ALASKA MARITIME NATIONAL WILDLIFE REFUGE

HOMER, ALASKA

ANNUAL NARRATIVE REPORT

CALENDER YEAR 1989

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

HOMER OFFICE

ALASKA MARITIME NATIONAL WILDLIFE REFUGE

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REVIEW AND APPROVALS

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Calendar Year 1989

Refuge Manager — Date 1/9/91

Associate Manager, Refuges & Wildlife — Date

Regional Office Approval — Date

INTRODUCTION

Homer Headquarters Office

Alaska Maritime National Wildlife Refuge

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

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

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

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

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

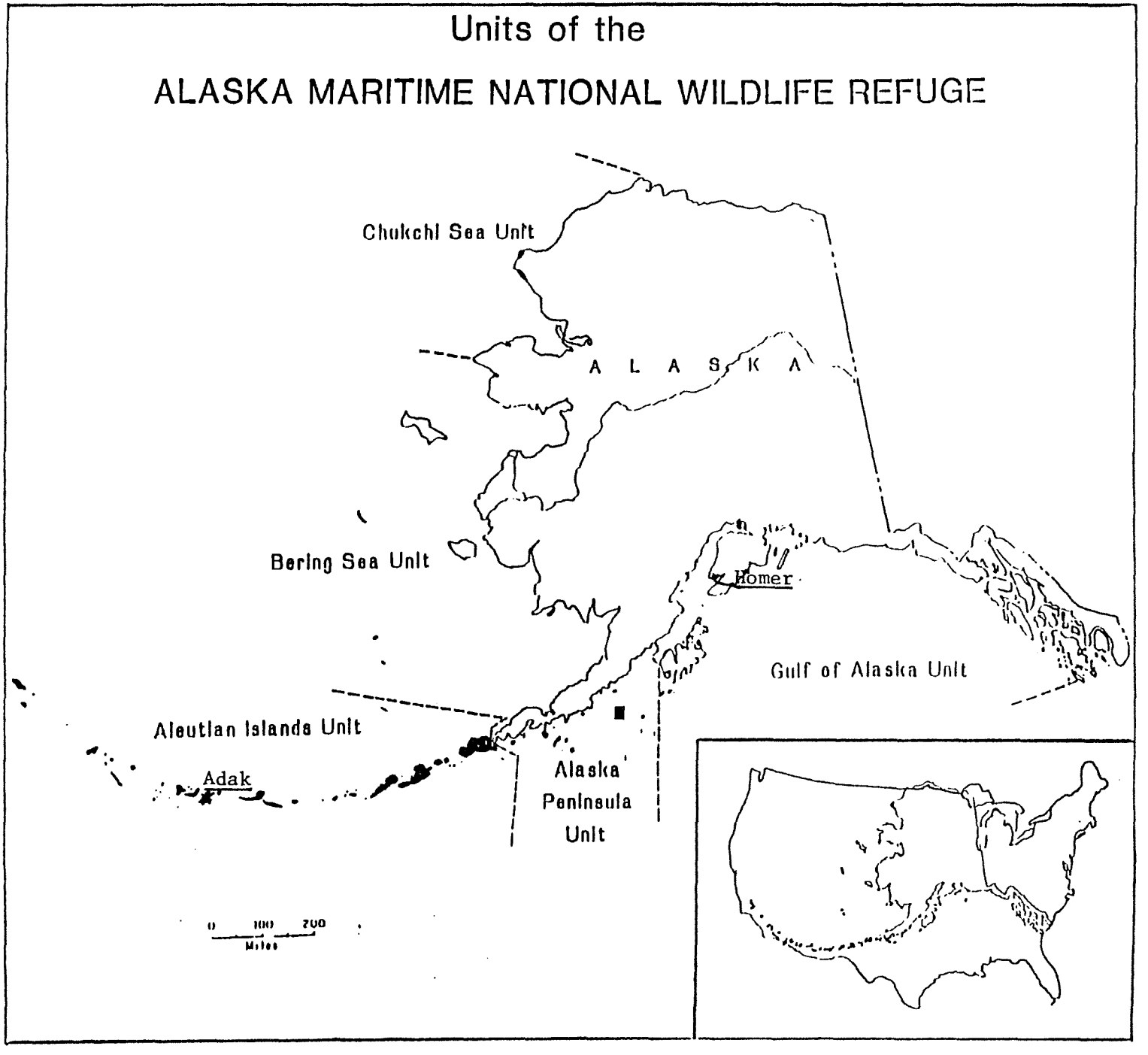

Figure 1. Location of the units of the Alaska Maritime National Wildlife Refuge

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A. HIGHLIGHTS

- Exxon Valdez oil spill wreaks environmental and administrative havoc.
- Michael Blenden fills Deputy Refuge Manager position vacated by Tom Early.
- Eric Nelson fills Marine Machinery Mechanic position aboard M/V Tiglax.
- Susan Schulmeister and Don Dragoo fill newly established permanent intermittent Biological Technician positions.
- Public visitation to Homer Visitor Center soars.
- Refuge receives a Congressional appropriation to conduct a concept study for a visitor center and headquarters in Homer.
- Supervisory Wildlife Biologist Nysewander and Wildlife Biologists Nishimoto and Bailey detailed to Exxon Valdez Oil Spill Assessment Task Force.
- Regional Director Stieglitz and Assistant Regional Director Rogers conduct inspections of Aleutians, Pribilof Islands and St. Matthew Island.
- Refuge Manager Martin detailed to Anchorage Regional Office as Associate Manager from March 20 - May 1.
- Mike Hedrick, Deputy Refuge Manager from Kenai National Wildlife Refuge, detailed as Alaska Maritime National Wildlife Refuge's Manager in Martin's absence.

D. PLANNING

1. Master Plan

The refuge's Comprehensive Conservation Plan which was signed off on in October of 1988 called for establishment of a permanent refuge headquarters and large visitor center in

Homer. In November of 1989, the refuge learned that Congress had appropriated $100,000 for development of a concept plan for the refuge headquarters and visitor center. Refuge Manager Martin and Outdoor Recreation Planner (ORP) Benson traveled to Anchorage to meet with the Regional Office (RO) engineering staff and create a planning team. The team will be represented by Refuge Manager Martin or Deputy Refuge Manager Blenden and ORP Benson. Since the plan is due in Congress May 1, there was little time to waste. The biological staff and administrative staff met separately to delineate expected program activities and resulting space needs for the year 2005. Other refuge ORPs and RO educational staff met with Benson to brainstorm visitor center ideas. Benson began public involvement activities (see below).

The American Society of Landscape Architects awarded one of nine honor awards out of 323 entries for the refuge's Comprehensive Conservation Plan. The plan had been submitted to the annual competition by RO Chief of Planning and Landscape Architect Leslie Kerr. A two page spread with photos in the November issue of "Landscape Architecture" described the refuge and the planning process.

2. Management Plan

The Kenai Fisheries Assistance Office continued preparation of the Refuge Fisheries Management Plan, in cooperation with the refuge. The plan was near completion at year's end.

3. Public Participation

ORP Benson created a working group to advise the refuge on development of a visitor center in Homer. The city council, the Chamber of Commerce, the Center for Alaskan Coastal Studies, the Pratt Museum, the school district, and the tourist industry were represented in the working group which met once in December. Prior to this meeting, Benson had met with the boards of all the above organizations to explain the visitor center planning. In addition, she met with the tourism committee of the Kenai Economic Development Council.

E. ADMINISTRATION

Personnel

PERMANENT:

1. John L. Martin, Refuge Manager, GM-13, entered on duty December 21, 1981, permanent full-time.
2. Michael D. Blenden, Deputy Refuge Manager, GS-12, entered on duty February 27, 1989, permanent full-time.
3. David R. Nysewander, Supervisory Wildlife Biologist, GS-12, entered on duty September 28, 1986, permanent full-time.
4. Edgar P. Bailey, Wildlife Biologist, GS-11 entered on duty October 1, 1981, permanent full-time.
5. Michael L. Nishimoto, Wildlife Biologist, GS-11, entered on duty April 15, 1984, permanent full-time.
6. Arthur L. Sowls, Wildlife Biologist, GS-11, entered on duty September 28, 1986, permanent full-time.
7. Carol M. Hagglund, Budget Assistant, GS-7, entered on duty August 21, 1983, permanent full-time.
8. Trina B. Fellows, Refuge Clerk, GS-4, entered on duty November 28, 1983, permanent full-time.
9 Kimberlee D. Honsowetz, Clerk-Typist, GS-3, entered on duty July 5, 1988, permanent full-time, resigned on June 9, 1989.
10. Laurie (Poppy) A. Benson, Outdoor Recreation Planner, GS-9, entered on duty July 17, 1988, permanent full-time.
11. Robert E. Archibald, Engineer, WG-10, entered on duty March 23, 1987, permanent full-time, resigned on February 21, 1989.
12. Alvin D. Bayer, Ship Operator, WG-12, entered on duty October 6, 1986, permanent full-time.
13. Kevin D. Bell, Ship Operator 1st Mate, WG-11, entered on duty July 8, 1987, permanent full-time.
14. Eric A. Nelson, Marine Machinery Mechanic, WG-10, entered on duty February 21, 1989, permanent full-time.
15. Marcia J. Macone, Cook/Deckhand, WG-8, entered on duty August 8, 1988, permanent intermittent.
16. Susan D. Schulmeister, Biological Technician, GS-5, entered on duty May 22, 1989. permanent intermittent.
17. Donald E. Dragoo, Biological Technician, GS-6, entered on duty May 27, 1987, permanent intermittent.

