 11 Greg McClellan,  
14 Fred Zeillemaker/Greg McClellan, 15 Fred Deines
- H. Public Use - 1-16 Tom Edgerton, 17 Van Klett,  
18 Tom Edgerton
- I. Equipment & Facilities - Bob Schulmeister



- J. Other Items - 1-2 Van Klett, 3 Fred Zeillemaker
- K. Feedback - Fred Zeillemaker
- L. Bird and Mammal Lists - Fred Zeillemaker

Word processing, computer entry, photo placement and collection were accomplished by Cynthia Malcolm and Sonya Boss. Final editing was provided by Fred Zeillemaker.



After a hard days work, it is time to kick back and relax as the sun begins to set behind the Kiska volcano steam vent. 3/26/86, #038605, FGD.

### K. Feedback

We continue to struggle along with additional task assignments each year with reduced resources. I continue to be amazed at how our people perform tasks safely when faced with inadequate funding and resultant tight field activity schedules. I hope a balance can be achieved before any serious consequences result. We continue to successfully deploy volunteers and SCA contract volunteers in strenuous and tedious tasks under very adverse weather conditions. We sometimes wonder if personnel with increased experience would be easier to attract if we could afford to pay them a decent wage.

Our manager, assistant manager and biologist have been at Adak for nearly five years each as the year ended. Our ORP has been at isolated Adak for nearly four years. All desire a return to life in the "real world," but none have been successful in landing jobs anywhere else to date. Morale will begin to slip severely if rotations cannot be arranged by mid-1987. We hope corrective action is forthcoming.



Birds of Agattu, Alaid, Nizki, Shemya  
and Buldir Islands  
Aleutian Islands Unit, Alaska Maritime National Wildlife Refuge

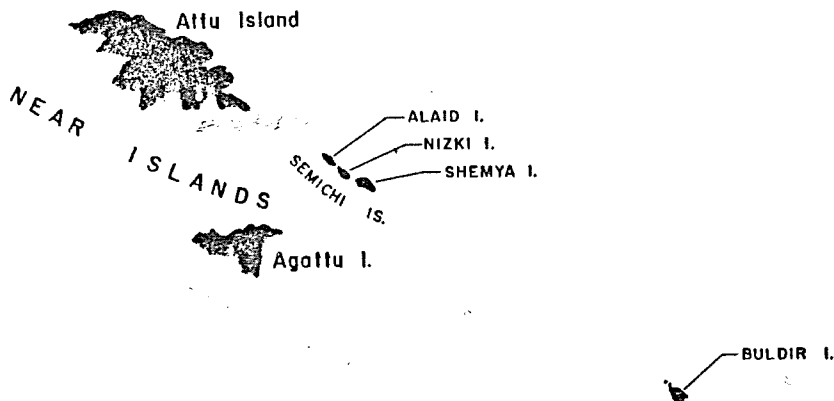
NOTE: Access to Shemya Island is limited to U. S. Air Force personnel, contractors and other authorized visitors. Advance military clearance is required for all visitors. There is no civilian population on Shemya. There are no inhabitants, runways, harbors or commercial transportation available for any other islands in this checklist.

The Near Islands Group in the extreme western Aleutian Islands is composed of five major islands and a number of smaller islands, islets and named rocks. Four of the major islands are included in this checklist. Attu Island, the largest island in the group, is treated in a separate checklist. Buldir Island, 60 miles east of Shemya in the Rat Islands Group, has been included in this checklist due to its avifaunal similarities. It is hoped that this document will serve as an inspiration to ornithologists passing through the Near Islands to gather and report additional information on the avifauna of this interesting area.

Bird occurrence and abundance can vary by season and year, but a single matrix is used here to indicate normal levels of bird use. Breeding status, abundance and periods of occurrence are indicated as follows:

- \* - Nests or has nested on at least some of the islands
- a - Abundant (very numerous species)
- c - Common (certain to be seen in suitable habitat)
- u - Uncommon (present, but not always easy to find)
- r - Rare (seen only a few times during indicated season)
- x - Accidental (found once/twice during season since 1880's)
- 1-12 - Months of recorded occurrence

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



		Aqatt	Alaid	Nizki	Shemy	Buldi	Offsh
Bufflehead	r	/	/	/	4-5/	5/	/
Smew	r	/	/	/	5/9	/	/
Hooded Merganser (1976)	x	/	5/	/	/	/	/
Common Merganser (Asiatic)	r	6/	5/	5-6/	5/	5-6/	/
Red-breasted Merganser *	r	5-7	5-6	5-7	5/	5-7/	/
Bald Eagle *	r	/	/	/	/	1-12	/
Steller's Sea-Eagle (1976)	x	6/	/	/	/	/	/
Northern Harrier (1977,1978)	x	/	/	/	/9-10	/	/
Rough-legged Hawk	r	/	5/	/	5/	5-7/9	/
[Common Buzzard (1983)]	x	/	/	5/	/	/	/
Eurasian Kestrel (1978)	x	/	/	/	/9-10	/	/
Peregrine Falcon *	r-u	1-12	1-12	1-12	5/9-10	1-12	/
Gyr Falcon	r	/	/	/	/	6/	/
Sandhill Crane	r	5-6/	/	/	5/	5-8	/
Black-bellied Plover	r	/	5/	/	/9	/	/
Lesser Golden Plover(Pacific)	u	5/	5/	5/	5/9-10	5-7/7-9	/
Mongolian Plover	r	5/	5/	5/	5-6/8-9	5-6/7-8	/
Common Ringed Plover (1986)	x	/	/	/	5/	/	/
Semipalmated Plover (1974)	x	/	/	/	/9	/8-9	/
Little Ringed Plover (1974)	x	/	/	/	/	6/	/
Eurasian Dotterel(1977,78,86)	x	/	/	/	/9	/	/
Black Oystercatcher(1972,76)	x	/	/	/	/	/7	/
Black-winged Stilt (1983)	x	/	/	5/	/	/	/
Common Greenshank	r	/9	5-6/	6/	5-6/9	5-6/8-9	/
Greater Yellowlegs (1975)	x	/	/	/	5/	/	/
Lesser Yellowlegs (1974, 76)	x	/	/	/	/	6/8	/
Green Sandpiper (1983)	x	/	/	5/	5-6/	/	/
Spotted Redshank	r	/	5/	/	/9-10	/8-9	/
Marsh Sandpiper (1974)	x	/	/	/	/	/9	/
Wood Sandpiper	u	5/	5-6/7	5/	5-6/8-9	5-7/8-9	/
Wandering Tattler	u	5-6/	5-6/	5-6/8	5-6/8-9	5-6/7-9	/
Gray-tailed Tattler	r-u	/	5-6/	6/	5-6/8-10	5-6/8-9	/
Common Sandpiper	r	5-6/	5/	5-6/	5/8-9	5-6/8	/
Terek Sandpiper	r	5-6/8-9	/	5-6/	5-6/	5/8-9	/
Whimbrel (Asiatic)	r	/8	5-7	5/7	5-6/8-9	6/7-9	/
Bristle-thighed Curlew(1975)	x	/	/	/	5/	5/	/
Far Eastern Curlew (1983)	x	/	/	5/	/	/	/
Black-Tailed Godwit	r	/	5/	/	5/	5-6/	/
Bar-tailed Godwit	u	/	5/	5/	5/9	5-6/	/
Ruddy Turnstone	u-c	5-6/8	5-6/7	5-6/7-8	5-6/9	5-6/7-8	/
Great Knot (1976)	x	/	/	/	5/	/	/
Red Knot	r	5/	/	/	/9	5/	/
Sanderling	r	/	5/	/	4/9-10	5/8	/
Semipalmated Sandpiper(1972)	x	/	/	/	/9	/	/
Western Sandpiper (1977)	x	/	/	/	/9	/	/
Rufous-necked Stint	r	5/	5/	5-6/	5-6/8-9	5-6/7-9	/
Little Stint (1975)	x	/	/	/	5-6/	/8	/
Temminck's Stint	r	/	/	/	5/9	5-6/7-8	/
Long-toed Stint	r	5/	5/	/	5-6/8-9	6/7-8	/
Baird's Sandpiper	r	/	/	/	5/8-10	/8-9	/
Pectoral Sandpiper	r-u	/	5/	/	5/8-9	5-6/8-9	/

		Aqatt	Alaid	Nizki	Shemy	Buldi	Offsh
Short-eared Owl	r	/	5-6/	/	5/10	5-9	/
White-throated Needletail(74)x		/	/	/	5/	/	/
White-rumped Swift (1976-78)	x	6/	/	/	/9	/	/
Eurasian Skylark	r	5/	/	/	5-6/9	/	/
Horned Lark (1978)	x	/	/	/	/9	/	/
Tree Swallow (1972)	x	/	/	/	/	6/	/
Violet-green Swallow(1977,78)x		/	/	/	/9-10	/	/
Bank Swallow (1986)	x	/	/	/	/9	6/	/
Cliff Swallow (1974, 1972)	x	/	/	/	/	6/	/
Barn Swallow (1977, 79, 83)	x	6/7	/	/	5/8	/	/
Common Raven *	u-c	1-12	1-12	1-12	1-12	1-12	/
Winter Wren *	r-u	1-12	1-12	1-12	5/9-10	1-12	/
Wood Warbler (1978)	x	/	/	/	/10	/	/
Dusky Warbler (1978)	x	/	/	/	/9	/	/
Arctic Warbler (Asiatic)	r	/	/	6/	/9	6/7	/
Red-breasted Flycatcher(1977)x		/	/	/	6/	/	/
Siberian Flycatcher (1977)	x	/	/	/	/9	/	/
Gray-spotted Flycatcher	r	/	/	/	5-6/	6/	/
Mugimaki Flycatcher (1985)	x	/	/	/	5/	/	/
Siberian Rubythroat	r	/	/	6/	5-6/9-10	6/	/
Northern Wheatear (1976, 77)	x	/	/	/	/9	/9	/
Gray-cheeked Thrush (1978)	x	/	/	/	/9	/	/
Eye-browed Thrush	r	5-6/8	5-6/	5-6/	5-6/	5-6/	/
Dusky Thrush(1976,1977,1984)	x	/	/	5/	5/	/	/
Siberian Accentor (1978)	x	/	/	/	/9	/	/
Yellow Wagtail (Asiatic)	r	5-6/	5/	5/	5-6/8-9	5-6/8-9	/
Gray Wagtail	r	6/	5/	/	5/	6/	/
Black-backed Wagtail	r	5/	5-6/	/	5/	5-6/9	/
Olive Tree-Pipit	r	5/	/	/	5/9	5/	/
Red-throated Pipit	r	5-6/	/	/	5/9	5-6/	/
Water Pipit	r-u	/	5/	/	5-6/9-10	5/8-9	/
Brown Shrike (1978)	x	/	/	/	/10	/	/
Townsend's Warbler (1977)	x	/	/	/	/10	/	/
Savannah Sparrow (1977)	x	/	/	/	/10	/	/
Song Sparrow *	c	1-12	1-12	1-12	1-12	1-12	/
Lapland Longspur *	c-a	5-7	5-8	5-8	5-10	5-9	/
Little Bunting (1977)	x	/	/	/	/9	/	/
Rustic Bunting	r	5-6/	5/	5/	5-6/9-10	5-6/	/
Gray Bunting (1977)	x	/	/	/	5/	/	/
Common Reed-Bunting(1975,77)	x	/	/	/	6/	5/	/
Snow Bunting *	c	1-12	1-12	1-12	1-12	1-12	/
Brambling	r-u	5/	/	/	5/9-10	5/	/
Rosy Finch (Aleutian) *	u	1-12	1-12	1-12	1-12	1-12	/
Common Rosefinch(1973,75,77)	x	/	/	/	6/8	6/	/
Common Redpoll *	r	5/	5-8	5-8	5/9	5-8	/
Hoary Redpoll	r	5/	/	/	5/	5/	/
Oriental Greenfinch(1976,77)	x	/	/	/	/9	6/8	/
Eurasian Bullfinch (1977)	x	/	/	/	/9	/	/

Birds of Kiska, Segula, Rat, Little Sitkin, Amchitka  
and Semisopchnoi Islands  
Aleutian Islands Unit, Alaska Maritime National Wildlife Refuge

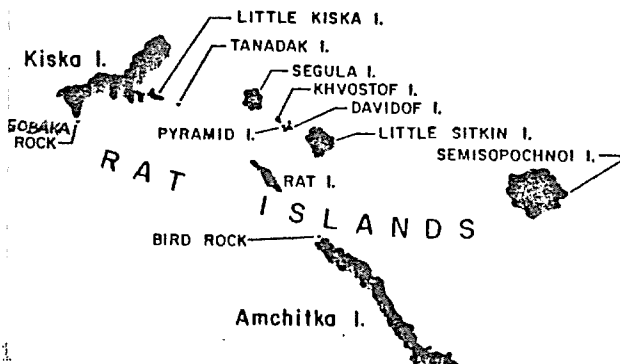
NOTE: Access to Amchitka Island is limited to U. S. Navy personnel, contractors and other authorized visitors. Advance military clearance is required for all visitors. There is no civilian population on Amchitka. There are no inhabitants, runways, harbors or commercial transportation available for any other islands in the Rat Islands Group.

The Rat Islands Group in the west-central Aleutian Islands is composed of eleven major islands and a number of smaller islands, islets and named rocks. Six of the major islands are included in this checklist. Buldir Island, 60 miles west of the other islands in the group, has been included in a bird checklist for the Near Island Group to the west. Little Kiska, Tanadak, Khvostof and Davidof islands have considerably less habitat diversity and have not been as regularly visited as the islands included in this list. The avifauna of Amchitka has been well studied. The birds of Kiska have been moderately studied. Little is known of bird use of the remaining four islands included in this list. It is hoped that this document will serve as an inspiration to ornithologists passing through the Rat Islands to gather and report additional information on the avifauna of this area.

Bird occurrence and abundance can vary by season and year, but a single matrix is used here to indicate normal levels of bird use. Breeding status, abundance and periods of occurrence are indicated as follows:

- \* - Nests or has nested on at least some of the islands
- a - Abundant (very numerous species)
- c - Common (certain to be seen in suitable habitat)
- u - Uncommon (present, but not always easy to find)
- r - Rare (seen only a few times during indicated season)
- x - Accidental (found once/twice during season since 1880's)
- 1-12 - Months of recorded occurrence

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



		Kiska	Sequ	Rat	LSitk	Amchi	Semis
Bufflehead	r	3-5/	/	/	/	9-6	/
Smew	r	/	/	/	/	11-6	/
Common Merganser	r	3-6/	/	/	/	11-6	/
Red-breasted Merganser *	r	3-6/	/	/	/	5-12	3/
Osprey (1957, 1970)	x	/	/	/	/	5/10	/
Bald Eagle *	u-c	1-12	1-12	1-12	1-12	1-12	1-12
Steller's Sea-Eagle (1961)	x	/	/	/	/	4/	/
Northern Harrier	r	/	/	/	/	5/11	/
[Eurasian Sparrowhawk (1978)]	x	/	/	/	/	/10	/
Rough-legged Hawk (1976, 78)	x	/	/	/	/	5/12	/
Merlin	r	/	/	/	/	1-6	/
Gyr Falcon	r-u	/	/	/	/	1-12	/
Peregrine Falcon *	r-u	1-12	1-12	1-12	1-12	1-12	1-12
Rock Ptarmigan *	u-c	1-12	1-12	1-12	1-12	1-12	1-12
Sandhill Crane	r	/	/	6/	/	5-6/7	/
Black-bellied Plover	r	/	/	/	/	5-6/9	/
Lesser Golden Plover	u-c	5/	6/	/	/	4-6/8-11	6/
Mongolian Plover	r	5/	/	/	/	/	/
Common Ringed Plover (1973)	x	/	/	/	/	5/	/
Semipalmated Plover (1973, 85)	x	6/	/	/	/	6/	/
Black Oystercatcher *	u	1-12	1-12	1-12	1-12	1-12	1-12
Common Greenshank	r	/	/	/	/	5-6/7-8	/
Lesser Yellowlegs	r	/	/	/	/	5/7-8	/
Wood Sandpiper *	r-u	5/	/	/	/	5-7/	/
Wandering Tattler	u	5-6/	/	5/	/	5-6/8-10	/
Gray-tailed Tattler	r	/	/	5/	/	5/	/
Whimbrel (Asiatic)	r	6/	/	/7	/	5/8-9	/
Bristle-thighed Curlew (1974)	x	/	/	/	/	5/	/
Far Eastern Curlew	r	/	/	/	/	5-7/	/
Black-tailed Godwit (1961)	x	/	/	/	/	5/	/
Bar-tailed Godwit	u	5-6/	/	5/	/	5-6/	/
Ruddy Turnstone	u-c	6/	/	/	/	5-6/7-11	/
Sanderling	r	/	/	/	/	9-5	/
Rufous-necked Stint (1976, 77)	x	/	/	/	/	/8-9	/
Long-toed Stint (1976, 1982)	x	5/	/	/	/	5-6/	/
Baird's Sandpiper	r	/	/	/	/	/8	/
Pectoral Sandpiper	r-u	/	/	/	/	5/7-11	/
Sharp-tailed Sandpiper	r-u	/	/	/	/	/9-11	/
Rock Sandpiper *	c-a	5-8	/	5-8	/	1-12	/
Dunlin	r	/	/	/	/	10-5	/
Ruff	r	5/10	6/	/	/	5-6/	/
Common Snipe (1974)	x	/	6/	/	/	/	/
Red-necked Phalarope *	r-u	6/	/	/8	/	5-10	/
Red Phalarope	r-c	5/	/	/	/	5/7-9	/
Pomarine Jaeger	r	/	/	5/	/	5-6/8	/
Parasitic Jaeger *	r-u	5-8	/7	6/	6/	4-9	6/
Long-tailed Jaeger	r	/	/	/	/	5/7-9	/
Common Black-headed Gull	r	5-6/	/	5/	/	5-7/10	6/
Herring Gull (1976)	x	/	/	/	/	/12	/
Slaty-backed Gull (1976)	x	/	/	/	/	4/	/
Glaucous-winged Gull *	c-a	1-12	1-12	1-12	1-12	1-12	1-12



		Kiska	Sequ	Rat	LSitk	Amchi	Semis
Common Redpoll	r	5/	/	/	/	1-6/11-12	/
Hoary Redpoll	r	/	/	/	/	11-5	/
Hawfinch	r	6/	/	/	/	/	/

## References:

### General

- Byrd, G. V., L. L. Trapp and D. D. Gibson. 1978. New information on Asiatic birds in the Aleutian Islands, Alaska. Condor 80:309-315.
- Deines, F. G. and G. T. McClellan. 1986. Western Aleutian trip report, AIU-AMNWR, 26 May-30 June 1985. USFWS administrative report. 10p.
- Fiscus, C. H., D. J. Rugh and T. R. Loughlin. 1981. Census of northern sea lion (*Eumetopias jubatus*) in central Aleutian Islands, Alaska, 17 June-15 July 1979. 109p.

### Kiska

- Deines, F. G. 1986. Pretreatment survey and monitoring of birds and mammals of Kiska Island, June 1985. USFWS administrative report. 52p.

### Amchitka

- Everett, W. T. 1983. A short-tailed albatross record for Alaska in 1981. Pacific Seabird Group Bulletin 10:77-78.
- Hall, G. 1877. Amchitka, Alaska, Christmas Bird Count (1 January 1977). American Birds 31:467.
- Jones, R. D. and D. D. Gibson. 1975. Specimens of birds from Amchitka Island, Alaska. Auk 92:811.
- Kenyon, K. W. 1961. Birds of Amchitka Island. Auk 78:304-326.
- Kenyon, K. W. 1963. Further observations of whooper swans in the Aleutian Islands, Alaska. Auk 80:540-542.
- Reiswig, B. 1980. Amchitka, Alaska, Christmas Bird Count (18 December 1979). American Birds 34:383.
- Schulmeister, S. D. 1979. Migratory birds of Amchitka Island, Alaska, November 26, 1975-June 30, 1979. Unpublished Humboldt State University manuscript. 33p.
- Schulmeister, S. D. 1986. Miscellaneous bird observations, Amchitka Island, Alaska-23 September 1986. USFWS administrative report. 1p.
- Schulmeister, S. D. 1986. Miscellaneous bird observations, Amchitka Island, Alaska-9 October 1986. USFWS administrative report. 1p.
- White, C. M., F. S. L. Williamson and W. B. Emison. 1974. *Tringa glareola* a new breeding species for North America. Auk 91:175-177.
- White, C. M., F. S. L. Williamson and W. B. Emison. 1977. Biology of the birds of Amchitka. Unpublished manuscript. p.
- Williamson, F. S. L. and C. M. White. 1974. Amchitka Bioenvironmental Program; Studies of the avifauna of Amchitka Island, Alaska; final progress and summary report, August 14, 1967-September 30, 1973. Battelle Memorial Institute, Columbus Laboratories, U. S. Atomic Energy Commission BMI-171-155. 22p.

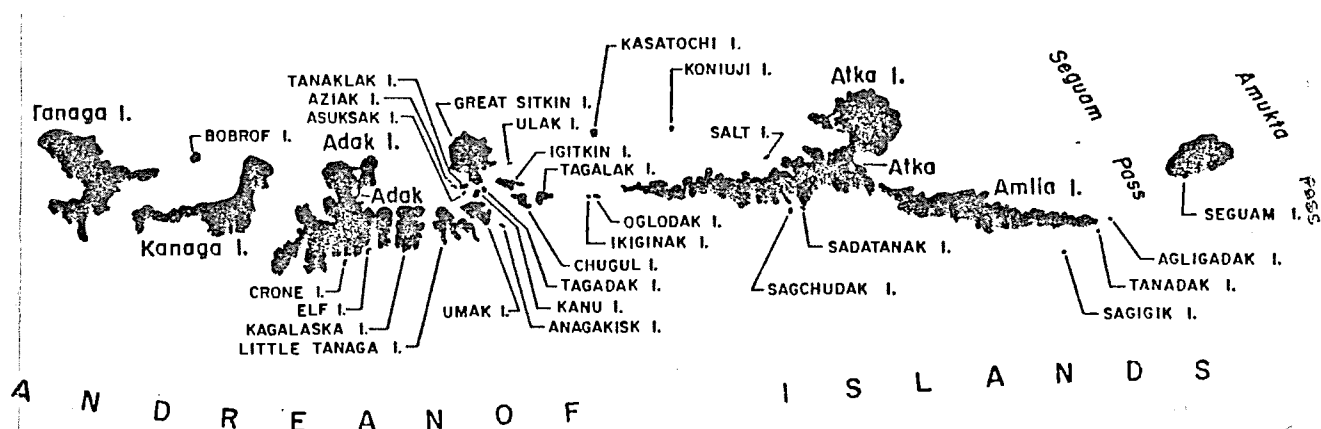
Birds of Tanaga, Kanaga, Great Sitkin, Atka, Amlia  
and Seguam Islands  
Aleutian Islands Unit, Alaska Maritime National Wildlife Refuge

The Andreanof Islands Group in the central Aleutian Islands is composed of sixteen major islands and numerous smaller islands, islets and named rocks. Six of the major islands are included in this checklist. Adak Island, site of a large U. S. Navy base, is treated in a separate checklist. The privately owned portion of Atka Island supports a civilian community which can be accessed most easily only through Adak Island. Limited public lodging is available there. Private lands also occur on the western portion of Amlia Island. Authorization to enter private lands on Atka and Amlia islands can be obtained from the Atkam Corporation, Rural Branch, Atka, Alaska 99503. It is hoped that this document will serve as an inspiration to ornithologists passing through the Andreanof Islands to gather and report additional information on the avifauna of this area.

