

ALASKA MARITIME NATIONAL WILDLIFE REFUGE

HOMER, ALASKA

ANNUAL NARRATIVE REPORT

CALENDAR YEAR 1993

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

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1993

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**ARLIS**  
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REVIEWS AND APPROVALS

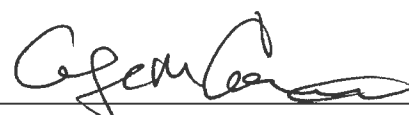
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Homer, Alaska

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Calendar Year 1993

 1/14/97  
for Refuge Manager Date

 2/7/97  
Associate Manager Date  
Refuges and Wildlife

 2/7/97  
Regional Office Approval Date

## INTRODUCTION

### Alaska Maritime National Wildlife Refuge

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

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

The Alaska Peninsula Unit is the second largest unit of the Alaska Maritime National Wildlife Refuge. More than 800 islands, totaling 600,000 acres comprise this unit, which incorporated two refuges established before designation of the Maritime Refuge. The Semidi Islands, designated a refuge in 1932, and Simeonof Island, a refuge since 1958, also are the only areas in the Alaska Peninsula Unit where jurisdiction extends below mean high tide. Over 6,000,000 seabirds comprised of at least 25 species nest in this region. Few of the islands remain truly pristine due to introductions since the 1800s of foxes, rodents and ungulates. Foxes destroyed seabird colonies on numerous islands and left remnant populations on other islands. Ground squirrels and voles, released with foxes as food sources, do intense damage on seabird colonies.

Russian contact with the Aleut people first occurred on 1741 in the Shumagin Islands. The unit has been minimally affected by oil exploration; however, ship groundings can seriously affect marine life and habitat due to contamination and introduction of rodents. Commercial fishing harvests may also negatively impact marine birds and mammals.

The Aleutian Islands Unit comprises about 3.9 million acres in southwestern Alaska and extends over 1,100 miles from Unimak Island to Attu Island. The chain of islands is 20-60 miles wide with a maximum elevation of 9,400 feet above sea level. The unit includes over 200 mostly treeless islands, islets, and rocks. Some islands are wave-cut platforms, less than 600 feet above sea level, while other islands are intensely glaciated mountainous islands as high as 3,000 feet above sea level. The islands are divided into seven island groups: Krenitzin Islands, Fox Islands, Islands of the Four Mountains, Andreanof Islands, Delarof Islands, Rat Islands, and the Near Islands. The AIU provides nesting habitat for several million seabirds, the Aleutian Canada goose and other waterfowl. The unit is an important migration and staging region for waterfowl, shorebirds and passerines and provides wintering habitat for emperor geese and other waterfowl. Asiatic birds are frequently seen in spring and autumn. Thirty-five percent of all bird species observed in the Aleutians breed only in Asia; some 260 bird species have been recorded in the Aleutian Islands Unit. The AIU has the largest nesting population of seabirds in North America and is one of the few refuges in the United States managed primarily for seabirds. The historic introduction of foxes since the 1880s has widely affected seabird colonies on many islands. Reindeer were introduced to Atka, and caribou were released on Adak. Sea otter populations throughout the Aleutian Islands have made strong recoveries since the Russian American days. An estimated 85,000 harbor seals are found throughout the Aleutians, as is the Steller sea lion which is classified as threatened.

The Bering Sea Unit extends over 600 miles and comprises about 1.4 million acres. It includes far-flung islands and headlands between the Aleutian Islands and the Bering Strait. The topography within this unit varies from small sandy islands to large volcanic islands. These areas provide habitat for nesting seabirds, as well as haul-out and rookery areas for marine mammals. This unit is divided into five different groups: 1) Hagemeister Island; 2) Pribilof Islands; 3) St. Matthew Island group; 4) Sand Islands; and 5) the Norton Sound islands and capes.

Lying primarily north of the Arctic Circle, the Chukchi Sea Unit extends nearly 500 miles from west of Point Barrow to just north of the Bering Strait and comprises nearly 300,000 acres. Unlike other units in the refuge, this one includes sizeable acreages of mainland areas. Topography varies from low, sandy barrier islands in the Arctic Ocean to high, rocky spires in the western Brooks Range. This unit includes the former Chamisso National Wildlife Refuge which was established in 1912. Nearly half a million kittiwakes and murrelets breed on cliffs at Cape Lisburne and Cape Thompson. Chamisso and Puffin Islands in Kotzebue Sound are the largest island colonies in the unit. Black guillemots, a species which normally is found in the north Atlantic, extends as far south as Cape Thompson. The most common bird species nesting on the low barrier islands between Cape Lisburne and Point Barrow is the common eider. Up to several hundred walrus haul out annually at Cape Lisburne when the sea ice recedes. In winter polar bears roam Cape Lisburne; other terrestrial mammals in the unit include grizzly bear,

musk ox, wolverine, marmot, Dall sheep and caribou. The Western Arctic Caribou herd congregate near Cape Lisburne and Cape Thompson for summer post-calving.

Homer, Alaska, is the refuge headquarters, as well as the home port for the motor vessel *Tiglax*. The vessel was commissioned in 1987 and serves the needs of the Alaska Maritime National Wildlife Refuge biological program and a variety of other users. The headquarters office in Homer supports numerous efforts throughout the year, including summer field projects and *Tiglax* needs, coordination of radio field camp checks, directing tourism-related inquiries, performing daily administrative work, and a deep immersion in field data analysis. Refuge programs include working agreements with the Smithsonian and National Marine Fisheries Service, student and volunteer employees, the Pratt Museum, Homer Chamber of Commerce, Tanaq, TDX, The Aleut Corporation, U.S. navy, U.S. Air Force, Corps of Engineers, National Biological Survey, Alaska Department of Fish and Game and various other State agencies, several colleges and universities, and other private and public entities.

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## A. HIGHLIGHTS

The Refuge received a Challenge Grant for rat control in Pribilof Island dock areas.

Project Chariot neared completion, and the Adak caribou project started up.

On September 13, fragmentary remains of over 82 Chugach Alutiiq men, women and children ancestors were repatriated to Yukon Island.

The refuge partnered with the Homer Chamber of Commerce to produce the first annual Kachemak Bay Shorebird Festival.

The concept plan or 10% design submittal for the new refuge headquarters and visitor center was completed by The Portico Group of Seattle.

Controversy erupted in the environmental community over the size and scale of the proposed refuge visitor center.

Buried nuclear waste at Cape Thompson became a hot topic.

Gary Montoya, the new Deputy Refuge Manager, entered on duty in January, 1993.

Eric Nelson was detailed to Tern Island (R-1) for three weeks in February to assist with maintenance.

Art Sowls received the first ever "Special Recognition Award" from the Pacific Seabird Group for his contributions to seabird research.

Ira Bailey's ashes were scattered in Kachemak Bay on the 14th of March. The ceremony was conducted aboard the *M/V Tiglax*.

Denise Witte, a Cooperative Education student, received her first permanent assignment at the Alaska Maritime NWR Visitor Center.

In March, ORP 'Poppy' Benson gave birth to a son, Cedar Benson Cloyd.

On April 1, Budget Assistant Carol Hagglund received a certificate commemorating thirty years of government service.

Ed Bailey received an "On-the-Spot" Award for his report Introduction of Foxes to Alaskan Islands--History, Effects on Avifauna, and Eradication.

Art Sowls received an "On-the-Spot" Award for his excellent "rat education program."

Norma Dudiak was hired to write three environmental assessments: 1) removal of nuclear waste at Cape Thompson, 2) removal of introduced caribou at Adak, 3) construction of the refuge headquarters.

## B. CLIMATIC CONDITIONS

Month	Avg Temp (°F)	Min Temp (°F)	Max Temp (°F)	Precip. (inches)	Precip Dev. (inches)
JAN	24.2	-05	41	2.13	-.27
FEB	27.3	-09	45	1.60	-.53
MAR	33.5	18	48	2.00	.30
APR	40.5	27	54	1.01	-.27
MAY	48.0	31	71	.37	-.78
JUN	51.1	36	67	.60	-.43
JUL	56.5	40	81	1.19	-.30
AUG	55.8	37	73	2.99	.75
SEP	49.1	28	62	3.95	.66
OCT	40.8	21	58	1.69	-1.55
NOV	32.5	10	50	3.11	.49
DEC	32.4	18	44	4.37	1.55

## D. PLANNING

### 2. Management Plan

#### Proposed Refuge Headquarters and Visitor Center

Planning for the new headquarters, environmental assessment of the project and handling the resulting public concern and controversy took up much of the year. In 1992, the refuge had purchased a 60 acre site in Homer for the headquarters and hired a design firm, Portico of Seattle to complete the first phase of design. Aldrich/Pears of Vancouver, B.C. was the interpretive subcontractor. The refuge is currently managed out of four rented spaces at two widely separated locations.

In February of 1993 Portico submitted their final "10% design submittal" which laid out the concept plan for the visitor center, offices and site. The plan called for a 31,000 square foot two story building with the upper story for offices and administrative functions and the lower story a partially underground visitor center evoking a feeling of Aleut barabaras.

The purpose of the visitor center was to create an interest in and support for seabirds, their marine ecosystem, and Service seabird work. More seabirds nest on this refuge than on the remainder of the North American continent. The second purpose was to allow the expected 100,000 visitors per year to experience this remote and difficult to access refuge.

Key features planned for the center were a live seabird aquarium as the centerpiece, a theater and refuge film, 4,000 square feet of exhibits on the refuge environment and the Bering Sea Ecosystem, and an interpretive trail system through four coastal habitats. The environmental education areas, expected to serve about 4,000 students a year, consisted of a multi-purpose room, a large wet lab and a separate entrance from the trails with mud room. These details had been worked out over several years of meetings between the refuge, the regional office, interest groups, an advisory group, public meetings, public officials and finally the contractors.

Portico's initial contract was completed with the submittal and no progress was made in negotiating another contract for the remainder of the design. Due in part to the stalemate and in part to growing public controversy, the refuge elected to complete the environmental assessment (EA) for the project before proceeding to final design. Wildlife Biologist Norma Dudiak was hired to complete the visitor center EA as well as two others the refuge had pending (see section D4).

RO Engineering staff continued work on the in-house design for the headquarters support facility consisting of a bunkhouse, warehouse and shop to be located across the street from the office/visitor center. RO landscape architect Paul Schrooten came to Homer several times during the year to meet with refuge staff, city officials and others on design for the support facility. In December, Schrooten presented the 65% drawings of the facility to the refuge staff for comments.

### 3. Public Participation

#### Proposed Refuge Headquarters and Visitor Center

In September the refuge learned a local group, Kachemak Bay Conservation Society, had taken a strong stand against the proposed visitor center in letters to Secretary Babbitt and the Inspector General. This caught the refuge by surprise as no criticism of this type had surfaced at previous public meetings and several members of the refuge staff belonged to the Society. The group was opposed to the live bird aquarium, the size of the facility, and the expanded role of the refuge in providing environmental education and visitor services.

KBBI radio, the *Homer News* and the *Anchorage Daily News* picked up on the controversy. RM Martin and ORP Benson were interviewed for these reports. Numerous briefings were held for various public officials including Senator Ted Stevens, State Representative Gail Phillips, and Borough Assemblyman Ron Drathman.

ORP Benson and WB Dudiak met with the Alaska representatives of the Sierra Club, Audubon Society, Wilderness Society, the National Wildlife Refuge Association and the Alaska Wildlife Alliance in December in an attempt to stem the growing controversy. Benson also briefed the board of the Alaska Natural History Association, the board of the Kenai Peninsula Tourism Marketing Council, and the Rotary Club.

The citizens' working group that had advised the refuge on the headquarters proposal since 1990, met in November to reconsider the live bird aquarium. The majority felt it was a critical part of the center.

The controversy prompted resolutions of support for the center from the City of Homer, the Kenai Peninsula Borough, the Board of the Kachemak Bay Branch of the University of Alaska Anchorage, and the Kenai Peninsula Tourism Marketing Council.

Other meetings with the public included briefings for the fire chief and the chief of police, and several meetings with the city planner and the public works director. RO Realty Specialist Bob Rice, ORP Benson and RM Martin also met with the City and the Veteran's Memorial Committee to explore ways to combine the proposed city-owned Veteran's Memorial Park with the headquarters project.

On December 1, RO Landscape Architect Paul Schrooten went before the Homer City Planning Commission to secure the needed variances to construct shop/warehouse facilities in a commercial zone. The Commission unanimously awarded the variances.

#### 4. Compliance with Environmental and Cultural Resource Mandates

##### Yukon Island Repatriation

Through cooperation among Chugach Alaska, Cook Inlet Region Incorporated, Port Graham Corporation, Port Graham Tribal Council, English Bay Corporation, Seldovia Native Association, Nanwalek Tribal Council, the CIRI Foundation, Chugach Heritage Foundation, the U.S. Fish and Wildlife Service, and Father Simeon Oskolkoff of the Russian Orthodox Church, the Yukon Island Repatriation Project became reality. On September 13, the fragmentary remains of over 82 Chugach Alutiiq men, women and children ancestors were brought to Yukon Island and returned to the soil. The original gravesites, dating from 500 B.C. to 500 A.D., were located primarily at Cottonwood Creek and Yukon Island and were desecrated in the early 1930s.

##### Proposed Refuge Headquarters and Visitor Center

Work officially began on this environmental assessment in December. The headquarters had been previously addressed in the EIS for the Comprehensive Conservation Plan published in 1988. A scoping meeting had been held in 1992.

WB Dudiak, RM Martin and ORP Benson developed four alternatives for the headquarters/visitor center: the visitor center as designed, the visitor center as designed without the aquarium, a more traditional Service visitor center of about 3,000 sq. feet and no new headquarters - continue to rent. The size of the offices and support facilities did not vary much across the alternatives except for the "continue to rent" alternative.

#### Environmental Assessments

Environmental assessments were written for 1) removal of nuclear waste at Cape Thompson; 2) removal of introduced caribou at Adak; and 3) construction of the refuge headquarters.

### E. ADMINISTRATION

#### 1. Personnel

##### PERMANENT FULL-TIME:

Edgar Bailey	Wildlife Biologist	GS-11	10/01/81-pres
Alvin Bayer	Ship Operator	WG-12	06/06/86-pres
Kevin Bell	Ship Oper. 1st Mate	WG-11	07/08/87-pres
Laurie Benson	Outdoor Rec. Planner	GS-9	07/17/88-pres
G. Vernon Byrd	Superv. Wildl. Biol.	GS-12	09/23/92-pres
Trina Fellows	Accounting Tech.	GS-5	11/28/83-pres
Carol Hagglund	Budget Assistant	GS-7	08/21/83-pres
John Martin	Refuge Manager	GM-13	12/21/81-pres
Gary Montoya	Dep. Refuge Manager	GS-12	12/27/92-pres
Eric Nelson	Marine Machine Mech.	WG-10	02/21/89-pres
B. Leslie Slater	Wildlife Biologist	GS-11	11/16/92-pres
Katherine Smith	Ofc Auto Clerk	GS-4	06/01/92-pres
Arthur Sowls	Wildlife Biologist	GS-11	09/28/86-pres

##### PERMANENT INTERMITTENT:

Ira Bailey	Relief Ship Operator	WG-11	06/25/89-03/06/93
Lisa Climo	Biol. (Science) Tech.	GS-6	02/09/92-pres
Ivan Davies	Marine Machin. Mech.	WG-10	03/25/90-pres
Don Dragoo	Biological Tech.	GS-7	05/27/87-pres
Marcia Macone	Cook/Deckhand	WG-8	08/08/88-pres
Gregory Snedgen	Deckhand	WG-5	06/01/89-pres
Robert Ward	Cook (Deckhand)	WG-8	04/19/92-pres
Denise Witte	Park Ranger	GS-5	

##### TEMPORARY:

Joel Cooper	Biological Tech.	GS-5	05/17/92-pres
Belinda Dragoo	Biological Tech.	GS-5	04/29/89-pres
William Dunne	Park Ranger	GS-7	05/20/91-pres

Carmen Field	Park Ranger	GS-5	04/15/93-pres
Karin Holser	Training Instructor	GS-7	06/15/93-pres
Rebecca Howard	Biological Tech	GS-3	06/07/91-pres
John Jamieson	Deckhand	WG-5	05/04/91-pres
Bev Short	Biological Tech	GS-5	
Jeffrey Wraley	Laborer	WG-2	05/19-91-pres

#### VOLUNTEERS AND STUDENT CONSERVATION ASSOCIATION (SCA):

Mary Daugherty, Washington

Heather Dickenson, Vermont

Mary Pitts, Missouri

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

Table 1. Staffing Pattern, Fiscal Years 1989 to 1993

	<u>Permanent</u>		<u>Temporary</u>	<u>Total</u>
	<u>Full-Time</u>	<u>Part-Time/ Intermittent</u>		
FY <u>93</u>	14	7	13	21.8
FY <u>92</u>	13	7	9	19.10
FY <u>91</u>	15	6	15	28.88
FY <u>90</u>	13	5	11	28.00
FY <u>89</u>	13	3	21	25.77

#### 5. Funding

Alaska Maritime Refuge funding by programs for the last five fiscal years is presented in Table 2 (see page 7). Funding for the entire Refuge is through the Homer headquarters office. Funds internally distributed to the Aleutian Islands Unit are discussed in that unit's section.