TEMPORARY:

18. Ira S. Bailey, Relief Ship Operator, WG-11, entered on duty August 29, 1989, temporary full-time, terminated September 10, 1989.
19. David E. Swift, Relief Ship Operator, WG-11, entered on duty June 23, 1989, temporary full-time, terminated August 5, 1989.
20. Natasha C. Kline, Wildlife Biologist, GS-9, entered on duty June 22, 1989, temporary full-time, terminated August 17, 1989.
21. Crispin H. Dippel, Wildlife Biologist, GS-9, entered on duty November 13, 1989, temporary full-time.
22. Anna Marie Bott, Cook/Deckhand, WG-8, entered on duty December 1, 1989, temporary full-time.
23. Natasha Edwards, Cook/Deckhand, WG-8, entered on duty June 18, 1989, temporary full-time, terminated July 15, 1989.
24. Aleta Lynn Gibson, Cook/Deckhand, WG-8, entered on duty September 13, 1989, temporary full-time, terminated November 18, 1989.
25. Jerry M. Andrew-Miller, Deckhand, WG-5, entered on duty December 1, 1989, temporary full-time.
26. Rick Dean Mathis, Deckhand, WG-5, entered on duty September 14, 1989, temporary full-time, terminated November 18, 1989.
27. Gregory B. Snedgen, Deckhand, WG-5, entered on duty June 1, 1989, temporary intermittent.
28. Jeffrey H. Wraley, Deckhand, WG-5, entered on duty September 18, 1989, temporary full-time, terminated November 17, 1989.
29. Bekki J. Andrew-Miller, Clerk-Typist, GS-3, entered on duty October 25, 1989, temporary full-time.
30. Marlene G. Arndt, Clerk-Typist, GS-3, entered on duty May 3, 1989, temporary full-time, terminated June 30, 1989.
31. Paul D. Grubb III, Clerk-Typist, GS-3, entered on duty June 26, 1989, temporary full-time, terminated September 15, 1989.
32. Joanne C. Popham, Clerk-Typist, GS-3, entered on duty September 25, 1989, temporary full-time, terminated October 24, 1989.
33. Tina M. Odenbough, Data Transcriber, GS-3, entered on duty May 1, 1989, temporary full-time, terminated May 12, 1989.
34. Belinda K. Bain, Biological Technician, GS-5, entered on duty April 29, 1989, temporary full-time.
35. Andrea J. Blakesley, Biological Technician, GS-5, entered on duty May 10, 1989, temporary full-time, terminated October 29, 1989.
36. Laura A. Fairchild, Biological Technician, GS-5, entered on duty June 12, 1989, temporary full-time, terminated October 20, 1989.
37. Teresa M. Ferraro, Biological Technician, GS-5, entered on duty July 14, 1989, temporary full-time, terminated July 25, 1989. Student Conservation Association Volunteer May 29, 1989-July 13, 1989 and July 26, 1989-August 4, 1989.

38. Elizabeth A. Beringer, Biological technician, GS-5, entered on duty April 28, 1989, temporary full-time, terminated June 27, 1989. Student Conservation Association volunteer April 8, 1989-April 27, 1989 and June 28, 1989-August 4, 1989.

VOLUNTEERS:

39. Robert C. Angell, Student Conservation Association volunteer, April 19, 1989-July 15, 1989.
40. Sharon L. Bayer, M/V Tiglax volunteer, May 16, 1989-July 12, 1989 and October 31, 1989-November 15, 1989.
41. David Beadle, Student Conservation Association volunteer, June 6, 1989-September 4, 1989.
42. Michael T. Brown, Volunteer Deckhand, April 21, 1989-July 12, 1989.
43. Douglas B. Caldwell, Volunteer Deckhand, February 21, 1989-March 3, 1989.
44. Darlene L. DeGhetto, Refuge volunteer, July 1, 1989-August 6, 1989.
45. Anthony A. Flaherty, Student Conservation Association volunteer, July 11, 1989-October 30, 1989.
46. Dianna Fornasier, Biological Technician volunteer, July 20, 1989-August 30, 1989.
47. John V. Hudsen, Volunteer Deckhand, April 15, 1989-May 5, 1989.
48. Elizabeth A. Jay, Student Conservation Association volunteer, August 6, 1989-September 29, 1989.
49. Ian L. Jones, Refuge volunteer, May 6, 1989-August 30, 1989.
50. Ann Kaiser, Refuge volunteer, September 22, 1989-October 7, 1989.
51. Donald P. Kemner, Refuge volunteer, July 6, 1989-August 15, 1989.
52. Tess Madigan, Student Conservation Association volunteer, June 4, 1989-September 4, 1989.
53. Joe McClung, Volunteer Ship Operator, Surfbird June 26, 1989-August 1, 1989.
54. Eric Murphy, Refuge volunteer.
55. Kim Marie Murphy, Refuge volunteer.
56. Mary E. Pitts, Student Conservation Association volunteer.
57. Annette Roessek, Refuge volunteer, July 11, 1989-September 16, 1989.
58. Jerry R. Spraher, Refuge volunteer, July 1, 1989-September 1, 1989.
59. William H. Stahl, Student Conservation Association volunteer, June 15, 1989-September 30, 1989.
60. Robert H. Sunstrom, Refuge volunteer, May 6, 1989-August 30, 1989.
61. Kathryn Thomas, Student Conservation Association volunteer, June 4, 1989-September 4, 1989.

Homer office personnel, from left to right top row: Blenden, B. Andrew-Miller, J. Andrew-Miller; bottom row: Hagglund, Nysewander, Fellows, Sowls, Schulmeister, Snedgen, Bailey. 1989 CD

Bell (left) and Bayer in wheelhouse of M/V Tiglax.

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

Table 1. Staffing Pattern, 1985 to 1989

	Permanent			Total
	Full-Time	Part-Time/ Intermittent	Temporary	FTE
FY89	13	3	21	25.77
FY88	13	3	4	15.20
FY87	10	0	0	10.00
FY86	7	0	0	7.00
FY85	7	0	2	6.30

4. Volunteer Program

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

5. Funding

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

Table 2. Alaska Maritime Refuge Funding, FY 1985 to FY 1989

	1260	1400/ 1480/1113	1520	8610	1971	1975	Totals **
FY89	1,544,000	330,000	-	15,933	60,036	11,438	1,961,407
FY88	1,395,600	340,000	-	17,700	-	69,498	1,823,023
FY87	1,154,000	346,000	-	19,000	-	68,201	1,587,201
FY86	882,000	476,000	1,975	26,781	-	-	1,389,136
FY85	1,100,000	239,000	3,010	24,500	-	-	1,368,010

**Includes 6850 funds of $2,380 for 1986; $1,500 for 1985; and 225 for 1988.

The Alaska Maritime National Wildlife Refuge is headquartered in the Ross Duncan building located on Pioneer Avenue in downtown Homer. A total of $59,400 (which includes utilities, snow and refuse removal) is paid for approximately 4,032 square feet of leased office/storage space. An additional 1,400 square feet of storage space located at 509 Sterling Highway, was leased at the rate of $769 per month.

6. Safety

First aid and CPR training were given to field people before leaving for field camps. In addition, all employees receive survival suit training and must complete the U.S. Coast Guard Water Survival Series of video tape training. All permanent employees who operate boats must complete the U.S. Coast Guard Axillary Small Boat Safety and Seamanship course.

The following summarizes the safety operations conducted on the Tiglax during the year. All fire fighting and high pressure vessels were inspected by authorized inspectors. These included fire extinguishers, air receivers, scuba tanks, halon auto systems, aqueous film forming foam (AFFF) systems, etc. The two 25-man life rafts were checked and certified. All safety apparel were inspected and tested by Chief Mate Bell and by the U.S. Coast Guard shipping inspector who prepared a letter of

compliance with U.S. Coast Guard regulations. Numerous survival suits were found defective and sent in for repairs. Many flotation coveralls were replaced. Safety meetings and fire and boat drills were held every two weeks while at sea.

Bell completed Emergency Medical Care at Sea Training at the U.S. Merchant Marine Academy, Kings Point, New York. Cook/Deckhand Macone completed Emergency Trauma Training given by the Homer Volunteer Fire Department.

All the remote camps have a SAFETY plan which is kept in the Homer office radio room. The plan indicates emergency contacts, radio schedule frequencies and times, camp members, etc. This works in most areas. However, we do have some places, like the Barren Islands, that appears to be a "black hole" which swallows all radio transmission. We still have not figured out a satisfactory communication system for this area.

Due to turnover in personnel and the disruption from the Exxon Valdez oil spill, safety meetings were held only sporadically during the year. Regularly scheduled meetings will be reinstated next year.

8. Other

Thirty-two Special Use Permits were issued for activities in all refuge units except the Aleutian Islands Unit, which are issued from Adak. Six permits were issued for the following activities in the Alaska Peninsula Unit: maintenance of a seismic station, cattle grazing, bathymetric mapping, survey of strain accumulation, archaeological survey and guiding fishers and photographers.

Twenty-two permits were issued for the following activities in the Gulf of Alaska Unit: commercial set net fishing, cattle grazing, operation of outfall line, guiding sea kayakers, assess oil spill damages, clean oil contaminated beaches, paleontological survey, operation of VHF repeater, maintain windsock, geologic survey, operate seismic station, and guided waterfowl hunts.

Two permits were issued for the following activities in the Chukchi Sea Unit: guiding big game hunts, and cadastral survey of native lands.

Two permits were issued for the following activities in the Bering Sea Unit: commercial cinematography, and access across refuge lands for vessel salvage rights.

The March 24, 1989 grounding of the Exxon Valdez resulted in the country's worst environmental disaster, directly affecting Alaska Maritime, Kodiak and Alaska Peninsula National Wildlife Refuges. Not only did it decimate several seabird populations in Alaska Maritime NWR and foul many miles of refuge shoreline, but resulted in an administrative and management nightmare. Even the most bizarre predictions during the first two weeks of the spill fell short of describing the profound effect the spill would have on marine and coastal resources, regional and national programs and Service employee's lives. The following highlights the oil spill activities of Alaska Maritime National Wildlife Refuge staff members for the year.

Refuge Manager Martin was detailed to Washington, D.C. from April 4 - 17 to work as a special assistant on the oil spill to the Director. During that time he prepared Congressional testimony, prepared answers to Congressional inquiries, briefed the Secretary of the Interior, briefed news reporters and routinely briefed the Directorate. Upon his return to the Anchorage Regional Office and his duties as Acting Associate Manager he worked on assigning staff from various refuges to work at various oil spill field stations.

Deputy Refuge Manager Blenden represented the Service on Homer Advisory Committee to the Seward Multi-Agency Coordination Committee, later to become the Homer Multi-Agency Coordination (MAC) Committee. These meetings, open to a very interested and vocal public, convened daily from April 5 through late May. Blenden and Acting Refuge Manager Hedrick spent most of their time during April and May meeting with this group, attending various committee and sub-committee meetings and individual meetings with representatives from Exxon, state and other federal agencies, local and national conservation organizations, news media and ever present entrepreneurs seeking U.S. Fish and Wildlife Service's blessing so they and their boats would be hired by Exxon for wildlife recovery and rescue.