Bird occurrence and abundance can vary by season and year, but a single matrix is used here to indicate normal levels of bird use. Breeding status, abundance and periods of occurrence are indicated as follows:

- \* - Nests or has nested on at least some of the islands
- a - Abundant (very numerous species)
- c - Common (certain to be seen in suitable habitat)
- u - Uncommon (present, but not always easy to find)
- r - Rare (seen only a few times during indicated season)
- x - Accidental (found once/twice during season since 1880's)
- 1-12 - Months of recorded occurrence

Slashes (/) separate periods or seasons of occurrence. The years of occurrence for accidental species are shown in parentheses.



		Tanaq	Kanag	GSitk	Atka	Amlia	Sequa
Red Phalarope	r-c	5/	5/	/	/	/	5/8
Pomarine Jaeger	r	5/	/	/	/	/	/
Parasitic Jaeger	r-u	6/	/	/	/	/	6/
Long-tailed Jaeger	r	/	/	/	6/	/	/
Slaty-backed Gull (1941) *	x	/	/	/	/2	/	/
Glaucous-winged Gull *	c-a	1-12	1-12	1-12	1-12	1-12	1-12
Black-legged Kittiwake *	u-c	5-8	/	6/	6-7	/7	6/
Red-legged Kittiwake	r	6/	/	/	6/	/	/
Sabine's Gull (1971)	x	/	/	/	/7	/	/
Common Murre	u	6/	/	6/	6/	6/	6-7
Thick-billed Murre	r-u	6/	/	6/	6/	5-6/	6-7
Pigeon Guillemot *	r-u	6/	/	6/	5-7	5-8	6-7
Marbled Murrelet	u	/	/	/	5-7	6-7	/
Kittlitz's Murrelet	u	/	/	/	6-7	6-7	/
Ancient Murrelet	r-u	/	/	6/	6-7	/7	/
Cassin's Auklet	r	/	/	/	7-9	6-8	/
Parakeet Auklet *	r-u	/	/	/	7-9	6-8	/7
Least Auklet	r-u	/	/	6/	/	/	/7
Whiskered Auklet	r	/	/	4/	5-6/	5-8	/7
Crested Auklet	u	/	/	6/	6/	6-7	/7
Tufted Puffin *	u-c	/	/	6/	5-7	5-7	6-7
Horned Puffin *	r-u	/	/	/	6-8	6-7	6-7
Belted Kingfisher (1984)	x	/	/	/	/9	/	/
Common Raven *	u-c	1-12	1-12	1-12	1-12	1-12	1-12
Winter Wren *	r-u	1-12	1-12	1-12	1-12	1-12	1-12
Water Pipit	r	/	/	/	/	6/	/
Savannah Sparrow	r	/	/	/	/	/	5-8
Song Sparrow *	c	1-12	1-12	1-12	1-12	1-12	1-12
Lapland Longspur *	c-a	5-8	5-8	5-8	5-10	5-8	5-8
Snow Bunting	c	/	/	/	1-12	/	/7
Rosy Finch (Aleutian) *	u	/	/	1-12	1-12	1-12	1-12
Common Redpoll	r	/	/	/	/1	/	/

#### References

- Bailey, E. P. and J. L. Trapp. 1986. A reconnaissance of breeding marine birds and mammals in the east-central Aleutian Islands-Kasatochi to the Islands of Four Mountains-Summer 1982, with notes on other species. USFWS administrative report. 70p.
- Fiscus, C. H., D. J. Rugh and T. R. Loughlin. 1981. Census of northern sea lions (*Eumetopias jubatus*) in central Aleutian Islands, Alaska, 17 June-15 July 1979. NOAA Technical Memorandum NMFS f/NWC 17. 109p.

#### Atka

- Dirks, M. 1982. Atxam Sangis-Atkan Birds. Material Development Center, Rural Education, University of Alaska. \_\_p.
- Gibson, D. D. 1972. Alaska Region (The Nesting Season June 1-July 31, 1971). American Birds 25:894

17 MAR 1987

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Birds of Fourteen Locations on Adak Island  
Aleutian Islands Unit, Alaska Maritime National Wildlife Refuge

NOTE: Access to Adak Island is limited to U. S. Navy personnel, contractors and other authorized visitors. Advance military clearance is required for all visitors. There is no civilian community on Adak Island.

Adak lies near the center of the axis formed by the Alaska Peninsula, the Aleutian Islands and the Commander Islands and hosts a mix of North American, Asian and Pacific Islands avifaunas. About 65 percent of the bird species that have been recorded at Adak breed or regularly occur in North America and Asia (Holarctic), 19 percent breed in Asia only, 12 percent breed in North America only, and the remaining 4 percent breed on Pacific Islands (Hawaii, Australia, etc.).

Only the northeastern 15-20 percent of Adak is accessible by road or short hike. The roads, which are maintained to provide access to various U. S. Navy facilities, traverse most Adak habitats, allowing vehicle access to beaches facing the Bering Sea, several bays and coves, a shallow lagoon, numerous fresh water lakes, small ponds, rolling lowland tundra and lower alpine tundra on the slopes of 1196 m (3923 ft) Mt. Moffett. Bird species and abundance can vary from year to year, but a single matrix is used here to indicate normal levels of bird use. Breeding status, abundance and periods of occurrence are indicated as follows:

- \* - Nests or has nested on Adak
- a - Abundant (very numerous species)
- c - Common (certain to be seen in suitable habitat)
- u - Uncommon (present, but not always easy to find)
- r - Rare (seen only a few times during indicated season)
- x - Accidental (found once/twice during season since 1980's)
- 1-12 - Month of recorded occurrence

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

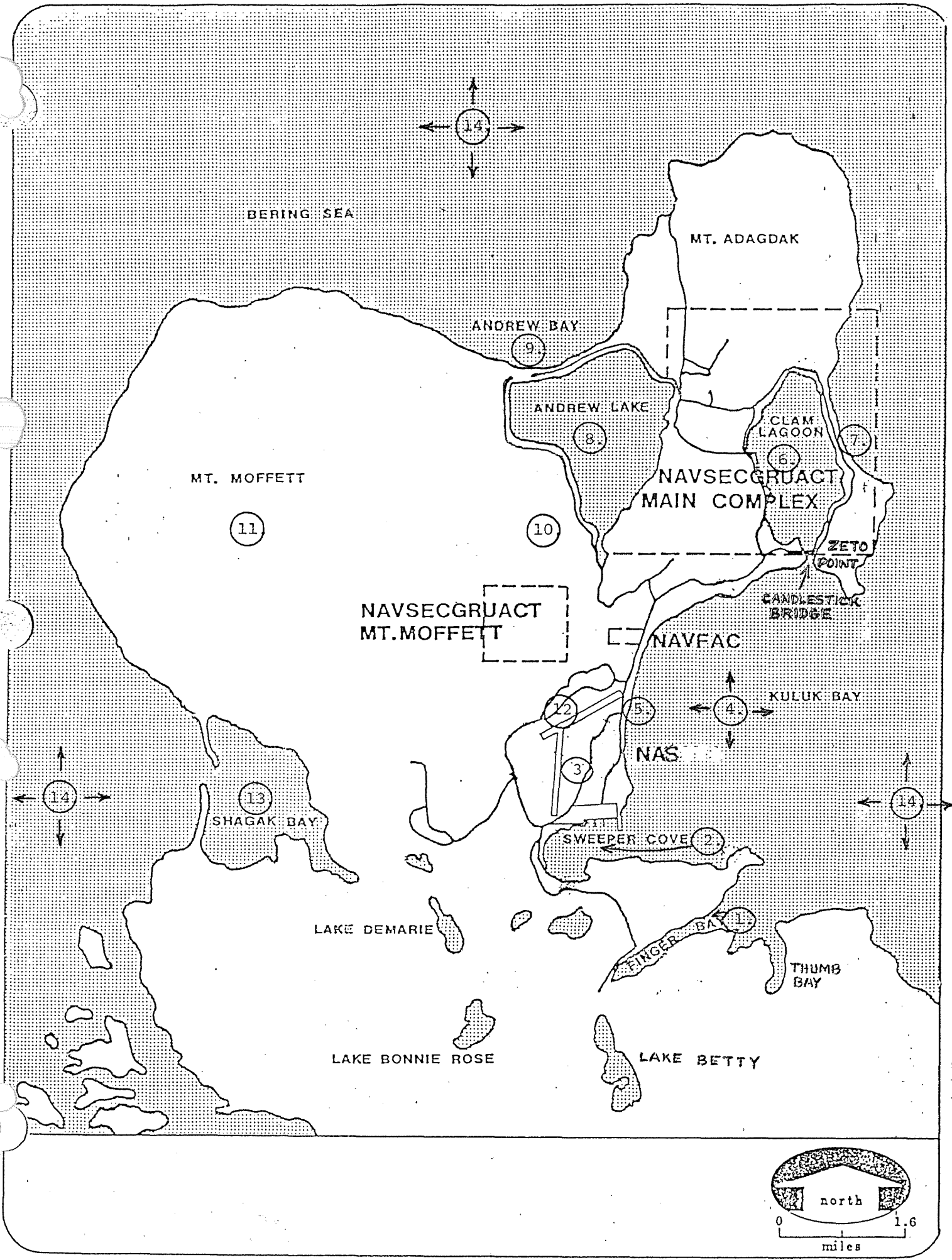
		F	S	N	K	K	C	C	A	A	H	M	S	S	O
		i	w	A	u	u	l	l	n	n	a	t	m	h	f
		n	e	S	B	B	a	L	d	d	v	M	e	a	f
		g	e	t	a	e	m	S	L	B	n	o	w	q	s
Canvasback	10-6						u		u						
Ring-necked Duck (1977)	4													x	
Tufted Duck	9-8								u						
Greater Scaup *	1-12								c						
Lesser Scaup (1986)	5														
Common Eider *	1-12						u								
King Eider	1-5														
Steller's Eider	10-6														
Harlequin Duck	1-12														
Oldsquaw	8-7														
Black Scoter	9-7														
Surf Scoter	1-6/11-12														
White-winged Scoter	1-12														
Common Goldeneye	9-5														
Barrow's Goldeneye (1970,72)	5														
Bufflehead	10-7														
Smew	10-7														
Hooded Merganser (1970, 1979)	11-2														
Common Merganser	9-6														
Red-breasted Merganser *	1-12														
Bald Eagle *	1-12														
Northern Harrier	1-4														
Rough-legged Hawk	8-10														
Eurasian Kestrel (1981, 1982)	1-2														
Merlin (1945, 1980)	10-12														
Peregrine Falcon *	1-12														
Gyr Falcon	9-7														
Rock Ptarmigan *	1-12														
Sandhill Crane	5-7/10-11														
Black-bellied Plover	5-6/7-10														
Lesser Golden Plover	5-6/8-11														
Mongolian Plover (1968, 1978)	5-6														
Semipalmated Plover *	6-7														
Common Ringed Plover (1975)	8														
Black Oystercatcher *	1-12														
Greater Yellowlegs	9-10														
Lesser Yellowlegs (1972, 84)	6														
Spotted Redshank	5														
Wood Sandpiper	5-6/8														
Wandering Tattler	5-6/7-10														
Gray-tailed Tattler (1975,86)	6/9														
Common Sandpiper (1971, 1982)	5/9														
Whimbrel (Asiatic)	5-6														
Bristle-thighed Curlew(68,86)	5														
Far Eastern Curlew	5-7														
Black-tailed Godwit (1976)	5														
Bar-tailed Godwit	5-6/9-11														
Ruddy Turnstone	5-6/7-10														



Bank Swallow (1975, 1983)	6								x
Common Raven *	1-12	c	c	c	c	c	c	u	c u u c c
Winter Wren *	1-12	u			u	u		u	u
Northern Wheatear (1971)	8							x	
Dusky Thrush (Naumann's, 1982)	10			x					
Black-backed Wagtail	5-6			o				o	
Water Pipit	9-12						o	o	
Bohemian Waxwing (1984)	10							x	
Northern Shrike	3/10-1						o		o
Savannah Sparrow (1941, 1972)	9							x	
Song Sparrow *	1-12	u	u	u		u	u u u u		u
Lapland Longspur *	2-12	c	c	c		u	c c c u c c c c		
Rustic Bunting (1911, 1951)	5/10						x		
Snow Bunting *	1-12	u	u	u		u	u o u o c c		u
McKay's Bunting (1975)	3			x					
Brambling (1971, 1976, 1980)	5-6							x	
Rosy Finch (Aleutian) *	1-12	u	u	c		u	u o u u u c o u		
Common Rosefinch (1982)	6							x	
White-winged Crossbill (1986)	11			x					
Common Redpoll	5-7/10-3			o		o	o		
Hoary Redpoll	12-1							o	
Hawfinch (1971)	5-6			x					

Byrd, G. V., J. L. Trapp and D. D. Gibson. 1978. New information on Asiatic birds in the Aleutian Islands, Alaska. Condor 80:309-315.

5



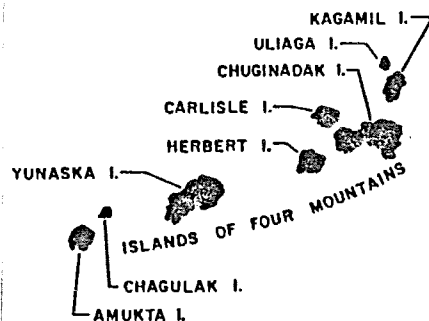
Birds of Amukta, Chagulak, Yunaska, Herbert, Chuginadak  
and Kagamil Islands  
Aleutian Islands Unit, Alaska Maritime National Wildlife Refuge

The Islands of Four Mountains Group in the east-central Aleutian Islands is composed eight islands. Carlisle and Uliaga have been omitted from this list due to space limitations. It is hoped that this document will serve as an inspiration to ornithologists passing through the Islands of Four Mountains to gather an report additional information on the avifauna of this little studied area.

Bird occurrence and abundance can vary by season and year, but a single matrix is used here to indicate normal levels of bird use. Breeding status, abundance and periods of occurrence are indicated as follows:

- \* - Nests or has nested on at least some of the islands
- a - Abundant (very numerous species)
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Slashes (/) separate periods or seasons of occurrence. The years of occurrence for accidental species are shown in parentheses.



		Amukt	Clagu	Yunas	Herbe	Chugi	Kagam
Winter Wren *	r-u	1-12	1-12	1-12	1-12	1-12	/
Bohemian Waxwing (1982)	x	5/	/	/	/	/	/
Savannah Sparrow *	r-u	6/	5-8	6/	/7	/7	6/
Song Sparrow *	u-c	1-12	1-12	1-12	1-12	1-12	/
Lapland Longspur *	c-a	1-12	1-12	/	1-12	1-12	1-12
Rosy Finch (Aleutian) *	u	1-12	1-12	/	1-12	1-12	1-12
Common Redpoll	r	/	6/	/	/	/	/

#### References:

Bailey, E. P. and J. L. Trapp. 1986. A reconnaissance of breeding marine birds and mammals in the east-central Aleutian Islands-Kasatochi to the Islands of Four Mountains-summer 1982, with notes on other species. USFWS administrative report. 70p.

Fiscus, C. H., D. J. Rugh and T. R. Loughlin. 1981. Census of northern sea lion (Eumetopias jubatus) in central Aleutian Islands, Alaska, 17 June-15 July 1979. NOAA Technical Memorandum NMFS F/NWC-17. 109p.

18 MAR 1987

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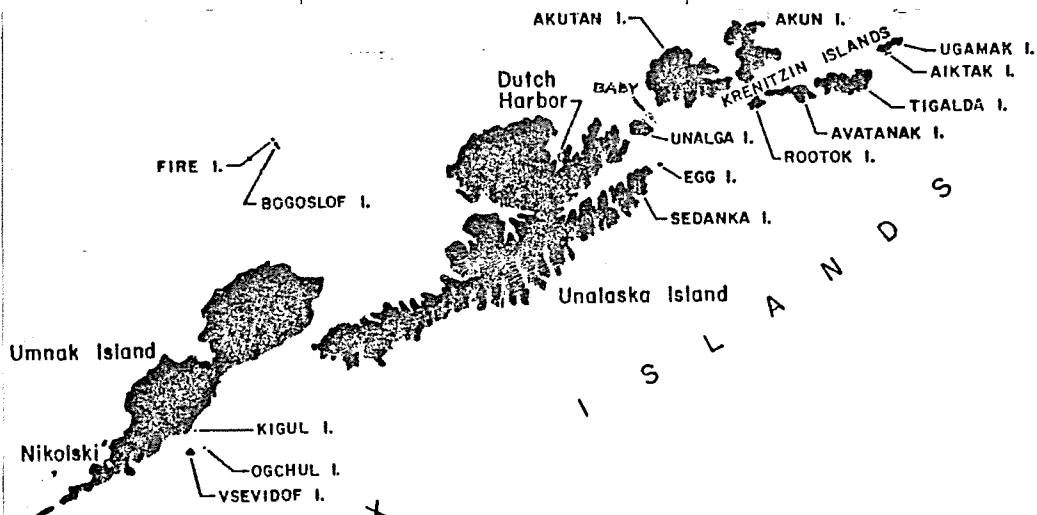
Birds of Umnak, Bogoslof, Baby, Akutan, Akun  
and Ugamak-Aiktak Islands  
Aleutian Islands Unit, Alaska Maritime National Wildlife Refuge

The Fox Islands Unit in the eastern Aleutian Islands is composed of nine major islands with numerous smaller islands, islets and named rocks. Umnak, Akutan and Akun islands are private land in part. The Bogoslof Islands (Bogoslof and Fire) are unique in their location north of the alignment of other islands in the Aleutian chain and their relatively recent formation. The Baby Islands (Tangam, Auklet, Excelsior, Koschekt, Adokt) are small privately owned islands that are included here due to their high wildlife values. The civilian community of Nikolski is located near the western tip of Umnak Island and the fishing community of Akutan is located on the northeastern side of Akutan Island. Both can be accessed through Dutch Harbor on Amaknak Island. The relatively well known avifaunas of Amaknak and Unalaska islands are treated in a separate checklist. Little is known about the avifaunas of the islands included in this list. It is hoped that this document will inspire ornithologists passing through the Fox Islands to gather and report additional information on the avifauna of this little studied area.

Bird occurrence and abundance can vary by season and year, but a single matrix is used here to indicate normal levels of bird use. Breeding status, abundance and periods of occurrence are indicated as follows:

- \* - Nests or has nested on at least some of the islands
- a - Abundant (very numerous species)
- c - Common (certain to be seen in suitable habitat)
- u - Uncommon (present, but not always easy to find)
- r - Rare (seen only a few times during indicated season)
- x - Accidental (found once/twice during season since 1880's)
- 1-12 - Months of recorded occurrence

Slashes (/) separate periods or seasons of occurrence. The years of occurrence for accidental species are shown in parentheses.





		Umnak	Bogos	Baby	Akuta	Akun	Ug-Ai
Dovekie (1980)	x	/7	/	/	/	/	/
Common Murre *	u	5/	5-8	5-6	/	/	5-8
Thick-billed Murre *	u-c	5/	5-8	/	/	/	5-8
Pigeon Guillemot *	r-u	/	5-8	5-7	/	6-7	5-8
Ancient Murrelet	u	/	/	/	/	/	6-7
Cassin's Auklet	r	/8	/	/	/8	/	6/
Parakeet Auklet	r-u	5/	/7	5-6/	/	/	/
Least Auklet	r-u	5/	6/	/	/7	/	/
Whiskered Auklet	r-c	5/	/	6-7	/	6-7	6/
Crested Auklet	u	5/	6-7	6/	6/	/	/
Tufted Puffin *	u-c	5-8	6-7	5-7	/	5-8	5-8
Horned Puffin	r-u	/	6-7	/	/	5-8	5-8
Short-eared Owl	r	/	/	/	/8	/	6/
Belted Kingfisher (19???)	x	?/	/	/	/	/	/
Bank Swallow	r	/	/	/	6/	/	6/
Common Raven *	u-c	1-12	/	5/	1-12	1-12	1-12
Winter Wren *	r-u	/	1-12	/	/	/	1-12
Water Pipit	r	/	/8	/	6/	/	6/
Savannah Sparrow	u-c	/	/	/	/	/	6/
Song Sparrow *	r-c	1-12	1-12	1-12	1-12	1-12	1-12
Lapland Longspur *	u-c	/	/	/	5-8	/	5-8
Snow Bunting	c	/	/	/	/	/	6/
Rosy Finch (Aleutian)	c	/	/	/	/	/	6/
Common Redpoll	r	/	/7	/	/	/	/

#### References:

- Deines, F. G. and G. T. McClellan. 1986. Eastern Aleutian trip report, AIU-AMNWR, 11-24 May 1985. USFWS administrative report. 7p.
- DeLong, R. 1985. Survey of Aikta Island. NMFS administrative memorandum. 1p.
- Fiscus, C. H. 1969. Steller sea lions at Ugamak Island, Aleutian Islands, Alaska, June 1969. USFWS administrative report. 53p.
- Fiscus, C. H., D. J. Rugh and T. R. Loughlin. 1981. Census of northern sea lion (*Eutopias jubatus*) in central Aleutian Islands, Alaska, 17 June-15 July 1979. NOAA Technical memorandum NMFS F/NWC-17. 109p.
- Merrick, R., P. Gearin and D. Withrow. 1985. Report on field studies of the northern sea lion population on Ugamak Island, Alaska, 1985 field season. NMFS administrative report. 32p.
- Merrick, R. and O. Osmeck. 1986. Report on field studies on northern sea lions on Ugamak Island, Alaska, 1986 field season. NMFS administrative report. 24p.
- Nysewander, D. R., D. J. Forsell, P. A. Baird, D. J. Shields, G. J. Weiler and J. H. Kogan. 1982. Marine bird and mammal survey of the eastern Aleutian Islands, summers of 1980-81. USFWS administrative report. 134p.

19 MAR 1987

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Birds of Fifteen Locations on Amaknak (Dutch Harbor)  
and Unalaska Islands, Aleutian Islands, Alaska

Dutch Harbor, on Amaknak Island, is the only civilian community in the Aleutian Islands served by regularly scheduled air service direct from Anchorage, Alaska. Unalaska Village, on Unalaska Island, is connected to Amaknak Island by road. Both communities have lodging and restaurants to serve the public. Automobile rentals are also available.