Table 2. Alaska Maritime Refuge Funding, FY 1989 to FY 1993 (thousands).

	<u>FY93</u>	<u>FY92</u>	<u>FY91</u>	<u>FY90</u>	<u>FY89</u>
1260	1979.1	2,087.0	1,715.7	1,392.3	1,544.0
1113	114.0	206.0	206.0	206.0	330.0
8610	45.3	--	14.0	26.6	15.9
1971	341.4	14.7	181.0	121.7	60.0
5390	--	--	14.3	55.0	--
1975	--	--	--	--	11.4
6850	--	--	--	--	--
4650	103.4	206.0	--	--	--
6320/30	10.0	45.0	--	--	--
8381	182.5	--	--	--	--
TOTAL	2775.7	2,558.7	2,131.0	1,801.6	1,961.3

G. WILDLIFE

## 15. Animal Control

The proposed emergency use of toxicants to prevent accidental introductions of rats from shipwrecks on islands in the Alaska Maritime National Wildlife Refuge was revised in 1993. In summary:

Norway rats (Rattus norvegicus) have become established on at least 32 islands in the Alaska Maritime National Wildlife Refuge, beginning with the wreck of a ship before 1800 in the duly named Rat Islands in the central Aleutians. Most rat introductions occurred during the military occupation of many of the Aleutian Islands during World War II. The problem of introductions of commensal rats is worldwide (Moors et al. 1992). These rodents have been introduced to 82%



of the world's islands, and they are still expanding mainly by shipwrecks or moored vessels. With expanding fisheries, offshore oil leasing, and increasing human population in Alaska, the chances for accidental rat invasions on additional refuge islands are rising. Several ecological catastrophes have been documented after the arrival of rats elsewhere in the world, and a grounding of a rat-infested ship on a key seabird island, such as Buldir, Chagulak, or Forrester, probably would prove locally disastrous for many species of birds.

Once rats become established on islands larger than a few hundred acres, removal is probably impossible with present methods. Therefore, a rapid response following shipwrecks is needed to kill rats while they remain on the ship or just as they come ashore. To be prepared for this eventuality, a contingency plan for the quick deployment of appropriate toxicants, namely brodifacoum and bromethalin, is essential to protect the ecological integrity of rat-free islands. Local dispersal of concentrations of single-dose baits containing toxicants along the shoreline adjacent to a grounded vessel and on the grounded vessel is proposed as the only effective alternative for total elimination of all rats which may otherwise become established following a marine accident. Effects of localized use of brodifacoum and bromethalin on non-target species would be short-term and minimal and are tremendously outweighed by the ominous risk of allowing rats to permanently colonize a new island and cause an ecological catastrophe.

Other means of preventing rats from becoming established on additional islands, such as using traps, would likely fail to eliminate all rats from reaching shore from a grounded vessel. Likewise, previous attempts on many islands worldwide to eradicate alien rat populations with introduced mammalian predators, such as cats, have failed and have in many cases severely exacerbated the demise of insular wildlife. The alternative of taking no action to prevent rats from invading pristine islands would likely result in eventual destruction of fossorial, crevice-nesting, and accessible surface-nesting seabird colonies as well as drastic reductions of certain species of other ground-nesting birds.

## H. Public Use

### 1. General

This was another year of change for our public use program. The first annual Kachemak Bay Shorebird Festival took place in early May, the concept plan was completed for the proposed 16,000 sq. ft. visitor center (see discussion in planning section); and the existing programs, the interim visitor center, the ferry naturalist, environmental education and the Pribilof Stewardship Camp grew in scope and complexity. Personnel also changed. In June, coop education student Denise Witte was hired as a permanent Park Ranger to fill the long vacated Sue Matthew's position, ORP Benson was on maternity leave for four months, and long time seasonal William Dunne served as the Supervisory Park Ranger GS 7 to run things in Benson's absence.

## 2. Outdoor Classrooms - Students

### School Programs

The refuge's environmental education program increased by nearly 70% to serve 1156 students. This dramatic increase is attributable to a better spring EE season. The previous spring, the interim visitor center was not ready for use and the staff was still busy moving and installing exhibits. Most EE programs took place in April, May, September and October.

Spring EE started early with an otter program by PR Dunne for McNeil Canyon in February. Things heated up in late April with numerous program for local and visiting (Anchorage) schools as part of their Sea Week activities. PR Carmen Field presented programs to all classes at Paul Banks Elementary during their Sea Week in May.

Fall use increased significantly as the result of a letter sent to local schools. Homer intermediate students studied lake ecology, salt marsh ecology and migratory birds in September with Park Rangers Witte and Carmen Fields. Nikiski Elementary explored intertidal life and shore and seabirds in a field trip to Ninilchik with Park Rangers Witte and Dunne. McNeil Canyon Elementary studied Kachemak wildlife and Nikiski studied careers, both with PR Witte.

In October, Witte presented programs to three outlying schools, Seldovia and Port Graham, across the bay, and Razdolna, an Old Believer Russian school at the head of the Bay. Razdolna presented the unique challenge of working through an interpreter. SO Bell gave his annual Aleutian program and tour of the Tiglax to McNeil Canyon and Homer Intermediate students. In addition, a Cub Scout pack visited the center. In November, 8 classes from Homer Jr. High came to the visitor center to study refuge wildlife and marine ecology.

### Pribilof Stewardship Camp

This was the second year for this day camp for the Aleut children of St. Paul and St. George Islands in the Pribilofs. This camp is a cooperative project with the cities of St. Paul and St. George, the Native Corporations, Tanaq and Tanadgusix; St. Paul Traditional Council, St. George IRA Council, and the Nature Conservancy. RO Environmental Education Specialist Beverly Farfan ran the camps this year as ORP Benson was on maternity leave and vice-Matthews position had not yet been filled.

## 6. Interpretive Exhibits/Demonstrations

This was our second year in our new "interim" visitor center. Although the center was closed all winter, visitation increased 33% over the previous year to 16,574 visitors. The previous summer the visitor center was not fully open until mid-July. Visitation remained concentrated in the summer months with nearly half the visitors coming in July.

Supervisory Park Ranger Willie Dunne ran the visitor center with the assistance of PR Denise Witte, and SCA volunteers Heather Dickenson, Mary Daugherty, and Mary Pitts. Dunne



The refuge's 2400 sq. ft. visitor center hosted Shorebird Festival registration. This was our second summer in this rented facility which also houses the bunkhouse (upstairs) and the warehouse (basement). As the year went on, it seemed less likely that the planned refuge headquarters would be constructed anytime soon. (LAB)



During the three day Shorebird Festival, refuge and RO personnel and volunteers manned "shorebird stations," providing interpretation to visitors on every high tide. The Spit Road on Kachemak Bay is possibly the easiest place to watch shorebirds in Alaska. (LAB)

received an “On-the-Spot” Award for his work in managing the center and the Shorebird Festival in Benson’s absence. PR Witte assumed responsibility for the center in the fall after Dunne’s temporary appointment expired.

Beach walks and bird walks were offered four times a week during the summer serving a total of 500 visitors. Volunteer Dickenson created a booth for Homer’s Street Fair in August which reached about 332 people. Children’s programs were offered once a week at both the public library and the visitor center. About 10 children came to each program.

## 7. Other Interpretive Programs

### Kachemak Bay Shorebird Festival

This first ever festival celebrating the migration of 100,000 shorebirds through Kachemak Bay was an outstanding success. Approximately 1,000 participants, half from the Homer area and half from Anchorage, participated in the three day event. Events included guided shorebird viewing stations, bird walks, lectures, an art gallery migration, a crafts fair, a wooden boat festival, a story teller and a mother’s day brunch.



Chief refuge cheerleader Tiglax First Mate Kevin Bell and RM John Martin meet the public at the refuge booth at the first annual Kachemak Bay Shorebird Festival. (LAB)



A challenge cost share grant of \$7,000 from the Service was matched by the Homer Chamber of Commerce, the Pratt Museum, the Alaska Natural History Association, the Homer Council on the Arts and 40 other Homer organizations and businesses. The Chamber served as the lead agency. RD Walt Stieglitz praised this partnership in a letter stating, "Our joint effort with the Homer Chamber of Commerce sets the standard by which future joint endeavors in Region 7 will be measured." ORP Benson was serving on the Tourism Committee of the Chamber when she sold them on the idea of the festival. The committee planned and implemented the festival and hired coordinator, Sally Oberstein. PR William Dunne carried out the Service's responsibilities for the festival including organizing all the birding events and talks.

Benson conceived of the idea of the festival to head off various development proposals for the city-owned mud flats on which the migration depends. Prior to the festival few Homer residents were aware of the migration in their midst. The Homer tourist industry rapidly embraced the festival and it received the "Peninsula Pride Award" from the Kenai Peninsula Tourism Marketing Council.

A new shorebird festival committee formed up in August to begin planning the 1994 festival. Benson and Dunne represented the Service at the monthly meetings. A new idea of linking schools up the flyway as "Shorebird Sister Schools" emerged from these meetings. Benson and PR Witte put together a committee of local volunteers that were hard at work at year's end planning this environmental education project.

#### State Ferry Naturalist

This was the fourth year for this successful program. Naturalists from the refuge ride the state ferry *Tustumena* from Homer to Kodiak and Dutch Harbor interpreting refuge wildlife and programs and assisting with wildlife watching. This was Carmen Field's first year as Ferry Naturalist for which she received an "On-the-Spot" award for outstanding work. The *M/V Tustumena's* purser in a letter to RM Martin described her as the finest naturalist to have ever served on the ferries. About 2,000 travelers participated in programs on the *Tustumena*.

#### 11. Wildlife Observation

About 500 people participated in viewing opportunities including shorebird viewing stations, bird walks and pelagic bird viewing boat trips (see section H7).

Marine wildlife viewing trips to the popular Chiswell Islands out of Seward increased at least 10%. The refuge participated for the second year with the Park Service in a training session for Seward tour operators. PR Dunne gave a presentation on seabirds.

#### 18. Cooperating Associations

The Alaska Natural History Association sales area in the visitor center experienced a 37% increase in sales slightly out pacing the 33% increase in visitors. More sales items contributed to

this success. In addition, ANHA donated \$1,000 to the Shorebird Festival to pay for the first order of festival T-shirts. The stunning shorebird shirts designed by ornithologist and artist George West were best sellers both at the refuge and the chamber. Shirt sales quickly proved to be the best money maker for the festival.

## I. EQUIPMENT AND FACILITIES

### 8. Other

#### *M/V Tiglax* Operations

A draft ship's schedule was prepared by RM Martin, Captain Bayer, and Supervisory Biologist Byrd, with funding for 75 days at sea.

Chief Mate Bell removed two life rafts and 25 immersion suits from the ship for annual inspection.

Electronic Technician performed maintenance, tuning, and repairs of electronics in wheelhouse. Captain Bayer inspected repairs on navigational equipment.

CH Engineer Nelson repaired broken waterline in CH Mate's cabin. Copper line burst in severe cold weather, and water flooded the mate's stateroom.

CH Mate removed wire grating and racks in all refrigerators and freezers for epoxy painting by contractor.

Engine equipment and repair crew aboard *M/V Tiglax* rebuilt both Caterpillar main engines and both John Deere auxiliary engines. Contract crew lived aboard until work was completed. CH Engineer Nelson worked with the contractor. Chief Mate Bell helped lift heavy parts. Dock trials and sea trials were conducted following engine rebuilds. Refuge staff was invited along for sea trials in Kachemak Bay.

In March, *M/V Tiglax* Relief Captain Ira S. Bailey passed away in his sleep. With over 55 years plying Alaskan waters, Captain Bailey was held in high regard for his 'local knowledge'. On March 14 aboard the *M/V Tiglax*, Captain Bailey's ashes were scattered at sea in Kachemak Bay. Family and friends were aboard for the ceremony conducted by Captain Alvin Bayer.

Deckhand Jamieson repaired teak woodwork, built cabinets, and reinstalled overhead on bridge.

In late March, the Captain, Relief Cook, and Deckhand attended first aid training. Cook/Deckhand Instructor Marcia Macone prepared for CPR course. Captain Bayer, Cook Relief Ward, and Deckhand Jamieson attended CPR course conducted by Cook/Deckhand Macone. Refuge staff also attended this class.

In April, Chief Mate Bell tended a local contract diver to replace keel cooler anodes and make hull inspections.

Cook/Deckhand Macone and Deckhand Jamieson loaded supplies aboard and replaced worn out deck tiles.

FWS representative from Kenai NWR inspected all personal property. Chief Mate Bell assisted with vessel and refuge property.

US Coast Guard performed courtesy safety inspection of all deck and engine safety apparatus. Captain Bayer, CH Engineer Nelson, and CH Mate Bell assisted the Coast Guard. Very few deficiencies were noted, and the inspection was completed with approved inspection letter forthcoming.

Cook/Deckhand Macone compiled food order for fresh produce and dairy products.

In April, CH Mate Bell conducted a small boat training course in Homer for FWS refuge employees. The course covered both classroom and hands-on inflatable and Boston whaler handling. Personnel were instructed in small boat safety and sea survival. CH Engineer Nelson conducted outboard motor training.

In early May, Captain Bayer assembled the crew for annual crew meeting and safety training. Topics discussed were: proper fitting of canister face mask for all painting as per OSHA standards and donning of Self-Contained Breathing Apparatus, their proper use and care. All reviewed hazardous communication written program for chemical and oil spill response, reviewed MSDS program aboard the *M/V Tiglax*, discussed use of safety apparatus and when it must be used, reviewed use and activation of fixed halon, AFFF, and Aqua Blue fire fighting system. Apparatus included safety harness, gloves, boots, shoes, canister masks, safety goggles and glasses, rain gear, ocean and painter coveralls. CH Engineer/EMT Nelson demonstrated the proper use of long spine board, spider straps, KED, extricating device, cervical collar, and CPR mask. Also viewed at the meeting were videos on sea survival, use of flares, air rescue, de-watering ships, life sling rescue, and hypothermia. Captain Bayer reviewed fire and boat drill responsibilities for hazardous chemicals coming aboard, and reiterated the need to keep all watertight and fire proof hatches closed at all times.

Deckhand Jamieson, Cook/Deckhands Ward and Macone attended bear and firearms training.

The ship was shifted to the deep water dock for loading of field camps, water, fuel, gasoline, lumber, skiffs, boat gear, etc. Waste oil was pumped.

The crew made ready for sea, lashed cargo, and checked all systems on the ship.

The *M/V Tiglax* departed Homer on May 18th for the Aleutian Islands, with stops along the way

for field camp set up. A total of 13 field stations was constructed on islands spread out for 1,500 miles in the Gulf of Alaska and the Bering Sea.

In July, the *M/V Tiglax* was drydocked in Seward for two weeks as repairs were made and a new shaft bearing was installed. The *M/V Tiglax* completed the field season and returned to Homer on September 9 to end the year underway. Gear was stowed and the vessel was cleaned.

#### J. OTHER ITEMS

##### 4. Credits

The Homer office section was written and edited by Poppy Benson, Dan Boone, Carol Hagglund, Art Sowls and Chris Thorsrud.