Mike Hedrick, Acting Refuge Manager from March 23 through May 1, replaced Blenden on the Homer MAC Committee on May 11 and served not only as chairperson of the group through the end of the year, but as the Service's oil spill representative in the Homer zone.

On March 29 Supervisory Biologist Nysewander was called to Valdez to assist Regional Contaminants Coordinator Everett Robinson-Wilson in conducting reconnaissance trips with dignitaries and scientists, and drafting response plans. Following this he prepared and lead the first Service vessel and scientific crew into the sound to assess spill related wildlife mortality. In late spring Nysewander was assigned to an interagency team in Juneau that drafted the first set of damage assessment proposals for all bird species potentially affected by the spill. For the remainder of the year he was appointed the principle investigator

for Bird Study #3 of the damage assessment proposals. This study involved censuses of all bird colonies in the oil spill zone, from Prince William Sound to the Semidi Islands. This work and the associated report writing and presentations to management and scientific reviewers extended through the end of the year.

On March 21 Wildlife Biologist Nishimoto travelled to Seward to assist the National Park Service with wildlife surveys of park and refuge shorelines. He and Biological Technician Beringer worked out of Seward until May 15. While in Seward Nishimoto and crew assisted not only in surveys, but advised the MAC Committee on local wildlife issues, assisted in the collection of dead wildlife, helped organize wildlife collections and managed data at the bird rehabilitation facility (see Gulf of Alaska Unit Section, J.3).

Wildlife Biologist Sowls assisted Kent Wohl of the Migratory Bird Office to work in Prince William Sound from April 5 - 19. They performed shoreline transects from a 25 foot Boston Whaler around Naked, sections of Knight and Little Smith islands and proceeded to Green Island where they joined up with the Service team on the Service vessel Curlew. The following two weeks were spent conducting beached bird surveys, and shoreline and pelagic censuses for marine birds and mammals.

Oiled beach on Eleanor Island in Prince William Sound. 4-89 AS

he worked with the National Park Service on surveying wildlife in the Chiswell Islands (part of Alaska Maritime National Wildlife Refuge) and Kenai Fjords National Park. From April 23 - May 2 Dragoo assisted Ron Britton from the Endangered Species office in Sacramento, California in capturing oiled sea otters along the outer coastline of the Kenai Peninsula. This was part of what was later to become a large effort to capture oiled otters and send them to rehabilitation facilities in Seward and Homer.

Biological Technician Bain was also in Seward from April 1-6 working with the National Park Service on both the refuge and park. Upon her return to Homer she was assigned to the seabird and marine mammal morgue. For several weeks she helped sort, identify and label hundreds of oiled marine birds and mammals.

Wildlife Biologist Bailey worked in the Barren Islands, assisted the Homer MAC Committee in helicopter surveys along the south side of the Kenai Peninsula, the Chugach Islands and Kachemak Bay, and assisted with shoreline surveys of the Chiswell and Pye islands and Kenai Fjords National Park. Between April 6 and June 16 Bailey collected bird carcasses and surveyed Barren Island beaches nine times. He established and supervised a field camp on Ushagat Island in May. He worked in cooperation with Kenai Fjords National Park between June 27 and August 4 conducting seabird colony censuses, shoreline counts of marine birds and mammals from the Park Service vessel Kenai Ranger.

Outdoor Recreation Planner Benson assisted Bailey in surveys of the Barren Islands and outer Kenai Peninsula coastline. From May 1 through the end of the year she was in charge of the Homer wildlife morgue where she supervised and worked at species identification, record keeping, storage and transportation. This typically required meeting incoming boats early in the morning and rummaging through reeking masses of rotten carcasses well into the night. She also coordinated deliveries of live birds and sea otters to rehabilitation facilities in Homer and Seward.

While most staff members were away from the office most of the time during April and May Budget Assistant Hagglund, Refuge Clerk Fellows and Clerk-Typist Honsowetz were left to manage a continual barrage of incoming phone calls and office visitors, and pinch in wherever needed. Telephone traffic swamped our four line system, requiring it be expanded to eight incoming lines. The number of personnel actions, amount of employee travel and number of financial transactions was twice that for the same period last year. The refuge administrative staff supported oil spill operations on as many as three vessels at one time, twelve additional oil spill employees and approximately seven oil spill volunteers.

Mousse oil, Prince William Sound. 4-89 AS

Various oiled seabirds and sea otter, Prince William Sound. 4-89 AS

office all but ceased. We will be working on the backlog of work for some time to come. To assist with the administrative backlog Secretary Sally Jo Collins and Clerk-Typist Judy Steeves were graciously "loaned" to us from Innoko National Wildlife Refuge. They updated our entries into the Field Financial Tracking System, submitted invoices for payment and a multitude of administrative details we had been unable to tackle. Sally was here June 19 - July 12. Judy came shortly thereafter and continued work on these projects through July 28.

The Tiglax and crew also made substantial contributions. First Mate Bell and Cook/Deckhand Macone operated the M/V Curlew in Prince William Sound from April 1 - 8. The Curlew, normally supporting the Ecological Services office in Juneau, was brought up to the Sound to provide berthing for Service employees conducting shoreline surveys and assessing initial damages.

The Tiglax participated in off-shore transects, surveying seabird mortality in open ocean during May 1-8. Following the scheduled field season she was called out for three more oil spill cruises. Between September 23 and October 14 she conducted off-shore and near-shore seabird transects around Kodiak Island, in Shelikof Strait and along the Alaska Peninsula with seabird biologists from the office of Migratory Bird Management and Alaska Peninsula National Wildlife Refuge. On October 31 she sailed again for Cordova with sea otter biologists from the Alaska Fish and Wildlife Research Center and supported the capture phase of a sea otter study until returning to Cordova on November 16 and Homer on November 18. The Tiglax sailed again from Homer on December 3 and arrived in Cordova on December 4 to continue sea otter capture. This work was hampered by poor weather and discontinued on December 13. The Tiglax returned to Homer on December 14.

Wildlife Biologist Sowls with oiled sea otter on the east side of Knight Island in Prince William Sound. 4-89

Dead oiled sea otter found near Knight Island in Prince William Sound. 4-89 AS

Oil spill clean up debris left on north side of Naked Island. 4-89 AS

H. PUBLIC USE

1. General

This was ORP Benson's first full year on the Homer staff and what a year it was! Benson had just finished her law enforcement training with an add-on course at the Federal Law Enforcement Training Center when the Exxon Valdez went aground in March. From that point on most information and education activities discussed in the following sections were aimed at interpreting America's largest oil spill and the most damaging oil spill ever from a wildlife standpoint.

The spill substantially changed the refuge's relationship to the Homer community. The refuge office served as the headquarters for the Service oil spill effort in the Homer sector. (Four towns were oil spill centers - Valdez, Seward, Homer, and Kodiak.) Local people who were only vaguely aware of our location and purpose came to the office to deliver dead birds, meet with the oil staff, or just hang out and wait for "The Word" - any word on what was happening. The early days were particularly chaotic as the oil advanced on Homer. The refuge office was open seven days a week from 8:00 a.m. to 9:00 p.m. Phones rang constantly and refuge staff were continually heard on local radio and quoted in the paper. Refuge visibility skyrocketed and working relationships with other agencies and groups were formed or improved. It was unfortunate it took a great tragedy to push us into the limelight. Hopefully we can use our new status in the community to advance understanding of the refuge's goals.

On a cheerier note, in November, the refuge learned Congress had appropriated $100,000 for a concept study for a headquarters and visitor center in Homer. Initial planning activities for the visitor center included a brainstorming session in the Regional Office for refuge ORPs and Regional Office engineering and educational staffs, formation of a working group representing all segments of the Homer community to advise the refuge, and talks to numerous civic groups on the visitor center by ORP Benson, (See the discussion under planning.)

A public use review of the refuge was conducted in October by Regional Office ORP Dave Patterson and Educational Specialist Janet Addy. The entire staff filled out extensive questionnaires on the public use program before their arrival. For most of a week they met with various refuge and community members. Their report is not yet out.

A school class watched the bio-techs sort and identify the casualties of the Exxon Valdez. Most interpretive activities in 1989 centered on the oil spill. 1989 PB

Marine sightseeing was sharply curtailed in Homer as all the boats left to work on the oil spill. In Seward, several companies continued their very successful sightseeing trips to the Chiswell Islands. Over 24,000 people per year visit this seabird and sea lion rookery. 1989 PB

2. Outdoor Classrooms - Students

The morgue for receiving and processing the casualties of the Exxon Valdez was originally set up in the garage of the refuge headquarters. As weather improved, morgue activities were moved outside onto the driveway which fronted on the main street of Homer. People noticed the activity and came by to watch including several school groups on marine field trips to Homer. Benson took advantage of the situation and created her "dead bird" talk on the effects of the spill on birds and otters and the purpose of collecting and studying them. Four school groups, an Elderhostel, a Boy Scout troop, and four sessions of Trailside Discovery Camp from Anchorage came by the morgue for the talk and to watch biologists at work.

ORP Benson gave presentations for SeaWeek to eight different groups, a total of 250 students, at Paul Banks Elementary School. Although Benson soft-played her topic of the effects of the oil spill on wildlife for the young, K-3 students, their artwork and writings displayed at the school showed how much they had already been traumatized by the spill. Benson will always remember that day, May 12, because she assured the children the oil had bypassed Cook Inlet and would not come to Homer. Later that afternoon, tar balls and oil patties came ashore on the Homer Spit in a pattern which was to continue for three months. So much for building faith in the Service among the very young!

Other oil spill presentations Benson made to students and youth groups included a Homer 4-H meeting, a Kenai Peninsula 4-H encampment, a field trip for home learning students, and a Boy Scout troop.

Elderhostel, a college sponsored education program for senior citizens, expanded from one session per year in Homer to two. Refuge Manager Martin and ORP Benson took time out in mid-spill to address the May session. Martin talked on the big picture of the spill particularly his experiences in Washington D.C. as the Service's spill representative. Benson talked on the effects of the spill on wildlife. For the September session, Benson presented her slide program, "Tarred Feathers: Wildlife and the Exxon Valdez", and accompanied the seniors on a ferry trip to Seldovia helping them with bird and mammal spottings and identification. About 40 seniors participated in each program.