The Aleutian Islands bridge the Commander Islands of Russia with the Alaska Peninsula of North America. as a result, the Aleutian Chain hosts a mix of North American, Asian and Pacific Islands avifaunas. Due to their position in the eastern Aleutian Islands, the areas included in this list are only visited periodically by Asiatic bird species. The area is productive for several seabird species, including those that nest locally in areas inaccessible to terrestrial predators.

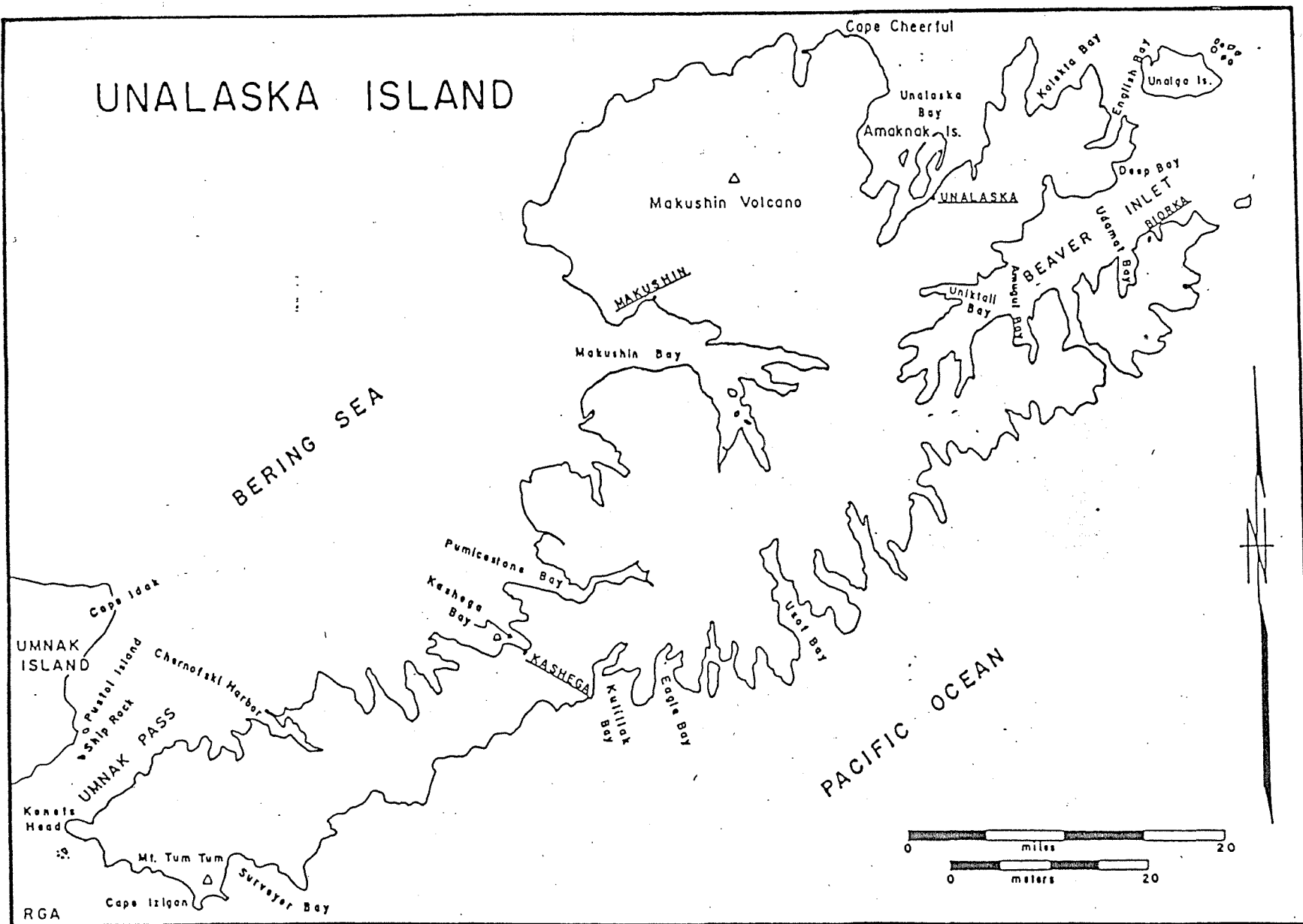
Most of small Amaknak Island and only a limited portion of Unalaska are accessible by road or short hike. The road system is unpaved for the most part, although some paving is being accomplished at Dutch Harbor. Bird species and abundance can vary from year to year, but a single matrix is used here to indicate normal levels of bird use. Breeding status, abundance and periods of occurrence are indicated as follows:

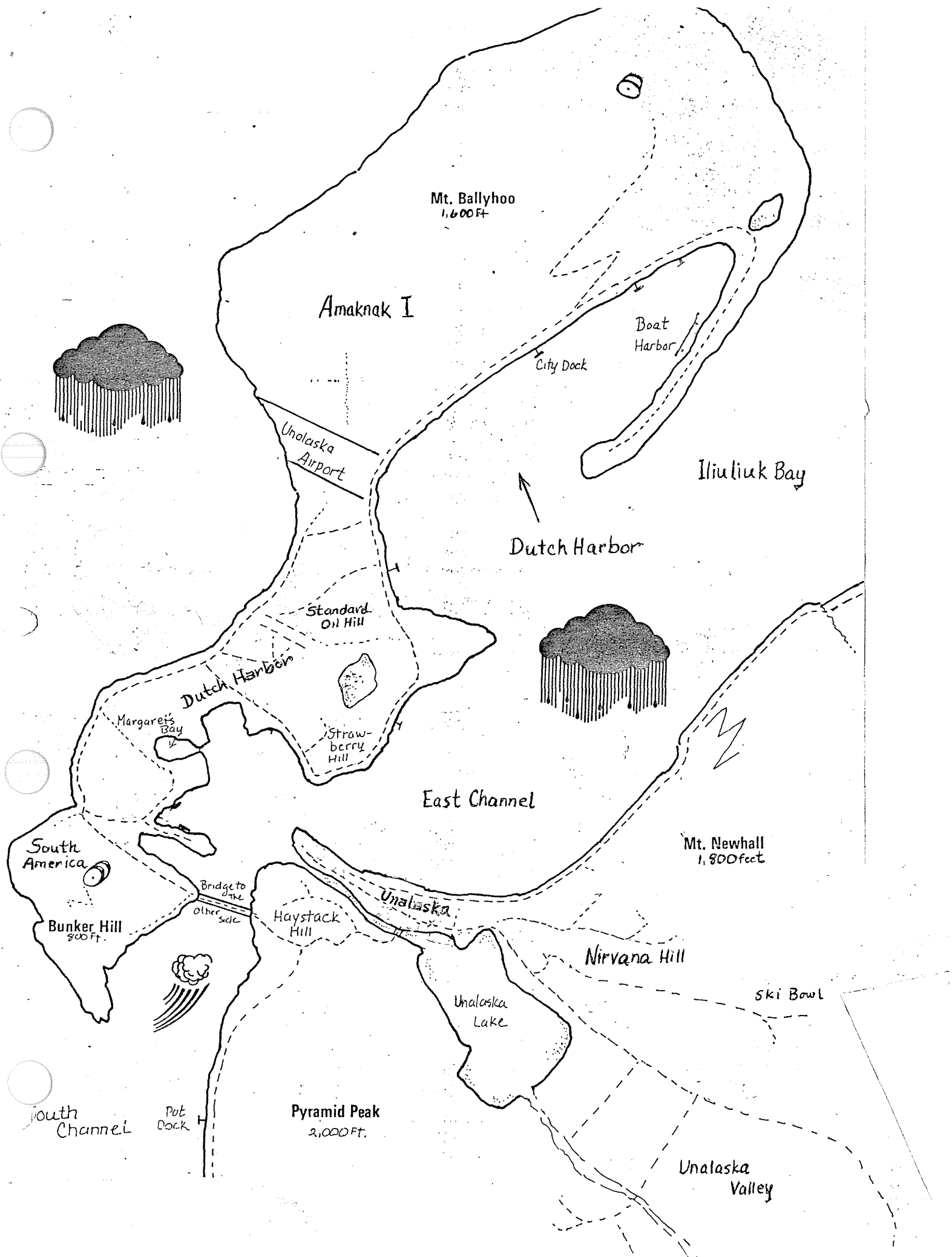
- \* - Nests or has nested on the islands
- a - Abundant (very numerous species)
- c - Common (certain to be seen in suitable habitat)
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Brackets ([]) indicate species which are considered hypothetical by some ornithologists. Slashes (/) separate periods or seasons of occurrence. The years of occurrence for accidental species are shown in parentheses.

		A	U	U	U	I	S	L	C	S	N	R	B	M	U	G
		m	n	n	n	l	u	k	a	h	a	u	r	a	n	l
		a	V	L	V	i	m	C	p	a	t	t	o	k	B	U
		k	i	k	a	u	m	x	t	i	e	h	a	u	y	n
Bufflehead	12-2	u														u
Common Merganser	6/12	o														o
Red-breasted Merganser *	1-12	u														c
Bald Eagle *	1-12	c														u c
White-tailed Eagle(1895,1945)	5/10	x														x
Steller's Sea-Eagle (1906)	5															x
Northern Harrier	6-7/10															o
Northern Goshawk (1946)	8	x														
Rough-legged Hawk	9	o														
Golden Eagle	6/8	o														o
Merlin (1922)	9															x
Peregrine Falcon *	1-12	u														u
Gyr Falcon	8	r														
Rock Ptarmigan *	1-12															u
Semipalmated Plover	5-7															u
Black Oystercatcher *	1-12															u
Wandering Tattler	5-6/8-10	u														u
Gray-tailed Tattler (1974)	9															x
Bar-tailed Godwit	5-6	o														o
Ruddy Turnstone	5/7-8		u													u
Semipalmated Sandpiper (1932)	?															x
Western Sandpiper	?	x														
Least Sandpiper	5-6/8	o														o
Baird's Sandpiper	?															o
Pectoral Sandpiper	10	u														u
Sharp-tailed Sandpiper	9-10															u
Rock Sandpiper	1-12	u														c
Common Snipe	6															u
Red-necked Phalarope	5/8															c c
Red Phalarope	7-8															c c
Pomarine Jaeger	5/8															u
Parasitic Jaeger	6-9															u
Long-tailed Jaeger	5															u
Bonaparte's Gull	5															o
Mew Gull	10-12	u														u
Ring-billed Gull (1982)	6		x													
Herring Gull	10									o						
Slaty-backed Gull (1880,1942)	3/10															x
Glaucous-winged Gull *	1-12		c	c	c	c	c	c	c	c	c	c	c	c	c	c
Glaucous Gull	4-5															o u
Black-legged Kittiwake	6-9/12	c														c c
Red-legged Kittiwake	7-9															r r
Arctic Tern	8															o o
Aleutian Tern	5-8															u
Common Murre	12-6	u						u								c c
Thick-billed Murre *	8-5	u						u								u u
Pigeon Guillemot *	1-12	c						c								u c
Marbled Murrelet	5-9/2	u														u u

# UNALASKA ISLAND







Birds of the Aleutian Islands Unit  
Alaska Maritime National Wildlife Refuge

The Aleutian Islands Unit of the Alaska Maritime National Wildlife Refuge contains over 200 named islands, islets and rocks totalling more than two million acres and stretching over 1100 miles from the tip of the Alaska Peninsula on the east to within five hundred 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 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 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 at Adak, the U.S. Navy facilities at Adak, the U.S. Air Force base at Shemya, and a small U.S. Coast Guard LORAN facility at Attu, the only signs of past human activity on refuge lands are unhealed scars and debris remaining from World War II activities throughout the chain. Public access to the Aleutians is generally limited to private lands at adjacent Dutch Harbor and Unalaska Village. Dutch Harbor is served daily by commercial airlines from Anchorage, Alaska. Each community has a single motel. Restaurants and vehicle rentals are also available.

Birdlife on the central and western Aleutian Islands has been adversely impacted through the introduction of arctic and red foxes beginning in 1836 for fur farming purposes. The industry faded away when World War II reached the islands. In the meantime, many ground nesting birds, especially the now endangered Aleutian Canada goose, were greatly reduced by foraging foxes. Through fox removal efforts, the goose is gradually being reintroduced to islands near remaining traditional nesting grounds at Buldir and Chagulak islands where foxes were never introduced. Continuing fox removal efforts are also benefitting a variety of other migratory bird species. Breeding seabirds have already begun to increase at Agattu, Alaid, Nizki, Amchitka and Amukta islands which are once again fox free. The endangered short-tailed albatross passes near the Aleutians during migrations enroute to and from breeding grounds south of Japan. The species has suffered from human activities and introduced rats on its nesting island.

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

	S	s	F	W
Red-throated Loon MEW 1-12 (^) *	u	u	u	r
Arctic Loon MEW 5/9 {	o		o	
Pacific Loon MEW 9-5 ^}	u		r	u
Common Loon MEW 1-12 (^) *	u	u	u	u
Yellow-billed Loon MEW 2-6/7-11 (^)	r	o	o	r
Horned Grebe MEW 9-7 (^)	u	o	r	u
Red-necked Grebe ME 8-7 (^)	u	x	u	u
Western Grebe ME 12 ^ (1980)				x
Short-tailed Albatross M 5-10 (^)	o	o	o	
Black-footed Albatross M 5-11 (^)	o	u	c	
Laysan Albatross M 2-11 (^)	u	u	u	u
Northern Fulmar M 4-11 (^) *	c	c	c	
Mottled Petrel M 5-10 (^)	o	r	r	
Cook's Petrel M 6/8 ^ (1933, 1975)		x	x	
Pink-footed Shearwater M 5-6/9 { (1975, 1983)	x	x	x	
Flesh-footed Shearwater M 5/7-9 (^	x	x	o	
Sooty Shearwater M 4-10 (^)	r	a	a	
Short-tailed Shearwater M 4-10 (^)	u	a	a	
Fork-tailed Storm-Petrel M 4-11 (^)	a	a	a	
Leach's Storm-Petrel M 5-11 (^) *	c	c	c	
Double-crested Cormorant MEW 4-12 ^) *	u	u	u	o
Pelagic Cormorant M 1-12 (^) *	c	c	c	c
Red-faced Cormorant M 1-12 (^) *	a	a	a	u
Chinese Egret W 6 { (1974)		x		
[ Gray Heron W 5 { (1986) ]	x			
Black-crowned Night-Heron W 4 (^	x			
Tundra Swan EW 12 ^ (1972)				x
Whooper Swan MEW 10-5 (^	r		r	u
Bean Goose MEW 5-6/10 (^	r	o	x	
Greater White-fronted Goose EWT 5/9-2 (^)	x		o	x
Snow Goose MEWT 5/7-11 (^	o	x	x	
Emperor Goose MEW 9-7 (^)	u	x	c	a
Brant ME 9-7 (^)	r	x	r	o
Canada Goose MEWT 4-11 (^) *	u	u	u	
Green-winged Teal EWT 1-12 (^) *	a	a	a	a
[ Baikal Teal ME 6 (^ (1971, 1983) ]		x		
Falcated Teal WT 5-6/10/2 (^	o	x	x	x
Mallard EWT 1-12 (^) *	c	c	c	c
Spot-billed Duck EW 1-12 ^	o	x	o	x
Northern Pintail EWT 1-12 (^) *	u	u	u	c
Garganey WT 5-7/8-11 (^	r	o	r	
Blue-winged Teal EW 7/10 ^ (1968, 1979)		x	x	
Northern Shoveler EWT 1-12 (^	u	o	u	o
Gadwall MEW 10-6 (^)	u	r	o	o
Eurasian Wigeon EWT 8-7 (^)	u	o	u	r
American Wigeon EWT 9-6 (^)	r	o		r
Common Pochard EW 4-6/10-12 (^	u	x	x	
Canvasback MEW 10-7 (^	o	o	o	r
Ring-necked Duck EW 4 ^) (1977, 1985)	x			
Tufted Duck EW 1-12 (^)	u	o	u	r
Greater Scaup MEW 1-12 (^) *	c	r	u	c

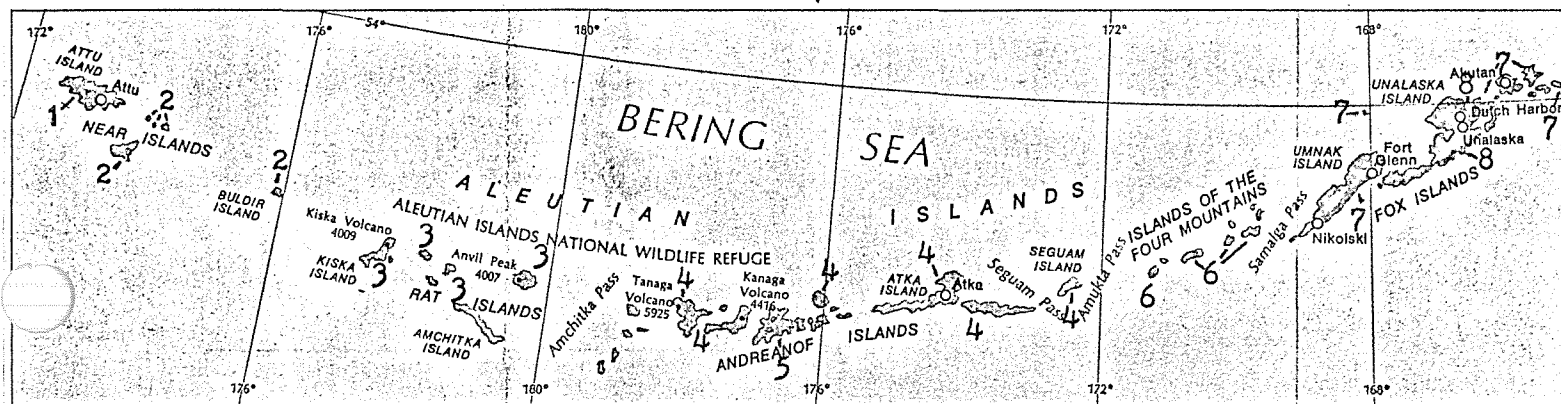
	S	s	F	W
Red-throated Loon MEW 1-12 (^) *	u	u	u	r
Arctic Loon MEW 5/9 {	o		o	
Pacific Loon MEW 9-5 ^}	u		r	u
Common Loon MEW 1-12 (^) *	u	u	u	u
Yellow-billed Loon MEW 2-6/7-11 (^)	r	o	o	r
Horned Grebe MEW 9-7 (^)	u	o	r	u
Red-necked Grebe ME 8-7 (^)	u	x	u	u
Western Grebe ME 12 ^ (1980)				x
Short-tailed Albatross M 5-10 (^)	o	o	o	
Black-footed Albatross M 5-11 (^)	o	u	c	
Laysan Albatross M 2-11 (^)	u	u	u	u
Northern Fulmar M 4-11 (^) *	c	c	c	
Mottled Petrel M 5-10 (^)	o	r	r	
Cook's Petrel M 6/8 ^ (1933, 1975)		x	x	
Pink-footed Shearwater M 5-6/9 { (1975, 1983)	x	x	x	
Flesh-footed Shearwater M 5/7-9 (^	x	x	o	
Sooty Shearwater M 4-10 (^)	r	a	a	
Short-tailed Shearwater M 4-10 (^)	u	a	a	
Fork-tailed Storm-Petrel M 4-11 (^)	a	a	a	
Leach's Storm-Petrel M 5-11 (^) *	c	c	c	
Double-crested Cormorant MEW 4-12 ^) *	u	u	u	o
Pelagic Cormorant M 1-12 (^) *	c	c	c	c
Red-faced Cormorant M 1-12 (^) *	a	a	a	u
Chinese Egret W 6 { (1974)		x		
[ Gray Heron W 5 { (1986) ]	x			
Black-crowned Night-Heron W 4 (^	x			
Tundra Swan EW 12 ^ (1972)				x
Whooper Swan MEW 10-5 (^	r		r	u
Bean Goose MEW 5-6/10 (^	r	o	x	
Greater White-fronted Goose EWT 5/9-2 (^)	x		o	x
Snow Goose MEWT 5/7-11 (^	o	x	x	
Emperor Goose MEW 9-7 (^)	u	x	c	a
Brant ME 9-7 (^)	r	x	r	o
Canada Goose MEWT 4-11 (^) *	u	u	u	
Green-winged Teal EWT 1-12 (^) *	a	a	a	a
[ Baikal Teal ME 6 (^ (1971, 1983) ]	x			
Falcated Teal WT 5-6/10/2 (^	o	x	x	x
Mallard EWT 1-12 (^) *	c	c	c	c
Spot-billed Duck EW 1-12 ^	o	x	o	x
Northern Pintail EWT 1-12 (^) *	u	u	u	c
Garganey WT 5-7/8-11 (^	r	o	r	
Blue-winged Teal EW 7/10 ^ (1968, 1979)		x	x	
Northern Shoveler EWT 1-12 (^	u	o	u	o
Gadwall MEW 10-6 (^)	u	r	o	o
Eurasian Wigeon EWT 8-7 (^)	u	o	u	r
American Wigeon EWT 9-6 (^)	r	o		r
Common Pochard EW 4-6/10-12 (^	u	x	x	
Canvasback MEW 10-7 (^	o	o	o	r
Ring-necked Duck EW 4 ^) (1977, 1985)	x			
Tufted Duck EW 1-12 (^)	u	o	u	r
Greater Scaup MEW 1-12 (^) *	c	r	u	c