The Aleutian Islands Unit section was written and edited by Laura Greffenius, Joe Meehan, and Jeff Williams.

The Alaska Peninsula Unit was written and edited by Steve Ebbert.

The Bering Sea/Chukchi Sea Unit was written and edited by Art Sowls.

The Gulf of Alaska Unit Section was written and edited by Leslie Slater and Dave Roseneau.

The *M/V Tiglax* section was written and edited by Kevin Bell.

Chris Thorsrud and Brenda Eliason typed, edited and produced the final document.

#### K. FEEDBACK



ALASKA PENINSULA UNIT  
ALASKA MARITIME NATIONAL WILDLIFE REFUGE  
Homer, Alaska

ANNUAL NARRATIVE REPORT

Calendar Year 1993

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

## INTRODUCTION

### Alaska Peninsula Unit

#### Alaska Maritime National Wildlife Refuge

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

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

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

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

Few people visit refuge islands except in the vicinity of villages, primarily Sand Point, Squaw Harbor, and King Cove; six other villages are located in the region. Egging and hunting of seabirds is generally negligible in this region where most residents derive their livelihoods from commercial fishing. The first contact between Russians and Alaska Natives occurred in 1741 in the Shumagin Islands. The islands have been little affected by off-shore oil exploration and development. Human competition for fish relied upon by marine birds and mammals probably poses the greatest potential threat.

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## A. HIGHLIGHTS

Ed Bailey received an award for his research efforts that cumulated in the Service Resource Publication entitled, "Introduction of foxes to Alaskan islands - history, effects on avifauna and eradication." This publication received many requests since becoming available in June of 1993.

The Canadian Wildlife Service distributed the special publication, "The status, ecology and conservation of marine birds of the North Pacific" in April. Ed bailey wrote a chapter on impacts of introduced predators on marine birds. Vernon Byrd wrote two chapters (Status and ecology of kittiwakes, Status and ecology of murres) in the same publication.

Vernon Byrd revised an environmental assessment drafted by Ed Bailey in 1991 for using toxicants to prevent accidental rat introductions immediately following ship wrecks on refuge islands.

## G. WILDLIFE

### 1. Wildlife Diversity

#### Big Konuji Island Recheck for Foxes

Apparently no introduced red foxes survived the eradication efforts on Big Konuji Island (21,560 acres), where fox eradication efforts began in 1985. During the summer of 1993, trappers were unable to find any sign that foxes were still present on the island.

#### Little Konuji Habitat Restoration

Beginning on May 22, four trappers, including the APU project leader, caught 27 arctic foxes from 14,055 acre Little Konuji Island. Apparently no more foxes remained on the island when the trappers left on June 25. The amount of habitat restored by the combined efforts on Yunaska, Herbert, and Little Konuji islands exceeded expectations for the 1993 field season. Their success was due to excellent training by their project leader, extremely hard work and resourcefulness by the trappers, and good weather early in the season.

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

The Alaska Wildlife Research Center conducted research at several sites in the unit on food habits of tufted puffins during the summer of 1993. This is the third year of the study designed to understand the relationships between puffin productivity and prey types.

The Alaska Wildlife Research Center continued to collect data on numbers and reproductive success of ledge-nesting seabirds (fulmars, kittiwakes, and murres) at Chowiet Island in the Semidi Island Group.

## J. OTHER ITEMS

### 4. Credits

The Alaska Peninsula section of this report was compiled by Steve Ebbert and typed by Chris Thorsrud.

ALEUTIAN ISLANDS UNIT  
ALASKA MARITIME NATIONAL WILDLIFE REFUGE  
Adak, Alaska

ANNUAL NARRATIVE REPORT  
Calendar Year 1993

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



## INTRODUCTION

### Aleutian Islands Unit

The Alaska National Interest Lands Conservation Act (ANILCA) combined a majority of Alaska's seabird habitat into one refuge by adding 1.9 million acres of land to 11 existing refuges to create Alaska Maritime National Wildlife Refuge.

The Aleutian Islands Unit (AIU) comprises about 3.3 million acres in southwestern Alaska and extends over 1,100 miles from Unimak Island west to Attu Island. The Aleutians are actually tips of an arc of 57 submerged volcanoes, 27 of which are active and rise 2,000 to over 9,000 feet above sea level. Izembek National Wildlife Refuge borders the east end of the unit.

Bounded by the Pacific Ocean to the south and the Bering Sea to the north, the unit includes over 200 treeless islands, islets, and rocks. These surrounding oceans affect the climate and weather, and provide habitat and migrational pathways for fish, birds, and marine mammals.

The AIU is divided into seven island groups; the Near Islands, Rat Islands, Delarof Islands, Andreanof Islands, Islands of the Four Mountains, Fox Islands, and Krenitzen Islands. Unimak Island is also presently part of the unit but is not considered part of the Aleutian Chain.

Approximately 68 percent or 2.3 million acres of the AIU is congressionally designated wilderness; this includes Unimak Island which has 910,000 acres of wilderness. Unimak has been proposed for transfer to Izembek National Wildlife Refuge.

The Aleutians have a maritime climate characterized by overcast skies, frequent, violent storms, high winds, fog and precipitation. Year-round temperatures are cool but not normally severe, with a mean annual temperature of 40° F. Strong winds, sometimes approaching 100 m.p.h., can induce very cold wind chill factors.

The AIU provides unique nesting habitat for several million seabirds, the threatened Aleutian Canada goose, and other waterfowl. It is also an important migration and staging area for a wide variety of waterfowl, shorebirds, and passerines and provides wintering habitat for emperor geese and other waterfowl. The refuge is one of the few places in North America where Asiatic birds are frequently seen in spring and fall. Fully 35 percent of all bird species observed in the Aleutians breed only in Asia; most are seen at the western end of the chain. Some 260 bird species have been recorded in the AIU.

The AIU has the largest nesting population of seabirds (approximately 10 million) in North America. It is one of the few refuges in the United States managed primarily for seabirds. A major problem affecting seabirds in the AIU is the widespread introduction of foxes. The Aleutians' seabird population is probably a fraction of what it was prior to fox introduction. Only 44 units of over 100 named islands, islets, and rocks in the Aleutian Islands Unit are fox-free; this constitutes approximately 6% of the total acreage.

Land mammals found in the AIU (other than Unimak Island) are generally non-native. Reindeer were introduced to Atka for food and for antlers to be sold as an aphrodisiac. The commercial venture failed, and over 2,000 feral reindeer remain on the island. Caribou from mainland Alaska were released on Adak in 1958 for emergency food and recreational hunting. The herd is managed for a post-season population of 250 animals.

The Norway rat was accidentally introduced by early Russians and again during World War II, and is now found on 20 islands throughout the chain. Introduced rodents act as predators of ground nesting birds; voles and ground squirrels cause erosion by overgrazing the vegetation.

Arctic and red fox were originally found on a few of the eastern Aleutians, but were introduced to over 80 other islands between 1836 and 1930. The damage to native bird populations on these islands is significant. Plans call for eradication of introduced foxes to allow native bird species to recover.

The Aleutian Islands were originally established as a refuge in 1913 to protect the sea otter. Since that time, the sea otter has made a dramatic recovery. Their population in the Aleutians is estimated to be 55,000-75,000.

An estimated 85,000 harbor seals are found throughout the Aleutians and can be seen hauled-out on offshore reefs, rocks, ledges, and beaches along the main islands. The northern or Steller sea lion is also found throughout the Aleutian Chain. The world population of northern sea lions has decreased by more than 50 percent in a decade, prompting National Marine Fisheries Service to classify them in April 1990 as "threatened". On certain rookeries in the eastern Aleutian Islands, the sea lion population is estimated to be 20 percent or less of its original numbers. In the western Aleutians, populations may have declined by over 60%.

Fourteen species of cetaceans have been observed in the waters of the Aleutian Chain: orcas, Dall porpoises, and Minke whales are the three species most commonly observed.

The Aleutian Canada goose, short-tailed albatross, Chinese egret, Steller sea lion, and Aleutian shield fern are the five endangered/threatened species that have been observed in the Aleutians.

The Aleutian Canada goose historically nested throughout the Aleutians. Since the introduction of arctic foxes, these birds occur naturally on only two islands (Chagulak and Buldir) in the AIU. Neither island had foxes introduced. Reintroduced goose populations are developing on Agattu, Nizki-Alaid, and Little Kiska Island following fox removal.

To aid in the recovery, fox are being eradicated on selected islands and geese transplanted from Buldir to fox-free islands where the birds historically nested. The Aleutian Canada goose population is estimated to be over 5,000 birds, up from its 1975 population of 700 geese.

The Aleutian shield fern, historically found only on Adak and Atka islands, was listed as endangered in 1988. Field work continues in an effort to prepare a recovery plan for this species, recently found only on Adak.

The Aleutians were originally occupied by the Aleuts, related to the Eskimos. Subsistence was entirely maritime, with extensive exploitation of local whales, sea mammals, fish, invertebrates, seabirds, eggs, and plants.

The Russian fur trade and Russian Orthodox Church dominated Aleut life from the 1750s until the American purchase of Alaska. The early years, before the founding of the Russian-American Company, saw considerable loss of population from epidemic and other causes. Today's Aleut population numbers some 2,000 in only four villages, but up to 20,000 once called these islands home.

The later history of the Aleutians was marked by a continuation of fur trapping, the introduction of fox farming, and the development of commercial fishing. The 20th century was dominated by World War II, including the first occupation of American soil since the War of 1812.

During World War II, the Japanese seized Kiska and Attu islands after bombing the military bases on Dutch Harbor. The U.S. constructed large bases in the Aleutians, with thousands of structures erected on Adak, Amchitka, Shemya, and other refuge islands. An assault on Attu Island resulted in a hard-won victory for the United States, followed by the Japanese evacuation of Kiska Island. Prior to the invasion of Kiska, there were 100,000 American and Canadian soldiers in the Aleutians. The recapture of Attu was the only battle of the war fought on U.S. soil; also the only battle fought in a National Wildlife Refuge.

Several sites in the Aleutians are National Historic Landmarks due to their significance in World War II. Attu, Shemya, Amchitka, and Adak are military bases. The Coast Guard maintains a base on Attu Island and Shemya is an Air Force Base, while the Navy is on Amchitka and Adak islands, the latter AIU headquarters. With over 5,000 people, Adak is the eighth largest community in Alaska.

The Department of Defense continues its Defense Environmental Restoration Program (DERP) to rehabilitate World War II military sites, including chemical sampling and analysis for contaminants. Sites on Alaid, Agattu, Buldir, Amchitka, Tanaga, Atka, Great Sitkin, and Unimak islands in the AIU are targeted for cleanup.

Olaus Murie called the Aleutians "a melting pot" for species from two continents, while Michael Frome described them as a "great oceanic crossroads". Ironically, the Aleutians' remoteness has not guaranteed their preservation, and may have hastened their demise. Would Amchitka Island have been thrice-choked by nuclear blasts were it near Anchorage? Was it not the isolation that allowed a "forgotten war" of three years to leave a legacy of debris and toxic wastes that we are unable to clean up after half a century? And was it not this isolation that allowed foreign foxes to wipe out native birds, as native Aleuts were being exterminated by foreign entrepreneurs and armies?

Geologically, the Aleutians are the youngest part of Alaska. But in 100 years, humankind has inflicted considerable damage by manipulating these islands, trying to make them something other than the Aleutians. Aldo Leopold said the first rule of intelligent tinkering is to "save all the pieces". Only time will tell if we have done so in the Aleutians. If we have not, time will not matter..

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#### K. FEEDBACK

### A. HIGHLIGHTS

Native villages in Aleutian Islands Unit (AIU) selected an additional 40,040 acres.

U.S. Navy closed radar site on Amchitka Island.

Clean-up of WWII hazardous waste continued.

Adak Naval Air Station is scheduled to undergo a major reduction in its mission with an anticipated severe effect on the Adak caribou herd.

Aerial survey produced data that indicates the caribou herd is twice as large as previously thought. Harvest at a three year low.

Russian seabird biologists conducted research on refuge.

Refuge caught up in WWII 50th Anniversary activities.

AIU staff assisted in Project Chariot radiation clean-up.

National Wildlife Week programs/activities involved 515 children.

Air Force Museum interested in WWII airplane wrecks on refuge islands.

Adak seismic lab moved into refuge Visitor Center.

Alaska Natural History Association sells outlet set new record --just over \$46,000.

Earth Day clean-up activities drew 173 helpers.

Two heat records broken.

Former Service Director's wife visited the refuge.

Possible field camp medical emergency avoided.

Future AIU staff organization underwent review.

Fox removal crews did an excellent job, seabird production boom to bust.

A great egret, probably the Asiatic subspecies, observed on Adak.

First "Alpha" weather condition (blizzard) closed base for six hours.



## B. CLIMATIC CONDITIONS

The complex, highly irregular Aleutian weather is a frequent subject of discussion in and away from the islands. Conditions vary greatly and change abruptly. Individual islands have their unique micro-climates based upon storm tracks and topography. Weather data for 1993 were available from Shemya and Adak.

Total precipitation for 1993 on Adak was 55.7 inches, 10.3 inches above that received in 1992. Snowfall in 1993 was 110.3 inches, 4.9 inches above normal but 12.1 inches below the 1992 accumulation. The first snow on downtown Adak, 1.1 inches, occurred on October 23rd. Above average amounts of snow occurred in January, February, April, May, and December, with all other months being below or near average. Maximum and minimum temperatures were similar between years.

Near blizzard conditions occurred several times during January, October, November and December. Our first "Alpha" condition -- complete close-down of the majority of NAS activities due to blizzard conditions -- happened on December 10th. Blizzards and icy runways in November and December forced the cancellation of the daily Reeve Aleutian Airline flights on several occasions.

On July 31st, thermometers on Adak registered a high of 73 degrees and set two records: 1) A new high for that date -- previous high was 65 degrees; and 2) new high for the month -- previously set in 1962 at 72 degrees.

Earthquakes are a monthly occurrence and residents soon learn to "roll with the punch" and go on about their business. Major shakers measured 5.3 (February), six in the 5.1 to 6.6 range (May), 5.1 & 5.2 (July), 5.1 & 6.2 (November) and 5.1 & 5.3 (December).

Due to the lack of nearby mountains to snag passing clouds, Shemya receives considerably less precipitation than other Aleutian weather stations. In 1993, they received 30.5 inches of rain compared to 55.7 inches at Adak. Rainfall and the number of days of measurable precipitation were about the same each year. Snowfall totaled 23 inches more than in 1992. Overall, the winter months were cooler in 1992 than in 1993.

## D. PLANNING

### 2. Management Plans

In light of the downsizing of naval operations at Adak, a review of the staff structure for the Aleutian Islands Unit was conducted. The present permanent staff structure is:

Refuge Manager  
Refuge Operations Specialist  
Wildlife Biologist (vacant)

Outdoor Recreation Planner  
 Administrative Technician  
 Maintenance Worker  
 Biological Technician (intermittent)

The re-structured permanent staff will be:

Unit Manager  
 Logistical/Biological Assistant  
 Administrative Clerk  
 Maintenance Worker

Several transfers are being dictated by the downsizing of naval operations. The implementation of this new structure will occur about mid-year (1994) as vacancies occur. The Interpretation and Recreation program, as it is today, will be phased out by early 1995. Responsibilities for a much smaller, new program will be distributed amongst the staff. In particular, the branch manager for the Alaska Natural History Association (ANHA) outlet will be the Administrative Clerk.

Three positions will be moved to Homer, one managerial, the Unit Wildlife Biologist, and the Outdoor Recreation Planner (ORP); a Clerk Typist position was moved to Homer in August 1993. The ORP and biological positions will be easy to place in the current organizational structure. However, the managerial position is not so simple; several organizational options are currently being considered. Now is the appropriate time to review our organizational structure and develop a structure that will be able to accommodate the expanding maintenance and I&R programs.

The biological programs conducted out of the Adak office, but primarily on other islands, are expected to remain unchanged. Recovery efforts will continue with the threatened Aleutian Canada goose, seabird population/productivity monitoring and fox eradication are also expected to continue.

The Fish and Wildlife Service vessel M/V Tiglax has traditionally re-fueled, re-supplied, and taken on fresh water at Adak. It is expected the Tiglax will continue to stop at Adak 8-12 times for 1-2 days each time during the May to September time period in support of the biological program in the Aleutians.