Benson also gave a talk on the seabirds of Gull Island to 120 participants at a Pratt Museum fund raiser. The talk was part of a day long field trip to the Center for Alaskan Coastal Studies in China Poot Bay.

A Homer area Girl Scout troop completed their wildlife badge in three meetings at the visitor center under the direction of their leader, Clerk-Typist Honsowetz.

3. Outdoor Classrooms - Teachers

The regional conference of the Northwest Association of Marine Educators was held in Homer in July. Both ORP Benson and Student Conservation Association (SCA) Volunteer Mary Ellen Pitts were involved in the three days of activities. Pitts and Benson ran a refuge information booth at the conference which included a refuge display, a video on the oil spill, and Alaska Natural History sales items. Benson gave a slide talk on the refuge program at one of the workshops, tantalizing the primarily teacher audience with volunteer opportunities on the largest marine refuge in the country. She also served as a naturalist on two boat trips to Gull Island offered as field trips for conference participants.

Fifteen counselors from the Youth Earth Stewardship Program, an educational/outdoor adventure program for teenagers, visited the refuge in June. Benson talked to them about the oil spill and its impact on wildlife.

In October, Benson assisted Kenai Park Ranger Candace Ward in a wildlife curriculum workshop as part of the Kenai Peninsula's school district in-service program. A small, but enthusiastic, group of teachers attended the workshop which was held at the Kenai National Wildlife Refuge visitor center. Benson did a slide talk on the impacts of the spill on wildlife.

The Center for Alaskan Coastal Studies in conjunction with the Pratt Museum held a 17 session training program for volunteers on the natural history of Kachemak Bay. Over 70 people faithfully attended the sessions. At the session devoted to birds, wildlife biologist Ed Bailey gave a slide talk on seabird habitats of the refuge and Benson talked on identifying and interpreting seabirds.

The statewide conference of school librarians was held in Homer in March. Benson created a refuge information sheet for inclusion in the librarian's packets and erected an exhibit at the conference on the Alaska Natural Resource and Outdoor Educators Association.

6. Interpretive Exhibits/Demonstrations

The refuge continued to make due with the cramped "storefront" it uses for the visitor center. Parking, particularly for motor homes, remains a serious problem. Lack of any group space is very limiting. The center did not open until mid-May when Benson was finally relieved of her duties running the Homer oil spill morgue. Although visitor center use remained low, 3700 visitors,

it increased dramatically over 1988, up 155 percent. This change is the result of the refuge's increased visibility due to the oil spill, ORP Benson's first year on the job, and the excellent help of SCA Volunteer Pitts. This was also the first summer the visitor center was open weekends.

New additions to the visitor center were an Alaska Natural History Association sales outlet, a video player, wall maps, several additional marine bird specimens, and oil samples, tar balls, an oil spill map and the most effective exhibit of all, a weekly tally of recovered oil spill casualties from the spill overall and just from the Homer area. Visitors frequently photographed the tally board and expressed shock at the numbers even though they reflected such a small percentage of the total toll. The video player was a very welcome addition, because it allowed us to show various oil spill tapes in addition to the old favorite, the refuge's movie "Chain of Life".

SCA Pitts prepared a brochure describing visitor center services and hours which was widely distributed to hotels, bed and breakfasts, and other visitor centers.

The refuge's traveling exhibit of photos, text, and refuge map got a workout this year. The exhibit was used to create a refuge information booth at the Homer Travel Fair and the Northwest Association of Marine Educators regional meeting described above. The booth looks very professional and attracted good comments at both events. The Homer Travel Fair was not well attended, probably 200 participants, but it was a good source of contacts with other Homer tourist interests.

The Pratt Museum of Homer created the finest oil spill exhibit in the state, "Darkened Waters: Profile of an Oil Spill". The exhibit opened June 23, allowing summer visitors an opportunity to understand what had and was happening here. Wildlife Biologist Sowls contributed a large percentage of the photographs used in the exhibit. ORP Benson, RO Public Affairs Officer Bruce Batten, and other refuge staff contributed information, review assistance, and an otter and oil murre for taxidermy. The refuge is very grateful to the Pratt for creating this fine exhibit particularly at a time when we were too embroiled in the spill itself to do a proper job of public information. By year end, the response to the exhibit had been so positive that the Pratt Museum began work on a traveling exhibit to open in major museums outside Alaska.

The National Park Service completed and installed two exhibits containing refuge materials. Kenai Fjords National Park in Seward installed a panel in their visitor center designed by ORP Benson describing the wildlife values of the Chiswell Islands, a nearby unit of the refuge. An airport exhibit for Sitka includes photos and text describing St. Lazaria Island, another refuge

unit. Since the Alaska Maritime National Wildlife Refuge has units adjacent to other state and federal entities throughout the entire state, the potential for cooperative exhibits is unlimited. This first experience has been very positive.

Refuge Clerk Fellows assisting in tagging and tooth-pulling (for identifying age) of sea otter. 1989 PB

7. Other Interpretive Programs

Since the Pratt Museum had already created an excellent oil spill exhibit, Benson decided the greatest interpretive need for the spill was a slide talk. Slides were gathered from refuge, Regional Office, and oil spill staffs, professional photographers, and community members. Benson presented seven showings in Homer of "Tarred Feathers: Wildlife and the Exxon Valdez" to an average audience size of 45 tourists. Two local hotels donated their conference rooms since the refuge has no space large enough for presentations.

In September, the show went on the road and was given once on the ferry to Kodiak, once in Kodiak, seven times in Minneapolis, and once in Seattle. The Minneapolis and Seattle talks were done in conjunction with a training trip of Benson's. Two of the Minneapolis talks were of particular interest, one to the University of Minnesota College of Wildlife and one at Region 3's Regional Office. The interest in the spill in land-locked Minnesota was so high that Benson had to turn down six more invitations to speak and a radio talk show. Refuge Manager Martin gave the program twice, once in Ohio and at the Rocky Mountain Arsenal in Denver. In all, over eleven hundred people heard the program presented by refuge staff. In addition, Regional Office oil czar Rowan Gould also requested a copy of the slide show and gave his own version of it to several Service audiences outside Alaska. At year's end, Kodiak refuge got a grant from the Alaska Natural History Association to make a video of the program.

The extensive collection of oil spill slides Benson had amassed during preparation of "Tarred Feathers" was in great demand throughout the year. At least two dozen parties from otter center workers to the U.S. Attorney's Office in Washington D.C. requested copies.

In September, Benson did a one day trial run as a naturalist on the state ferry Tustumena to Kodiak to explore the possibilities for a summer ferry naturalist program. The Kodiak ferry route passes through refuge islands and waters and offers excellent opportunities for pelagic bird and marine mammal watching. the experience was very positive and a Challenge Grant proposal was prepared for the project for the summer of 1990.

Benson did a slide talk on the birds of Kachemak Bay to the regional gathering of the Homemakers Club. About 50 people attended.

11. Wildlife Observation

Wildlife viewing opportunities in the Seward, Homer, and Kodiak areas were substantially reduced due to the oil spill activity. Charter operators could make much more money renting their boats to Exxon. No boats were available in Homer strictly for sightseeing. Tourism, however, was not reduced in spite of or perhaps because of the spill. Tourists would have loved to visit the oiled areas, but there were simply no boats, helicopters, or planes available.

Wildlife sightseeing at other popular refuge areas, St. Lazaria near Sitka and the Pribilof Islands, was not affected. No current use figures are available.

17. Law Enforcement

Benson completed her Federal Law Enforcement Training Center training with a Service add-on for Service regulations in March. Deputy Refuge Manager Blenden attended the refresher training at Marana in March. Both Benson and Blenden qualified in September with the Kenai National Wildlife Refuge staff at a Kenai shooting range.

Benson investigated an owl killing in a chicken coop in February. Owl and hawk attacks on chicken coops are common in late spring and often result in the death of the intruder. The Regional Office decided to drop the case.

Refuge involvement in the law enforcement aspects of the spill consisted of collecting and cataloguing as evidence of all of the bodies recovered. Oil spill casualties were stored in a locked freezer van in Homer and other oil spill towns. The vans were moved to Anchorage in September. Numerous special agents from Anchorage and other regions were in Homer and on the refuge in connection with the oil spill. Some collected "pure" evidence from refuge beaches, others helped refuge staff identify and catalogue at the morgue, and others monitored activities at the otter center in Jakolof Bay.

On November 22, a Notice of Violation was issued to an outfitter in the Village Islands for operating a commercial enterprise on a national wildlife refuge without a Special Use Permit. At year's end the case was still open and no court date was set.

18. Cooperating Associations

In May, the refuge reopened its branch of the Alaska Natural History Association which had been closed in 1985 due to low sales. In its first month of operation, the branch grossed more than in all of 1985. Gross for the year was $7,286, more than $2.00 per visitor. This high per visitor amount is probably the result of the numerous oil spill workers, Service and non-Service, who passed through the office with a lot of money to spend. Twenty percent of the sales were for oil spill videos, books, and magazines. In December, Benson attended the Alaska Natural History Association's two day annual meeting and training session in Anchorage. The meeting was particularly helpful for orienting a new branch manager.

I. EQUIPMENT AND FACILITIES

4. Equipment Utilization and Replacement

The Exxon Valdez spill greatly increased vessel usage in the refuge. In addition to the 120 ft. M/V Tiglax, the refuge supported assessment operations using the M/V Surfbird, a 65 ft. T-boat out of Juneau. Moreover, a new 25 ft. Boston Whaler was purchased to use in assessment work around the Barrens, the south side of the Kenai Peninsula, and the Chiswell Islands. With the use of the M/V Surfbird we do not have to change the main part of the schedule for the Tiglax. However, we did add extra work before and after our normal summer schedule in support of the oil spill. With the additional oil related work the Tiglax put in enough mileage to circumnavigate the earth!

The year started with the Tiglax in port at Homer. The main engines and single-side band radios were worked on by local contractors. The Tiglax left Homer on the evening of February 23, and arrived in Seattle on March 1. Upon arrival in Seattle she tied up to the U.S. Coast Guard pier. While there we had all of our inflatable boats repaired and our biosonics hydroacoustic equipment was repaired by vendors. Food and supplies for the upcoming season were ordered at the lower non-Alaskan prices of Seattle. MCI of Bellingham, Washington dry-docked the Tiglax to scrape, sandblast, and paint the hull. In addition, ring gears were replaced in the mains.