	S	s	F	W
Gray-tailed Tattler ME 5-6/7-10 (^)	r	r	r	r
Common Sandpiper EW 5-9 (^ *	r	o	o	
Terek Sandpiper ME 5-6/8-9 (	r	o	o	
Whimbrel MEWT 5-6/7-9 (^	r	o	o	
Bristle-thighed Curlew E 5-6 (^)	o	x		
Far Eastern Curlew ME 5-7 (^	o	r		
Black-tailed Godwit E 5-6 (^	r	x		
Bar-tailed Godwit ET 5-6/9-11 (^)	u	r	o	
Ruddy Turnstone MEW 4-6/7-10 (^)	c	o	a	
Great Knot E 5-6 (^) (1971, 1976, 1982)	x	x		
Red Knot E 5-6/7-10 (^	o	o	o	
Sanderling ME 8-5 (^	u		u	u
Semipalmated Sandpiper EW 9 (} (1932, 1977, 1980)	x		x	
Western Sandpiper EWT 5-6/7-12 (^)	x	o	o	x
Rufous-necked Stint E 5-6/7-9 (^	r	x	r	
Little Stint EW 5-6/8-9 ( (1975, 1979, 1983)	x	x	x	
Temminck's Stint E 5-6/7-9 (	o	o	o	
Long-toed Stint EW 5-6/7-9 (^	u	o	r	
Least Sandpiper EWT 4-8 (^ *	r	r		
Baird's Sandpiper MEW 4-5/8-10 (^	o	o	r	
Pectoral Sandpiper EW 5-6/7-11 (^)	o	o	r	
Sharp-tailed Sandpiper EW 5/9-11 (^)	x		r	
Rock Sandpiper MET 1-12 (^) *	c	c	c	c
Dunlin MEWT 8-6 (^	o	x	o	o
Curlew Sandpiper E 5/9 ( (1977, 1982, 1983)	x	x	x	
Spoonbill Sandpiper E 5-6 ( (1977, 1986)	x	x		
Broad-billed Sandpiper E 8-9 (^ (1977, 1978, 1986)		x	x	
Buff-breasted Sandpiper E 9 ( (1977, 78, 79, 84)			x	
Ruff E 5-6/8-10 (^	r	o	r	
Long-billed Dowitcher MEW 6/9 (^)	x		o	
[ Jack Snipe W 5 ( (1981) ]	x			
Common Snipe EW 5-10 (^)	u	r	r	
[ Pin-tailed Snipe W 5 (^ (1984) ]	x			
Red-necked Phalarope MEW 5-10 (^) *	c	c	c	
Red Phalarope MEW 5-6/7-10 (^)	r	c	r	
Pomarine Jaeger M 5-9 (^)	o	u	x	
Parasitic Jaeger MEWT 4-9 (^) *	u	u	u	
Long-tailed Jaeger ME 5-6/8-9 (^)	o	o	o	
South Polar Skua MTA 7 ^ (1969)		x		
Common Black-headed Gull ME 4-10 (^	r	o	o	
Bonaparte's Gull MEWT 5/8-10 }	x	o	x	
Black-tailed Gull ME 5-6 ( (1980, 1983)	x	x		
Mew Gull MEWT 8-5 (^)	r	x	r	r
Ring-billed Gull E 6 } (1982)		x		
Herring Gull MEWT 2-6/9-11 (^)	o	o	o	o
Slaty-backed Gull ME 2-6/8-10 (^)	r	o	o	

	S	s	F	W
Dusky Warbler T 9 { (1978, 1983)			x	
Arctic Warbler T 5-6/9-10 {^	x	o	o	
[ Greenish Warbler T 6 { (1986) ]		x		
[ Pale-legged Willow Warbler T 6 { (1985)		x		
Mugimaki Flycatcher T 5 { (1985)	x			
Red-breasted Flycatcher T 5-6 {	o	o		
Siberian Flycatcher T 6/9 { (1977, 1986)		x	x	
Gray-spotted Flycatcher T 5-6 {^	o	o		
Brown Flycatcher T 5 { (1985)	x			
Siberian Rubythroat T 5-10 {^ *	r	r	o	
Bluethroat T 9-11 { (1984, 1985)			x	
Siberian Blue Robin T 5 { (1985)	x			
Red-flanked Bluetail T 6 { (1982)		x		
Northern Wheatear TA 8-11 {^		x	o	
[ Stonechat T 6 { (1992) ]		x		
Gray-cheeked Thrush T 9 { (1978, 1983)			x	
Eye-browed Thrush T 5-6/8-10 {^	u	r		
Dusky Thrush T 5-6/10 {^	o	x	x	
American Robin T 5 ^ (1977)	x			
Siberian Accentor T-9 { (1978)			x	
Yellow Wagtail MEW 5-10 {^	u	r	u	
Gray Wagtail T 5-6/10 {^	o	o	x	
Black-backed Wagtail ET 5-9 {^	r	r	r	
Olive Tree-Pipit T 5-6/9 {	r	o	o	
Pechora Pipit T 5-6 { (1979, 1982)	x	x		
Red-throated Pipit ET 5-7/8-10 {	r	o	o	
Water Pipit EWT 2-12 {^} *	r	r	r	o
Bohemian Waxwing T 5-6/10 {^} (1971, 1983, 1984)	x	x	x	
Brown Shrike T 6/9-10 { (1978, 1984)		x	x	
Northern Shrike ET 7/10-3 ^}	x	x	x	o
Yellow Warbler T 9 { (1984)			x	
Yellow-rumped Warbler T 5/10 { (1980, 1984)	x		x	
Townsend's Warbler T 10 { (1977)			x	
Savannah Sparrow T 5-9 {^} *	u	u	r	
Fox Sparrow T 6/9 {} (1974, 1944, 1984)		x	x	
Song Sparrow EWT 1-12 {^} *	c	c	c	c
Golden-crowned Sparrow T 3/9-11 {^} (1977, 79, 83, 84)	x		x	
White-crowned Sparrow T 9 { (1984)			x	
Dark-eyed Junco T 4/11-2 ^} (1957, 74, 75, 77, 79)	x		x	x
Lapland Longspur EWT 2-12 {^} *	a	a	a	o
Pine Bunting T 11 { (1985)			x	
Little Bunting T 5 { (1977, 1983, 1984)	x		x	
Rustic Bunting T 5-6/9-10 {^	r	r	r	
Gray Bunting T 5/8 { (1977, 1980, 1986)	x	x		
[ Pallas' Reed-Bunting T 5 { (1980) ]	x			
Common Reed-Bunting T 5-6 {^ (1974, 75, 77, 80)	x	x		
Snow Bunting EWT 1-12 {^} *	c	c	c	c
McKay's Bunting T 1-3 ^} (1889, 1975)	x			x
Brambling T 5-6/9-10 {^	r	o	r	
Rosy Finch ET 1-12 {^} *	a	a	a	a
Pine Grosbeak T 5 { (1983)	x			



# The Aleutian Islands Alaska



## Other Aleutian Bird Checklists Available:

1. Attu Island
2. Agattu, Alaïd, Nizki, Shemya and Buldir Islands.
3. Kiska, Segula, Rat, Little Sitkin, Amchitka and Semisopochnoi I.
4. Tanaga, Kanaga, Great Sitkin, Atka, Amliia and Segum Islands.
5. Adak Island.
6. Amukta, Chagulak, Yunaska, Herbert, Chuginadak and Kagamil Isl.
7. Umnak, Bogoslof, Baby, Akutan, Akun, Ugamak and Aikta Islands.
8. Amaknak (Dutch Harbor) and Unalaska Islands.

Birds of Fifteen Locations on Attu Island  
Aleutian Islands Unit, Alaska Maritime National Wildlife Refuge

NOTE: Access to Attu Island by aircraft requires advance authorization from the U.S. Coast Guard, Juneau, Alaska. The only runway at Attu is on the Coast Guard LORAN Station. All commercial tours to Attu and use of the refuge Casco Cove buildings require refuge use permits issued at Adak, Alaska.

Attu is the westernmost of the Aleutian Islands. The island lies along the axis formed by the Alaska Peninsula, the Aleutian Islands and the Commander Islands and hosts a mix of North American, Asian and Pacific Islands avifaunas. Due to its position a few hundred miles east of Russia's Kamchatka Peninsula and Commander Islands, Attu is very rich in Asiatic birds during the spring (May-June) and fall (September-November) migrations. The island has been the only known nesting site for a growing number of Asiatic species. About 48 percent of the bird species that have been recorded at Attu breed or regularly occur in North America and Asia (Holarctic), 39 percent breed in Asia only, 11 percent breed in North America only, and the remaining 2 percent breed on Pacific Islands (Hawaii, Australia, etc.).

Only the eastern 10-15 percent of Attu is accessible by road or short hike. The unmaintained World War II roads away from the LORAN Station are occasionally used by U. S. Coast Guard and U. S. Air Force personnel to access facilities near Massacre Bay and on Engineer Hill. Bird species and abundance can vary from year to year, but a single matrix is used here to indicate normal levels of bird use. Breeding status, abundance and periods of occurrence are indicated as follows:

- \* - Nests or has nested on Attu
- a - Abundant (very numerous species)
- c - Common (certain to be seen in suitable habitat)
- u - Uncommon (present, but not always easy to find)
- r - Rare (seen only a few times during indicated season)
- x - Accidental (found once/twice during season since 1880's)
- 1-12 - Month of recorded occurrence

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

		M	A	M	U	C	M	T	A	C	E	S	H	C	S	O
		a	l	a	S	a	u	e	b	a	a	t	o	h	a	f
		s	e	s	C	s	r	m	r	p	r	e	l	i	r	f
		B	x	V	G	c	d	n	a	e	l	l	t	c	a	s
Greater Scaup	1-12	u	u	u	u	c	c					u	r	u		
Common Eider *	2-12	a	a	r	a	c	a	c	c	c	u	a	a	u	c	u
King Eider	5-6	r					r	o								
Steller's Eider	5/10-12	r	r				r									
Harlequin Duck	2-12	c	a		c	c	c	c	c	u	u	a	a	a	c	c
Oldsquaw	7-6	a	a		c	u	u	u								
Black Scoter	2-11	c	c		u	c	u	u				c				
White-winged Scoter	3-10	u	u			u	u					c			u	
Common Goldeneye	9-6	u	u	u	c	c	u						u	u	u	u
Barrow's Goldeneye (1986)	5						x									
Bufflehead	10-5	o					u	u								
Smew	5-6/11				u	u		u								
Hooded Merganser (1974)	3-5							x								
Common Merganser (Asiatic) *	4-6/8	u		u	r	r	r					r	u			
Red-breasted Merganser *	2-12	c	c	c	c	c	u	c	c			u	c	c	c	u
Osprey (1978, 1985)	5-6						x	x								x
White-tailed Eagle *	5-10				r	o		o	r	o	r	r	r	r	r	r
Steller's Sea-Eagle (1980)	5						x									
Northern Harrier	5-6/9				o			o								
[ Eurasian Sparrowhawk(1983)]	8							x								
Rough-legged Hawk	5-10				r	r		r								
Eurasian Kestrel	5-6/9-10	x			o											
Merlin (1983)	5/9				x											
Northern Hobby (1983, 1984)	5/10						x	x								x
Peregrine Falcon *	1-12	u	u	u	u	u	u	u	u	u		u	u	u	u	
Gyr Falcon	5/10				o	o										
Rock Ptarmigan *	1-12				r	c	c	c	c	u	u	u	c	c	c	u
Sandhill Crane	5-6/7-10				r	r	r	r								
Oriental Pratincole (1985)	5											x				
Black-bellied Plover	5/9				o	o			o							
Lesser Golden Plover(Pacific)	4-6/8-10				c	c	c	u	c	c				c	c	
Mongolian Plover	5-7/8-10				r	o	o	o		o					o	
Common Ringed Plover	5/9									o						
Little Ringed Plover (1986)	5				x											
Eurasian Dotterel (1983)	9						x									
Common Greenshank	5-6/8				x	o	r									
Greater Yellowlegs (1983)	9						x									
Green Sandpiper	5-6/8				o	o				o						
Spotted Redshank	5/9				r											
Wood Sandpiper *	5-9				u	c	u	u	u	u		u	u		u	
Wandering Tattler	5-6/8-9				u		u	u	u	u	u	u		u		u
Gray-tailed Tattler	5-6/8-11				u	o	u	u	u	u				r	u	
Common Sandpiper	5-7/8				u	u	u	u	u		u					
Terek Sandpiper	5-6/8				r		r	r	r							
Whimbrel (Asiatic)	5-6/8-9				u		r		u					r	u	
Bristle-thighed Curlew(84,86)	5				x				x							
Far Eastern Curlew	5-6						r	o	o							
Black-tailed Godwit	5-6				r		r									

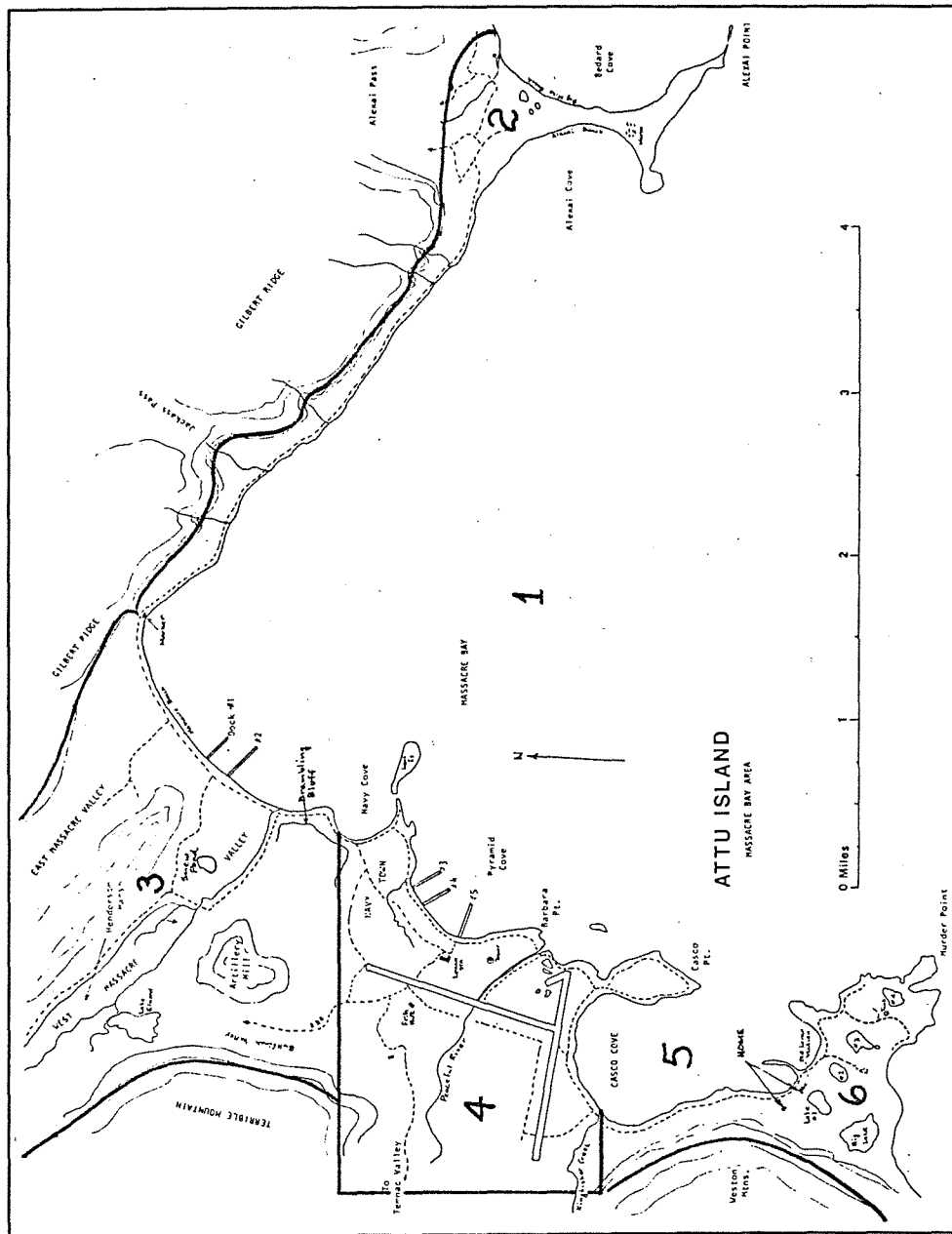
		M	A	M	U	C	M	T	A	C	E	S	H	C	S	O
		a	l	a	S	a	u	e	b	a	a	t	o	h	a	f
		s	e	s	C	s	r	m	r	p	r	e	l	i	r	f
		B	x	V	G	c	d	n	a	e	l	l	t	c	a	s
Least Auklet (1985)	4-5							x								
Whiskered Auklet	3-9		x					o		r						
Crested Auklet	5-6			o			x	x								
Tufted Puffin *	4-9		c	c		a	c	a	a	c	u	u	u	a	a	c
Horned Puffin *	5-7		r	u				u	c	c					u	
Common Cuckoo	5-7		r	u			r	r								
Snowy Owl *	4-10			u	r	r			r					r	r	
Short-eared Owl	5-6/9-10				r	r		x					x			
White-throated Needletail	5					o		o								
Great Spotted Woodpecker(85,86)	4-10		x	x												
Eurasian Skylark	4-6/9-10		r	o	r		r						r		r	
Bank Swallow	6/8-9			o												
Barn Swallow (1978, 1979)	5/9		x		x											
Common Raven *	1-12		u	u	c	c	c	u	u	u	u	u	u	u	u	u
Winter Wren *	1-12		c	u	u		r	r	c	c	u	c	u	c	u	c
Middendorf Grasshopper Warbler	6/8-9				x	x										
Lanceolated Warbler *(1984,85)	6-8				x	x		x			x		x			x
[ Pallas' Grassh Warbler(1985)]	6				x											
Dusky Warbler (1978,1983,1985)	5/9							x					x		x	
Arctic Warbler (Asiatic)	6-7/9-10		u	u	r		u	r						r	r	
[ Greenish Warbler (1986) ]	6															x
[ Pale-leg.Willow Warbler(85)]	6															
Red-breasted Flycatcher	5-6			o	o	o		o	o							
Gray-spotted Flycatcher	5-6			r	r	r		r							r	
Brown Flycatcher (1985)	5			x												
Siberian Rubythroat *	5-10		u		u	u	u	r						u	u	u
Bluethroat (1984, 1985)	9-11				x	x										
Siberian Blue Robin (1985)	5										x					
Re-flanked Bluetail (1982)	6						x		x							
Northern Wheatear (1983)	9								x							
Gray-cheeked Thrush(1978,1983)	9							x								
[ Stonechat (1982) ]	6				x											
Eye-browed Thrush	5-6			r	o	u	u	u	u			u	u	u		u
Dusky Thrush	5-6					o		o				o				
American Robin (1977)	5					x										
Yellow Wagtail (Asiatic) *	5-10		u	u	u	u	u	u	u	u			u	u	u	
Gray Wagtail	5-6/10		r	o	r	r		o					r	r	r	o
Black-backed Wagtail *	5-9			o	o	o		o					o		o	
Olive Tree-Pipit	5-6/8-10		u	r	u	u		o		o			u	u	r	u
Pechora Pipit	5-6					o										
Red-throated Pipit	5-6/8-10		r	r	r		o	r					r	r	r	r
Water Pipit	5-6/9-10		r	r	r		r	r					r	r		r
Bohemian Waxwing (1983, 1984)	5-6/10			x					x							
Brown Shrike (1984)	6/9			x												
Yellow Warbler (1984)	9			x												
Yellow-rumped Warbler(1980,84)	5/9			x												
Savannah Sparrow (1983,84,85)	5/9				x	x										
Song Sparrow *	1-12		c	c	u	c	c	c	u	u	c	c	c	c	c	u

- Tobish, Jr., T. G. 1985. The first record of Locustella lanceolata for North America. Auk 102:645.
- Wagner, G. F. 1984. Attu bird observations, 12 April-18 October 1984. USFWS administrative report. 17p.
- Wagner, G. F. 1984. The breeding avifauna of Attu Island-Avian migratory system in the Near Islands, a joint preliminary report, 1984. USFWS administrative report. 8p.
- Wagner, G. F. 1985. Attu bird observations, 2 May-12 December 1985. USFWS administrative report. 17p.
- Wagner, G. F. 1985. The breeding avifauna of Attu Island-Avian migratory system in the Near Islands, a joint preliminary report, 1985. USFWS administrative report. 12p.
- Wilson, R. S. 1948. The summer bird life of Attu. Condor 50:124-129.
- Zeillemaker, C. F. 1986. Miscellaneous wildlife observations, Attu Island, 12-15 June 1986. USFWS administrative report. 4p.

2 JAN 1985, Rev 24 MAY 1986, 31 DEC 1986

C. F. Zeillemaker, Box 5251 NAS Adak, FPO Seattle, WA 98791





BERING SEA UNIT  
ALASKA MARITIME NATIONAL WILDLIFE REFUGE  
Homer, Alaska

ANNUAL NARRATIVE REPORT  
Calendar Year 1986

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

REVIEW AND APPROVALS

BERING SEA UNIT  
ALASKA MARITIME NATIONAL WILDLIFE REFUGE  
HOMER, ALASKA

ANNUAL NARRATIVE REPORT  
CALENDAR YEAR 1986

*J. L. Munt*  
Refuge Manager

*1/88*  
Date

*Paul R. Schmitt* *2/1/88*  
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 (ANILCA) in 1980. It was established to conserve fish and wildlife populations and habitats in their natural diversity, fulfill international fish and wildlife treaty obligations, provide opportunities for continued subsistence uses by local residents, provide a program of national and international scientific research on marine resources and ensure water quality and necessary water quantity within the refuge. This Act consolidated management of eleven existing refuges with 460,000 additional acres resulting in a 35,000,000 acre refuge. Although relatively small in land mass, its lands are scattered through most of coastal Alaska and extends from Forrester Island in Southeast Alaska along the Gulf of Alaska to the Aleutian Islands and northward until near Barrow in northwest Alaska. There are over 2,500 islands, islets, and pinnacle rocks within the refuge which are used annually by millions of seabirds of at least 30 species. The AMNWR has five units with all former refuges designated subunits.

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

Some of the most serious potential threats to the seabirds and marine mammals 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.

Long-term refuge objectives include establishing a seabird monitoring scheme that involves all the major species and which is of sufficient intensity to detect population changes of 20% or greater with 90% confidence, and also to measure annual changes in reproductive success. In addition, we should be able to identify the major causes of change. This will require a cooperative effort with other divisions in the Service, other federal, state, and local government agencies, and private organizations. In 1986 monitoring was conducted at three sites; the Pribilof Islands (refuge personnel), St. Matthew Islands (Univ. of Alaska personnel under contract to Minerals Management Service), and Bluff (Univ. of Alaska personnel under contract to the refuge).

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

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### A. HIGHLIGHTS

Kittiwakes had slightly improved reproductive success after several seasons of nearly complete failure, but success in 1986 remained below 1970's levels.

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

Impacts on seabirds of noise from harbor construction activities at St. Paul and St. George Islands was assessed by City biologists and found to be negligible.

Potential habitat for crevice-nesting birds was created at St. Paul Island as mitigation for boulder removal from the refuge.

### B. CLIMATIC CONDITIONS

Following a cold January, a warm February, and a cold March, spring and summer were about normal or slightly warmer in the Pribilofs (Table 1). Spring temperatures may have a profound impact on the timing of breeding events of various species on the refuge. In 1986 kittiwakes in the Pribilof Islands initiated nests particularly early. This may have been the result of very warm temperatures (3 degrees to 6 degrees above average) during the last five days of April and the first six days of May, when kittiwakes were beginning to attend ledges regularly and even warmer temperatures (5 degrees to 9 degrees above normal) in mid-June during the peak of laying.

In contrast, temperatures were very erratic at Nome, near Bluff in Norton Sound. Temperatures were extremely warm in February (over 11 degrees above normal), but April was unusually cold (nearly 6 degrees below normal). Although May was only 2.1 degrees below normal (Table 2), there was an extremely cold spell during the month (13-21 May) when daily temperatures were 6-11 degrees below normal. It is not known how this affected seabirds beginning to attend nesting cliffs. During the time of egg laying in June, temperatures was extremely warm (six days in a row in mid-June were more than 10 degrees above normal). The remainder of the summer was nearly normal.