Work on Clam Lagoon Auto Tour Route continues. Three platforms were constructed and binocular spotting scopes installed. Unfortunately, the eye pieces on the scope near Candlestick Bridge were sand blasted during a storm shortly after installation. This is an area where sand blows frequently so some means of protection must be devised or the scope will be relocated.

Members of the local Ducks Unlimited Chapter helped construct six new duck blinds at strategic locations around Clam Lagoon just prior to the duck season. Some minor changes may be

required to make hunters in the blinds less visible, but all in all the new blinds were a tremendous improvement.

Funding for both the Clam Lagoon Auto Tour and the new blinds is a combination of Department of Defense Legacy Resource Management Program funds, USFWS Challenge Grant, and matching funds from Alaska Department of Fish and Game and Ducks Unlimited.

### 3. Public Participation

Refuge Operations Specialist Klett was a member of a Realty Division team that visited Native villages and other communities in the eastern Aleutians to present and discuss the Alaska Maritime Refuge Land Protection Plan (LPP) with interested landowners. Realty is tasked with preparing a LPP listing privately owned lands within the refuge that the Service would like to see protected for wildlife. The process consists of identifying inholdings, collecting information on wildlife species for all lands within the refuge boundaries and then setting priorities for protection of wildlife habitat on conveyed private lands. It solicits and incorporates from "willing sellers" their interests in selling and/or exchanging their lands to the service.

The guiding purpose of the LPP is to protect the resource integrity of the refuge area and to insure the refuge remains consistent with the stated purposes for which it was created.

### 5. Research and Investigations

#### Legacy Resource Management Program

Several biological monitoring programs were conducted during 1993 on Adak Island as a result of funds received through the Department of Defense's Legacy Resource Management Program. This program was established by Congress and recognizes the responsibility of military agencies to manage the biological and cultural resources that exist on military lands. The northern half of Adak is a Naval Air Station with the USFWS retaining management authority over the natural and cultural resources. As a result, \$235K were received at the end of FY92 for work on several projects during 1993.

A thorough survey was conducted using a chartered helicopter to determine the island's introduced caribou population. Biologists from the Navy and Alaska's Department of Fish and Game assisted with the surveys. The herd size was estimated at a minimum of 751 animals, a record high in the herd's 35 year existence and well above the management goal of 200-250 animals.

Other projects resulted in the establishment of monitoring programs for passerine and other breeding landbird populations including point-counts, line-transects and beach transects. A North American Breeding Bird Survey route, which was established in the 1980's, was also surveyed.

Surveys were conducted to monitor the area's wintering waterfowl and seabirds. The breeding biology of the endemic Aleutian green-winged teal was studied to learn more about its breeding biology, population trends, productivity and migration.

Tufted puffins were examined in three colonies located on islets near Adak's northeastern, western and southern shores. Crew established monitoring plots to detect trends in the puffin population. This population will also be used as a control in the monitoring of the western Aleutian puffin population where drift net fishing has recently been eliminated. Drift nets were suspected of having an impact on this population.

The marbled murrelet was also a subject of the Legacy studies. This species has been listed as Threatened in the Pacific northwest and Canada and is listed as a Category II species in Alaska. Work concentrated on monitoring areas used by murrelets for feeding and nesting to better understand the species in this part of its range.

A comprehensive, island-wide anadromous fish survey was completed by the Kenai Fisheries Resource Office to evaluate the population and timing of spawning salmonids on the island. Pink salmon were the most abundant species, occurring in 40 of the 49 streams surveyed. Coho salmon were found in 35 streams, Dolly Varden in 48 streams, sockeye salmon in 2 streams and chum salmon in 9 streams. Rainbow trout were found in 2 streams, coastrange sculpin were found in 36 streams and threespine stickleback were in 6 streams. An investigation into the landlocked salmon in Andrew Lake found that a majority were comprised of sockeye salmon (kokanee) possessing unique characteristics not usually found on sockeye salmon. Black spots cover their back and tail and they lack serrations on their gill rakers. Coho salmon were also present in the lake but in very small numbers.

Considerable effort was made by Regional Office and refuge staff to locate additional populations of Alaska's only endangered plant, the Aleutian shield fern. Adak is the only known location where this species occurs and only 127 plants exist in high, rocky mountain ridges. Five additional plants were located approximately 3 km from the known site.

An additional \$839K were requested from the military for FY94 to continue these programs and conduct additional projects on Adak Island and Eareckson Air Force Station on Shemya Island.

#### E. ADMINISTRATION

##### 1. Personnel

###### PERMANENT FULL-TIME:

Daniel L. Boone	Refuge Manager	GS-12	12/30/90-pres
Evan V. Klett	Refuge Operations Specialist	GS-11	02/21/82-pres
Laura M. Greffenius	Outdoor Recreation Planner	GS-9	12/01/91-pres
Deborah C. Jones	Administrative Technician	GS-5	09/06/92-pres
Melita Bradford	Clerk Typist	GS-3	11/04/91-pres

Jeffrey W. Lewis	Maintenance Worker	WG-8	11/15/92-pres
Jeffrey C. Williams	Wildlife Biologist	GS-7	05/12/90-pres

## TEMPORARY:

Joseph Meehan	Biological Tech.	GS-5	10/22/92-pres
Lisa Scharf	Illustrator	GS-7	01/14/93-06/01/93

## SEASONAL:

Julian Fischer	Biological Tech.	GS-5	May-Sept
Angela Palmer	Biological Tech.	GS-5	May-Sept
Laura Olsen	Biological Tech.	GS-5	May-Sept
Toby Burke	Biological Tech.	GS-5	May-Sept
Gregory Thomson	Biological Tech.	GS-6	May-Sept
Mariana Tamayo	Biological Tech.	GS-5	May-Sept
Andrew Durand	Biological Tech.	GS-5	May-Sept
John Arnold	Biological Tech.	GS-5	May-Sept
Brad Benter	Biological Tech. (Kenai Fish.)	GS-5	Jun-Oct

## OTHER:

Shelley White	Alaska Natural History Association (ANHA) Assistant Branch Manager
Daniel Smullen	ANHA On-the-Job Trainee

## VOLUNTEER:

Clay Caldwell	Biological Aide
Daniel R. Boone	Biological Aide
Nikki Benjamin	Biological Aide
Leah Lipinski	Biological Aide
Patricia Boone	
Jim Schneeweis	Minnesota DNR
Ian Jones	Biological Research
Fiona Hunter	Biological Research
Mark Hipfner	Biological Research
Nikolia Konyukhov	Biological Research
Victor Zubakin	Biological Research
Al Manville	Biological Research
Jay Pitocchelli	Biological Research
Claudine Watts	Biological Research
Jon Watt	Biological Research
Tom Gelatt	Biological Research
Bernard Krause	Biological Research
Sandra Talbot	Biological Research
Ann Andres	Archaeological Research
Doug Siegel-Causey	Archaeological Research
Stephen Loring	Archaeological Research

Christine Lefevre	Archaeological Research
Dixie Lee West	Archaeological Research
Tom Corbett	Archaeological Research
Eliz. Wilmerding	Archaeological Research
Laura Jones	SCA Resource Assistant
Daryl Maleike	SCA Resource Assistant
Charles Hassrick	SCA Resource Assistant
Sue Berry	ANHA
Art Messer	ANHA
Brian Jones	ANHA
Stephen Morrisette	USAF
Rex Hadley	USAF (retired)
Darrel Clarke	USAF (retired)
Don Patone	USAF (retired)

## 6. Safety

Refuge Operations Specialist Klett served as station safety officer during 1993.

Routine safety material was routed to all personnel. Naval Air Station Fire Department personnel conducted monthly inspections of our office complex. Snow and ice were periodically removed from the office complex sidewalks for visitor safety.

A variety of safety training was taken by refuge personnel during the year. Permanent, seasonal, and volunteer employees were certified for CPR and basic first aid. A week long spring training session for field personnel included viewing U.S. Coast Guard cold weather/cold water survival films, actual use of personal flotation and survival suits in the small boat harbor and the local swimming pool, use of compass and maps, the care and use of outboard motors and inflatable boats, radio operation and communication procedures.

A great deal of time was spent receiving on-hands boating practice with emphasis on safe operation, paying attention to weather reports and radio procedures.

All field personnel were given a safety tour of the refuge *M/V Tiglax*, shown the location and use of all safety and survival equipment, and participated in fire and abandon ship drills.

Safety related purchases included new batteries for ELT's and EPIRB's. The first aid kits were checked and old, outdated, contaminated medications/compresses replaced.

Two radios were assigned to each AIU field camp in 1993. One served as the primary communication unit and the other was a backup in the event of failure of the primary unit. Multi-frequency antennas were used at all field camps.

Due to the remote locations of our field camps, all field personnel received briefings regularly on the safety aspects of their duties relating to sea conditions, weather, getting lost and the necessity for maintaining equipment in good working order. Minimum of twice-daily radio contact was maintained between Adak and all field camps as well as with the *M/V Tiglax*. Weather conditions could isolate field camps for days; they are no place for an accident to occur.

#### 8. Other

Amchitka Island Oil Contaminants Survey was conducted January through March resulting in a total of 99 oil spots found. Two were large enough for samples to be collected and analyzed, and persistence plots were established.

Shemya Island Oil Contaminants Survey was conducted January through March resulting in substantial amounts of oil being found. Persistence plots were established. Several oiled gulls and one oiled Common murre were observed; a dead oiled auklet was found and collected.

Contaminants surveys were conducted on Adak, Kanaga, Tanaga and Ilak islands.

### F. HABITAT MANAGEMENT

#### 1. General

The AIU contains some 300 islands totaling 3.3 million acres. These islands stretch over 1,100 miles from the tip of the Alaska Peninsula to within 500 miles of the Soviet Union's Kamchatka Peninsula. All but portions of the seven larger eastern Aleutian Islands are included in the refuge unit. Due to their close proximity to the Alaska Peninsula, Unimak (1.0 million acres) and Amak islands are administered by the Izembek National Wildlife Refuge, headquartered at Cold Bay, Alaska. The refuge's Comprehensive Conservation Plan (CCP) recommends that these islands be formally transferred to Izembek NWR. The Sanak Islands south of the Alaska Peninsula are managed from refuge headquarters at Homer, Alaska. Except for the Aleut village at Atka, the Navy bases at Adak and Amchitka, the U.S. Air Force base at Shemya, and the U.S. Coast Guard LORAN Station at Attu, the only recent signs of human activity on the AIU are the unhealed scars and debris remaining from World War II.

#### 2. Wetlands

Many of the islands have numerous freshwater "potholes", some superficially resembling the prairie pothole country of the midwest. A few areas at lower elevations produce aquatic growth and support modest waterfowl populations, especially Amchitka, Kanaga and Agattu islands. Refuge management efforts include orienting military development away from wetlands and lagoons. The AIU staff monitors construction projects on military installations at Adak, Amchitka, Shemya and Attu, and provides recommendations on proposed activities by Native Corporations on the refuge as well. The military, especially at Adak and Shemya and Amchitka, are cooperative and sensitive to our suggestions.

## 6. Other Habitats

### Beach Oil Surveys

Emperor geese surveys continued on Shemya and Amchitka in January and February 1992 produced birds with obviously oiled heads. We initiated surveys of the beaches on these two islands in 1993, recording all oil observed and the quantity and condition (i.e., large or small spot on rock, tar ball, gooey mess). Records were also kept on any oiled birds or mammals sighted or found dead on the beach. Preliminary results indicated that there may be a chronic, widespread problem with oil contamination on Shemya.

Sections of selected beaches on Adak were also checked for the presence of oil while conducting winter emperor goose surveys. Additional beach surveys were established on other islands with summer field camps.

No gross contamination was found. As expected, those islands with active military bases (Shemya, Amchitka, and Adak) had more contamination than unoccupied islands.

Aleutian shield fern populations were monitored, and a new population was discovered.

Steve Talbot collected lichens.

During June, Kiska was surveyed to evaluate the potential for reintroduction of Aleutian Canada geese. The island has remained fox-free since 1988; however, a large bald eagle population is a detriment to ACG reintroduction.

Scott Johnson conducted beach debris surveys in June.

## 7. Grazing

A decision was made this year to discontinue the issuing of grazing permits. This act was based on two reasons: 1) All lands involved have been selected by Native Corporations, but as yet have not been conveyed. Under new regulations we expect them to be conveyed soon. 2) It has been determined that in our case grazing is not an issue of compatibility, but one of on-and-off trespass. The Service is not in the habit of permitting trespass activities, consequently no SUP's will be issued. Grazing will still continue as in the past. We had been charging only an administrative fee of \$100.00 for this permit.

## 12. Wilderness and Special Areas

The Alaska National Interest Lands Conservation Act (ANILCA) designated approximately 2.3 million acres of the Aleutian Islands Unit as Wilderness. Notable areas of the refuge unit excluded from the designation include 127,870 acres on Shemya, Attu, Adak, Amchitka and Ugamak islands for military and lighthouse purposes or World War II debris and approximately



200,000 acres selected by Native Corporations under the Alaska Native Claims Settlement Act (ANCSA).

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

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

#### G. WILDLIFE

##### 1. Wildlife Diversity

###### Uliaga Island Recheck for Foxes

The APU Biologist, Ed Bailey, concluded an experiment to use biological control methods to remove foxes from Uliaga successfully. Sterilized red foxes were placed on Uliaga in May 1984 to eliminate arctic foxes already established on the island. Trappers detected no fox sign on Uliaga in 1993, suggesting the last remaining fox, a red fox, must have died during the past winter.

###### Yunaska Island Habitat Restoration

Six trappers removed fifty-one adult foxes from 43,520-acre Yunaska Island using foothold traps between May 26 and August 1. Apparently no foxes remained on the island after the trappers left at the end of the field season. The purpose of the eradication effort is to restore important nesting habitat for the endangered Aleutian Canada goose, Yunaska Rock Ptarmigan (a category two species), and other native Aleutian island birds. Also on Yunaska, some beaches were surveyed for oil, passerine point count routes were established, and Steller sea lions were counted. Sea lion scat was collected for a National Marine Fisheries Service study of food habits.

###### Herbert Island Habitat Restoration

Trappers removed twenty-one introduced arctic foxes from Herbert Island using foothold traps between July 7 and August 29. Five trappers removed all foxes from the 13,790-acre island, except one trap-shy adult and two pups. They surveyed some beaches for oil, and they maintained a bird sighting list for the island.

#### Amchitka Island Winter Wildlife Survey

Species surveyed during January through March included Emperor geese (500-800 individuals), harlequin ducks (150-500), Snowy owl, Whooper swan, Eurasian widgeon, Northern harrier, a pair of nesting Aleutian Canada geese, sea otters and killer whales.

#### Shemya Island Winter Wildlife Survey

Species surveyed during January through March included Emperor geese (250-450 individuals), harlequin ducks (50-600), Common eiders (450-800), Snowy owl, Eurasian widgeon, Steller's eider and Canvasback.

#### Attu Island Winter Wildlife Survey

Species surveyed during January and February included Emperor geese (225-275 individuals), Harlequin ducks (less than 50), Yellow-billed loons, Steller's eider, Tufted duck and Peregrine falcon.

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

Tufted puffin monitoring included establishing and monitoring plots for burrow occupancy and persistence, collecting chick food, determining feasibility of installing artificial nest boxes. Studies conducted on Harlequins, Common eiders, kittiwakes, auklets, murres.

### 7. Other Migratory Birds

Established ten population monitoring routes. Most observations included Lapland longspurs, song sparrows, snow buntings, and rosy finches.

Dr. Edward West, with The Alaska Natural Heritage Program, conducted behavioral research on song sparrows on Adak Island to provide preliminary information on the potential for reproductive isolation between island populations.

### 8. Game Mammals

Barren-ground Caribou population survey conducted in May, resulting in 661 adults and calves counted.

### 9. Marine Mammals

Richard Merrick with NMFS conducted Steller sea lion research.

On Bogoslof Island, a census of Steller sea lions as threatened and sensitive vertebrates was conducted by Mark Schroeder of National Park Service.

## 11. Fisheries Resources

Forty-nine streams were identified as containing anadromous fish stocks. Samples were collected of the Lake Andrew land-locked salmon.