The Tiglax left Seattle and went straight to Seward where she picked up a crew of 10 people from Division of Research and Migratory Birds. They ran off-shore transects as part of the Exxon Valdez response work.

By May 7, the vessel had returned to Homer and off-loaded the oil spill assessment crew. The following week was spent making the vessel ready for the summer voyage and loading field camps. On May 16, the Tiglax started underway for Adak. Upon reaching Adak the ship loaded again and departed for Amukta where a camp was set up to look for nesting Aleutian Canada Geese. She then headed for the western Aleutians where she dropped off both Service people and Bureau of Indian Affairs (BIA) people on Agattu Island.

Pod of killer whales. 1989 KB

Volunteer Deckhand Angell and BIA crew at Hidden Bay, Adak Island. Summer Solstice, 1989 KB

BIA Crew. 6-89 KB

On June 1, she picked up a BIA team in support of BIA work from the Near Islands to Tanaga. On June 24, the BIA team was dropped off at Adak. A crew change was made on the vessel and the boat headed back west to pick up people on Buldir and at Agattu.

During the first part of July the boat was to support hydroacoustics work being done by the Division of Research off of Buldir Island. However, this had to be cancelled due to problems with the governor on the starboard main engine. The boat returned to Adak where a mechanic had been flown out. He worked on the governor and got it repaired and the boat headed east again to conduct work at Poperechnoi Island where fox elimination had to be done. Support for hydroacoustics work off Bogoslof Island was lost when the boat had to go to Dutch Harbor to have repair work done to the port reduction gear. After that was completed the alarm system went out on the vessel. This took 6 more days in Dutch Harbor waiting for various parts. With the loss of that work the boat then headed back west without the alarm system being repaired. The vessel crew had to stand engine room watches while underway. After the boat arrived back at Adak a new board had arrived for the alarm system. This was installed and fixed the computerized alarm system.

During August the Tiglax supported Aleutian Canada Goose transplant work from Buldir and also supported fisheries and seabird work on Agattu Island. On the return trip from the Near Islands, contaminant sampling was completed at Semisopochnoi Island by personnel from Ecological Services. During the same time period Service people had been put ashore at Kiska and were picked up later to confirm the removal of all foxes on that island. They found no fox sign.

On August 31, after unloading all the crews at Adak the Tiglax headed east and arrived at the Shumagin Islands where fisheries work was conducted. From the Shumagins they went to the Barrens where they picked up a camp we had on East Amatuli doing oil spill assessment work. The boat arrived back at Homer on September 10.

Then on the 1st of October an unscheduled trip was planned to observe seabird transects in the area of the oil spill. This operation went from October 1 to October 13. On October 31, the boat left for Prince William Sound where it supported sea otter research in the sound. This project lasted 19 days with the vessel returning back to Homer on November 18. The crew had a short break and then on December 3 departed for Prince William Sound where they again supported sea otter research. This project ended December 14. The vessel was then tied up for the rest of the year and went into a maintenance status.

Table 3 shows the proposed schedule at the beginning of the field season and the attached map shows all the trips the boat made. This was the longest season the vessel ever had. It was also the first year where field work was missed due to mechanical problems. In the past we've been able to fly people out to get the problems repaired. This time, with the computerized alarm system, when the first circuit board was put in, the technician put it in upside down and shorted it out. We then had to wait for another one. Rather than wait we decided to run from Dutch Harbor to Adak and have a new board sent to Adak. When the vessel got to Adak the new board was put in.

The computerized alarm system allows people on bridge watch to maintain an engine room watch when the boat is underway. With the loss of the alarm system we had to stand extra watches with people actually in the engine room conducting watches of all the equipment operating there. This, of course, increases the amount of overtime spent, but even more, is harder on the crews who get less sleep and less breaks.

Cook-Deckhand Macone with M/V Tiglax in the background. 1989 KB

Table 3. Schedule of the M/V Tiglax, 1989

Date	Location	Activity
Feb 23	Homer	En route Bellingham
Feb 29-Apr 24	Bellingham	Yard work
May 1	Seward	Pick up personnel
May 3-8	At sea	conduct oil transects
May 9-15	Homer	Off load, prepare boat for season
May 16	Barrens	Off load Bailey
May 21	Adak	Load gear, personnel
May 22-23	Amukta	Off load, set up camp for fox and goose recon. 4 seasonals remain
May 24-25	Adak	Load
May 27	Buldir	Off load refuge and BIA people
May 28-31	Agattu	Set up camps, off load gear
Jun 1	Shemya	Refuel, pick up crew
Jun 1-4	Alaid/Nizki	Support BIA
Jun 5	Buldir	Support BIA, off load personnel
Jun 6-15	Kiska	Support BIA
Jun 16	Segula	Support BIA
Jun 17-19	Rat Island	Support BIA
Jun 20-22	Little Sitkin	Support BIA
Jun 24-24	Adak	Off load BIA, resupply
Jun 27	Buldir	Pick up personnel
Jun 28-30	Agattu	Move camps, sea lion counts, seabird work
Jul 1	Shemya	Refuel, off load
Jul 2-6	Buldir	Support Buldir camp, pick up personnel hydroacoustic work
Jul 8-9	Adak	Off load gear, replenish
Jul 12	Dutch Harbor	Pick up crew and personnel
Jul 13	Aiktak	Conduct goose survey
Jul 14-19	Shumagins	Support fox recon
Jul 21-29	Bogoslof	Seabird and hydroacoustic work
Jul 30	Amukta	Pick up camp

Aug 1-3	Adak	Load and resupply
Aug 5	Buldir	Off load for goose transplant
Aug 6	Agattu	Off load fishery biologists, pick up personnel
Aug 7	Shemya	Refuel, pick up personnel
Aug 8-20	Agattu	Support goose transplants, fisheries work, Air Force
Aug 20	Buldir	Support camp
Aug 21-24	Agattu	Support fishery and seabird work
Aug 25	Shemya	Off load and pick up personnel
Aug 26	Buldir	Load camp and personnel
Aug 27	Kiska	Off load personnel
Aug 28	Semisopochnoi	Conduct contaminant sampling, fisheries surveys, fern surveys
Aug 29	Kiska	Pick up personnel
Aug 31-Sep 1	Adak	Off load
Sep 4-6	Shumagins	Support fisheries work
Sep 8-9	Barrens	Pick up personnel, conduct fisheries work
Sep 10	Homer	Off load
Sep 24-Oct 13	Kodiak Shelikof Straight Alaska Peninsula	Oil spill response, off-shore, near-shore surveys
Nov 2-17	Prince William Sound	Sea otter study, AK Fish & Wildlife Research Center
Dec 4-13	Prince William Sound	Sea otter study continued

J. OTHER ITEMS

3. Items of Interest

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

4. Credits

The Homer office section was written and edited by Hagglund, Blenden, Martin, and Benson and typed by Fellows, and Andrew-Miller.

K. FEEDBACK

We pass from 1989 on a hopeful note. This may well have been the most chaotic and stressful year many Service employees will face in their careers. When tasks start to pile up and pressures build again we should take a moment and think how bad it could be, or how bad it was back in '89.

Our special appreciation goes to those many individuals and offices who helped with our administrative headaches, monitored clean up of our beaches, expedited our emergency hires and provided a laugh when despair prevailed.

ALASKA PENINSULA UNIT

ALASKA MARITIME NATIONAL WILDLIFE REFUGE

Homer, Alaska

ANNUAL NARRATIVE REPORT

Calendar Year 1989

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, but exploration has begun in Shelikof Strait to the north and is planned elsewhere off the Peninsula. Human competition for fish relied upon by marine birds and mammals probably poses the greatest potential threat.

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H. PUBLIC USE (cont.)

I. EQUIPMENT AND FACILITIES

J. OTHER ITEMS

K. FEEDBACK

A. Highlights

Although all preparations had been finalized to continue fox eradication and seabird censusing in the Pavlof and Shumagin islands in 1989, all operations off the Alaska Peninsula by Homer personnel were cancelled because of the Exxon Valdez oil spill.

B. CLIMATIC CONDITIONS

Cold Bay provides the only long-term weather records available for the south side of the Alaska Peninsula. Intermittent records are available from Sand Point in the Shumagin Islands and from Chignik, which lies 100 miles to the northeast. Sand Point's annual mean temperature is 37.9°F and it averages 60.3 inches (four-year record) of precipitation. Chignik, one of the wettest stations in the state, averages 127 inches of precipitation and has an annual mean temperature of 38.5°F, based on 8 years of data.

In 1989 the annual mean temperature at Cold Bay, located near the tip of the Alaska Peninsula, was more than a degree above average (Table 1). Only January and November were colder than average. Extreme temperatures were -8°F in January and 71°F in August. Annual mean precipitation was slightly above normal; November with nearly 8 inches of precipitation was the wettest month while March with only 0.52 inches was the driest. Cold Bay weather patterns generally reflect those on the rest of the Alaska Peninsula.

Table 1. Weather Summary, Cold Bay, Alaska, 1989

	TEMPERATURE (F°)				PRECIPITATION (INCHES)			WINDS (MPH)		
Month	High	Low	Average	(Deviation)	Amount	(Deviation)	#Days (≥.01)	Average	1-Minute*	Gust
January	43	-8	22.3	(-6.0)	1.68	(-1.02)	21	19.4	53	83
February	46	22	35.0	(+7.5)	4.02	(+1.75)	19	26.9	63	83
March	42	11	31.5	(+2.9)	0.52	(-1.79)	8	17.5	46	58
April	47	22	34.3	(+1.3)	2.20	(+0.25)	19	20.0	53	69
May	53	30	40.6	(+1.1)	2.21	(-0.26)	17	16.2	44	54
June	63	33	46.0	(+0.6)	2.48	(-0.32)	15	15.2	35	47
July	63	38	50.9	(+0.6)	1.40	(-1.10)	12	16.9	39	51
August	71	45	53.3	(+2.1)	3.20	(-0.50)	23	14.7	39	47
September	61	37	49.8	(+2.3)	7.77	(+4.00)	25	17.0	46	61
October	55	29	42.3	(+2.8)	4.39	(+0.10)	26	17.5	40	55
November	49	13	32.1	(-2.2)	2.60	(-1.44)	22	16.7	40	56
December	43	10	31.3	(+1.8)	3.80	(+0.95)	25	15.5	44	62
	71	-8	39.2	(+1.2)	36.27	(+1.26)	232	17.8	63	83

* Greatest sustained wind for a one minute period.