Table 1. Jan. to Oct. 1986 temperatures at St. Paul Island

Month	Average Temp. (F)	Departure (F)
Jan	22.1	-4.2
Feb	25.7	3.8
Mar	20.4	-2.9
Apr	27.9	0.2
May	35.9	1.1
Jun	42.5	1.6
Jul	47.6	1.6
Aug	47.8	0.3
Sep	46.5	2.0
Oct	39.1	1.5

Table 2. Jan. to Oct. 1986 temperatures at Nome.

Jan	5.2	-0.6
Feb	14.5	11.2
Mar	6.3	0.3
Apr	12.1	-5.8
May	33.6	-2.1
Jun	51.9	6.5
Jul	52.6	2.1
Aug	48.6	-1.3
Sep	41.9	-0.4
Oct	28.0	0.0

#### D. PLANNING

##### 1. Master Plan

The Alaska National Interest Lands Conservation Act (ANILCA) requires all Alaskan refuges to prepare a Comprehensive Conservation Plan (CCP). 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 CCP 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 original schedule for the AMNWR CCP was accelerated and we plan to have the final published document out by the end

of the year. In May a presentation of management alternatives was given to the Regional Director. A final draft of alternatives was developed by the end of the year with meetings set up with numerous villages for their input after the first of next year.

## 2. Management Plan

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

## 5. Research and Investigations

AMNWR-NR86.01 Monitoring disturbance to seabirds from harbor construction and other activities at St. Paul I.

Ian Jones, City of St. Paul, St. Paul I.

Ref: Jones, I. 1986. A study of productivity, populations, and sources of disturbance to seabirds nesting near the City of St. Paul, Alaska, 1986.

This study was the third consecutive year of observations of seabirds near the City of St. Paul designed to determine if harbor construction or other man-caused activities were causing damage to seabird populations. Jones (see the above reference) set out to monitor productivity and populations of kittiwakes and murres relatively near and far from sources of disturbance on plots used for the same purposes in 1984 (Rodstrom, W. 1984. St. Paul seabird monitoring study. Report to the City of St. Paul, St. Paul I., AK.) and 1985 (Witter, M. 1986. Results of a seabird monitoring study at St. Paul I., Alaska in 1985. Report for the City of St. Paul, St. Paul I., AK). Jones also summarized available data on least auklets using the Village Cove beach and new talus areas created during harbor construction.

Information gathered by Jones is included in the Wildlife Section of this report, but his findings are summarized below:

1. Reproductive success of kittiwakes and murres was lower at plots near the harbor construction site than at more distant areas, but there was no evidence to implicate disturbance as the cause (i.e. panic flights or other types of behavior which might cause losses of eggs or chicks were not observed).
2. Aircraft did not regularly fly near seabird cliffs, and were not observed causing damage.
3. Tourists apparently did not cause significant disturbance.

4. Repeated eggging may have significant consequences locally on murre (the major species from which eggs are taken), but the activity was not widespread.
5. Deliberate harassment of seabirds by village children was the most obviously disruptive activity observed, but even this probably affected only a small number of birds.
6. Overall, Jones concluded that protective measures currently in place (e.g. a ban on shooting during the seabird nesting season), continued cooperation between local authorities and the refuge, and continued monitoring should help insure that seabird populations are not adversely affected by disturbance.

AMNWR-NR86.02 Impacts of blasting on seabirds nesting near the harbor construction site at St. George I.

Lisa Climo, City of St. George, St. George I., AK

Ref: Climo, L. 1987. The effect of blast-generated noise on breeding seabirds at Saint George Island, Alaska. A report prepared for the City of St. George.

The City of St. George is in the process of building a harbor. Due to the need for blasting at the harbor site during the breeding season for seals and seabirds, this study was conducted to determine how blast-generated noise affected seabirds. Objectives of the study were to measure the level of noise at seabird colonies near the harbor, record the behavioral response of birds to the noise, and evaluate the overall influence of blasting on reproductive success and populations of seabirds in the area. A summary of Climo's findings follow:

1. Nesting seabirds near the harbor construction site showed no obvious response to blasts (i.e. no panic flights were observed and there was no indication that the birds noticed the blasts).
2. The timing of breeding, attendance patterns at colonies, hatching success, and population numbers were normal near the harbor compared to control areas.
3. Murre chick mortality was higher near the harbor than in control areas, but that was probably caused by wind-driven rain during the period when chicks were small (no control areas had exactly the same exposure as the plots near the harbor).
4. Measurements of blast-generated noise levels at seabird colonies nearest the blast site indicated background



noise (e.g. waves breaking, wind) were usually higher than blast noise levels.

5. Overall it was concluded that blast-generated noise had no discernible affect on the well-being of the seabird populations nesting near the harbor construction site.

AMNWR-NR86.03 - Food habits and reproductive success of murres and kittiwakes at St. George Island, Alaska.  
Don Dragoo, Graduate Student, Univ. of Alaska, Fairbanks, AK.

Ref: Dragoo, D. 1986. Progress Report submitted to Alaska Cooperative Wildlife Research Unit, 1986.

Mr. Dragoo conducted the second season of field work toward his graduate project in 1986 at St. George. His objectives are to determine if there has been a shift in diet of kittiwakes and murres (a species by species comparison) since the late 1970's when similar studies were done. This is of particular interest since kittiwakes had relatively good reproductive success during the late 1970's, but have had poor success in most years since. Mr. Dragoo's study should indicate whether a shift in diet has accompanied this phenomenon. The tedious process of sorting, identifying and analyzing the stomach contents of the birds is underway and preliminary findings may be available by summer 1987.

AMNWR-NR86.04 Monitoring populations of seabirds on St. Matthew and Hall Islands in 1986 (AKM-24-86).

Ed Murphy (principal investigator) Institute of Arctic Biology, Univ. of Alaska, Fairbanks, AK.

Ref: Murphy, E. C. et al. 1987. The population status of seabirds on St. Matthew and Hall Islands, 1985 and 1986. Draft Final Report to MMS under contract No:14-12-0001-30237.

This study was funded by Minerals Management Study as part of their responsibility for conducting environmental studies of the Outer Continental Shelf (OCS) lease areas that may be affected by oil and gas development.

Little was known about the seabird colonies at St. Matthew (used hereafter to refer to Hall as well) until 1978 when U.S. Fish and Wildlife Service biologists completed the first detailed reconnaissance (DeGange and Sowles, 1978, A faunal reconnaissance of the Bering Sea) of the area. From 1982-1984 Fish and Wildlife Service personnel and MMS contractors conducted more extensive studies of the flora and fauna of St. Matthew, including some counts of ledge-nesting seabirds.

The recent study (1985-1986) conducted by Murphy et al. was designed to "establish a population monitoring protocol

primarily for three species of cliff-nesting seabirds: Black-legged Kittiwakes..., Common Murres..., and Thick-billed Murres...". The authors collected information on populations, reproductive success, and food habitats of the target species to compare among years and sites (St. Matthew north, St. Matthew south, and Hall Island).

As the report points out, "To assess the effects of development on bird populations the natural variability in population variables must be distinguished from changes induced by human activity". The authors explained their approach as follows: "Although design of a monitoring protocol for population trends was of primary concern, pursuit of this goal demands consideration of all aspects of the study. Reproductive success and foraging conditions likely affect numbers of birds counted on census plots. Factors known to influence colony attendance include stage of breeding, diurnal cycles, and weather. It is necessary to consider these factors, both in attempting to obtain a precise estimate of population numbers and in interpreting apparent changes in numbers."

Murphy et al. used time-lapse cameras to obtain detailed information on attendance patterns of murres which was then used to interpret plot counts. This report includes an intensive examination of factors influencing variability in murre counts. It was apparent that day-to-day differences were greater than hour-to-hour differences (as long as counts were confined to afternoon periods). The authors found "no clearcut trends in Common Murre counts, except perhaps a decrease in counts from 1983 to 1985 and 1986. Thick-billed Murre counts increased significantly from 1983 to 1986." Nevertheless the authors suggest the 1983 counts should be viewed somewhat skeptically since only one or two replicates were made.

For black-legged kittiwakes, Murphy et al. found no significant differences in counts between 1985 and 1986, but there was a significant increase in these two years over 1983. Numbers of nests varied significantly but in a different pattern than birds; there being less nests in 1985 than in 1983 or 1986.

Besides the "key" species the contract called for to monitor, the authors gathered incidental data on fulmars and cormorants also. Fewer fulmars were found at the south end of St. Matthew in 1986 than in 1985, but no differences were detected between those years at the north end of St. Matthew. Population trends could not be measured for pelagic cormorants, but there was a similar number of active nests on a reproductive study area in 1985 and 1986.

Reproductive success in common and thick-billed murres was higher in 1986 than in 1985 based on k-ratios (the ratio of eggs laid to the average number of adults counted at the

plot). Reproductive success of kittiwakes was relatively low at St. Matthew in 1982, 1983, 1985, and 1986. Nevertheless, 1986 began as a good year (high clutch sizes, and lots of nests with eggs) but high chick mortality reduced overall success. The maximum possible reproductive success was only 15-22% in 1985 and 1986.

Approximately 45% of the active fulmar nests contained chicks in 1985 compared to 37% in 1986. Also the number of chicks visible on study plots declined from 65 in 1985 to 57 in 1986. These data suggest fulmars had slightly better success in 1985 than in 1986. Cormorants had lower productivity in 1986 than in 1982, 1983, or 1985 apparently due to bad weather and storms which caused high chick mortality.

AMNWR-NR86.05. Seabird monitoring at Bluff.

Ed Murphy, Institute of Arctic Biology, Univ. of AK, Fairbanks.

Ref: Murphy, E.C. 1987. Preliminary report of the 1986 field studies of seabirds at Bluff, Alaska. Report to Alaska Maritime NWR.

Field studies have been conducted annually at this refuge site since 1979. The data base provides a valuable record of population trends and variations in reproductive success from which reasons for changes may be investigated. Due to lack of adequate funding, data have had to be gathered during short visits to the site in recent years. In 1986 brief visits were made 10-17 June and 8-14 August.

Objectives of the first visit were to determine the condition of birds just as laying began, and to describe food habits at this energetically critical time in the reproductive cycle. Also, information on nesting phenology gained during this initial trip was used to time the later visit. The second visit was to make counts of birds on plots and obtain a general idea of reproductive performances.

It was hypothesized that capelin are important food items for kittiwakes and perhaps murres early in the breeding season. Perhaps in years when capelin are not present, reproductive success is reduced. Collections of kittiwakes revealed that capelin were rare in the area in 1986 (only one stomach contained this species and no beach spawning occurred during the observation period). The major food items found were saffron cod and sand lance.

Laying was apparently relatively late in 1986 for kittiwakes. Reproductive success was better in 1986 than in 1984 or 1985 which were almost complete failures. However, 1986 was still poorer than the average reproduction for other years. A maximum of .36 chicks fledged/nest and the figure may have

been lower (depending on how many chicks died after the period of observation).

Murre reproductive success in 1986 was poor relative to 1978-1981 and 1983, but higher than in 1984 and 1985, and numbers of murres on plots were higher in 1986 than in 1984-1985. Overall, it appeared 1986 was a relatively poor year reproductively for kittiwakes and murres, but better for both species than the dismal 1984 and 1985 seasons.

AMNWR-NR86.06 Archaeological Survey of Hagemeister Island (AKM-19-86). Berkley Bailey, U. of Alaska, Fairbanks.

An archaeological survey was performed on Hagemeister Island. Two new sites were discovered and one site was excavated. The excavation uncovered a large amount of artifacts which are still being catalogued. Apparently the site is about 1000 years old and represents an undisturbed example of a coastal hunting camp.

AMNWR-NR86.07 Distribution of marine birds in relation to water masses and prey communities in the northern Bering Sea (AKM-04-86).

N.M. Harrison and George Hunt, U. of California, Irvine, CA.

Ref: Harrison, N.M. et al. 1986. Research Cruise Report, R/V Alpha Helix Cruise #087.

The objectives of this National Science Foundation-funded project are to assess the feeding ecology of auklets and other seabirds relatively near and far from breeding colonies in the northern Bering Sea with emphasis on areas near St. Matthew and St. Lawrence Islands. Part of the field work in 1986 focused on Sarichef Strait between St. Matthew and Hall Islands. As in past years, it was observed that auklets fed mostly in the strait and they changed locations depending on currents.

#### E. Administration

##### 1. Personnel

###### Permanent Full Time

1. John L. Martin, Refuge Manager, GS-13, EOD 12/21/81
2. Tom J. Early, Assistant Refuge Manager, GS-11, EOD 08/23/81.
3. David R. Nysewander, Wildlife Biologist, GS-11 EOD 09/28/86.
4. Edgar P. Bailey, Refuge Biologist, GS-11, EOD 10/01/81.
5. Mike Nishimoto, Wildlife Biologist, GS-11, EOD 4/15/84
6. Arthur L. Sowls, Wildlife Biologist, GS-11, EOD 09/28/86
7. Carol M. Hagglund, Budget Assistant, GS-7, EOD 08/21/83

8. Trina B. Fellows, Clerk-Typist, GS-3, EOD 11/28/83
9. Alvin D. Bayer, Ship Operator, WG-12 EOD 10/06/86

Permanent Intermittent

10. G. Vern Byrd, Wildlife Biologist, GS-11, EOD 4/29/84

Volunteers:

11. Jessica M. Abel, (SCA) EOD 06/04/86 Term 08/29/86
12. Colleen M. Baggot, (SCA) EOD 06/09/86 Term 08/25/86
13. K. Birgit Christiansen, (SCA) EOD 06/09/86 Term 08/25/86
14. Diane Debinski, (SCA) EOD 06/05/86 Term 08/20/86
15. Annette Emig, (SCA) EOD 06/05/86 Term 08/01/86
16. Brian Lance, (SCA) EOD 06/04/86 Term 06/11/86
17. Alan Storey, (SCA) EOD 07/01/86 Term 08/23/86
18. Kim Thounhurst, (SCA) EOD 05/01/86 Term 08/20/86
19. Gavin Wright, (SCA) EOD 06/09/86 Term 08/23/86
20. Donald Dragoo, EOD 06/07/86 Term 09/12/86
21. Ronald S. Hicks, EOD 01/08/86 Term 04/17/86
22. Steven Kirkhorn, EOD 06/20/86 Term 06/30/86
23. Edward C. Murphy, EOD 06/10/86 Term 06/17/86
24. Gretchen J. Murphy, EOD 06/10/86 Term 06/17/86
25. Kevin P. Rose, EOD 06/09/86 Term 08/12/86
26. Alan Springer, EOD 07/26/86 Term 08/15/86
27. Martha T. Springer, EOD 08/05/86 Term 08/15/86
28. Wayman Walker, II EOD 08/05/86 Term 08/15/86

YCC

29. John Libal, EOD 06/16/86 Term 08/20/86

Cooperators:

30. Wells Stephenson, ADC, Dept. of Agriculture

Four of the five units of the Alaska Maritime NWR (AMNWR) are supported by personnel located in the Homer office. Personnel, for the Aleutian Islands Unit (AIU) is presented in that section.

During 1986, the Homer staff increased from seven permanent employees to ten (Table 2). Biologists Nysewander and Sowls transferred from Wildlife Assistance in the Regional Office. They were picked up on the payroll September 28, but did not complete their moves until late December due to problems with the relocation services in completing the sale of their former residences.

Alvin Bayer was selected to fill the new Ship Operator position for the FWS vessel currently being built. He reported for duty in early October and shortly thereafter traveled to Escatawpa, MS to spend the next six months monitoring construction of the vessel.

Table 3. Staffing Pattern

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

#### 4. Volunteer Programs

Volunteers were used extensively to accomplish our biological programs on the Bering Sea Unit. Student Conservation Association volunteers provided the bulk of our summer-long force, but a number of refuge volunteers also assisted, primarily for shorter periods. Table 4 lists all of our volunteers.



Volunteers Birgit Christiansen and Colleen Baggott  
on St. Paul Island.  
7/86 GVB





A lot of cooperation and camaraderie was evident with scientists at St. George Island during the summer months. Pictured from left to right are Gavin Wright, Craig Johnson (NMFS), Mike Goebel (NMFS), Don Dragoo, Alan Storey, and Lisa Climo (City of St. George).  
7/86 GVB

Table 4. Volunteers, types and duration of their appointments, and the locations where they served.

Name	Type of Appointment	Duration	Location
Don Dragoo (a)	refuge vol.	June-Sept.	St. George
Alan Storey	SCA	July-Aug.	St. George
Gavin Wright	SCA	June-Aug.	St. George
Colleen Baggott	SCA	June-Aug.	St. Paul
Birgit Christiansen	SCA	June-Aug.	St. Paul
Vivian Mendenhall (b)	USFWS	July	Pribilofs
Ed Murphy	refuge vol.	June	Bluff
Gretchen Murphy	refuge vol.	June	Bluff
Alan Springer	refuge vol.	Aug.	Bluff
Martha Springer	refuge vol.	Aug.	Bluff
Wayman Walker	refuge vol.	Aug.	Bluff

a

Also helped at St. Paul.

b

Wildlife biologist with USFWS, Anchorage, who volunteered to help conduct population surveys.

## 5. Funding

Funding for the entire refuge is through the Homer headquarters office. Funds internally distributed to the Aleutian Islands Unit (AIU) is discussed in that unit's section.

Table 5. AMNWR Funding, FY 1983 to FY 1987

	<u>1260*</u>	<u>1400/ 1480/1113</u>	<u>1520</u>	<u>1994/ 8610</u>	<u>6850</u>	<u>Totals</u>
FY87	1,154,000	346,000	-	-	-	1,500,000
FY86	882,000	476,000	1,975	26,781	2,380	1,389,136
FY85	1,100,000	239,000	3,010	24,500	1,500	1,368,010
FY84	858,560	245,000	1,875	7,000	-	1,112,435
FY83	730,000	250,000	-	26,375	-	1,006,375

\*Includes 1210, 1220, and 1240 funding for FY 83. This also includes ARMM funds.

## 6. Safety

No lost time accidents were reported for the year. Assistant Manager Early is the Station Safety Officer. Monthly safety meetings are scheduled the first Monday of each month with most permanent staff members attending.

The following is a list of the monthly meetings:

<u>Month</u>	<u>Subject</u>
January	- ATV Safety
February	- General Safety Discussion Session
March	- Mental/Physical
April	- Wood Stove Use and Safety
May	- Boating Safety & Comprehensive Session on CPR /First Aid/Defensive Driving.
June	- Hiking, Bear, and Back Country Safety
July	- Office Safety and Hazards
August	- Hunting Safety
September	- Fire Prevention
October	- Winter Driving Safety
November	- Open Subject/or General Safety Discussion
December	- Drinking/Driving

## 7. Technical Assistance

At the request of the cities of St. Paul and St. George, WB Byrd helped design the studies for monitoring impacts of harbor construction activities on nearby seabirds. Results of the refuge seabird monitoring programs were provided to city biologists as controls for their disturbed area plots, and there was interaction between Service and City biologists throughout the studies.

WB Byrd provided Ecological Services with review of existing data for seabirds at St. George that might be used to evaluate the potential impact of a proposal to construct a new runway at St. George. A review of existing literature on the impact of aircraft noise to nesting seabirds revealed little helpful material. It is clear that judgments about potential impacts will have to be largely subjective. There is a need for appropriate studies.

The National Marine Mammal Laboratory hosted a workshop in Seattle to discuss the present status of northern sea lions, and to develop research plans that might identify causes of the current decline. At the request of NMFS, WB Byrd participated in the workshop and presented data on the status of fish-eating marine bird populations over the past 10 years in the western Gulf of Alaska and eastern Bering Sea so that any parallels with sea lions could be discussed.

## 8. Other

A Special Use Permit (SUP) was issued to an archaeologist from the University of Alaska, Fairbanks, to survey and test cultural resources on Hagemester Island. During the month-long study two new sites were found on the island dating about 1,000 years before present. Subsistence was primarily on seal and mollusks. A layer of volcanic ash was also collected which upon analysis indicated the eruption that produced it was of such magnitude that it probably wiped out a great deal of prehistoric vegetation.

A SUP was issued to Exploration Holidays and cruises, Seattle WA. to conduct public wildlife tours on our lands on St. Paul Island. More discussion on visitor use is included in Section H.

Another SUP was issued to Brice, Inc., a construction firm from Fairbanks, to construct a temporary haul road across our lands on St. Paul Island. This road was used to transport quarry rock to construct new breakwater in Zapadni Bay. The road is to be restored to original conditions prior to termination of the permit.

## HABITAT MANAGEMENT

### 6. Other Habitats

In October 1985 an SUP was issued to the city of St. Paul to construct a temporary access road and to remove large stones from an old, overgrown talus slope on the refuge south of Antone Lake. The slope had probably once provided nesting habitat for crevice-nesting birds (e.g. least auklets, snow buntings, rosy finches), but due to weathering and subsequent encroachment by vegetation, which covered the slope, the area probably no longer provided nest sites. The city needed large rock to protect the new breakwater at the harbor, but

the slope contained a large amount of small boulders as well. ARM Early reached an agreement with City contractors to have them pile newly exposed boulders, that were too small for breakwater protection, so that they might provide "restored" habitat for crevice nesters. Removal of boulders to be used on the breakwater was completed by January 1986, and rehabilitation of the talus occurred in February.

Observations during the summer of 1986 indicated snow buntings and rosy finches were nesting in the new talus. Least auklets were observed flying over the new habitat, and a few pairs may have nested. Continued observations are planned for 1987.



Area at St. Paul near Antone Lake where a new talus area was constructed (in distance) after large boulders were removed. The near area shows how old, over grown talus looked prior to work. 7/86 GVB

## 7. Grazing

A survey of reindeer at Hagemeister made on January 31, 1986, revealed 650 animals were present. This was nearly 100 less than in 1985 but still 200 animals above the permitted stocking rate of 450 reindeer. Because of the need to enforce permit conditions, the refuge entered into a cooperative agreement with the Soil Conservation Service to fund a range survey at Hagemeister I. in 1986. The stocking rate was previously set at 450 animals subjectively by BLM, but no range survey has been done on the island which might allow an informed estimate of carrying capacity. The primary



objective of the planned survey was to characterize the available plant communities on the island, determine if the forage seemed overgrazed at the current stocking level, and to recommend a proper stocking level.

ARM Lee Hotchkiss at Togiak NWR agreed to fly a crew of SCS and USFWS personnel to Hagemeister from Dillingham in late August to conduct range surveys. Unfortunately, extremely poor weather kept the crew from reaching Hagemeister. While in Dillingham they prepared a preliminary range map from aerial photographs, so now all that is needed is to ground truth the map and check the condition of the vegetation. Perhaps that can be done next season.

## 12. Wilderness and Special Areas

Two SUP's were issued for studies at St. Matthew I., the units only wilderness area. Both studies were of seabirds on the island. Only temporary camps were established, and the camps were removed at the end of the studies.

## G.WILDLIFE

The information summarized in this section comes from reports mentioned in the Planning Section (e.g. Jones 1986, Climo 1987, Murphy 1986, and Murphy et al. 1987) and the refuge monitoring program in the Pribilof Islands (Byrd 1986. The status of ledge-nesting seabirds in the Pribilof Islands, 1976-1986, An executive summary).