### H. PUBLIC USE

#### 1. General

With the aid of refuge staff and Student Conservation Association (SCA) Volunteers, ORP Laura Greffenius conducted public use programs throughout the year.

The Visitor Center remained open on weekends all year. Monthly visitation was as follows:

January	517
February	442
March	599
April	651
May	773
June	780
July	929
August	873
September	604
October	530
November	484
December	<u>430</u>
Total	7612

Monthly activities at the Fish and Wildlife Center included Adak NAS "Blue Card/Firearms Safety" lectures (total of 941 people) and orientation lectures for new arrivals on Adak.

We also hosted meetings of the NAS Search and Rescue Team and Ducks Unlimited, and provided classroom space for Construction Battalion training sessions. The University of Alaska used our facilities during the spring and fall semesters for its "Alaska Mammals" course, with several guest lectures by refuge staff. Other community organizations occasionally held programs in our presentation room.

The variety and extent of our information and environmental education programs could not have been accomplished without the contributions of time and enthusiasm by Student Conservation Association Resource Assistants. In January, Charles Hassrick arrived, providing a great start to getting the environmental education and public contact programs rolling once again. Laura Jones continued the Nature Day Camp during the summertime. She loved going on trips with the kids, and also became involved in our busy summer fieldwork schedule. In November, Daryl Maleike arrived, continuing the popular kids' programs. These staff made good use of an

Environmental Education Resources Reference for the Aleutian Islands Unit, completed in 1992. It is a valuable contribution which teachers and staff utilize. Another helpful resource was Adak Environmental Education Programs, Fall 1992. None of these special environmental education programs could have been carried out if it had not been for these fine workers who brought with them their enthusiasm, plus an eagerness to learn and teach.

Many thanks are extended to our community Volunteers who assisted with answering questions at the front counter, selling ANHA items, leading interpretive walks, and helping out with all facets of the operation. The staff is grateful to all who donated their time and skills to this refuge.

Another successful means of advertising our programs and keeping local residents informed has been the local radio and television station. Interviews included the topics of eagle rehabilitation, why the Blue Card session is important for hikers, and hunting regulations. During the summer, the Nature Day Camp was featured.

## 2. Outdoor Classrooms - Students

It was easy to lose count of the number of kids participating in our environmental education programs during this year because we were so busy! Presentations were given to students at local schools, at the Fish and Wildlife Center, and on field trips. We also conducted a summertime kids' "Nature Day Camp", which extended to Saturdays during the spring and fall. Other community groups also benefitted from our programs, since our outreach efforts included Camp Funtime, Child Development Center (preschool), Family Home Care, Scouts, and a group of homeschool children.

The Fish and Wildlife Center hosted students participating in "Career Day" at the high school. All were interested in biology and the outdoors, and learned firsthand about the work we do here by talking to everyone on the staff.

In February, we fulfilled requests from teachers, whose classes participated in the 1994 Goose Calendar Contest. This included classroom activities with middle school students and a field trip to Clam Lagoon.

In April, National Wildlife Week activities were conducted at local schools.

Many teachers wanted to bring their classes to view our displays while taking part in Sea Week activities during May. We gave talks and led activities for students, who are always excited about a field trip here.

During the summer months, SCA Resource Assistant Laura Jones led a highly successful Nature Day Camp for preschool age kids and older "Junior Naturalists". Each group of kids met once a week for 11 weeks. They ventured out on field trips nearly every week, enjoying valuable educational experiences.

The summertime activities became so popular that we had requests to continue a similar program in the fall. Volunteer Daryl Maleike started a Saturday "Kids Explore Adak" group of 3rd through 5th graders. They took part in numerous explorations outdoors.

The thousands of pink salmon spawning at Finger Bay in September were an intriguing sight for local students, who learned some fish biology.

Popular destinations for field trips included Palisades Beach to view intertidal life and learn about oceans and tides. Another good site for field trips is viewing harbor seals feeding at Candlestick Bridge.

The Fish and Wildlife Service SCA Volunteers were an integral part of Camp Funtime. During the spring, several special programs were planned for this afterschool childcare program at the Visitor Center. Our environmental education activities for 40-50 kids became part of their regular weekly schedule.

Through our programs, we have been able to reach a wide range of age groups, including preschoolers. Regular visits and special activities were planned for the kids at the Child Development Center. Groups of youngsters came to the Visitor Center. Some kids met weekly at the Visitor Center. The open curriculum of homeschool children provides a unique opportunity to offer a separate session to these kids for an eager and enthusiastic bunch of learners. Weekly field trips were taken by this group.

Girl Scouts wanted help with badges and learning about Adak. Kids and adults came to the Visitor Center or went on a field trip to Palisades Beach.

### 3. Outdoor Classrooms - Teachers

The refuge provided environmental education materials to teachers. Items were distributed locally on Adak, and sent to Atka, Nikolski, and Unalaska schools. A joint agreement with the Izembek NWR Refuge Manager has made Akutan School the responsibility of their office, since that Native village is in the same school district as Cold Bay.

By advertising and promoting the Goose Calendar Contest, National Wildlife Week, and Sea Week, teachers often requested our assistance for curriculum materials and borrowed videos for classroom use.

ORP Greffenius met several times with teachers to get input into our programs, discuss their needs, plan and coordinate field trips, and discuss ideas for future plans.

### 5. Interpretive Tour Routes

Plans and writing text for the Clam Lagoon Auto Tour Route progressed considerably during 1993. Funding for this project originated under the "America the Beautiful" program, Legacy

Funds from the Department of Navy, plus a Challenge Cost Share with matching funds coming from Ducks Unlimited and State of Alaska Department of Fish and Game. As part of this project, lumber obtained in 1992 was used to build six duck blinds, used by hunters and photographers at Clam Lagoon. The lumber was also used to build viewing platforms.

Each platform is equipped with a high powered scope. The platforms along the Clam Lagoon roadside are in strategic locations for optimum wildlife viewing. Unfortunately, the "weatherproof" scope at the Candlestick Bridge platform could not withstand high winds mixed with a dose of sand. The sand blasting turned the eyepiece glass opaque, and the scope had to be returned to the manufacturer.

Plans were finalized for the topics of the Clam Lagoon interpretive panels and their locations. Proposals were written for each panel to detail the interpretive message, artwork, and graphics. Visual Information Specialist Patti Gallagher in the Regional Office was a tremendous help along each step of the process. Artwork and text writing were underway. Once these panels are installed, the drive around Clam Lagoon will be highly informative and educational for all.

## 6. Interpretive Exhibits/Demonstrations

The Fish and Wildlife Center continues to be Adak's "must see" stop for everyone. This is easy enough to explain when you remember that our 5,000 population makes us Alaska's 8th largest community. Annual visitation by military and civilian personnel from other locations swell it by another 20%.

For this predominantly military constituency which includes some high-level decision makers with large budgets, it is an unsurpassed opportunity to present the Service's message. For the majority of Adak residents, refuge programs, classes, ANHA bookstore and technical assistance are a welcome relief from military duties and provide insight into an unusual area of a unique state. The Visitor Center exhibits include an outstanding eagle display created by a local taxidermist. The diorama depicts an adult and immature bald eagle with wings flared, fighting over a pink salmon. The realistic scene has impressed many visitors.

The front entry bulletin board is changed once or twice a month to include informative displays relevant to the season. It's a way for us to educate those entering and exiting about wildlife identification, hunting or fishing regulations, protected species, and an array of other pertinent topics.

Community events provide a great opportunity for the FWS to educate the public by setting up an exhibit booth. We participated in the Spring Fling, Memorial Day weekend, Fall Fest, and Christmas Bazaar festivities with a combination FWS display and ANHA sales booth. At each of these day-long events, we talk to and answer questions for several hundred people, many of whom had never been to the Fish and Wildlife Center.

Our interpretive displays, particularly the WWII exhibits, were enjoyed by many who came to Adak, particularly for WWII Commemorative recognition.

Fish and Wildlife provided and temporarily loaned Navy personnel archaeological artifacts and photographs for an Aleut display in recognition of Native American heritage.

## 7. Other Interpretive Programs

Interpretive and environmental education programs beyond Adak were supported. We donated a selection of natural history books to the Shemya Air Force Base library and to the Attu Coast Guard LORAN Station. Informational materials (i.e., brochures and posters) were sent to the Native villages and to the other military facilities (Amchitka, Shemya, and Attu). Goose posters and other goose literature were sent to Native villages and the military bases.

Here on Adak, we scheduled a variety of special evening programs at the Visitor Center, and spoke about the FWS at meetings of other community organizations. The following list summarizes the array of topics:

- Welcome Aboard - Refuge orientation for the Civilian Wives Club
- Aleutian Archaeology
- Puffins
- Oil and Wildlife
- The Vanishing Steller Sea Lion: Why Are Their Populations Declining?
- Sea Otters
- Fly Fishing on Adak
- WWII movies
- Kids Teach Adak - Parents' Night
- Christmas Bird Count - Learn the Birds

Trips to Shemya are made when possible to present evening programs. The residents of the Air Force base at Shemya are very interested in our work and in finding out what we do here in the Aleutians.

Interpretive hikes offered by SCA Volunteers and local volunteers were a great benefit to our programs. We announced these trips several times in the spring, during June, July, and August, and several times until November. Attendance averaged from 3 to 14 for wildflower identification, Palisades Beach intertidal explorations, bird watching, and longer hikes to Shagak Bay. These outdoor activities are appreciated by families and individuals who like exploring in groups and asking questions of their naturalist guide.

April Clean-up Day was a success. Sixteen participants assigned to different trails and popular roadside areas outside of town all pitched in to pick up litter.

## 8. Hunting

Specific species hunted in the Aleutians include caribou, ptarmigan, reindeer, fox, and waterfowl. Areas closed to hunting are limited to Shemya Air Force Base and the Navy base at Amchitka. The USCG only allows a waterfowl season on Attu.

The Adak waterfowl and caribou hunts are monitored closely, given the high interest in the community. Adak's caribou are large and healthy, and the popular hunt is enjoyed by many. A world record bull weighing over 700 pounds was taken at Adak in 1968. The NAS tug service, as well as the NSGA charter vessel Kuluk Clipper, provided transportation on a limited basis to hunters using the south side of the island. This support is vital to the refuge's ability to manage the caribou herd.

Caribou hunting is a popular sport on Adak. In 1993, 236 caribou were harvested.

Pre-season publicity of regulations and visible LE patrols have contributed to no noted waterfowl violations.

## 9. Fishing

Both commercial and sport fishing are important activities in the Aleutians. Salmon, halibut, black bass, and tanner and king crab are the primary commercial targets. Saltwater sports enthusiasts enjoy catching these species along with Japanese perch, lingcod, and the infinite other surprises found off these shore. Adak saltwater fishing is usually from the breakwater, a private boat, or NSGA's Kuluk Clipper. Stream and lake fishermen are looking for pink, red, and silver salmon, Dolly Varden, and the occasional rainbow.

Fishing pressure is heaviest in salmon streams close to the base on Adak. Weekend and evening patrols by refuge officers minimize violations. Because there was only one law enforcement person on the staff (ROS Klett), who was mostly in the field during the summertime, patrols could not be carried out as often as desired. The Navy continues to assist in managing the fishery by posting some streams for fly-fishing only or as closed.

National Fishing Week was recognized during June. We celebrated with a variety of information and education programs, including articles on fishing topics in Adak's weekly newspaper, fish movies for the Weekend Film series, bulletin board displays, a fish identification notebook, distribution of a kids' fishing activity and coloring book, and a fishing trip for the Nature Day Camp kids (preschoolers and Junior Naturalists).

The first red salmon were reported to be running in late June, one indicator of the beginning of summer and enthusiasm for outdoor activity!



## 10. Trapping

The fox trapping season was from November 10, 1991 to February 28, 1992. Free refuge permits were issued to trappers on Adak during the year. Participants included both serious and recreational trappers.

## 11. Wildlife Observations

Adak's annual Christmas Bird Count was once again a success. The all day event was concluded with a potluck at the refuge bunkhouse to tally the day's results. Alaska Natural History Association paid participants' entry fees.

## 13. Camping

The entire AIU, except Amchitka and Shemya, 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. MWR's "gear issue" has camping items to rent at a very reasonable rate to those residents who want to get out and explore Adak's beauty but do not own tents, pots/pans, stoves, etc.

## 15. Off-road Vehicling

ORVs were not a problem this past year. No incidents were reported by NAS Security. Newspaper articles and television spots were the focus of our preventive enforcement efforts, aimed at keeping vehicles on the roads rather than on the tundra where they leave scars that take years to heal. The word was also put forth at all the NAS Blue Card and Welcome Aboard lectures.

## 16. Other Non-Wildlife Oriented Recreation

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

## 17. Law Enforcement

ROS Klett attended the 40 hour Refuge Law Enforcement Officer refresher training session in Marana, Arizona.

We spread the word in Dutch Harbor, Akutan and Atka about the closed spring hunting of Emperor geese. Arctic Nesting Geese video tapes were distributed.

At present, most refuge enforcement work occurs on Adak Island. The lack of logistical support makes enforcement on other islands virtually impossible. By agreement with the Navy, resource-related infractions (hunting, fishing, ORVs) are cited under the Service's authority while other violations (litter, vandalism, etc.) will receive review by the Commanding Officer for possible military sanctions which may include loss of pay, demotion and extra duty.

The Navy's volunteer natural resource patrol is a great help to us. With an anticipated record salmon run, target shooting in unauthorized areas, one part-time refuge officer is stretched to monitor Adak's 4,500+ population for resource violations. We are pleased to have the help of these additional volunteers whose hundreds of field contacts kept violations from occurring.

Routine law enforcement patrols included trips to Shagak Bay, Finger Bay, Lake Andrew and Clam Lagoon checking caribou/duck hunters and fishermen.

Unscheduled patrols during the week and on weekends occurred after the waterfowl season opened on October 8th. Pre-season publicity of license, duck stamp, and steel shot requirements plus visible patrols contributed to compliance with these regulations.

#### 18. Cooperating Associations

The Adak ANHA outlet completed another highly successful year in retail sales. The revenue for FY93 totaled just over \$46,000, which is a 15% (\$7,000) increase compared to sales of the previous fiscal year. The heightened sales occurred despite the dwindling population of military personnel. The Adak Fish and Wildlife Center and the sales outlet continue to be popular and are primary sources of information for Adak residents.

The Visitor Center remains open seven days a week, featuring an afternoon film series every weekend, and evening programs every month. Our staff has an information and sales booth at community fairs about five times per year--this kind of exposure is always good and sales are exceptional! Through our local weekly newspaper, we provide U.S. Fish and Wildlife Service news and publicize the ANHA sales outlet. These factors benefit this outlet remarkably and contribute to increased ANHA sales.

The Visitor Center operates with the assistance of numerous people who help out at the information counter. These individuals answer questions, issue permits, make sales and keep the sales area stocked. Our volunteer program includes local persons who assist us part-time and interns who work for three to four months. ANHA employees and Fish and Wildlife Service staff help out countless hours as well.

During FY93, over half of the year's expenditures went toward educational aid. ANHA funds supported three Environmental Education Interns. These enthusiastic volunteers conduct programs for children and work with teachers and classes. They perform overall support tasks for our information and education services and part of their duties includes Visitor Center/ANHA operations. Refuge Volunteers are given items donated from ANHA as appreciation gifts for all

of their time and effort contributed to biology and education programs. Additional educational expenses were used to purchase numerous library books and videos, including environmental education materials.

Part-time ANHA employees during FY93 included several outstanding individuals. Lisa Scharf served as an Information Clerk II, then Assistant Branch Manager from October 1992 until May 1993. She handled and organized all of the accounting and inventory records to make our operation run much more smoothly and efficiently. Since May 1993 until the present, Shelley White serves as Information Clerk II. Shelley does an excellent job taking care of all the details necessary for a year-round operation such as ours. During the 92-93 school year, we employed a high school senior after school as part of an on-the-job training program. Dan Smullen assisted with biological surveys, environmental education and clerical tasks. All three ANHA employees worked in the Visitor Center providing information and keeping the sales area functioning smoothly.