D. PLANNING

1. Master Plan

See Homer office section.

2. Management Plan

See Homer office section.

5. Research and Investigations

AMNWR NR 89 - People in a Tectonically Unstable Environment-Vassar College, New York.

Dr. L. Lewis Johnson continued archaeological research in the Shumagin Islands under a grant from the National Geographic Society. A camp was again established on the west end of Chernabura Island at the site of one of the largest Aleut middens in the Shumagins.

Margaret Winslow, a geologist, and Dr. Johnson surveyed the inner Shumagins from July 2 - July 16, 1989. From Squaw Harbor they surveyed the east coast of Unga from Unga Cape to Unga Spit along Popof Strait. They also surveyed the north coast of Popof Island from And Point to the Fox Hole. They discovered 15 new sites, 13 on Unga and 2 on Popof. They also hosted a film crew from KCTS, Seattle who were filming a TV series, Fire on the Rim, which is due to air on the Public Broadcasting Station in fall, 1990.

Five additional students, four from Vassar and one from Boston College, proceeded to Chernabura for excavation. They arrived on Chernabura July 18 and left August 16 and spent the whole season on Chernabura digging at a site on the Chernabura Spit. The south end of the island also was surveyed. No more sites were found.

Apparently the people on this spit first visited here when the dune was actively building and stayed for short periods only. In between their visits, the sand built up and covered the previous occupation layer with 20-50cm of deposit.

Given the dates for the midden layers, Dr. Johnson suggested in the field that the period of active dune building might follow the 4000 BP major seismic event, which Dr. Winslow hypothesizes would have exposed much till-covered oceanic shelf. This till would have been a major source of sand for dune building, and the uplift also would have provided much new coastline for human habitation. For this series of hypotheses to be valid, Dr. Johnson suggested that the date of the charcoal lens above the debitage concentration should be in the vicinity of 35-3800

years BP. It turned out to date to 2970 +/- 270 BP, while a hearth more than a meter above it, just below the midden layers, dates to 2960 +/- 140 BP. If both dates are correct, the dune was building extraordinarily fast! If the "real" date for the lower layer is towards the lower value, then it comes close to the date suggested by her hypothesis. More data are needed.

E. ADMINISTRATION

1. Personnel

See Homer office section.

2. Youth Programs

See Homer office section.

4. Volunteer Program

See Homer office section.

5. Funding

See Homer office section.

6. Safety

See Homer office section.

7. Technical Assistance

See Homer office section.

F. HABITAT MANAGEMENT

7. Grazing

Two cattle grazing permits remain in effect on the Alaska Peninsula Unit. Both Dolgoi and Wosnesenski islands were either wholly or partially selected by Natives or the state. No counts were made on either island in 1989.

G. WILDLIFE

2. Endangered and/or Threatened Species

For the first time in 12 years, no refuge or research personnel visited the Semidi Islands to ascertain the status of the relict population of Aleutian Canada geese on tiny Kiliktagik or conduct studies of fulmars and other seabirds.

3. Waterfowl

No emperor goose surveys were conducted on islands off the Alaska Peninsula by personnel from Cold Bay in 1989. Surveys this year were restricted to the mainland.

15. Animal Control

We had planned to return to Poperechnoi Island, where we removed 11 red foxes in 1988, but the oil spill prevented anyone from Homer returning to the island. However, in July Vern Byrd from Adak briefly visited Poperechnoi to ascertain whether any foxes remained on the island. For part of 2 days three separate crews of two to four people aboard the M/V Tiglax checked beaches and the interior of this rugged island.

They found signs of foxes in four different parts of the island. Tracks and scats of probably at least two foxes were apparent on the northern and southern ends. Only 20 of the 57 traps left set the previous summer were relocated. All the traps on beaches would have vanished with winter storms. One trap contained a fox foot, and an ermine, river otter, and two ptarmigan had been captured by others. This again illustrates that traps can adversely affect non-target species as much or more than the careful selection and placement of toxic baits. Crews in 1989 were unable to relocate the fox den found the previous summer. A combined total of 55 reset old traps and new sets were left on Poperechnoi on July 18.

The failure to remove all foxes from 3400-acre Poperechnoi Island the previous summer again illustrates how difficult it is to trap all foxes on a sizable, rugged island. Moreover, capturing the last few red foxes is more difficult than removing all arctic foxes from an island. Red foxes are more difficult to trap than the generally less wary arctic foxes, but with either species trapping the last trap-wise animals is extremely difficult or may not always be possible. Authorization for the use of cyanide projectiles (M-44s) or another toxicant at least for a backup is vital. Without an alternative to traps and firearms an entire summer's effort may be wasted. Moreover, without poisons there is no point in attempting to remove foxes from large islands. Even for small islands trapping is the most labor-intensive and inefficient

means of eradicating alien species. It is also the cruelest method possible, and trapping does not preclude killing raptors and other non-target species, the primary rationale for the strident opposition to the use of toxicants. Hopefully increased awareness of this situation and the knowledge that the greatest benefit which the refuge can provide islands is removal of alien species will ultimately again allow discrete use of toxic baits on selected islands.

On July 16 a few hours were spent checking beaches on Bird Island in the outer Shumagins to see if foxes were present. No tracks or scats were noted, and former fox trails were overgrown, evidently confirming the successful removal of arctic fox in 1984. Although the M/V Tiglax briefly stopped at Big Koniuji Island after visiting Bird Island, only the small beach at Flying Eagle Harbor was checked. No fox sign was detected here, but this represents only a minimal area on this large island.

H. PUBLIC USE

Very little recreational use takes place in the remote unit. Sea kayaking occurs in rare instances because of the costly and difficult logistics and frequent foul weather.

1. General

See Homer office section.

17. Law Enforcement

See Homer office section.

I. EQUIPMENT AND FACILITIES

4. Equipment Utilization and Replacement

See Homer office section.

J. OTHER ITEMS

3. Items of Interest

See Homer office section.

4. Credits

Most of the Alaska Peninsula section of this report was compiled by Edgar Bailey.

ALEUTIAN ISLANDS UNIT
ALASKA MARITIME NATIONAL WILDLIFE REFUGE

Adak, Alaska

ANNUAL NARRATIVE REPORT

Calendar Year 1989

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

INTRODUCTION

Aleutian Islands Unit

Alaska Maritime National Wildlife Refuge

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 along the north side of the islands. 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 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 is 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 cold but not normally severe, with a mean annual temperature of 40 degrees F. Strong winds, sometimes approaching 100 m.p.h., can induce very cold chill factors.

The AIU provides unique nesting habitat for several million seabirds, the endangered 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 the emperor goose and other waterfowl. The refuge is one of the few places in North America where Asiatic birds can be observed in the 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' 10 million seabirds is probably a fraction of what it was prior to fox introduction. Of over 100 named islands, islets and rocks in the Aleutian Islands Unit, only 44 units or 6% of the total acreage are fox-free.

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 are left 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 the 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 birds on these islands is significant. Plans call for the eradication of introduced fox 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 and National Marine Fisheries Service is considering a "depleted" status for them. 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: killer whales, Dall porpoises and Minke whales are the three species most commonly observed.

The Aleutian Canada goose, short-tailed albatross, Chinese egret, and the Aleutian shield fern are the four endangered 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. A reintroduced population is developing at Agattu 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 about 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 1850's 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 America 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 solders 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 sixth 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 entrepeneurs 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...

INTRODUCTION

G. WILDLIFE

H. PUBLIC USE

I. EQUIPMENT AND FACILITIES

J. OTHER ITEMS

A. HIGHLIGHTS

There were major personnel changes for the Aleutian Islands Unit in 1989 as we replaced a Clerk-Typist, Outdoor Recreation Planner, Maintenance Worker and Biological Technician. We lost an Assistant Refuge Manager and Clerk-Typist.

A labor intensive winter effort at eradicating introduced arctic fox from islands near the Adak headquarters was successful as Igitkin, Chugul, Umak and Little Tanaga were cleared by staff trappers.

AIU staff presented major conservation awards in 1989 to two Adak residents. Local elementary teacher Debbie Panier earned the "Conservation Teacher of the Year" award from the Alaska chapter of the National Wildlife Federation. NAS Adak Commanding Officer Captain R.P. Munro accepted a regional "Take Pride in America" award for an innovative "Adopt-a-Trail" clean-up program.

We knew the winter of 1989 was going to be rough on shipping when at least four freighters leaked oil when they ran aground in the Aleutians in January. But spills in the Aleutians didn't even rate the back-page of the newspapers after Good Friday (March 24) when the Exxon Valdez ran aground in Prince William Sound.

The Fish and Wildlife Center hosted the University of Alaska's four-credit "Mammals of Alaska" course taught by a Navy officer for two semesters in 1989; the refuge also hosted a number of Alaska certified hunter safety courses.

Regional Director Walt Stieglitz accompanied by ARD/RW Dr. John Rogers, Alaska Maritime NWR RM John Martin and AIU RM Boylan made his first visit to the Aleutians June 26-30. In a week of frenzied flying, the RD visited military officials on Adak, Shemya, Amchitka and Attu and even stopped to visit refuge staff in the Pribilof Islands on his return to Anchorage. In total, a one-week round trip of some 3,000 miles!

Three AIU refuge officers enjoyed a week in sunny Arizona in March attending the first law enforcement refresher training held at the Marana Training Center in cooperation with Region 2 officers.

Even remote Adak felt the effects of the Exxon Valdez oil spill in March. Assistant Manager Klett was detailed to Kodiak NWR for two weeks to help with administrative duties and the refuge vessel Tiglax delayed the start of the Aleutian field season by three weeks for spill-related work. In September, AIU biologists were detailed to assist in monitoring efforts around Kodiak NWR.

Ten archaeologists from the Bureau of Indian Affairs in Anchorage chartered the vessel Tiglax for the month of July to investigate archeological sites on numerous islands in the Aleutians in compliance with the 1971 Alaska Native Claims Settlement Act

(ANCSA).