### 2. Endangered and or Threatened Species

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

At the request of the Endangered Species Office in Anchorage, WB Byrd and Vivian Mendenhall conducted a study of the habitat use by the Pribilof Shrew, at St. Paul I. during July and August 1986 (Byrd and Mendenhall. 1986. Habitat use by the Pribilof Shrew in summer). A summary of the project follows:

1. Live trapping was carried out in each of four major vegetation types occurring on St. Paul.
2. A total of 37 shrews were captured, most in a habitat dominated by the grass Elymus arenarius and several umbelliferous species (e.g. Angelica lucida).

3. Shrews were found in each of four geographic areas containing the grass umbel habitat type.

4. Although the 1986 effort was only a pilot survey, results suggest the shrew may be fairly widespread on

St. Paul, but more intensive surveys would be needed to estimate relative densities.

#### 4. Marsh and Waterbirds

Shearwaters -- About 40-50 short-tailed shearwaters washed up on the beaches along the east side of St. Paul Island in August. Apparently this was a fairly wide-spread phenomenon as birds were also found along the north shore of Bristol Bay (L. Hotchkiss pers. comm.) and along the eastern Aleutians (W. Crayton pers. comm.). These southern hemisphere breeders spend the austral winter in the southern Bering Sea. A sample of birds examined by the National Health Laboratory suggested starvation was the cause of death.

Northern Fulmar -- Information was gathered on this species at St. Matthew and in the Pribilofs. Unfortunately, the species was not intensively monitored at either site, but the information available indicates populations may have increased in the past 10 years at St. Paul, but not at nearby St. George I. At St. Matthew, there were less birds on plots at one end of the island in 1986 than had been present in 1985, but counts were similar in the two years at the other end of the island.

Cormorants -- At St. Matthew pelagic cormorants had poor reproductive success in 1986 due primarily to high chick mortality caused by stormy weather. In contrast, red-faced cormorants in the Pribilofs had relatively good success in 1986.

#### 5. Shorebirds, Gull, Terns, and Allied Species

Kittiwakes -- Following several consecutive years of nearly total reproductive failure in the Bering Sea, black-legged kittiwakes had somewhat better success in 1986. In fact, 1986 began very well at the Pribilofs and at St. Matthew (large average clutch sizes, and a high rate of nests contained eggs). There was some egg loss, but the largest contributor to reduced reproductive success was chick mortality. This may also have caused reduced success at Bluff. This fairly widespread phenomenon suggests starvation may be the cause. Why the birds are unable to find enough food for chicks is a matter of speculation at this point, but continued monitoring may provide adequate data bases to test different hypotheses. If the birds do not have good success before long, populations are bound to decline. Indeed



declines are suggested by counts over the past 10 years in the Pribilofs.



Populations of red-legged kittiwakes in the Pribilofs have apparently declined significantly since 1976.  
7/86 GVB

Red-legged Kittiwakes have generally had even poorer success than black-legged kittiwakes in the Pribilofs. In 1986 they had similar success (about 30 percent of the nests successfully produced a chick). Counts of red-legged kittiwakes suggest populations have declined significantly since 1976 in the Pribilofs. Causes of reproductive failures and subsequent population declines are not fully understood.

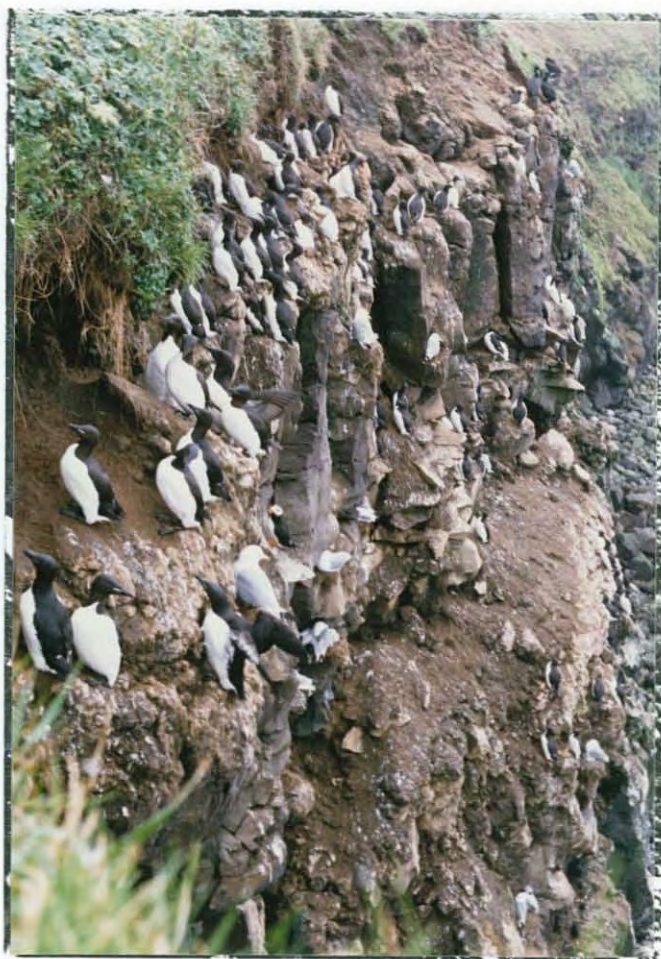
Murres -- Information gathered on common murres at Bluff and St. Matthew indicated success was up slightly in 1986 over 1985. This was not the case in the Pribilofs where chick mortality, perhaps due to storm-driven rain, reduced overall productivity to below 1985 levels. Overall, however, common murres had a moderately successful season in 1986.

Only a few population counts were available for Bluff in 1986 due to poor weather during the short visit, but meager evidence suggested the decline that has been occurring there may not have continued in 1986. At St. Matthew, it appeared there were fewer common murres on plots in 1986 (and 1985) than in 1983. Likewise counts were substantially lower at

St. Paul in 1986 than they had been in 1976, but at St. George no decline was indicated.

Thick-billed murres were slightly higher in 1986 than in 1985 at St. Matthew, but the opposite was true in the Pribilofs where only 38% to 45% of the eggs that were laid produced young old enough to depart from the colony. This figure is usually well over 50% (has been over 75% in the Pribilofs).

Counts at St. Matthew provided no indication of a decline since 1983, but data are not adequate to draw strong conclusions about population trends there. In the Pribilofs, thick-billed murres may have declined on both islands since 1976.



Murres and kittiwakes on one of the "Productivity" plots at St. Paul.  
7/86 GVB

Auklets -- Jones (1986) analysed counts at St. Paul of least auklets since 1984, and concluded that numbers on the surface of plots have remained fairly stable among years. A similar conclusion was drawn from counts at St. George in 1985 and 1986.

#### 14. Scientific Collections

As part of Don Dragoo's study of food habits of kittiwakes and murrelets at St. George, he collected 63 black-legged kittiwakes, 19 red-legged kittiwakes, 30 thick-billed murrelets and 2 common murrelets.

### H. PUBLIC USE

#### 1. General

At the request of the city of St. George and the Alaska Audubon Society, WB Byrd and D.D. Gibson, U. of Alaska museum, wrote an updated bird list for the Pribilof Islands. This was published in 1986.

#### 7. Other Interpretive Programs

WB Byrd provided evening presentations to seven natural history tour groups totaling about 135 people at St. George and St. Paul. This was only about 15-20% of the total natural history-oriented visitors to the islands during the summer. All groups would have liked such a presentation, but time permitted only the level of response described.

#### 11. Wildlife Observation

From June through August 1986 Exploration Holidays Tour company had 751 people visit the refuge at St. Paul for two to three days. The monthly breakdown was as follows: June 254, July 348 and August 149. At least 88 people that had reserved a place on the tour were unable to reach the island due to canceled flights as a result of fog. The following groups took the Exploration Holidays tour: WINGS (2 tours), ATTOURS, Victor Emmanuel Nature Tours, Cornell Lab of Ornithology, Field Museum of Natural History (Chicago), American Museum, and National Audubon Society.

At St. George, the village corporation, Tanaq, runs 4-day nature tours primarily in July and August. They had about 80 people participate in 1986.

#### 17. Law Enforcement

We received a report, long after the fact, that a number of walrus and seals that had been shot were found on Hagemester I. during that summer (Berkly Bailey report). In addition, Bailey found a dead adult bald eagle, apparently

shot, that he believed was part of a pair that had nested near their camp on Hagemeister.

## 18. Cooperating Associations

The Alaska Natural History Association (ANHA) outlet opened on March 28, 1984 in our Homer headquarters building at 202 Pioneer Avenue. We offered 15 publications for sale to the visiting public. Gross sales were: \$52 in 1984; \$120.15 in 1985; and \$304.47 in 1986. Despite efforts to increase visitors, the low sales volume continued. At the end of the year, a decision was made to place the outlet in an inactive status. We hope to re-open sometime in the future when full-time personnel can be employed to handle the interpretive work.

## I. EQUIPMENT AND FACILITIES

### 1. New Construction

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

### 6. Computer Systems

In 1986 we used transportable Corona computers in the Pribilofs for data storage and analysis. The machines and our "workhorse program" Dbase II, performed even above our expectations. At least two man-months of labor at the end of the season were saved by entering data each evening at the field camps and using the program to sort and analyze results.

### 8. Other

Semi-permanent markers were installed at St. Matthew and the Pribilofs at observation points for long-term monitoring plots. The 5/8" aluminum rods with survey-type caps bearing unique identifiers, should make it possible to relocate exact plots (for which reference photographs are available) for future surveys.

## J. OTHER ITEMS

### 1. Cooperative Programs

As mentioned above under grazing, the refuge entered into a cooperative agreement with the Soil Conservation Service (SCS) to evaluate and manage a reindeer grazing program on Hagemeister Island.



### 3. Items of Interest

Two journal papers were published during the year of particular interest to the refuge:

Byrd G.V. and R.H. Day, "The Avifauna of Buldir Island, Alaska" was published in the journal Arctic

E.C. Murphy, A.M. Springer, and D.G. Roseneau, "Population status of Common Guillemots at a colony in western Alaska: results and simulations" was published in Ibis.

### 4. Credits

The report was written by WB Byrd and edited by ARM Early. CT Fellows produced the report.

CHUKCHI SEA UNIT  
ALASKA MARITIME NATIONAL WILDLIFE REFUGE  
Homer, Alaska

ANNUAL NARRATIVE REPORT  
Calendar Year 1986

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



REVIEW AND APPROVALS

CHUKCHI SEA UNIT  
ALASKA MARITIME NATIONAL WILDLIFE REFUGE  
Homer, Alaska

ANNUAL NARRATIVE REPORT  
Calendar Year 1986

*A. L. Muth* *2/9/88*  
Refuge Manager Date

*Paul R. Schmitt* *2/11/88*  
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 460,000 additional acres resulting in a 3,500,000 acre refuge. Although relatively small in land mass, it's lands are scattered through most of coastal Alaska and extends from Forrester Island in Southeast Alaska along the Gulf of Alaska to the Aleutian Islands and northward until near Barrow in Northwest Alaska. There are over 2,500 islands, islets, and pinnacle rocks within the refuge which are used annually by millions of seabirds of at least 30 species. The AMNWR has five units with all former refuges designated subunits.

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 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 murrees breed on cliffs at Cape Lisburne and Cape Thompson; these are the most spectacular 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 (>500 birds).

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

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### A. HIGHLIGHTS

Black-legged kittiwakes experience improved reproductive success after two consecutive years of nearly total failure.

Cleanup of Atomic Energy Commission debris is planned for the "Project Chariot Site" near Cape Thompson.

Archaeologists study an ancient site that is being damaged by ice scour and marine erosion from the Arctic Ocean.

### B. CLIMATIC CONDITIONS

Data from the National Weather Service station at Kotzebue probably best represents the conditions affecting seabirds in the Chukchi Sea Unit. Winter and early spring temperatures were highly variable in 1986 (Table 1). Following a normal January, the February average temperature was 13.2 degrees above normal (!), but in March and April averages were 4.3 and 8.2 degrees below average respectively. By May the cold trend had moderated, and June and July were nearly normal. In the northern Bering Sea, April was also cold, May temperatures began to return to normal and June was warmer than average. These conditions are of interest, because they probably influence the sea temperatures and biological oceanography of the western Chukchi Sea because Bering Sea water flows into the Chukchi through the Bering Straits.

Cold spring temperatures delay the development of the food base for seabirds and can cause breeding failures, especially in surface-feeding kittiwakes, while warmer springs tend to favor better reproductive success. Predicting the exact relationships between ambient temperatures, seawater temperatures, plankton blooms, and abundance of favored food fish for seabirds is not yet an exact science, but the fact that such relationships exist is becoming more obvious as more data accumulates.

Table 1. January to October 1986 temperatures at Kotzebue

Month	Average Temp. (F)	Departure (F)
Jan	-3.0	0.0
Feb	7.1	13.2
Mar	-4.9	-4.3
Apr	4.1	-8.2
May	29.7	-1.9
Jun	43.6	-0.2
Jul	53.3	0.2
Aug	50.0	-1.9
Sep	41.2	-0.4
Oct	21.3	-1.5



## D. PLANNING

### 1. Master Plan

The Alaska National Interest Lands Conservation Act (ANILCA) requires all Alaskan refuges to prepare a Comprehensive Conservation Plan (CCP). These plans are to serve as the station master plan and will be initiated by special planning team from the regional office. The primary objectives of the CCP 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 original schedule for the AMNWR CCP was accelerated and we plan to have the final published document out by the end of the year. In May a presentation of management alternatives was given to the Regional Director. A final draft of alternatives was developed by the end of the year with meetings set up with numerous villages for their input after the first of next year.

### 2. Management Plan

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

### 4. Compliance with Cultural Resources Mandates

SJS Archaeological Services, a cultural resources contracting firm from Pennsylvania, investigated the Pingasagruk archaeological site at Point Franklin, Chukchi Sea Unit, from late July to early August (Contract No. 14-16-0007-86-6612). The site, parts of which are at least 500 years old, is probably eligible for inclusion in the National Register of Historic Places, and is subject to substantial erosion. After a major storm in October, personnel from SJS were able to revisit the site, and were pleased to find that damage from that storm had been less than anticipated. A final report on this project, including National Register nomination paperwork, is expected in late 1987. The principal investigators have expressed an interest in excavating this site, and are seeking funding through other agencies.

## E. Administration

### 1. Personnel

#### Permanent Full Time

1. John L. Martin, Refuge Manager, GS-13, EOD 12/21/81
2. Tom J. Early, Assistant Refuge Manager, GS-11, EOD 08/23/81.
3. David R. Nysewander, Wildlife Biologist, GS-11 EOD 09/28/86.
4. Edgar P. Bailey, Refuge Biologist, GS-11, EOD 10/01/81.
5. Mike Nishimoto, Wildlife Biologist, GS-11, EOD 4/15/84
6. Arthur L. Sowls, Wildlife Biologist, GS-11, EOD 09/28/86
7. Carol M. Hagglund, Budget Assistant, GS-7, EOD 08/21/83
8. Trina B. Fellows, Clerk-Typist, GS-3, EOD 11/28/83
9. Alvin D. Bayer, Ship Operator, WG-12 EOD 10/06/86

#### Permanent Intermittent

10. G. Vern Byrd, Wildlife Biologist, GS-11, EOD 4/29/84

#### Volunteers:

11. Jessica M. Abel, (SCA) EOD 06/04/86 Term 08/29/86
12. Colleen M. Baggot, (SCA) EOD 06/09/86 Term 08/25/86
13. K. Birgit Christiansen, (SCA) EOD 06/09/86 Term 08/25/86
14. Diane Debinski, (SCA) EOD 06/05/86 Term 08/20/86
15. Annette Emig, (SCA) EOD 06/05/86 Term 08/01/86
16. Brian Lance, (SCA) EOD 06/04/86 Term 06/11/86
17. Alan Storey, (SCA) EOD 07/01/86 Term 08/23/86
18. Kim Thounhurst, (SCA) EOD 05/01/86 Term 08/20/86
19. Gavin Wright, (SCA) EOD 06/09/86 Term 08/23/86
20. Donald Dragoo, EOD 06/07/86 Term 09/12/86
21. Ronald S. Hicks, EOD 01/08/86 Term 04/17/86
22. Steven Kirkhorn, EOD 06/20/86 Term 06/30/86
23. Edward C. Murphy, EOD 06/10/86 Term 06/17/86
24. Gretchen J. Murphy, EOD 06/10/86 Term 06/17/86
25. Kevin P. Rose, EOD 06/09/86 Term 08/12/86
26. Alan Springer, EOD 07/26/86 Term 08/15/86
27. Martha T. Springer, EOD 08/05/86 Term 08/15/86
28. Wayman Walker, II EOD 08/05/86 Term 08/15/86

#### YCC

29. John Libal, EOD 06/16/86 Term 08/20/86

#### Cooperators:

30. Wells Stephenson, ADC, Dept. of Agriculture

Four of the five units of the Alaska Maritime NWR (AMNWR) are supported by personnel located in the Homer office. Personnel, for the Aleutian Islands Unit (AIU) is presented in that section.

During 1986, the Homer staff increased from seven permanent employees to ten (Table 2). Biologists Nysewander and Sowls transferred from Wildlife Assistance in the Regional Office.

They were picked up on the payroll September 28, but did not complete their moves until late December due to problems with the relocation services in completing the sale of their former residences.

Alvin Bayer was selected to fill the new Ship Operator position for the FWS vessel currently being built. He reported for duty in early October and shortly thereafter traveled to Escatawpa, MS to spend the next six months monitoring construction of the vessel.

Table 2. Staffing Pattern, FY 1983 to FY 1987

	<u>Permanent</u>	<u>Part Time</u>	<u>Temporary</u>	<u>Total FTE</u>
FY87	10	0	0	10.00
FY86	7	0	0	7.00
FY85	7	0	2	6.30
FY84	6	1	0	6.30
FY83	3	0	2	3.80

#### 4. Volunteer Program

Alan Springer, Institute of Marine Science, Univ. of Alaska, Fairbanks, volunteered to accompany WB Byrd to Cape Lisburne for the annual seabird survey. Dr. Springer has done most of the previous research on seabirds at Cape Lisburne, so we were fortunate to have him volunteer to help with the survey.

#### 5. Funding

Funding for the entire refuge is through the Homer headquarters office. Funds internally distributed to the Aleutian Islands Unit (AIU) are discussed in that unit's section.

Table 3. AMNWR Funding, FY 1983 to FY 1987

	<u>1260*</u>	<u>1400/ 1480/1113</u>	<u>1520</u>	<u>1994/ 8610</u>	<u>6850</u>	<u>Totals</u>
FY87	1,154,000	346,000	-	-	-	1,500,000
FY86	882,000	476,000	1,975	26,781	2,380	1,389,136
FY85	1,100,000	239,000	3,010	24,500	1,500	1,368,010
FY84	858,560	245,000	1,875	7,000	-	1,112,435
FY83	730,000	250,000	-	26,375	-	1,006,375

\*Includes 1210, 1220, and 1240 funding for FY 83. This also includes ARMM funds.

#### 6. Safety

No lost time accidents were reported for the year. Assistant Manager Early is the Station Safety Officer. Monthly safety meetings are scheduled the first Monday of each month with

most permanent staff members attending.  
The following is a list of the monthly meetings:

<u>Month</u>	<u>Subject</u>
January	- ATV Safety
February	- General Safety Discussion Session
March	- Mental/Physical Fitness
April	- Wood Stove Use and Safety
May	- Boating Safety & Comprehensive Session on CPR/First Aid/Defensive Driving.
June	- Hiking, Bear, and Back Country Safety
July	- Office Safety and Hazards
August	- Hunting Safety
September	- Fire Prevention
October	- Winter Driving Safety
November	- Open Subject/or General Safety Discussion
December	- Drinking/Driving

#### 7. Technical Assistance

Refuge personnel reviewed a Corps of Engineers' Plan to clean up debris on the Cape Thompson subunit left after the Atomic Energy Commission conducted studies there in the 1960's to determine if the site was appropriate for blasting a harbor with a nuclear detonation. The blast never occurred, but a number of buildings and equipment remain. The challenge is to insure that cleanup of debris and any toxic material that may be found occurs without causing significant damage to the area in the process.

#### 8. Other

A special use permit was issued to Phil Driver to conduct commercial guiding activities on the Cape Thompson and Cape Lisburne subunits. No activity was conducted by the permittee due to caribou migration off-refuge.

Several special use permits were issued for surficial geological surveys on the Cape Thompson and Cape Lisburne subunits.

ARM Early inspected a shallow corehole sampling operation by Exxon Company at the permittee's expense at Cape Lisburne. The operation was very clean and minimal habitat disturbance was noted.

#### G. WILDLIFE

The only wildlife survey done by refuge personnel during the year was a one-week effort at Cape Lisburne. This annual monitoring program provides an index to reproductive performance of kittiwakes (about the time of hatching) and a measure of changes in population numbers of kittiwakes and murre at a series of plots (probably only large changes

could be confidently detected because of difficult counting conditions and inability during the short visit to get adequate replicates of counts). Results of the 1986 monitoring effort are summarized below, but a more detailed report is available at the refuge office (Byrd, G.V. 1986. Results of the 1986 seabird monitoring program at Cape Lisburne, Alaska).

##### 5. Shorebirds, Gulls, Terns, and Allied Species

Kittiwakes--Judging from the percentage of eggs that had hatched and the size of chicks in nests, the peak of hatching probably occurred during our stay (the last week of July). This is similar to other "early" years at Cape Lisburne. Counts of kittiwakes indicated that populations are not declining. The variability in counts makes trends difficult to document, but there is a strong indication that population have increased since counts began in 1977. Of 100 kittiwake nests checked in four plots in 1986, 67% contained at least one egg or chick. The presence of a nest to which material had been added during the current season was considered a nest attempt. In 1986 an average of 0.9 eggs or chicks were found per nest attempt. This is up from less than 0.3 eggs or chicks/nest attempt in 1984 and 1985, but still lower than the levels recorded 1979-1983 (range 1.3-1.8). Examination of stomach contents of a small collection of kittiwakes and observation of feeding flocks near shore confirmed that sand lance were present in the area in substantial numbers. The pattern that seems to be emerging is that in years when sand lance are present prior to hatching, kittiwakes tend to have relatively good reproductive success. In contrast, when sand lance are absent or arrive relatively late in the season, kittiwakes seem to have reduced success. The presence of sand lance seems to be related to sea water temperatures. In late July 1986 nearshore temperatures were 9 degrees C compared to only 5 degrees C at the same time in 1985.

Murres--Like for kittiwakes, evidence suggests the peak of hatching for murres occurred in late July, similar to other "early" years at Cape Lisburne. We were unable to obtain any quantitative information on murre reproductive success, but counts of birds on plots suggest 1986 populations in attendance at the nesting colony were slightly higher than the 9-year average. Changes among years of single annual counts are difficult to interpret because hour, daily, and yearly variation in attendance at cliffs may be substantial. Nevertheless with 9 years of data substantial trends should be apparent. They are not leading to the conclusion that populations are relatively stable at Cape Lisburne.