#### Projections for 1994

The downsizing of the Navy base on Adak will have a great affect on this branch's ANHA operations. Formerly Adak's population was over 5,000. Presently, it is around 3,000, and by Summer 1994, there will be just over 1,000 people living on the island. There is still the potential for a great deal of outreach since military personnel will rotate every year--one could consider them long-term visitors. There are also a number of transient, temporary duty personnel passing through Adak, and the ships which stop at our port bring in numerous visitors. The Fish and Wildlife Center is always a must see stop when they come to the island, and this will continue to be the case.

The Alaska Maritime National Wildlife Refuge is also undergoing reductions in staff and will be reorganized during 1994. The decreased staff will likely mean more limited Visitor Center hours and fewer outreach programs. There will no longer be an Outdoor Recreation Planner on Adak. It has been requested that the ANHA Branch Manager duties be shifted to the Administrative Technician position. Military funds have been applied for to hire a temporary Education Specialist to assist with Visitor Center operations. Several Adak projects are on hold due to the uncertainty of staff departures, limited staff time and the pending population decrease.

Despite all of the transitions taking place on Adak and with this branch, the start of FY94 indicates it will continue to be a productive and busy year.

#### 20. Subsistence

Thirty-six personal use salmon permits were issued on Adak-Kagalaska Islands. Estimated total catch is 676 salmon.

## I. EQUIPMENT AND FACILITIES

### 1. New Construction

With the receipt of new computers and a HP LaserJet 4 printer it was decided to tie all refuge computers, except the Administrative Technicians which was tied into both the LaserJet II and 4, into the LaserJet II which was relocated in our copy/printer room. This required the routing of phone lines from each computer station, above the doors and into the copy/printer room. The connecting phone lines networking all of the offices to the system were then concealed by fifty feet of crafted wood trim, painted to match the interior decor.

MW Lewis turned out a few more projects in the carpenter shop including a heavy-duty outboard motor stand, built of 2x4 and 2x6 lumber, which was placed outside the building. The four outboard engines acquired from Alaska Maritime NWR were then set in place using our front-end loader.

We were asked by the U.S. Geological Survey (USGS) Center in Albuquerque, New Mexico if a seismic monitoring/data processing unit could be installed in the refuge Visitor Center in order to maintain continuing seismic checks. Two USGS technicians were sent to Adak to install the data processor in August. The unit is equipped with a computer monitor and recorder drum on which visitors in the center can watch as earthquakes happen -- Adak is a very active place quake-wise! MW Lewis worked with the technicians in installing the system. The power supply cord and backup power lines were concealed by a false beam and wood trim painted in "Fish and Wildlife" brown. MW Lewis was trained to perform various maintenance procedures for this equipment and was tasked with keeping an eye on the system.

This field season required the construction of three more 12'x20' weatherport floors. The 4'x10' sections were framed with 2x4's and the deck with ½" plywood. The sections were then painted and holes were drilled for the bolts which were used to connect them when they reached their destinations in the eastern and western Aleutians.

Three outhouses were also built for field comfort. During the field season the folks on Buldir Island saw the need for a fuel storage box. A collapsible 8' x 4' x 44" box was constructed and delivered by *M/V Tiglax* during a resupply stop.

### 2. Rehabilitation

The refuge's 25' Boston Whaler racked up the miles around Adak this year in support of the many Legacy projects. Over 2,400 nautical miles, in just over 60 trips, were logged -- mostly in choppy water even though we experienced fairly mild summer weather. MW Lewis, the refuge's boat operator also managed to complete some much need maintenance at 4 of the 5 public use cabins on the west and south side of Adak Island during these trips.

The first cabin to receive attention was at Hidden Bay, an hour and 20 minute transit to the south side of the island. The roof was patched, new stove pipe was installed, additional 2x4 supports installed in the cabin rafters, a 16' x 6' deck constructed off the front of the cabin, coal and scrap wood for the stove were placed under the deck and a new outhouse was positioned to provide a spectacular view of the bay. A general cleanup in and around the cabin was performed by field personnel resulting in 2 boat-loads of trash from previous users being hauled away -- we hope for less use of lumber from the cabin itself as fuel and better cleanup from future users.

The Chapel Cove cabin was next and in was much better shape overall due to being used less as it is out of normal hiking range. The stove pipe was replaced and a new cap was installed, new steps were added, the outhouse was righted and tied-down, a few burlap bags of wood were left behind (again to discourage cabin destruction) and again a general cleanup was performed resulting in several bags of trash.

The Unalga Bight cabin, located at Expedition Harbor, was in fairly good shape so that all that was needed was a new stove pipe, cap and tie-downs, more bags of wood left behind and a general cleanup. Also, for field personnel use, a Zodiac and associated supplies were concealed nearby for summer use in Legacy projects.

The Wedge Point cabin, located on the southwest side of Yakak Peninsula, is the most difficult cabin to reach and requires ideal weather conditions. Roof patching was performed, a window was replaced, a door rehung and several bags of trash were hauled out. This cabin will require replacement of the stove next summer.

### 3. Major Maintenance

Before the start of the summer bird surveys and transportation of field personnel, the refuge's 25' Boston Whaler was pulled into the shop for a preseason overhaul. The whaler was totally cleaned inside and out, all gear was checked and inventoried and wood surfaces were sanded and treated. A few new additions were installed: a Magellan GPS, and HF radio with antennae and a ground plate which increases the electronic equipment performance. Inside the cabin the Furuno radar and the depth sounder were relocated to accommodate the boat skipper and make maximum use of interior space in an already small cabin. After filter changes and engine checks, the whaler was returned to its slip at the Boat Basin ready for use.

All the furnaces at the Fish and Wildlife housing complex received new filters; new fuel and circulating pumps were installed in the Bunkhouse, a new fuel pump in Quarters 4A, and nozzles and air filters at Quarters 4A, 4B, 5A and 5B.

The main water line which supplies the Fish and Wildlife housing complex had a 1-1/2" gate valve fail. The Navy had to secure the water to one of the housing areas so that MW Lewis could replace the valve.

All refuge vehicles received the normally scheduled tune-ups and oil changes. One of our volunteers, while on a survey, somehow managed to wrap up approximately 20' of wire around the drive shaft on the Jeep Cherokee then drove it 4 miles back to the refuge. The pinion seal had to be replaced. The Chevrolet S10 Blazer had a new radiator and ignition coil installed. The JCB frontend loader also received oil and fuel filter changes as well as a new transmission cooler. A storm in November produced winds sufficient to blow out the side window in the Dodge Caravan which was replaced.

The interiors of Quarters 2 and 5A were painted.

#### 4. Equipment Utilization and Replacement

We have acquired several items from the Naval Base closure at Amchitka Island, including a 20' aluminum jet boat. The jet boat will be sent east to Izembek NWR, but a 40 HP Evenrude motor will stay here and be mounted on the refuge's 17' Boston whaler -- the biotechs will make good use of it during their bird surveys in Kuluk Bay.

From Alaska Maritime NWR we received two 120 HP Johnson outboards and two 140 HP Evenrudes -- being this far from a parts dealer these spares will make for less down time while awaiting parts for repairs.

### J. OTHER ITEMS

#### 1. Cooperative Programs

##### Legacy Resource Management Program

Several biological monitoring programs were conducted during 1993 on Adak Island as a result of funds received through the Department of Defense's Legacy Resource Management Program. This program was established by Congress and recognizes the responsibility of military agencies to manage the biological and cultural resources that exist on military lands. The northern half of Adak is a Naval Air Station with the USFWS retaining management authority over the natural and cultural resources. As a result, \$235K were received at the end of FY92 for work on several projects during 1993.

A thorough survey was conducted using a chartered helicopter to determine the island's introduced caribou population. Biologists from the Navy and Alaska's Department of Fish and Game assisted with the surveys. The herd size was estimated at a minimum of 751 animals, a record high in the herd's 35 year existence and well above the management goal of 200-250 animals.

Other projects resulted in the establishment of monitoring programs for passerine and other breeding landbird populations including point-counts, line-transects and beach transects. A North American Breeding Bird Survey route, which was established in the 1980's, was also surveyed.

Surveys were conducted to monitor the area's wintering waterfowl and seabirds. The breeding biology of the endemic Aleutian green-winged teal was studied to learn more about its breeding biology, population trends, productivity and migration.

Tufted puffins were examined in three colonies located on islets near Adak's northeastern, western and southern shores. A crew established monitoring plots to detect trends in the puffin population. This population will also be used as a control in the monitoring of the western Aleutian puffin population where drift net fishing has recently been eliminated. Drift nets were suspected of having an impact on this population.

The marbled murrelet was also a subject of the Legacy studies. This species has been listed as Threatened in the Pacific northwest and Canada and is listed as a Category II species in Alaska. Work concentrated on monitoring areas used by murrelets for feeding and nesting to better understand the species in this part of its range.

A comprehensive, island-wide anadromous fish survey was completed by the Kenai Fisheries Resource Office to evaluate the population and timing of spawning salmonids on the island. Pink salmon were the most abundant species, occurring in 40 of the 49 streams surveyed. Coho salmon were found in 35 streams, Dolly Varden in 48 streams, sockeye salmon in 2 streams and chum salmon in 9 streams. Rainbow trout were found in 2 streams, coastrange sculpin were found in 36 streams and threespine stickleback were in 6 streams. An investigation into the landlocked salmon in Andrew Lake found that a majority were comprised of sockeye salmon (kokanee) possessing unique characteristics not usually found on sockeye salmon. Black spots cover their back and tail and they lack serrations on their gill rakers. Coho salmon were also present in the lake but in very small numbers.

Considerable effort was made by Regional Office and refuge staff to locate additional populations of Alaska's only endangered plant, the Aleutian shield fern. Adak is the only known location where this species occurs and only 127 plants exist in high, rocky mountain ridges. Five additional plants were located approximately 3 km from the known site.

An additional \$839K were requested from the military for FY94 to continue these programs and conduct additional projects on Adak Island and Eareckson Air Force Station on Shemya Island.

The 50th Anniversaries of the Battle of Attu Island occurred in June and the Allied landing on Kiska Island in August. Once again the desire to revisit an area overrode, according to the written word, what veterans who served here swore to forget. Two special use permits were issued for memorial visits. One to a group of 60 Japanese nationals, plus additional U.S. officers and press, to visit Attu in July to conduct a memorial service for WWII casualties on both sides. A group of 10 American veterans from the 87th Infantry Regiment, 101st Mountain Division, plus support and news service personnel visited Kiska in August. The 87th Infantry landed on Kiska beaches on August 15, 1943. This year they hit the beach on August 12. Just imagine the stories they relived during their five day stay!!

On June 15, NAS Adak hosted a group of 84 WWII veterans, dependents and guests. This total included 10 Japanese and 10 Aleuts plus news service personnel. NAS hosted a banquet for the group and guests that night. Mr. Buck Delkettie, an Alaska Native and a WWII Alaskan Scout, was the guest speaker. Everyone continued to Attu the next day for a tour and memorial service. They returned to Anchorage on the 19th.

Mr. Scott Kerr (Nikolski, AK) applied for and was issued a SUP to guide a group of 15 Japanese climbers from the Nagano Mountaineering Association, 2 members of the Alpine Club of Canada, 3 researchers studying local flowers and butterflies and 3 reporters from the Sinetsu Broadcasting Corporation to film their exploits. They spent a month visiting five islands in the eastern Chain and successfully climbed eight volcanoes ranging from 1,451 to 2,861 meters. The reporters also spent time in the Native villages of Atka, Nikolski and Unalaska interviewing residents about their lifestyles (comparison with life in rural areas in Nagano Prefecture) and WWII experiences. Bears, 80 knot winds on the mountains, fog and crumbly rock provided plenty of excitement for the group. We are to receive a copy of the finished video production.

RM Boone and Regional Archeologist Chuck Deters accompanied a group of retired military personnel associated with the Air Force Heritage Museum and Memorial Park, Hill Air Force Base, Utah, on an inspection of the P-38 on Buldir Island. Their long range goal is to use parts from this plane to restore another one for display in their museum. They also expressed an interest in the remains of a B-24 on Atka Island.

Due to a reduced budget, the Adak Seismic Lab was closed in September. To insure continuity of recovery of seismic information, the U.S. Geological Survey asked if we would house the data processing computer and recording module unit of a new global seismographic network. A special use permit was issued to cover the units installation in our visitor center and we hosted two technicians for 2-1/2 weeks as they installed, tested and calibrated the system.

ROS Klett was a member of a team composed of Service Realty Division, U.S. Bureau of Land Management, U.S. Bureau of Indian Affairs and Regional Aleut Corporation personnel tasked with holding meetings with Native village corporations regarding the selection of additional lands granted under Section 1410 of the Alaska National Interest Lands Conservation Act. In January 1992, the Secretary of the interior authorized under Section 1410 the re-withdrawal of lands from original Alaska Native Claims Settlement Act in refuges. Four villages within the AIU are authorized to select a total of 40,040 acres. All of this land will come from acreage already overselected by village or regional corporations.

### 3. Items of Interest

In July, the office received advance notice of a visit by a group of ladies comprising the Defense Advisory Committee on Women in the Services, established by the Secretary of Defense. Much to our surprise, one of the members was Mary Kay Turner, wife of past FWS Director John Turner. The group really enjoyed their tour through the Visitor's Center and a chance to visit with the staff. Mrs. Turner left with several personal gifts from the staff for her husband.



One problem associated with the base scaledown was the cost of removal of some 600 pets from the island. Refuge Operations Specialist Klett attended a military sponsored workshop on this subject. The one big concern revolved around the abandonment of pets, primarily dogs. The Navy states that no pets will be left on island after June 1994, they will either depart with their owners or be euthanized. It was explained that many pet owners did not realize what it would cost to ship a pet to the lower 48 (several hundred for a large German shepherd-size dog to several thousand to an overseas duty station; i.e., Great Britain, Hawaii or Guam).

It was felt that some of the lower-grade enlisted personnel would not want to spend this amount and would just turn the dog loose. No one wanted a pack of feral dogs running loose on the base. We definitely did not want this to happen because of the destruction they could cause to our wildlife populations. It was decided that a letter would be drafted and sent to all pet owners explaining the cost of shipping pets off island and options for adoption.

The "Clean Shemya Program" at Eareckson (formerly Shemya) Air Force Base was nominated and selected as one of fifty-nine initiatives nationwide to receive the Fish and Wildlife Service Outstanding Contribution Award which was presented by the Regional Director. The dedication and commitment by then Commanding Officer Colonel Voskuhl and his volunteers for creating a program for a cleaner and safer environment for man and wildlife.

Professor Daniel A. Guthrie, Claremont College, collected marine algae specimens along the outer Aleutian Islands' shoreline at low tide. Several species represent new records for Alaska and the United States. Others were previously located only on Amchitka.

A spring cruise on the *R/V Alpha Helix* included a variety of scientific collecting and research. Sea otter surveys were conducted to help determine any negative impact on common eiders, to assess diet and population density, to search for missing instrumented otters, and to obtain population estimate. Algae was collected and freeze-dried to identify and measure the concentration of secondary metabolites. SCUBA habitat surveys were conducted at Attu and Semichi islands to provide data on kelp forests. Sea urchins were collected live for breeding and growth experiments.

Archaeological investigations were conducted on Buldir Island by Stephen Loring of the Smithsonian Institution and by Doug Seigel-Causey and Debbie Corbett.

Recovery of World War II aircraft was undertaken on Buldir, Amchitka and Atka islands.

Volcano studies and seismological research occurred on Adak Island.

#### 4. Credits

The 1993 Narrative Report was authored by the following:

- Introduction: Dan Boone
- A. Highlights: Van Klett
- B. Climatic Conditions: Van Klett
- D. Planning: Dan Boone, Van Klett (Sec. 3) and Jeff Williams (Sec. 5)
- E. Administration: Dan Boone and Van Klett (Sec. 6)
- F. Habitat Management: Van Klett
- G. Wildlife: Jeff Williams
- H. Public Use: Laura Greffenius and Van Klett (Sec. 17)
- I. Equipment and Facilities: Jeff Lewis
- J. Other Items: Van Klett

Word processing, computer entry, and collating of text was accomplished by Debbie Jones and Chris Montoya in Homer. Final editing was provided by Daniel Boone and Laura Greffenius.