A high-school student from Unalaska joined refuge field operations for eight weeks this summer as the refuge's first participant in the "Resource Apprenticeship Program for Students" cooperative effort between BIA and FWS.

Major fuel spills plagued the military on Adak this year and key personnel were replaced. Estimates that as much as two million gallons of JP-5 fuel escaped into the ground and streams. While no wildlife casualties were attributed to the spills, Federal EPA and Alaska Department of Environmental Conservation officials visited the base and gave the military one year to make things right.

Botanist Jerry Tande of FWS Endangered Species office spent three weeks on Adak to establish transects and gather data on the endangered Aleutian shield fern. Accompanied by refuge staff and volunteers, Tande located over 120 of the tiny plants after which Pat Wagoner from the University of Alaska collected a few fertile fronds for attempted propagation at U. of A.

After 15 years chasing endangered Aleutian Canada geese through the waist-high grass of Buldir Island to capture them for translocation to other fox-free islands, refuge biologists successfully used trained border collies to help them capture more geese in less time.

The AIU manager and RO archaeologist joined National Park Service archaeologists and divers aboard the Navy vessel "Safeguard" in September for a one-week visit to survey World War II artifacts on and around Kiska Island.

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 1989 was available from Shemya and Adak.

Due to the lack of nearby mountains to snag passing clouds, Shemya receives considerably less precipitation than other Aleutian weather stations. In 1989, they received 28.8 inches of rain compared to 42.3 inches at Adak. Rainfall and the number of days of measurable precipitation was about the same each year as was total snowfall (Table 1). Overall the winter/spring months had higher temperatures in 1989 as compared with 1988 and the summer/fall months were cooler.

Total precipitation on Adak was equal to 1988's; however, both years were approximately 68% below normal (Table 2). Snowfall in 1989 was 24.0 inches below normal. Above average amounts of snow

Table 1. 1989 Shemya, Alaska, weather summary with comparisons to 1988.

	Inches of precipitation		Inches of snow		Days of measureable precipitation		Degrees fahrenheit				
							Maximum		Minimum		Average
	1988	1989	1988	1989	1988	1989	1988	1989	1988	1989	1989
JAN	1.22	2.42	10.7	18.9	24	26	36	40	20	20	30.3
FEB	1.28	2.92	12.3	13.9	23	22	36	40	19	25	32.7
MAR	1.61	0.58	14.5	1.9	23	14	37	40	22	27	33.9
APR	0.70	0.99	5.8	2.8	12	18	39	42	20	26	36.9
MAY	0.75	2.06	3.3	0.2	12	18	45	41	32	35	39.6
JUN	2.50	1.74	0.0	0.0	18	14	53	51	36	38	42.8
JUL	1.79	2.02	0.0	0.0	13	22	52	64	42	41	48.5
AUG	2.29	4.36	0.0	0.0	14	21	58	57	45	46	51.2
SEP	2.01	4.34	0.0	0.0	16	25	56	55	44	40	48.4
OCT	3.37	2.98	T	T	19	19	52	50	35	38	44.6
NOV	3.39	2.51	10.1	12.0	25	22	45	46	29	28	37.7
DEC	1.00	1.85	6.1	14.0	24	27	39	40	25	25	35.5
Totals:	21.91	28.77	62.7	63.5	223	248					
Extremes:							58	64	19	20	
Dates:							8/15	7/28	2/26	1/19	

Table 2. 1989 Adak, Alaska, weather summary with comparisons to 1988.

	Inches of precipitation			Inches of snow			Days of measurable precipitation		Degrees fahrenheit				
									Maximum		Minimum		
	1988	1989	NORM	1988	1989	NORM	1988	1989	1988	1989	1988	1989	NORM
JAN	1.99	2.30	6.11	51.5	39.2	17.5	29	28	46	44	16	15	33
FEB	0.74	2.79	4.75	20.4	7.8	19.2	28	20	44	44	20	18	33
MAR	1.48	2.42	5.85	31.3	5.7	20.1	26	19	47	49	14	15	35
APR	1.27	3.12	4.50	10.8	4.2	9.9	27	20	44	50	25	26	37
MAY	4.17	2.76	4.10	2.6	T	2.1	29	24	50	55	33	32	41
JUN	2.49	1.30	3.17	0.0	0.0	T	16	17	57	67	36	39	44
JUL	3.57	1.28	2.98	0.0	0.0	0.0	16	17	66	67	42	39	49
AUG	2.31	3.79	4.15	0.0	0.0	T	18	21	65	67	36	41	51
SEP	8.16	7.34	5.36	0.0	0.0	0.1	23	21	57	58	35	36	48
OCT	6.64	3.40	6.61	0.4	T	1.9	26	25	53	57	32	34	43
NOV	4.08	3.13	8.17	14.4	10.4	12.4	25	27	49	51	21	24	37
DEC	5.42	8.61	7.33	27.5	12.0	20.1	26	23	44	45	18	17	34
Totals:	42.32	42.24	63.08	158.9	79.3	103.3	289	262					
Extremes:									66	67	14	15	
Dates:									7/15	6/17	3/27	1/22	

occurred in January and all other months were below average. Maximum/minimum and average temperatures were about equal.

Storm force winds that were prevailing at the end of 1988 continued into 1989. These high winds, coupled with ice build up in January, caused the loss of electrical power at the refuge office on two different occasions, once for 2 1/2 hours and again for 5 1/2 hours.

Earthquakes are a monthly occurrence and residents soon learn to "roll with the punch" and go on about their business; however, everyone took notice on January 8 and 9 when four earthquakes measuring 5.6, 4.8, 5.3 and 4.7 took place followed by seven aftershocks below 3.0. Another day to remember happened on October 7 when more than half-a-dozen earthquakes occurred within a three-hour period, with the largest registering a 6.6. Several reports of volcanic activity were received throughout the year and on a flight from Shemya to Adak ARM Klett observed and photographed a large black/grey smoke plume emitting from Gareloi volcano.

A rare weather event occurred on Agattu Island on the evening of August 12 when field camps reported an electrical storm with lightening and thunder, accompanied by heavy rain, which lasted for ten minutes.

C. LAND ACQUISITION
(nothing to report)

D. PLANNING

5. Research and Investigation

Beach Debris Surveys in the Eastern Aleutians
[Albert M. Manville, Ph.D, Defenders of Wildlife Senior Staff Wildlife Biologist] Dr. Manville continued surveys begun in 1988 in the western Aleutians by focusing on Aiktak, Ugamak and Unalaska, islands for derelict fishing gear and other debris. This material washes ashore after being lost or dumped in the open ocean, and its effect on wildlife and the environment are becoming of national interest. We have not yet received a report on Dr. Manville's findings.

Maintenance of Seismic Telemetry Stations
[U.S. Geological Survey, Adak Seismological Observatory]. Personnel from the observatory (U.S. Navy and U.S. Geological Survey) visited Great Sitkin, Bobrof, Kanaga, Tanaga, Umnak, Unalaska and Adak islands to maintain seismic telemetry stations. These studies provide information for earthquake prediction studies.

Glaucous-winged Gull Study
[Douglas Bell, University of California, Berkely]. Mr. Bell requested 10 glaucous-winged gull carcasses from the western Aleutians to aid in his study of the taxonomic differences in large gulls in western North America. These specimens were taken at Buldir Island. The study is still underway.

Environmental Contaminants Sampling at Defense Environmental Restoration Program (DERP) Cleanup Sites
[Wayne Crayton and Mike Blendon, U.S. Fish and Wildlife Service]. Soil and sediment samples were collected from old World War II installations on Semisopochnoi Island during August. Soil samples were collected from around the quonset hut foundations, power poles and the two barrel dumps located near the site. Samples will be tested for trace elements, heavy metals, hydrocarbons, and organochlorines (pesticides, PCB's, etc.). Though no analysis has yet been done, Crayton indicated that petrocarbons will probably be discovered, but no pesticides or PCB's.

Seabird Food Habits Study
[John Piatt (U.S. Fish and Wildlife-Research) and Alan Springer (Institute of Marine Science, University of Alaska)]. During the summer of 1989, Piatt and Springer continued studies on seabird feeding distribution, food preferences, and other ecosystem processes. These studies are designed to help explain fluctuations in reproductive performance and population levels (monitored by refuge surveys), particularly to separate effects of natural from man-caused perturbations.
Common and thick-billed murres and red-and blacklegged kittiwakes were collected to obtain samples of stomach contents. Regurgitations from kittiwake chicks and bill loads from puffins were also used to determine the diet of the species involved. Plankton tows and ocean profiles (showing temperature and salinity variations in relation to depth) were also conducted to relate prey distribution with the ocean profile. Results have not yet been published.

Cultural Resource Assessment of Attu and Kiska islands
[Natural Park Service Submerged Cultural Resources Unit in cooperation with U.S. Navy and U.S. Fish and Wildife Service]. In 1985 the Secretary of the Interior designated Attu and Kiska islands of AIU as National Historic Landmarks. The focus of "Project Seamark" is 1) Locate and document underwater material remains from WWII in a nondestructive and cost effective manner; and, 2) inventory and document as many land-based historical resources a possible.

While bad weather prevented the Navy vessel Safeguard from working around Attu, investigations and documentation of underwater and land artifacts did take place at Kiska. A follow-up trip has been planned for 1990. All participating agencies will receive a written summary as well as still and video photographic documentation of 1989 discoveries.

6. Other

Refuge Biologist Byrd continued to fullfill the position as leader of the Aleutian Canada Goose Recovery Team. A team meeting was held in March to discuss the downgrading of the goose from "endangered" to "threatened" status. The proposal to reclassify was published in the Federal Register on September 29, 1989.

One other major item on the agenda centered around the depredation of translocated flightless Aleutian Canada geese by resident populations of bald eagles on Little Kiska and Amchitka Islands (past release sites). It has become apparent that flightless geese that are transplanted to any island with a population of eagles do not have a very good chance on making the migration to the wintering grounds. It was decided to place a small number of geese (125) on Little Kiska with two people scheduled to monitor eagle contact over a 2-3 week period.