Guillemots--Black guillemots are primarily a species of the north Atlantic region, but a few scattered populations nest along the Beaufort and Chukchi Sea coasts. Except for an experimental colony on Cooper Island in the Beaufort Sea

where the addition of artificial nest sites has greatly enlarged the population, Cape Lisburne has the largest breeding population of this species on the Pacific side of the Arctic Ocean. No recent population estimate is available, but in the late 1970's about 200 birds were thought to be present. During the 1986 surveys flocks of up to 40 guillemots were seen along the north shore of Cape Lisburne, and if the birds are distributed along the western shore of the Cape in substantial numbers also, there may have been a population increase in this area.



Black guillemots, a species primarily of the north Atlantic region, occur in scattered populations along the Beaufort and Chukchi Sea coasts of Alaska.

8/86 GVB

#### 8. Game Mammals

The western arctic caribou herd migrates from calving grounds southwest of Barrow to a post-calving aggregation area which includes Cape Lisburne and Cape Thompson in some years. In 1986 the photo counts were able to be made giving a minimal population of 230,000 animals. The last reliable photo count was made in 1982 and based on that figure the herd is increasing at 8 percent per year (David James, Game Biologist, ADF&G-Kotzebue).



## 9. Marine Mammals

In late July 1986 up to 150 walruses hauled out at Cape Lisburne. This is lower than the peak number observed in some years (over 300 animals).

## 10. Other Resident Wildlife

During the 1986 survey at Cape Lisburne, WB Byrd and volunteer Springer found two different pairs of red-throated pipits feeding young near the Air Force Station. Although this species, which breeds primarily in Siberia, is known to occur in northwestern Alaska, any nesting records are very valuable.

## 14. Scientific Collections

In late July 1986, 22 black-legged kittiwakes, 17 thick-billed murres, and 6 common murres were collected offshore at Cape Lisburne for continuing food habits studies (conducted primarily by Alan Springer, Univ. of Alaska).

# H. PUBLIC USE

## 8. Hunting

In 1986 Phil Driver, the permitted guide in the area, reported that his hunters took no animals from refuge lands.

Personnel at the Cape Lisburne Air Force Station have been reduced to less than 25 people. They took a few caribou during the 1986 season, but an exact total of this harvest was not available.

## 17. Law Enforcement

In 1984 it came to the attention of refuge personnel that the U.S. Air Force had a blasting site for large rock (which is needed for annual maintenance of the Cape Lisburne AFS runway) very near, if not within, the refuge. Boundaries of the "new" refuge were not posted, and maps with sufficient details to locate exact boundary locations were not available. Air Force personnel were questioned about the activities, and they felt they were located within the Air Force Station boundaries.

In late-July 1986 when WB Byrd visited the site to conduct seabird monitoring it was discovered that blasting activities had moved further west and were clearly on the refuge. Blasting crews indicated the extension of the area was needed to avoid a dangerous situation with overhanging rock at the old blast site. The refuge staff notified Air Force officials of the problem, and it was agreed to meet prior to the 1987 construction season to determine if the blasting

operation would be permitted in the future and if so, under what conditions.

#### 18. Cooperating Associations

The Alaska Natural History Association (ANHA) outlet opened on March 28, 1984 in our Homer headquarters building at 202 Pioneer Avenue. We offered 15 publications for sale to the visiting public. Gross sales were: \$52 in 1984; \$120.15 in 1985; and \$304.47 in 1986. Despite efforts to increase visitors, the low sales volume continued. At the end of the year, a decision was made to place the outlet in an inactive status. We hope to re-open sometime in the future when full-time personnel can be employed to handle the interpretive work.

### J. OTHER ITEMS

#### 4. Credits

This report was written by WB Byrd and ARM Early. Trina Fellows typed the report.

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

ANNUAL NARRATIVE REPORT  
Calendar Year 1986

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 1986

\_\_\_\_\_  
Refuge Manager

\_\_\_\_\_  
Date

*Paul R. Schmidt* 2/1/88  
\_\_\_\_\_  
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 (ANILCA) in 1980. It was established to conserve fish and wildlife populations and habitats in their natural diversity, fulfill international fish and wildlife treaty obligations, provide opportunities for continued subsistence uses by local residents, provide a program of national and international scientific research on marine resources and ensure water quality and necessary water quantity within the refuge. This Act consolidated management of eleven existing refuges with 460,000 additional acres resulting in a 35,000,000 acre refuge. Although relatively small in land mass, its lands are scattered through most of coastal Alaska and extends from Forrester Island in Southeast Alaska along the Gulf of Alaska to the Aleutian Islands and northward until near Barrow in northwest Alaska. There are over 2,500 islands, islets, and pinnacle rocks within the refuge which are used annually by millions of seabirds of at least 30 species. The 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 breed and nest. Besides terrestrial habitat, submerged lands also occur around Afognak and some waters around Kodiak Island.

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

## INTRODUCTION

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### A. HIGHLIGHTS

Storm petrel populations at St. Lazaria remain lower than estimates of 1981-82 (Section G.5).

Afognak Native Corporation proposes to construct a log transfer facility at Kazakof Bay, Afognak Island (Section F.3).

South side of the Kenai Peninsula surveyed with population increases noted for black-legged kittiwakes in the Chiswells (Section G.5).

Monitoring of seabirds at Chisik Island initiated by the refuge (Section G.5).

Gull Island kittiwakes continue to do well (Section G.5).

### 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.

In Homer, the year began with a lot of snow and average temperatures reading 8.9 degrees (F) above the normal for January. The eruption of Augustine volcano was a major event in the end of March. There were two explosions (one on the 27th and another on the 31st) that covered Homer with about 1/8th of an inch of ash. We had a record dry March (0.07 inch precipitation) and April followed that pattern with near-record dryness. Summer had temperatures close to average and it was very wet. Actually, Homer had rainfall significantly above normal from July through October. It was also a very warm October with no snow recorded. This phenomenon of no snow has only happened three times in the last thirty years. December brought back the very warm and wet weather with 7.78 inches of precipitation recorded. This was 5.2 inches above the average for this month.

## Meteorological Data - Homer 1986

Month	Ave. Temp			Norm.	Precip.	
	Max.	Min.	Ave.		Total	Snow
Jan.	35.4	24.0	29.7	20.8	3.78	15.5
Feb.	33.8	19.9	26.9	24.3	2.20	6.8
Mar.	34.4	19.2	26.8	26.9	0.07	0.5
Apr.	39.3	25.0	32.4	35.1	0.22	0.7
May	50.1	34.0	42.1	42.2	1.02	-0-
Jun.	52.3	43.7	48.0	48.8	0.29	-0-
Jul.	60.7	45.4	53.1	52.8	2.20	-0-
Aug.	58.2	46.6	52.4	52.8	2.93	-0-
Sep.	54.8	40.6	47.7	46.9	4.16	-0-
Oct.	47.8	33.0	40.4	37.3	5.56	-0-
Nov.	38.0	25.3	31.7	28.9	2.54	13.8
Dec.	39.0	28.6	33.8	23.6	7.78	8.2

D. PLANNING1. Master Plan

The Alaska National Interest Lands Conservation Act (ANILCA) requires all Alaskan refuges to prepare a Comprehensive Conservation Plan (CCP). 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 CCP 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 original schedule for the AMNWR CCP was accelerated, and we plan to have the final published document out by the end of the year. In May, a presentation of management alternatives was given to the Regional Director. A final draft of alternatives was developed by the end of the year with meetings set up with numerous villages for their input after the first of next year.

2. Management Plan

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

## 5. Research and Investigations

AMNWR NR86AKM-11-86 Adult survival of black-legged kittiwakes on Middleton Island, Alaska.

Hatch, S.A. 1986. Adult Survival of Black-legged Kittiwakes on Middleton Island, Alaska. Unpub. interim report. Alaska Fish/Wildlife Office of Research, Anchorage, Alaska

Several techniques were employed to catch adult kittiwakes at their nest sites on Middleton Island between 1 May and 15 May 1986. All methods proved to be relatively inefficient or disruptive. Suggestions were made for improving capture techniques in the future. However, the 17 birds captured and banded in 1986 more than replaced those that had disappeared from the marked sample of 1985.

Forty of 48 banded birds present in the colony in 1985 were resighted in 1986, giving an estimate of annual survival of 83%. This compared favorably with an (adjusted) estimate of 79% obtained by B. Roberts in 1985. Combined with recently observed rates of productivity, however, these initial estimates of survival indicate a population that should be declining at an annual rate of not less than 10%. Variations on the life table and possible biases in the input parameters are discussed.

AMNWR NR86AKM-48-86 "Breeding Populations and Productivity of cormorants and kittiwakes in Chiniak Bay, Kodiak Island 1975-86" (74500-GAU-12).

D.R. Nysewander, J. L. Trapp, Wildlife Assistance, U.S. Fish and Wildlife Service; and D. Zwiefelhofer, Kodiak National Wildlife Refuge, U.S. Fish and Wildlife Service.

The Marine Bird Management Project continued monitoring studies on kittiwakes and cormorants on 21 islands in Chiniak Bay 1984-86, offering comparison with data gathered 1975-78 at the same sites by earlier OCSEAP studies. Breeding failures or low reproductive success were common for both kittiwakes and cormorants 1985-86 with only moderate reproduction seen in 1984. This contrasts sharply with the high productivity levels recorded for this same bay and sites 1975-78.

The 1984-86 surveys confirmed that numbers of nesting kittiwakes and cormorants had increased dramatically since the 1975-78 period. Some kittiwake colonies increased over tenfold, but the overall average increase for all kittiwakes colonies in Chiniak Bay amounted to something between a twofold and threefold increase. Both species of cormorant increased their nesting numbers at a slightly smaller but still impressive rate in 1984-85 compared with 1975-78. In 1986 the numbers of breeding cormorants seemed comparable to that seen in 1984-85, but the actual amount of nesting and



The Alaska earthquake of 1964 raised Middleton Island about 5 m exposing large areas of previously submerged lands.  
5/86 MLN



Black-legged kittiwakes at Middleton Island nest on cliffs as well as large boulders in wetland ponds.  
5/86 MLN



renesting at any one time was slightly less than previous years due to extreme harassment of colonies by predators, the primary instigator of this harassment being eagles. There has been a dramatic increase of eagles, especially immature eagles, at every colony site in June 1984-86. In 1984-86 the eagles kept the seabirds off their nests more frequently and for longer periods of time. This behavior even made surveys more difficult since the seabirds were kept off the colony sites and nests so much. Efforts finally resorted to driving the eagles from the colonies temporarily so surveys could be completed when seabirds settled on their nests.

The combination of increased numbers of nesting seabirds, more consistent and widespread breeding failure in Chiniak Bay, and different predator attendance patterns at colonies raises the hypotheses that the increases of nesting kittiwakes and cormorants seen in Chiniak Bay over the last ten years may be in the process of reversing. If this is so, this may be a portion of a naturally recurring cycle. It is recommended that these sites be checked at least once every five years for the next twenty years to verify and document such cycle.

AMNWR-NR86AKM-49-86 "Seabird population monitoring, Middleton Island, Alaska Summer 1986."

A. L. Sowls. 1987. Unpubl. Admin Rpt. Alaska Maritime Nat. Wild. Refuge, Homer, AK.

The Marine Bird Management Project (Wildlife Assistance, USFWS, Anchorage) continued the long term monitoring program at Middleton Island. Data on numbers and productivity are now available for eight seasons since 1976. Information gathered in 1986 shows:

1) Comparisons of 1986 to 1977 photographs show a dramatic change in seabird nesting habitat on Middleton Island. Cliff erosion and advancement of vegetation are causing rapid loss of cliff nesting habitat. Habitat for burrowing species (tufted puffins and rhinoceros auklets are presently now at Middleton), gulls and waterfowl may be improving. Seabird populations have changed dramatically at Middleton in the past. The 1964 earthquake uplifted the island and probably caused populations of cormorants, glaucous-winged gulls, black-legged kittiwakes, and murrelets to increase. The erosion process may now be affecting species differently.

2) Numbers of black-legged kittiwakes nests were up 22% from 49,977 in 1985 to 61,190 in 1986. Still numbers of nests were below the mean number (63,856) for all years that nests were counted. Kittiwake productivity was again very low even though a large number of eggs were laid. Glaucous-winged gull predation on kittiwake chicks was apparently a factor in the low productivity.



Art Sowls, Wildlife Assistance biologist, checks black-legged kittiwake nest content from disturbance plots at Middleton Island.  
5/86 MLN



Pat Gould, Alaska Fish/Wildlife Office of Research and Art Sowls census black-legged kittiwake, murres and comorants at Middleton Island.  
5/86 MLN

3) Pelagic cormorant nests were at a all time high (3,790 nests).

4) Murre numbers appear to have dramatically increased. Comparisons with photos taken in 1977 to 1986 show the main colony using a much expanded area.

5) Food samples collected and sighting of birds with prey indicate that sand lance is the primary food for tufted puffins, rhinoceros auklets, and common murres.

#### E. Administration

##### 1. Personnel

###### Permanent Full Time

1. John L. Martin, Refuge Manager, GS-13, EOD 12/21/81
2. Tom J. Early, Assistant Refuge Manager, GS-11, EOD 08/23/81.
3. David R. Nysewander, Wildlife Biologist, GS-11 EOD 09/28/86.
4. Edgar P. Bailey, Refuge Biologist, GS-11, EOD 10/01/81.
5. Mike Nishimoto, Wildlife Biologist, GS-11, EOD 4/15/84
6. Arthur L. Sows, Wildlife Biologist, GS-11, EOD 09/28/86
7. Carol M. Hagglund, Budget Assistant, GS-7, EOD 08/21/83
8. Trina B. Fellows, Clerk-Typist, GS-3, EOD 11/28/83
9. Alvin D. Bayer, Ship Operator, WG-12 EOD 10/06/86

###### Permanent Intermittent

10. G. Vern Byrd, Wildlife Biologist, GS-11, EOD 4/29/84

###### Volunteers:

11. Jessica M. Abel, (SCA) EOD 06/04/86 Term 08/29/86
12. Colleen M. Baggot, (SCA) EOD 06/09/86 Term 08/25/86
13. K. Birgit Christiansen, (SCA) EOD 06/09/86 Term 08/25/86
14. Diane Debinski, (SCA) EOD 06/05/86 Term 08/20/86
15. Annette Emig, (SCA) EOD 06/05/86 Term 08/01/86
16. Brian Lance, (SCA) EOD 06/04/86 Term 06/11/86
17. Alan Storey, (SCA) EOD 07/01/86 Term 08/23/86
18. Kim Thounhurst, (SCA) EOD 05/01/86 Term 08/20/86
19. Gavin Wright, (SCA) EOD 06/09/86 Term 08/23/86
20. Donald Dragoo, EOD 06/07/86 Term 09/12/86
21. Ronald S. Hicks, EOD 01/08/86 Term 04/17/86
22. Steven Kirkhorn, EOD 06/20/86 Term 06/30/86
23. Edward C. Murphy, EOD 06/10/86 Term 06/17/86
24. Gretchen J. Murphy, EOD 06/10/86 Term 06/17/86
25. Kevin P. Rose, EOD 06/09/86 Term 08/12/86
26. Alan Springer, EOD 07/26/86 Term 08/15/86
27. Martha T. Springer, EOD 08/05/86 Term 08/15/86
28. Wayman Walker, II EOD 08/05/86 Term 08/15/86

###### YCC

29. John Libal, EOD 06/16/86 Term 08/20/86

Cooperators:

30. Wells Stephenson, ADC, Dept. of Agriculture

Four of the five units of the Alaska Maritime NWR (AMNWR) are supported by personnel located in the Homer office. Personnel, for the Aleutian Islands Unit (AIU) is presented in that section.

During 1986, the Homer staff increased from seven permanent employees to ten (Table 2). Biologists Nysewander and Sowls transferred from Wildlife Assistance in the Regional Office. They were picked up on the payroll September 28, but did not complete their moves until late December due to problems with the relocation services in completing the sale of their former residences.

Alvin Bayer was selected to fill the new Ship Operator position for the FWS vessel currently being built. He reported for duty in early October and shortly thereafter traveled to Escatawpa, MS to spend the next six months monitoring construction of the vessel.

Table 2. Staffing Pattern, FY 1983 to FY 1987

	<u>Permanent</u>	<u>Part Time</u>	<u>Temporary</u>	<u>Total FTE</u>
FY87	10	0	0	10.00
FY86	7	0	0	7.00
FY85	7	0	2	6.30
FY84	6	1	0	6.30
FY83	3	0	2	3.80

4. Volunteer Program

Several volunteers assisted in our Gull Island and Kachemak Bay surveys including: Diane Debinski, Kevin Rose, Annette Emig, Kim Thounhurst, Brigit Christiansen, Colleen Baggot and Don Dragoo. Kim Thounhurst and local Homer physician Dr. Steve Kirkhorn also monitored seabirds at East Amatuli Island. In July, Jim Logan, a school teacher from Arizona and Kent Hanson, a retired chemistry teacher and avid birder from Sitka, helped us monitor storm petrels at St. Lazaria Island.

5. Funding

Funding for the entire refuge is through the Homer headquarters office. Funds internally distributed to the Aleutian Islands Unit (AIU) are discussed in that section.

Table 3. AMNWR Funding, FY 1983 to FY 1987

	<u>1260*</u>	<u>1400/ 1480/1113</u>	<u>1520</u>	<u>1994/ 8610</u>	<u>6850</u>	<u>Totals</u>
FY87	1,154,000	346,000	-	-	-	1,500,000
FY86	882,000	476,000	1,975	26,781	2,380	1,389,136
FY85	1,100,000	239,000	3,010	24,500	1,500	1,368,010
FY84	858,560	245,000	1,875	7,000	-	1,112,435
FY83	730,000	250,000	-	26,375	-	1,006,375

\*Includes 1210, 1220, and 1240 funding for FY 83. This also includes ARMM funds.

## 6. Safety

No lost time accidents were reported for the year. Assistant Manager Early is the Station Safety Officer. Monthly safety meetings are scheduled the first monday of each month with most permanent staff members attending.

The following is a list of the monthly meetings:

<u>Month</u>	<u>Subject</u>
January	- ATV Safety
February	- General Safety Discussion Session
March	- Mental/Physical Well Being
April	- Wood Stove Use and Safety
May	- Boating Safety & Comprehensive Session on CPR/ First Aid/Defensive Driving.
June	- Hiking, Bear, and Back Country Safety
July	- Office Safety and Hazards
August	- Hunting Safety
September	- Fire Prevention
October	- Winter Driving Safety
November	- Open Subject/or General Safety Discussion
December	- Drinking/Driving

We purchased a VHF radio and depth recorder to improve the Safety features of a 25-foot Whaler used in Kachemak Bay and Cook Inlet. WB Nishimoto attended the regional dive board meeting in Anchorage and also completed CPR training given by the RO Safety Office.

## 7. Technical Assistance

Several times this year we inspected sites for Corps of Engineers permit applications at Beluga Wash area in Homer to assist the Western Alaska Ecological Services Anchorage field office. A tern colony near the Homer airport was monitored as a portion of the area was proposed for development.

During June and early July we assisted the Kenai Fjords National Park in a survey of the south side of the Kenai

Peninsula from Gore Point to Cape Resurrection. The report of the survey is currently being finalized by the refuge staff.

#### 8. Other

Three SUP's were issued for camp sites in support of commercial setnet fishing on Chisik Island. Two other permits are in existence to use cabins on the north end of the island.

A permit was issued to an air taxi firm in Kodiak to anchor floating cabins in several spots around Afognak Island. These cabins are temporary and used by hunters and fishermen chartering the air taxi service.

A permit was issued to KTOO FM and TV of Juneau to film wildlife and habitat on St. Lazaria Island. A segment of the footage was included in the weekly program "Rain Country" which airs in Southeast Alaska."

A permit was issued to LASH Corp. to install and maintain four mooring bouys in Women's Bay, Kodiak Island. This permit is to be renewed annually.

We also issued a permit to the U.S.G.S. to geologically map and hand sample areas of St. Lazaria Island. The Alaska Maritime Agency was issued a permit for the cruise ships Society Explorer and World Discoverer to visit several areas of the refuge in the Aleutian Islands and Bering Sea units of the refuge.





The water column and seafloor of Women's Bay, Kodiak Island, is part of the Alaska Maritime NWR. Portions of this area are heavily developed and are planned for intensive use/management category of the refuge comprehensive plan.

9/86

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#### F. HABITAT MANAGEMENT

##### 3. Forests

Forested islands exist only in the Gulf of Alaska Unit, with Ragged Island (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 incorporated into the refuge by the Alaska Lands Act. Though better 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 5 feet in diameter.

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

In the past, former U.S. Forest Service lands on Afognak Island have been logged and the timber transferred through a barge loading facility at Perenos Bay. Under ANILCA these lands were transferred to Native Corporations. In 1986, several Native corporations working through KONCOR, Inc, resumed logging on the north side of the island. There are also plans by the Afognak Native Corporation (ANC) to expand operations to the south side of the island where transfer facilities would have to be constructed in refuge waters.

ANC has contracted with the Arctic Environmental Information and Data Center (AEIDC), University of Alaska, to prepare the environmental assessment for this project. Meetings with resource agencies were being initially coordinated by the Division of Fish and Wildlife Enhancement, this role was transferred to the refuge in late October 1986.

#### 6. Other Habitats: Submerged Lands

Nearshore marine habitat on the refuge exist at Women's Bay and Karluk along the Kodiak Island coast and the former Afognak Forest and Fish Culture Reserve surrounding Afognak Island. Both Women's Bay and Afognak are threatened by development activities. A Coast Guard Base, freight transfer facility and seafood reduction plant have been constructed at Women's Bay. The bay supports a herring fishery which resulted in landings of 95.9 tons in 1984 and 90 tons is expected to be landed in 1985. A dungeness crab commercial and subsistence fishery also occur in the bay. The bay provides habitat for large numbers of king and tanner crab as well as shrimp and several species of salmon. It is used as a staging area by waterfowl and seaducks winter here. Several seabird colonies occur on islands within Women's Bay and have been monitored by Wildlife Assistance as part of their Chiniak Bay study described above.

Within two miles of Kodiak town is a seafood reduction plant that created sufficient air and water pollution problems that it resulted in an investigation by the State. The plant has been taken over by the City of Kodiak and renovated. The City has applied for a SUP, but declined to sign the permit. They hope to transfer operations of the plant to local seafood processors including the SUP.

#### 7. Grazing

The only cattle grazing permit on this unit is for Bear and Harvester islands in Uyak Bay, Kodiak Island. This permit covers 430 acres on the two islands and includes only 7 to 12 head of cattle. Thirty head of cattle are the maximum number allowed. Both islands have been selected by both the State of Alaska and the Native Association therefore active range surveys based on the low number of cattle grazed are not warranted.