BERING SEA UNIT

ALASKA MARITIME NATIONAL WILDLIFE REFUGE

Homer, Alaska

ANNUAL NARRATIVE REPORT

Calendar Year 1993

U.S. Department of Interior

Fish and Wildlife Service

NATIONAL WILDLIFE REFUGE SYSTEM

## INTRODUCTION

### Bering Sea Unit

#### Alaska Maritime National Wildlife Refuge

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

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

Some of the most serious potential threats to seabirds and marine mammals in this area are related to oil development in the outer continental shelf. Not only can oil spills directly cause decimation of birds and their food chain, but increased activities of airplanes, boats, and people in these relatively undisturbed areas may adversely affect marine animals as well. Commercial fishing in parts of this unit, particularly in the Bering Sea, is an issue of increasing concern because of the possible link between intense fishing pressure and declines of marine birds and mammals in that area. Introduction of alien predators, such as rats, pose perhaps the biggest threat.

Long-term refuge objectives include establishing a seabird monitoring scheme which is of sufficient intensity to detect population changes of 20 percent or greater with 90 percent confidence, and 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 1992 monitoring was conducted at St. George and St. Paul Islands of the Pribilof Island group. St. George is designated as an annual monitoring site by the refuge, while St. Paul is an intermittent monitoring site which is monitored every three years.

There are opportunities for interpretive programs in the unit, particularly in the Pribilof Islands where 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 are located near refuge seabird colonies.

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- 17. Law Enforcement ..... Nothing to report
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- 2. Other Economic Uses ..... Nothing to report
- 3. Items of Interest ..... 10
- 4. Credits ..... Nothing to report

#### K. FEEDBACK



### A. HIGHLIGHTS

Rat introduction program gets into full swing (see section F10)

Red-legged kittiwakes have another good year (see section G5)

### B. CLIMATIC CONDITIONS

#### St. Paul Island

Month	Avg Temp (°F)	Temp Dev (°F)	Precip (in)	Precip Dev (in)
JAN	22.5	-4.1	2.28	0.43
FEB	26.3	3.9	1.68	0.35
MAR	27.1	2.9	1.27	0.05
APR	33.4	5.1	0.89	-0.45
MAY	37.4	2.2	1.52	0.24
JUN	43.1	1.6	0.86	-0.37
JUL	49.4	3.3	2.05	0.15
AUG	50.9	3.2	3.31	0.56
SEP	46.0	1.4	4.92	2.33
OCT	41.0	3.2	3.12	0.31
NOV	36.4	3.4	5.40	2.60
DEC	27.8	-1.2	0.97	-1.25
ANNUAL	36.8	2.1	28.27	4.95

## Nome

Month	Avg Temp (°F)	Temp Dev (°F)	Precip (in)	Precip Dev (in)
JAN	-4.6	-11.6	1.14	0.35
FEB	14.8	10.9	1.14	0.54
MAR	13.2	4.6	1.68	1.14
APR	27.6	10.0	0.18	-0.50
MAY	40.2	4.6	0.52	-0.10
JUN	51.8	5.9	0.39	-0.73
JUL	56.2	4.7	0.92	-1.25
AUG	49.9	-0.3	3.15	0.44
SEP	38.9	-3.6	2.57	0.14
OCT	32.5	4.5	2.78	1.43
NOV	21.6	5.7	2.83	1.79
DEC	15.3	8.0	1.88	1.05
ANNUAL	29.8	3.6	19.18	4.30

D. PLANNING

## 5. Research and Investigations

At St. George Island a team of students from the University of Alaska-Fairbanks spent the summer monitoring the effects of aircraft noise on nesting seabirds in fulfillment of a contract to monitor disturbance to seabirds caused by the construction of a new runway. They also documented the use of the new runway and an adjacent lake by kittiwakes. Several of these students have undertaken graduate studies relating to kittiwake breeding ecology and possible effects on seabirds of the new runway at St. George. Another graduate project conducted at St. George Island in 1993 involved cross-fostering black-and red-legged kittiwake chicks to determine if each species could raise the other species' chicks.

## F. HABITAT MANAGEMENT

### 10. Pest Control

Rats have been introduced to over 82% of the world's island ecosystems and these rodents have been responsible for extinctions and major reductions of numerous native species. Norway rats have already become established on at least 22 islands in the Alaska Maritime NWR have devastated seabirds and other native birds.

At imminent risk are the Pribilof Islands, world famous as one of Alaska's premier marine bird and mammal areas. New harbor facilities and a very rapidly increasing commercial fishing industry make rat introduction through the harbor or by ship-wreck likely. Because of new harbors and new commercial fishing regulations (requiring % of catch to be processed on land) the Pribilofs are undergoing *very* rapid expansion. In the past 3 years St. Paul has become the third largest bottom fish processor in Alaska (after Dutch Harbor and Kodiak). This fall a new plant will be opened, two vessel processors (one 454 ft. long) will be moored at the harbor and trawlers will start entering the harbor. The human population of St. Paul will double before the end of the year.

The introduction of rats would: 1) decimate a large percentage of seabirds at some of the largest colonies in Alaska, and threaten (through disease introduction) the world's main northern fur seal population, 2) endanger the continued existence of red-legged kittiwakes and the Pribilof shrew, 3) cost hundreds of thousands of dollars on rat control just to minimize impact on wildlife, 4) further endanger other islands since a new source of rats to infest ships would have been created, and 5) threaten human health and the economy of the communities of St. Paul and St. George.

In 1993 the AMNWR continued a cooperative prevention program started the previous year to prevent rodent introductions. Actions taken were: 1) a City employee from St. Paul and St. George were trained and certified for the use of rodenticides, 2) wooden bait/trap stations were built and deployment in harbor areas was begun, 3) Joe Brooks from DA/ADC visited the islands in September to review the program and assist in training classes, 4) assistance was given to local governments in developing local rodent ordinances, 5) meetings were held with fish processing plant managers and shipping companies, 6) Service comments to COE permits required rat prevention measures on the UniSea barge which was permanently moored at St. Paul in November, and 7) public education efforts were begun.

A draft Environmental Assessment was also completed for the use of toxicants to respond to shipwrecks where rodent introductions are possible. The threat of shipwrecks introducing rats is a concern throughout most of the AMNWR.



UniPak Seafoods began construction of a 43,000 square foot processing plant on St. Paul in July 1993. The explosion in commercial fishing activity at the Pribilof Islands make rat introductions certain over-time without a preventive program. (08/93 ALS)



A UniSea Seafoods processing barge arrived in November 1993 for permanent mooring at St. Paul. COE permits required that it arrive rat free and have a rodent prevention program. (ALS)





The Refuge worked with the community, industry, and rodent specialists to establish a rodent prevention program at St. George and St. Paul. Here is a prevention station in the St. Paul harbor that contains poison and snap traps. (08/93 ALS)



Beach oil surveys were also started at St. Paul and St. George in 1993 to measure levels of pollution. Here Mark Giger inspects a mystery barrel on Lukanin beach, St. Paul. (08/93 LF)

## G. WILDLIFE

### 3. Waterfowl

Counts of waterfowl using the near shore areas of St. Paul Island were initiated in March of 1993. A variety of wintering waterfowl were present including large numbers of oldsquaw and harlequin ducks, king and Steller's eiders. Wintering populations of sea ducks can be very substantial with densities in near shore waters comparable or even greater than during the summer seabird nesting season. Harlequin numbers remain high during the summer.

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

#### Black-legged kittiwake

Although the mean hatching date for black-legged kittiwakes at St. George in 1993 was slightly later than in 1992, this still could be considered a relatively early year. Productivity of this species at St. George (19%) and at St. Paul (22%) was lower than the 1992 levels. Mortality of young was most pronounced during incubation. Relatively few black-legged chicks hatched in 1993, making it only a fair productivity year for this species. Black-legged kittiwakes have better productivity at higher elevations and at higher nest densities on St. George. It was found that, in general, either species of kittiwake can apparently successfully raise the chick of the other species.

#### Red-legged kittiwake

Like that of their congener, the hatching chronology of red-legged kittiwakes was relatively early in 1993, despite being slightly later than in 1992. Productivity of red-legged kittiwakes of 46% at St. George and 35% at St. Paul was relatively high for the third year in a row. Red-legged kittiwakes were found to be more prevalent at higher elevations than black-legged at St. George, where this species has higher productivity at higher elevations and nest densities. An average of 580 kittiwakes, mostly red-legged, was counted roosting on the new runway at St. George Island in 1993. Numbers of kittiwakes on the runway ranged from 0 to 5966. There is concern about aircraft safety from bird/plane collisions. Kittiwakes usually spent only a few minutes on the airstrip on any visit.

#### Murres

Murres exhibited early breeding chronology at St. George Island in 1993. The mean hatching date for common murres was the earliest on record and that for thick-billed murres was among the earliest. Common murre productivity was 61% at St. George, while that of thick-billed murres was 66%. Murre hatching success was found to be lower in both 1992 and 1993 in areas of highest aircraft activity on St. George Island. However, these differences may not be directly related to disturbance from aircraft. Nesting murres may be especially susceptible to disturbance early in the breeding season because birds not incubating eggs tend to flush from the cliff more readily than those on eggs.

#### 14. Scientific collections

Alan Springer of the Institute of Marine Sciences (University of Alaska-Fairbanks) collected kittiwakes and murres at both St. George and St. Paul islands for a food habits study. Collections were made of all four species during the breeding season. Eight black-legged kittiwakes, eight common murres and seven thick-billed murres were collected at St. Paul. Twenty-seven black-legged kittiwakes, 20 red-legged kittiwakes, one common murre and four thick-billed murres were collected at St. George.



Red-legged kittiwakes had good reproductive success at St. George and St. Paul for the third year in a row in 1993. (ALS)





Winter wrens are a year round resident of the Pribilof Islands. (KB)

#### 16. Marking and banding

Black- and red-legged kittiwakes were banded at St. George Island in 1993. The banding program is used to estimate adult survival rates. The kittiwake banding program was begun at St. George in 1991. Eight black-legged and 75 red-legged kittiwakes were color-banded at St. George in 1993, bringing the total number of banded birds to 15 and 135, respectively. All 7 (100%) of the previously banded black-legged kittiwakes were re-sighted in 1993. The oldest known-age bird of this species was a 16 year-old originally banded as a chick in 1977. Of the 60 previously color-banded red-legged kittiwakes on St. George, we re-sighted 52 (87%) in 1993. One red-legged kittiwake re-sighted this year was originally banded in 1976. Its age was recorded as being at least two years old at the time of banding, making this bird a minimum of 19 years old in 1993.

### H. PUBLIC USE

#### 2. Outdoor classrooms-students

Outdoor recreation planner Poppy Benson and Regional Office environmental education specialist Beverly Farfan coordinated environmental education day camps for the children of the Pribilof Islands. The camps were a challenge cost share project with the cities of St. Paul and St. George, Tanadquisix Corporation, Tanaq Corporation, the St. Paul Traditional Council, the St. George IRA



Council and the Nature Conservancy. Two week camps were held on both St. George and St. Paul during the month of July. Training instructors Karin Holser and Bev Short taught the camp with the assistance of 3 high school age RAP students. A total of about 80 children participated in this successful program. By fall, a committee composed of all the entities was active planning for the 1995 camp.

#### 7. Interpretation

Natural history tours continued in 1993 at the Pribilof Islands. About 800 people visited St. Paul Island and about 50 visited St. George. Refuge staff are not directly involved with tourists at the Pribilof Islands, although field personnel are often called upon to act as interpreters when encountered by tourists.

A small number of natural history tours are beginning to utilize refuge lands at Safety Sound near Nome. Nome, like the Pribilofs, is a particularly popular destination for serious birders.

#### 15. Off-Road Vehicling

There is a growing number of ATV's on the Pribilof Islands, particularly St. Paul. Cars and trucks have caused rutting from off-road driving.

### I. EQUIPMENT AND FACILITIES

#### 4. Equipment Utilization and Replacement

Our only means of transportation on St. Paul or St. George are Honda ATV's and the occasional opportunity to barrow National Marine Fisheries Service vehicles. We need a truck on each island and should consider replacing an ATV with a truck on each island.

### J. OTHER ITEMS

#### 1. Cooperative Programs

The Minerals Management Service, who funded AMNWR work at St. Matthew and Hall in 1991, published the final report. The work was funded as part of their oil and gas development of the Alaskan Continental Shelf. Results were:

Black-legged kittiwakes populations were counted on plots at the north end of St. Matthew and at Hall Island. From comparisons of these common plots the number of black-legged kittiwakes on plots at Hall Island in 1991 was lower than in 1985 or 1986, but at St. Matthew there was no significant difference among the three years. Combined data from the two areas showed 1991 numbers lower than either 1985 or 1986 levels. Combined data of numbers of kittiwake nests

from the two areas showed 1991 numbers higher than 1985 or 1986. Clutch size was estimated at 1.62 (#eggs/nest w $\geq$  1 egg). The first hatched kittiwake in 1991 was seen on July 18th.

Common murre populations counted on plots were lower at Hall Island in 1991 than 1985 and 1986, but there was no significant difference at St. Matthew or both areas combined. Thick-billed murre populations plots were lower on Hall Island than in 1985 and 1986. There was no significant difference among the three years at St. Matthew.

Populations of walrus using St. Matthew and Hall Island appear to have declined since the early 1980's. Counts at Hall Island never exceeded 20 animals even considering that the time-lapse film allowed counts to be made at several times of day over a 15 day period. Large areas of this beach have remains of old scat and compacted gravel, probably indicating much higher use by walrus and/or sealions during winter months.

### 3. Items of interest

Several beaches at St. George and St. Paul Island were surveyed for the presence of oil contamination. No oil was found on any surveyed beach.

CHUKCHI SEA UNIT  
ALASKA MARITIME NATIONAL WILDLIFE REFUGE  
Homer, Alaska

ANNUAL NARRATIVE REPORT  
Calendar Year 1993

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

## INTRODUCTION

### Chukchi Sea Unit

#### Alaska Maritime National Wildlife Refuge

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

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

Nearly half a million kittiwakes and murres breed on cliffs at Cape Lisburne and Cape Thompson; these are the most spectacular concentrations of seabirds on the unit. Chamisso and Puffin Islands in Kotzebue Sound are the largest island colonies in the unit. An extra-limetable 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. Other terrestrial mammals that occur in the unit include grizzly bear, musk ox, wolverine, marmot, moose, Dall sheep and caribou. Thousands of caribou from the Western Arctic Caribou Herd congregate near Cape Lisburne and Cape Thompson in a summer post-calving aggregation.

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- 16. Other Non-Wildlife Oriented Recreation ..... Nothing to report
- 17. Law Enforcement ..... Nothing to report

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- 18. Cooperating Associations ..... Nothing to report
- 19. Concessions ..... Nothing to report

#### I. EQUIPMENT AND FACILITIES

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#### J. OTHER ITEMS

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- 2. Other Economic Uses ..... Nothing to report
- 3. Items of Interest ..... Nothing to report
- 4. Credits ..... Nothing to report

#### K. FEEDBACK

### A. HIGHLIGHTS

Cape Lisburne site monitored murre- numbers appear to continue to increase, and peregrine falcon are present for only second known year.

### B. CLIMATIC CONDITIONS

#### Kotzebue

Month	Avg Temp (°F)	Temp Dev (°F)	Precip (in)	Precip Dev (in)
JAN	-9.0	-8.0	0.59	0.16
FEB	4.5	9.3	0.25	-0.07
MAR	0.7	0.3	0.64	0.29
APR	19.5	8.2	0.08	-0.29
MAY	33.5	2.3	0.18	-0.15
JUN	47.8	4.0	0.93	0.41
JUL	59.0	5.2	0.69	-0.77
AUG	49.4	-2.7	1.78	0.00
SEP	38.4	-3.6	2.45	0.87
OCT	29.0	6.1	3.20	2.47
NOV	11.2	3.4	2.00	1.41
DEC	8.9	9.8	0.62	0.10
ANNUAL	24.4	2.9	13.41	4.43

### D. PLANNING

#### 4. Compliance with Environmental and Cultural Resource Mandates

An Environmental Assessment explaining proposed removal of radioactive soils from the Project Chariot site was drafted. This document outlines the potential for significant impacts to result from activities proposed by the U.S. Department of Energy (DOE) at a location south of Point Hope, Alaska, known as the Project Chariot site. The site is in the Cape Thompson subunit of the Alaska Maritime National Wildlife Refuge (AMNWR). During experiments at the Project Chariot site in 1962, radioactive material was added to test plots to determine the mechanism and rate of migration of the radioactive material through the soil. Following the experiments, the test plots were excavated and the soils containing radioactive materials were consolidated and mixed



with local soils in a mound approximately 1.5 feet thick and 20x20 feet in width. The soil and solid debris used in the experiment (eg. boards, polyethylene sheeting) were covered with 4 feet of clean soil to form a mound approximately 6 feet thick and 40x40 feet in width. The present concentration of radioactivity in the soils at the mound is estimated to be 0.03 millicuries for the whole mound.

The DOE is proposing to sample the disposal mound and the areas used as test plots to determine the present concentration of radioactive contaminants, excavate and remove contaminated soils, transport the excavated soils to the Nevada Test Site (NTS) or the Hanford Site in the state of Washington for disposal, secure Alaska Department of Environmental Conservation (ADEC) approval of final closure of the mound and test plots, and revegetate the excavation site(s). The biota, soils, sediments and water in Ogotoruk Creek Valley where the test plots and mound are located, and in nearby Kisimilok Valley will be sampled, and concentrations of radionuclides will be compared to concentrations measured at the time of the experiments.

One alternative to the proposed action is to sample the test plots and disposal mound, as well as the biota, soils, sediments and water in Ogotoruk Valley and nearby Kisimilok Valley. Then a decision would be made on whether or not to excavate and remove any materials based on the results of the sampling and analysis program. The third alternative is to take no action.

Analyses contained in this Environmental Assessment (EA) indicate that no significant impact to the environment is likely to occur as a result of the proposed action or either of the alternatives. Either action alternative will create temporary, and minor, adverse impacts on air quality, soils, vegetation, wildlife and aesthetics. Beneficial impact to the human environment is expected to result from removing the source of contamination, or determining through an approved sampling program whether health or environmental risks warrant removal of the mound or test plots. A beneficial impact will also result from revegetating an old trail. The no action alternative may have an adverse effect on the local residents if their fears of radioactivity are not allayed.

## F. HABITAT MANAGEMENT

### 6. Other Habitats

The USAF maintains a quarry on AMNWR lands at Cape Lisburne. The refuge continued monitoring of quarry impacts, primarily by repeated censuses of near by seabird populations (see Section G5).

## G. WILDLIFE

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

#### Black-legged kittiwake

Field counts at Cape Lisburne indicate that there is no clear trend in populations of kittiwakes. Populations appear to be about what they were in 1977. There may have been some increase during mid 1980's and populations perhaps have gone back near the mid 1970's levels.

Kittiwakes layed lots of eggs in 1993. Out of 138 nests checked, 29 had 1 egg, 75 had 2 eggs and 1 had 3 eggs. New land based plots for kittiwakes were also set up and counted to further improve data sets into the future.

### Murres

Field counts at Cape Lisburne indicate that populations of murres on study plots have been increasing at an average annual rate of about 5% since 1976 when the first counts were completed. New land based plots for murres were also set up and counted to further improve data sets into the future.

### 6. Raptors

A peregrine falcon was repeatedly seen near land plot 3 at Cape Lisburne. The only other reported sighting for peregrines at this site was in 1992. There is probably a nest site in the area.

### 14. Scientific collections

Eleven black-legged kittiwakes, four common murres and eleven thick-billed murres were collected July 23 to July 28. Frozen carcasses were sent to Alan Springer of the Institute of Marine Sciences (University of Alaska-Fairbanks) for food habits analysis. Tissue samples from these were also saved for possible future study.



A grizzly bear trail on a sandbar east of Cape Lisburne (in distance) reflects the wilderness quality of the Chukchi Unit of the AMNWR. (ALS)



Granite spires above the seabird cliffs at Cape Lisburne. (ALS)

## H. PUBLIC USE

### 8. Hunting

Phil Driver, a hunting guide was issued a permit for hunting on Cape Thompson and Cape Lisburne refuge lands.

## J. OTHER ITEMS

### 1. Cooperative Programs

The seabird colony at Cape Thompson was monitored, with funding from Minerals Management Service, in 1991. The final MMS report was published in 1993. Results are summarized below. Productivity values are reported as minimums because many unfledged chicks remained in nests when the field crew left.

The median laying date for black-legged kittiwakes at Cape Thompson in 1991 was 28 June. Average clutch size was 1.44 eggs/active nest. The median hatching date for this species was 25 July and productivity was at least 0.09 chick/nest. Capelin, saffron and arctic cod, and sculpin were found in the stomachs of collected black-legged kittiwakes. Population counts of kittiwakes on plots indicate that numbers are relatively stable at Cape Thompson.

The median laying date for common murrelets at Cape Thompson in 1991 was 7 July, while that for thick-billed murrelets was 5 July. The median hatching date was 8 August for common murrelets and

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

ANNUAL NARRATIVE REPORT

Calendar Year 1993

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

## INTRODUCTION

### Gulf of Alaska Unit

#### Alaska Maritime National Wildlife Refuge

The Alaska Maritime National Wildlife Refuge was created by the Alaska National Interest Lands Conservation Act (ANILCA) in 1980 and 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 460,00 additional acres resulting in a 3,500,000 acre refuge.

The Gulf of Alaska Unit extends from Alaska's southcentral coast near Kodiak Island, eastward to southeast Alaska and includes four islands from 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, Pye, Chiswell, Middleton, St. Lazaria, Hazy and Forrester.

This unit has the only forest habitat on the Maritime Refuge. Across the Refuge, forested areas are restricted to the Gulf of Alaska Unit. Forested islands in the northern part of the Unit tend to be confined to protected drainages, while some southern islands support old-growth forests over much of their acreage.

Spruce-hemlock forests are the dominant plant community on nearly all the islands outside Cook Inlet. The transition zone occurs in the Barren Islands, where there is a small forested area on Ushagat Island, with alpine tundra being the dominant vegetation. Seabirds use the cliffs, talus slopes, burrows, boulder rubble and rock crevices to breed and nest. Submerged lands of the refuge occur around Afognak Island and Kodiak Island.

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- 5. Funding ..... Nothing to report
- 6. Safety ..... Nothing to report
- 7. Technical Assistance ..... 3
- 8. Other ..... Nothing to report

### F. HABITAT MANAGEMENT

- 1. General ..... Nothing to report
- 2. Wetlands ..... Nothing to report
- 3. Forests ..... Nothing to report
- 4. Croplands ..... Nothing to report
- 5. Grasslands ..... Nothing to report
- 6. Other Habitats ..... 3
- 7. Grazing ..... Nothing to report
- 8. Haying ..... Nothing to report
- 9. Fire Management ..... Nothing to report
- 10. Water Rights ..... Nothing to report

## F. HABITAT MANAGEMENT (cont.)

- 11. Wilderness and Special Areas ..... Nothing to report
- 12. WPA Easement Monitoring ..... Nothing to report

## G. WILDLIFE

- 1. Wildlife Diversity ..... Nothing to report
- 2. Endangered and /or Threatened Species ..... Nothing to report
- 3. Waterfowl ..... Nothing to report
- 4. Marsh and Water Birds ..... Nothing to report
- 5. Shorebirds, Gulls, Terns, and Allied Species ..... 4
- 6. Raptors ..... 4
- 7. Passerines ..... Nothing to report
- 8. Game Mammals ..... Nothing to report
- 9. Marine Mammals ..... Nothing to report
- 10. Other Resident Wildlife ..... Nothing to report
- 11. Fisheries Resources ..... Nothing to report
- 12. Wildlife Propagation and Stocking ..... Nothing to report
- 13. Surplus Animal Disposal ..... Nothing to report
- 14. Scientific Collections ..... Nothing to report
- 15. Animal Control ..... Nothing to report
- 16. Marking and Banding ..... Nothing to report
- 17. Disease Prevention and Control ..... Nothing to report

## H. PUBLIC USE

- 1. General ..... Nothing to report
- 2. Outdoor Classrooms-Students ..... Nothing to report
- 3. Outdoor Classrooms-Teachers ..... Nothing to report
- 4. Interpretive Foot Trails ..... Nothing to report
- 5. Interpretive Tour Routes ..... Nothing to report
- 6. Interpretive Exhibits/Demonstrations ..... Nothing to report
- 7. Other Interpretive Programs ..... Nothing to report
- 8. Hunting ..... Nothing to report
- 9. Fishing ..... Nothing to report
- 10. Trapping ..... Nothing to report
- 11. Wildlife Observation ..... Nothing to report
- 12. Other Wildlife Oriented Recreation ..... Nothing to report
- 13. Camping ..... Nothing to report
- 14. Picnicking ..... Nothing to report
- 15. Off-Road Vehicling ..... Nothing to report
- 16. Other Non-Wildlife Oriented Recreation ..... Nothing to report
- 17. Law Enforcement ..... Nothing to report

#### H. PUBLIC USE (cont.)

- 18. Cooperating Associations ..... Nothing to report
- 19. Concessions ..... Nothing to report

#### I. EQUIPMENT AND FACILITIES

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

#### J. OTHER ITEMS

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

#### K. FEEDBACK



## A. HIGHLIGHTS

Widespread common murre die-off in February; reached from the Sitka area, to the Pye Islands, to waters near Seward & Homer (see Piatt and Van Pelt, in prep.)

Fishing vessel grounded near Two-headed Island resulted in minimal fuel spillage; boat was moved to deeper water and sunk by the U.S. Coast Guard.

Unit biologist visited two log transfer facilities at Afognak Island in winter to evaluate their Right-of-Way permit compliance.

Refuge received Minerals Management Service funding to monitor seabirds at Gull Island and 60-foot Rock in Kachemak Bay, and at Chisik Island in Cook Inlet.

Air quality study conducted by Steve Talbot (botanist, Region 7) at Chisik Island. Mark Clark, of the Soil Conservation Service, collected soil samples at Chisik Island to supplement information related to botanical and air quality studies recently completed there.

Unit biologist participated in Career Day at the Homer High School in March.

ARCO, Inc. conducted geophysical exploration (including seismic surveys) in lower Cook Inlet in May & June; part of their exploration took place near Chisik Island.

Unit biologist "thumbed a ride" on the R/V *Medeia*, operated by the Alaska Department of Fish and Game (ADF&G), to Lowrie Island where she established ten permanent study plots to monitor burrow-nesting seabirds (primarily Cassin's auklets); one plot was put in at Forrester Island. Slater also helped construct a permitted cabin for ADF&G use during their long-term studies of Steller's sea lions. This late-May visit was an unusual event -- it was the first visit EVER for Refuge personnel to land on Lowrie & Forrester islands in Southeast Alaska.

For the first time, the Refuge monitored tufted puffins at privately-owned Flat Islands in Kachemak Bay.

Unit biologist visited a permittee's site at South Noisy Island in July to evaluate his Special Use Permit compliance.

In August, a Refuge volunteer and Unit biologist accepted a National Park Service (NPS) offer of transportation to the Pye Islands for a brief familiarization trip as NPS personnel revisited sites in the vicinity to monitor impacts of the T/V *Exxon Valdez* oil spill.

Comment period for proposed gold mine operation which may affect Tuxedni Bay & Chisik Island (designated Class 1 Wilderness), began in November.

St. Lazaria Island was visited briefly in early June to establish permanent study plots to monitor burrow-nesting seabirds.

## B. CLIMATIC CONDITIONS

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

## D. PLANNING

### 2. Management Plan

The wildlife inventory plan was revised to address seabird monitoring studies at Chisik Island and other seabird colonies in lower Cook Inlet.

### 5. Research and Investigations

A consortium of researchers (from Colorado State University, Texas A & M, University of British Columbia, University of California-Davis, and Alaska Department of Fish and Game) conducted sea lion studies at Lowrie Island and hope to learn why some sea lion populations are experiencing a severe decline in numbers.

East Amatuli studies were funded by *Exxon Valdez* oil spill monies.

### Alaska Maritime NR93- "Common Murre Restoration Monitoring in the Barren Islands, Alaska"

Abstract: This report summarizes the results of the second year of common murre (*Uria aalge*) restoration monitoring work conducted in the northern Gulf of Alaska for the *Exxon Valdez* Oil Spill Trustee Council. Information on population numbers, nesting chronology, and productivity of murres were collected by U.S. Fish and Wildlife Service (FWS) biologists at the injured East Amatuli Island - Light Rock and Nord Island - Northwest Islet colonies in the Barren Islands during the 1993 breeding season. These data are presented and statistically compared with information reported in the 1989-1992 FWS murre damage assessment and restoration studies. Although murre productivity was high (average = 0.63 fledglings per egg) at the Barren Islands in 1993 compared to values reported from other Alaskan colonies, no trends were found in population numbers over the 5-year postspill interval.

## E. ADMINISTRATION

### 4. Volunteer Program

Student Conservation Association volunteer John Ingram assisted with monitoring studies at Chisik Island for the summer, as did Refuge volunteer, Neil Herring. Many Refuge volunteers assisted with seabird monitoring at Gull and Flat Islands, and 60-foot Rock. They included: Terry Carten, Dave Erikson, Jane Kidd, Rick Lancot, George Powell, Sara Reinert, Lynda and Anne-Marie Ronan, Kurt Schmidt, Kathy Smith, Arthur and Carol Westing, and Stephanie Zador.

Rebecca Himschoot (Refuge volunteer), Chris Conroy (UAF student), and two Fish and Wildlife Service employees, Hilmar Maier and Mike "Jake" Jacobson, pluckily helped monitor permanent plots of burrow-nesting seabirds at St. Lazaria Island.

### 7. Technical Assistance

Not atypically, we received reports of dead wildlife (mostly bald eagles and sea otters). In most cases, specimens could be salvaged and distributed to education, research or government entities. These included the National Wildlife Health Research Center (NWHRC), Law Enforcement (and subsequently, the Bald Eagle Repository), and the Marine Mammals Management office.

In cooperation with the Migratory Bird Management office (Region 7) and National Biological Service (NBS), we sent several common murre carcasses to the NWHRC to investigate the cause(s) of an extensive die-off in February. Mortality was attributed to starvation, which may have resulted from the presence of saxitoxin. Herring collected in the same vicinity of dying murre were found to contain domoic acid.

Injured live bald eagles were evaluated by a local veterinarian, and then either euthanized or sent to "The Learning Center," a rehabilitation facility in Anchorage.

## F. HABITAT MANAGEMENT

### 6. Other Habitats

Refuge jurisdiction includes some nearshore marine waters at Womens and Karluk bays (Kodiak Island) and waters surrounding Afognak Island. Womens Bay and Afognak Island waters lie next to communities and upland resource extraction operations which cause marine degradation. Infrastructure includes a U.S. Coast Guard base, freight transfer facilities, a seafood reduction plant, and a sewage treatment plant.

Two Native corporations owning land adjacent to Refuge waters actively logged their lands in 1993. We visited their log transfer facilities (LTF) in 1993 to determine their level of

compliance with Special Use Permit stipulations. The particular concern with LTF's is the accumulation of bark deposits at the bottom of the water column in the vicinity of the log slide and log rafting area. Bark accumulations essentially smother macrofauna, and as the bark decomposes, it creates a highly acidic environment which prevents the survival of naturally-occurring microfauna.

## G. WILDLIFE

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

Jay Nelson, biological technician, and John Ingram, SCA volunteer, collected data at Chisik Island on a daily basis from 16 June to 14 September. Additional observers helped complete population counts in mid-June (one observer), and late July and early August (two observers). Crews of three or four people counted ledge-nesting seabirds on plots during four visits to Gull

Island and three visits to 60-foot Rock. Three people participated in tufted puffin burrow counts during two visits to Flat Islands.

### 6. Raptors

A survey of raptors at St. Lazaria Island, conducted by the Migratory Bird Management office (Juneau), also provided logistical support for the Unit Biologist to establish permanent monitoring plots for burrow-nesting seabirds. A small army of people helped to survey seven plots to determine occupancy and status: Hilmar Maier (Realty Division, Region 7), Mike "Jake" Jacobsen (Migratory Birds, Juneau), Chris Conroy (UAF student), and Rebecca Himschoot (volunteer).