We learned that the permittee constructed a house on

Harvester Island in late 1986 without our permission. The permittee indicated the new dwelling was to replace two existing structures which will be torn down. We are attempting to get letters of non-objection from both the State and Koniag, Corp. for the house before pursuing the matter further.

## 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>Acres</u>	<u>Designation Date</u>
Forrester	2832	10/23/70
Hazy	32	10/23/70
St. Lazaria	64	10/23/70
Tuxedni	5547	10/23/70

On January 2, 1986 the Ad Hoc Board of Appeals for the USDI Office of Hearings and Appeals ruled that the two cabins on the wilderness portion of Chisik Island are indeed illegal and are to be removed. They also declared a third cabin to be government property and not privately owned. This case has been ongoing for several years and was initiated by the Kenai NWR while the island was under their administrative control. With this decision, Kenai turned the administration of the area over to our office as mandated in ANILCA. We are now in the process of notifying people for a final removal date for the buildings.

## G. WILDLIFE

### 1. Wildlife Diversity

Since many of the islands in the Gulf of Alaska are forested, the diversity of North American avifauna 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 as well as Brant visit the Barrens in migration. Populations of common eiders and white-winged scoters can be found in waters around Duck and Chisik island.

#### 4. Marsh and Water Birds

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

Cormorants - This year we found 111 pairs of pelagic cormorants and 14 red-faced cormorants nesting at Gull Island in Kachemak Bay. This is over twice the number of nests located in 1984. No cormorant nests were observed on Sixty-Foot Rock. For more details on Gull Island and Sixty-Foot Rock see: M. Nishimoto et al. 1987. Breeding Seabirds at Gull Island and Sixty-Foot Rock. Kachemak Bay 1984-1986. Unpubl. Admin. Rpt. U. S. Fish and Wildlife Service, Homer.

In 1986, Alaska Maritime National Wildlife Refuge began studying seabirds on Chisik and Duck Islands in Tuxedni Bay in Lower Cook Inlet. Several studies were done in this region in the 1970's. We funded a project conducted by personnel of Kenai National Wildlife Refuge in 1983 and there were no further monitoring efforts until this year. The cormorant population was monitored by circumnavigating the islands in July. Sixteen double-crested cormorant nests and two pelagic cormorant nests were found on Chisik Island. None were observed on Duck Island. For more details on Chisik and Duck Islands see: M. Nishimoto et al. 1987. The Status of Seabirds at Duck and Chisik Island-Summer 1986. Unpubl. Admin Rept. U.S. Fish and Wildlife Service, Homer.

On July 18, St. Lazaria Island, near Sitka, was circumnavigated and no nesting cormorants were observed. In a land survey, however, five pelagic cormorant nests were found on the pinnacle on the north-central part of the island. For information on St. Lazaria Island refer to M. Nishimoto et al., 1987, The Status of Storm-Petrels at St. Lazaria Island - Summer 1986. Unpubl. Admin. Rpt., U.S. Fish and Wildlife Service, Homer.

From June 25 to July 12, a NPS and USFWS joint survey was conducted along the mainland coast and islands from Gore Point to Cape Resurrection. This was a ten-year re-survey of coastal seabird and marine mammal distribution and abundance. For further information on this survey see M. Nishimoto and B. Rice, 1987, A Re-survey of Seabird and Marine Mammal Distribution and Abundance Along the South Coast of the Kenai Peninsula and the earlier report by E.P. Bailey, 1976; Breeding seabird Distribution and Abundance Along the South side of the Kenai Peninsula, Alaska, Murrelet 58 (3):1977.

Both pelagic and red-faced cormorants in the Pye Islands showed a population decline since the 1976 survey. The pelagic cormorant population fell from 173 nests observed in 1976 to 71 nests counted this year. Similarly, the red-faced cormorant population declined from ten years ago when 75 nests were observed to 27 nests observed this year.





Old cannery buildings used by our crew monitoring seabirds at Chisik Island.  
5/85

MLN



Beehive Island  
7/86

MLN



Rhinoceros Auklet chick pulled from a burrow while monitoring for-tailed and Leach's storm-petrels at St. Lázaria Island near Sitka.  
7/86

MLN



Trespass cabins on Chisik Island  
5/85

MLN



The Chiswell Island group revealed a similar trend in cormorants. Bailey (1976) counted 81 pelagic cormorant nests and this year, 32 nests were counted. The red-faced cormorant population showed a major decline, from 267 nests to only 21 nests observed this year. In addition, this year we found 8 double-crested cormorant nests whereas Bailey (1976) noted only roosting individuals of this species.

Storm petrels - East Amatuli Island was visited June 20-30, to determine nesting attempts and continue banding studies of fork-tailed storm petrels. This year a total of 688 burrows were searched at eight sub-colonies. Active burrows ranged from 21.4% to 51%. The mean percent of active burrows was about 10% lower than in 1985. We could not check fledging success in August due to inadequate funds. Further information on seabirds at East Amatuli Island can be found in M. Nishimoto, et. al., 1987. The Status of fork-tailed storm petrels and other seabirds at East Amatuli Island during 1986. Unpubl. Admin. Rept, U.S. Fish and Wildlife Service, Homer.

This year on St. Lazaria, we used a two-stage random sampling method to determine population estimates. We found more fork-tailed than Leach's storm petrels which is the reverse of last year's results. This year the ratio of Leach's to fork-tailed storm petrels was 0.3:1 compared to 3.3:1 reported last year (Nishimoto, et. al.). The difference in species ratio between 1985 and 1986 was due primarily to the increase in the number of active fork-tailed burrows. Densities were 0.12 and 0.37 active burrows per meter square for Leach's to fork-tailed storm petrels respectively compared to 0.21 and 0.06 active burrows found in 1985. The larger population of fork-tailed storm petrels in 1986 compared to 1985 may be a reflection of a warmer spring. Fork-tails are earlier breeders so there is a possibility that they out-competed the Leach's for the prime burrows.

Fulmars - Seven suspected northern fulmar scrapes (21 adults) were located in the Chiswell Island group. Bailey (1976) observed 20 nests (40 adults) here.

##### 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.

Glaucous-winged gulls - On Gull Island, Kachemak Bay, 286 glaucous-winged gull nests were located on June 11. In this search, we observed that 65.4% of the nests had at least one egg. In comparison with a 1976 study (Erikson 1976), the population has more than doubled.

On June 26, we made a complete nest count of the gull colony located on the southwest ridge of East Amatuli island. We



Several thousand common murrens breed at Gull Island  
near Homer

6/86

MLN



Amatuli Cove at East Amatuli Island where fork-  
tailed storm-petrels have been monitored for over  
10 years.

6/86

MLN

found a total of 162 nests and 80.2% of them had at least one egg. Manuwal (1980) estimated this population at 300 pairs, which is considerably more than our estimate. Nishimoto (1986) reported failure of the colony in 1985.

Black-legged kittiwakes - At Gull Island, Kachemak Bay, seven cliff plots were monitored including 769 kittiwake nests. These nests produced an average of 0.69 chicks/nest. At nearby Sixty-Foot Rock, total island counts were made and 230 nests were reported. These nests produced 0.40 chicks/nest. This is up from last year's count of 177 nests which produced an average of 0.10 chicks/nest.

In July, long-term plots for kittiwakes on Chisik and Duck Islands were established. Adults, nests and chicks were counted at appropriate times throughout the reproductive season. The overall productivity of the Chisik/Duck colony is difficult to estimate in view of the differences in reproductive success observed this year between the south and east sub-colonies. Therefore, data was not pooled. Kittiwake productivity from seven plots included 1101 nests ranging from 0.01 to 0.50 chicks/nest. The east sub-colony had at least 0.30 chicks/nest and the south sub-colony essentially failed.

Results from the Pye Island 10-year re-survey showed similar numbers of kittiwake nests (about 520) in 1976 and 1986. The major colony here is located on Outer Island. The kittiwake population in the Chiswell Island group, mainly on Chiswell, Matushka and Beehive Islands, has increased in the last 10 years. A total of 6164 nests in comparison to Bailey's (1976) 2625 nest count.

In addition to the black-legged kittiwake populations found in the Pyes and Chiswells, several other colonies along the Kenai Peninsula coastline were noted. There are two small kittiwake colonies (one with 62 nests and the other with 22 nests) located near Cloudy Cape. Major colonies were found on Cape Resurrection (8611 nests) and on nearby Barwell Island (3923 nests).

Murres - About 1530 murres were estimated on St. Lazaria in July. It is believed that the nearly 50% less murres (3000 common murres and 2000 thick-billed in 1981 as estimated by Nelson et al.) represents a real change in the population rather than differences in attendance patterns. Although thick-bills have been reported here since 1981, this was the first year we could document the presence of breeding thick-bills. We found 2 birds of this species on eggs.

Puffins - This year, tufted puffin burrows were searched in 4 strip transects at East Amatuli Island. Ninety burrows were searched and 77% were occupied. There are estimates of 74,000 puffins reported on E. Amatuli and we are currently





Several wildlife tours of the Chiswell Islands are conducted out of Seward.  
7/86

MLN



Outer Island, one of the Pye Islands, support the largest sea lion rookery on the Kenai Peninsula.  
6/86

MLN

evaluating our monitoring efforts to better estimate the present population.

Ten tufted puffin burrows were found on one plot at St. Lazaria. And this was similar to previous years. No other attempt was made to monitor puffins due to their burrow location along steep slopes.

#### 6. Raptors

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

#### 7. Passerines

Common ravens, 4 species of sparrow (golden-crowned, fox, song, and savannah), and 2 species of swallow (violet-green and bank) are commonly seen on most of the islands.

#### 8. Game Mammals

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

#### 9. Marine Mammals

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

### H. PUBLIC USE

#### 1. General

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

This year the public TV station KTOO of Juneau accompanied biologists to St. Lazaria Island to film our monitoring efforts as well as wildlife on the island. This effort was later aired on a television magazine program "Rain Country".

#### 18. Cooperating Associations

The Alaska Natural History Association (ANHA) outlet opened on March 28, 1984 in our Homer headquarters building at 202 Pioneer Avenue. Fifteen publications were offered for sale to

the visiting public. Gross sales were: \$52 in 1984; \$120.15 in 1985; and \$304.47 in 1986. Despite efforts to increase visitors, the low sales volume continued. At the end of the year, a decision was made to place the outlet in an inactive status. It may be possible to re-open sometime in the future when full-time personnel can be employed to handle the interpretive work.

#### I. EQUIPMENT AND FACILITIES

##### 4. Equipment Utilization and Replacement

A 25-foot Boston Whaler used to survey Gull Island, Sixty-Foot Rock and Chisik Island had a VHF radio installed.

#### J. OTHER ITEMS

##### 4. Credit

Sections A,B,C,D. 4, E.2-7, F. 1,2,3,12; G and H were written by WB Nishimoto and SCA volunteer Beringer. Sections D.1,E.6,8 and F.7 were written by ARM Early. BA Hagglund wrote section E.1,5. The report was edited by ARM Early. C/T Fellows typed the narrative.





## ***TAKE PRIDE IN AMERICA***

Alaska's land and water are a vast but delicate habitat. Its protection is essential to wildlife that are nationally and internationally important. Be careful your actions do not alter the character of the landscape or disturb the biological processes.




**EAGLE - TIĞLA**



The *Eagle* was completed in April, 1987 at Moss Point Marine, Inc., a shipyard in Escatawpa, Mississippi, and commissioned in July, 1987 by the Fish and Wildlife Service.

**EAGLE - TIĠLAĶ**  
**Commissioned July, 1987**  
**Homer, Alaska**





## ALASKA MARITIME NATIONAL WILDLIFE REFUGE

is a spectacular blend of tundra, forest, cliffs, volcanoes, beaches, lakes, and streams. It extends from the Arctic Ocean to southeastern Alaska with most land bordering the Bering Sea and the Gulf of Alaska. The 3.5 million acre refuge consists of more than 2,500 islands, islets, spires, rocks, and headlands including nearly all of Alaska's seabird nesting habitat. The flora is rich and diverse with plants from both North America and Asia. Most of the refuge is nationally designated wilderness.

Its lands are important to millions of nesting seabirds and thousands of marine mammals. The refuge protects all or parts of hundreds of islands for seals, marine birds, and other wildlife. The refuge provides crucial resting and feeding stops for migrating birds. More than 250 species have been observed in the Aleutian Islands and new species are added almost annually.

The cold, turbulent ocean waters of the Alaskan coast are highly productive providing abundant food for people (several countries), seabirds, and other marine life. Large beds of kelp in the shallow waters add to the diversity and richness of the nearshore ocean environment. About 40 million seabirds return each year to nest in the isolation of refuge lands and to feed their young from these rich waters.

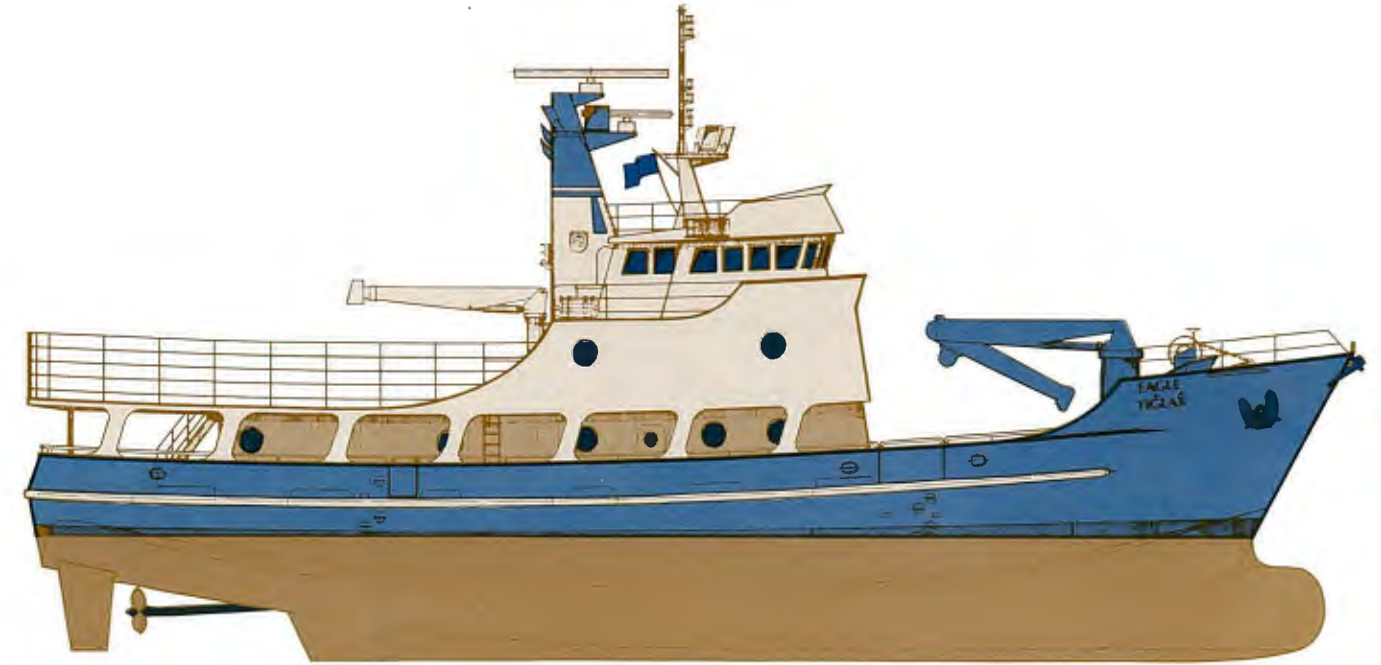


## A SPECIAL MISSION

The motor vessel *Eagle* is essential to managing the Alaska Maritime National Wildlife Refuge and collecting information on related marine resources. In support of management the *Eagle* is used mainly to transport Service personnel, equipment, and supplies between work sites throughout the refuge. These scientists monitor seabird colonies, work on re-establishing endangered species, survey habitats, identify archeological and historical resources, monitor human impacts on habitats and populations, and maintain remote field facilities.

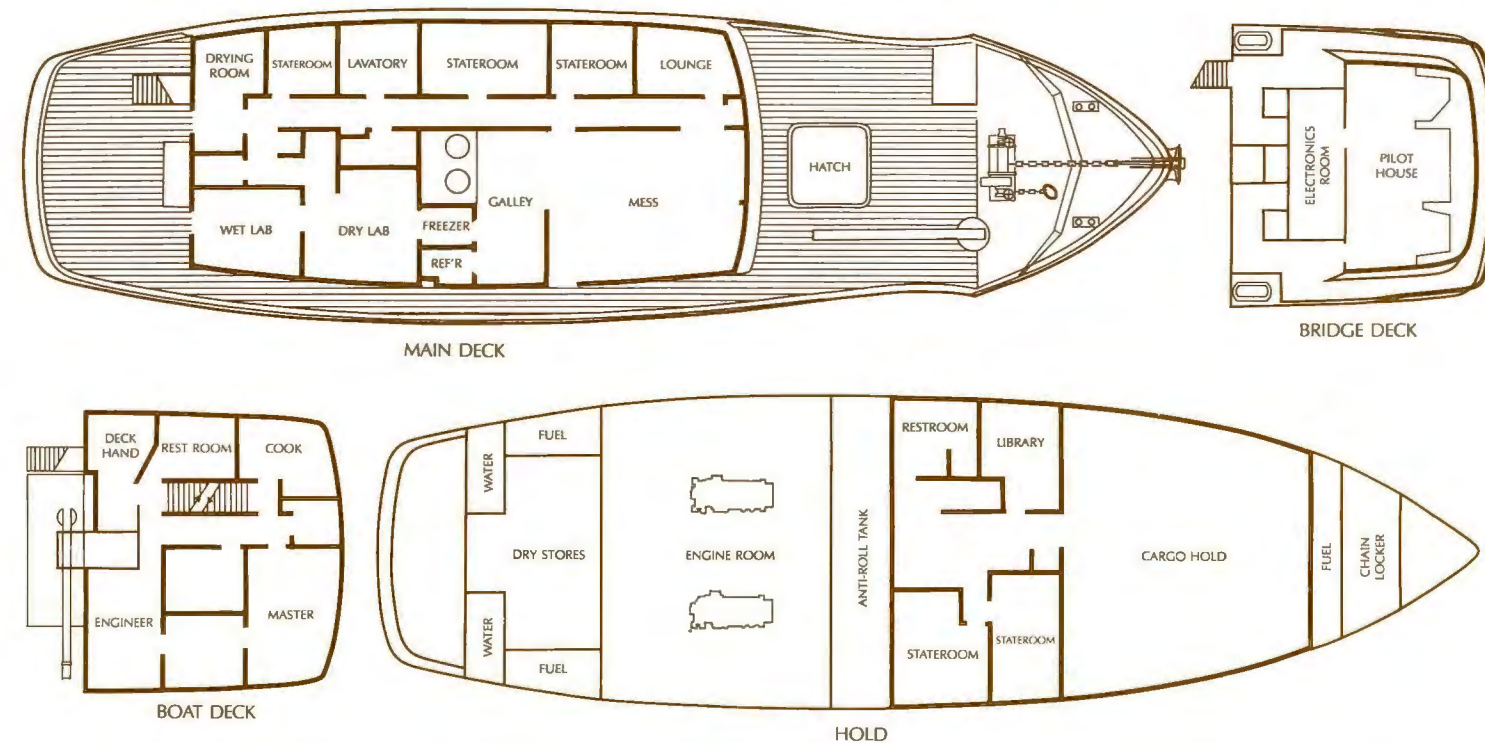
The *Eagle* also serves as a seagoing research platform and living quarters for Service personnel who survey wildlife, transplant endangered species, monitor commercial activities in refuge waters, assess populations and distribution of forage fishes upon which seabirds feed, mark and track polar bears and walrus along the edge of the Arctic icepack, respond to oil-spill and other pollution incidents, and patrol refuge waters.

Sometimes scientists or personnel from other agencies including universities are invited to use the *Eagle* as a sea-going base to do research that contributes to understanding resources and their management. The *Eagle* typically spends 160-200 days at sea covering as many as 10,000 nautical miles in traveling from the home port of Homer to Attu Island at the extreme west end of the Aleutian Chain and north past St. Matthew Island to areas beyond St. Lawrence Island.



## VESSEL CHARACTERISTICS AND CAPABILITIES

- Diesel-powered, twin-screw.
- 121 feet long, weight 250 tons (unladen).
- Crew of four to six persons.
- Accommodates up to 16 passengers or researchers; a fully-equipped galley and a combination lounge/mess area seating up to 25 persons.
- 21-foot launch; eight outboard-powered inflatables up to 17 feet long.
- Fuel capacity: 40,000 gallons. Unrefuelled range in excess of 10,000 nautical miles cruising at 9 to 10 knots (maximum speed about 11.5 knots).
- Navigation equipment: twin radars, sonar, Loran C, global positioning system (GPS), satellite navigation receiver, radio direction finders (RDF), and navigational depth sounders.
- Weather information received in map form on a weather facsimile receiver (weatherfax) and in photographic form on a weather image receiver. Radio communications include VHF marine, aircraft, and government bands, single-sideband, and citizens band.
- The vessel's helicopter deck accommodates aircraft up to the size of a Bell Jet Ranger. JP-5 fuel (5,300 gallons) carried to support the helicopter.
- Over 4,800 cubic feet of hold space available for cargo. A crane forward provides lifting power for loading and unloading supplies and equipment.



The *Eagle* is outfitted to conduct scientific work at sea. Wet and dry laboratories are provided for examining and preparing specimens which can be stored in special freezers. Depth sounders, water sampling devices, sonar, salinity and dissolved oxygen sensors, sampling nets, and data processing equipment are available to collect data on the physical properties and inhabitants of the sea.



# THE NATIONAL WILDLIFE REFUGE SYSTEM

The National Wildlife Refuge System is a vast collection of lands and waters. It was begun in 1903 when President Theodore Roosevelt established tiny Pelican Island refuge in Florida. There are now more than 400 National Wildlife Refuges and they contain habitat unequalled in quality and beauty. Of the 88 million acres of lands and inland waters within the National Wildlife Refuge System about 77 million acres (about five-sixths) is in Alaska. This count does not include the adjacent nearshore ocean waters (millions of acres) frequented by wildlife.

In Alaska most of the 16 refuges were established by the Alaska National Interest Lands Conservation Act of 1980. The pre-eminent purpose of these refuges is to conserve fish and wildlife populations and habitats in their natural diversity. Secondary purposes include fulfilling international treaty obligations relating to migratory birds and marine mammals, providing opportunity for subsistence uses, and ensuring adequate supplies of clean water.

Although set aside primarily to protect habitat for wildlife these refuges are for people too. Millions of people visit these refuges each year. They come to see wildlife in natural settings and to compare what they see with the quality of their own environment. Recreational uses that do not conflict with the purpose for which a refuge was established are allowed on these lands.

## FOR MORE INFORMATION:

Alaska Maritime  
National Wildlife Refuge  
202 Pioneer Avenue  
Homer, Alaska 99603  
(907) 235-6546

## ALASKA MARITIME REFUGE LANDS