E. ADMINISTRATION

Staff Photo: (L-R) Schulmeister, Wheeler, Fuller, Klett, Byrd, Boylan (not shown: Cline, Dewhurst, Sweeting)

1. Personnel

1. Michael F. Boylan, Refuge Manager, GS-12, PFT
2. Evan V. Klett, Assistant Refuge Manager, GS-11, PFT
3. G. Vernon Byrd, Wildlife Biologist, GS-11, PFT
4. Donna Dewhurst, Assistant Refuge Manager (Amchitka), GS-9, PFT (transferred 2/26/89)
5. Cheryl L. Cline, Outdoor Recreation Planner, GS-7, PFT, (EOD 2/18/89)
6. James P. Fuller, Biological Technician, GS-6, PI, (EOD 9/10/89)
7. Linda K. Sweeting, Clerk-Typist, GS-4, PFT, (resigned 10/28/89)
8. Dorothy G. Wheeler, Clerk-Typist, GS-3, PFT, (EOD 1/29/89)
9. Robert P. Schulmeister, Maintenance Worker, WG-8, PFT
10. John Cantu, Maintenance Worker, WG-5, TFT (EOD 11/19/89)
11. Hector Douglas, Seasonal Biological Technician, GS-5, (5/11/89 - 10/26/89)
12. David Blomstrom, Seasonal Biological Technician, GS-5, (5/7/89 - 10/26/89)
13. Debra Groves, Seasonal Biological Technician, GS-5, (3/28/89 - 8/18/89)
14. Greg Zuberbier, SCA Biological Aid, (4/13/89 - 8/16/89)
15. Sarah Toadvine, SCA Biological Aid, (4/13/89 - 8/16/89)
16. Joseph Wojcikiewicz, SCA Biological Aid, (5/11/89 - 8/25/89)
17. Andre Nault, SCA Biological Aid, (5/11/89 - 8/25/89)
18. Hugh Knechtel, SCA Biological Aid, (5/11/89 - 8/25/89)
19. Mark Hipfner, SCA Biological Aid, (5/11/89 - 8/28/89)
20. Kemper Carlson, SCA Biological Aid, (5-11/89 - 8/25/89)
21. Elizabeth Buck, SCA Biological Aid, (5/11/89 - 8/25/89)
22. Kathleen Kelso, SCA Resource Assistant (1/16/89 - 4/28/89)
23. Dana Roth, SCA Resource Assistant, (6/6/89 - 10/5/89)
24. Brian Rankin, Student Resource Apprentice, (7/5/89 - 9/5/89)

Volunteers

25. Robert Lewis and border collies 'Cap' and 'Lass'
26. Elizabeth Mayock
27. James Baker
28. Bobb Bruff
29. John Fink
30. Terry Fortney
31. Jack Hodnick
32. Polly Sanderson
33. Karen Conrad
34. Tim Kiilsholm
35. Donna Venglar
36. Mike Venglar
37. Greta Johnson
38. Mike Steward
39. William Hall
40. Jean Cole
41. Brenda Hoskyns
42. Liz Lang
43. Kathryn Lillithan
44. Dan Wills
45. Joe Gentile
46. Scott Crabtree

Table 3. AIU Staffing, FY 1984-1989

Year	Permanent FT	Permanent PT	TEMP	Total FTE'S	Volunteers SCA	Volunteers OTHER
89	8	1	5	10.2	10	24*
88	8	0	4	8.3	9	12
87	8	0	2	8.6	10	5
86	7	0	2	7.1	4	3
85	7	0	5	10.8	4	3
84	7	0	7	10.5	3	5

* includes two dogs

There were major personnel changes on the Aleutian Islands' Unit staff in 1989. In February, Dorothy Wheeler joined us as Clerk-Typist. In March, Cheryl Cline arrived on Adak as our Outdoor Recreation Planner fresh from the National Park Service's Kennesaw Mountain National Battlefield Park in Georgia. Former volunteer and seasonal Biological Technician James Fuller left in April for a seasonal position at Colorado's Arapaho National Wildlife Refuge but was detailed for much of the summer on oil spill duties in Prince William Sound before returning to Adak in September as a permanent Bio-Tech. In November, John Cantu filled our long-vacant second Maintenance Worker position.

Personnel losses this year included Donna Dewhurst, for two years the GS-9 Assistant Refuge Manager on Amchitka who, following completion of the Navy's radar installation, was promoted to the GS-11 Wildlife Biologist position at Alaska Peninsula-Becharof refuges in King Salmon in February. Instead of monitoring construction projects for environmental compliance she now spends her days surveying moose and brown bear from a Super Cub. Clerk-Typist Linda Sweeting resigned in October as a result of her husband's reassignment by the Navy.

Regional Director Walt Stieglitz paid his first visit to the Aleutians June 26-30. He was accompanied by ARD John Rogers, Refuge Manager John Martin and pilots Dale Moore of Office of Aircraft Services and Bob Richey from Kenai NWR. On arrival at Adak, they met with Captain Thomas Traughber of Naval Security Group Activity and Captain James Dulin, the new Commanding Officer of NAS Adak. Continuing their tour they met with officials of military bases at Amchitka, Shemya and Attu (where they also visited the Japanese Peace Memorial). When mechanical problems prevented the normally amphibious Grumman Goose from landing on water, they flew over field camps on Agattu and Buldir as well as the Tiglax.

ARW Dr. John Rogers (L.) and RD Walt Stieglitz examine the peace memorial atop Engineers Hill on Attu commemorating this World War II battlefield. (MFB)

On Attu, Coast Guard officials drove the group to Engineer Hill to see the U.S.-Japanese Peace Memorial erected in 1987. The RD's group concluded their whirlwind tour by stopping at the refuge station on St. Paul Island in the Pribilofs before returning to Anchorage, having flown over 3,000 miles in five days visiting America's most extensive National Wildlife Refuge. In this year of the oil spill, refuge staff truly appreciated the extra effort required to make this long trip during an unusually difficult time.

The ups and downs of government housing were a source of confusion to refuge staff. In January, elation over our 4% pay raise turned to disappointment as we were notified by Realty that our rents were going up as much as $56 a month! By December our frustration had subsided when we received another notice that our 1990 rents would decrease by up to $39 a month. Since our houses are sturdy and warm against the devastating Aleutian weather, nobody really complains about the rental rates but it was nice to get a break!

Refuge personnel took advantage of a variety of training and professional meetings on and off island this year. RM Boylan began by attending a one-week Wildlife Management Workshop at Colorado State University in late January.

In March, refuge officers Boylan, Klett and Cline left some of the world's worst weather for balmy southern Arizona and Alaska's first law enforcement refresher training at Marana in cooperation with Region 2. Improved course content, better facilities and hospitable weather made this year's training the best ever! Following completion of law enforcement, ARM Klett attended a two-day Pre-retirement Seminar in Anchorage. (We don't think there was any connection with law enforcement's new physical fitness emphasis...)

WB Byrd, leader of the Aleutian Canada goose Recovery Team, organized a meeting in Los Banos, California February 28-March 3 after which he returned to the University of Idaho to finish a Master's degree before returning to Adak in April for start of field season.

RM Boylan attended the Project Leaders' Meeting for Refuges and Wildlife in Anchorage April 10-14 and squeezed in a public meeting on Kodiak NWR's Public Use Management Plan over the weekend. ARM Klett was detailed to Kodiak NWR April 26 for two weeks administrative assistance in the wake of the extra workload caused by the March 24 wreck of the Exxon Valdez in Prince William Sound. Immediately upon his return, Van went from the airplane to a CPR/1st Aid class with other field personnel and left aboard the Tiglax May 22.

ORP Cline attended the National Association of Marine Educators (NAME) annual conference in Homer June 19-23 where she met environmental education specialists from throughout Alaska.

In late October, Cline attended the annual meeting of the Alaska Natural History Association where she learned Adak's outlet again surpassed all other Alaskan refuges with an income of $36,000.

Boylan attended Penn State University's "Management for Natural Resource Managers" course November 27-December 7 taught by personnel from the College of Business Administration, in one of the oldest (30 years) and best management programs in the country.

2. Youth Programs

AIU was one of two field stations in Alaska to implement the Resource Apprenticeship Program for Students (RAPS) in 1989. Funding from the bureau of Indian Affairs and the Aleut-Pribilof Islands Association in the amount of $5.00/hour went to Unalaska senior-to-be Brian Rankin who spent eight weeks assisting refuge biologists with field projects and travelled to a dozen islands aboard the vessel Tiglax.

The RAPS program is intended to provide native students the opportunity to participate in meaningful projects on federal conservation units and hopefully stimulate their interest in a career in resource management. If a student works well and goes on to college, future internships through the cooperative education program could eventually lead to a trainee position.

3. Other Manpower Programs
(nothing to report)

4. Volunteer Programs

During 1989 we again relied on the Student Conservation Association (SCA) to provide biological assistants for summer field work as well as resource assistants for refuge public use programs winter and summer. The dedicated efforts of these young people living prolonged periods in remote field camps in the world's worst weather cannot be overestimated. Their contributions to the Aleutian Canada goose translocation, seabird monitoring, fox eradication, beach debris surveys, visitor center operations, interpretive and environmental education programs were critical. Previous SCA volunteers Hector Douglas and James Fuller returned to us as Biological Technicians in 1989, proving that hard work has its rewards.

Our volunteer program not only grew in number in 1989 but also in variety. A dedicated cadre of local volunteers assisted by a seasonal SCA'er maintained visitor center operations. Another dedicated group of hardy Adak outdoorsmen assisted refuge staff by camping on nearby islands for weeks at a time during the winter to trap fox and help restore native birds.

Robert Lewis and his trained border collies 'Cap' and 'Lass' were our most extraordinary volunteers in 1989. Lewis, had allowed his dog 'Lass' to assist the Service on the Yukon Delta herding geese with such success that Lass was invited to the White House to receive her "Take Pride in America" award from President Bush. But Lass passed on the White House to come to the Aleutians where she and partner 'Cap' caught more geese in less time with less stress than ever before. The dogs' enthusiasm for their work was contagious, enabling their human helpers to overcome the hard work, long hours and rugged living conditions. Having proven their worth, Lass and Cap will join us again in 1990 only this time they'll be paid in something other than dog biscuits!

Volunteer Bill Hall rests with volunteer border collie Cap during a break in the 1989 goose translocation. (CLC)

6. Safety

Assistant Refuge Manager Klett served as station safety officer during 1989. Eight structured safety meetings were held and seven movies/videos were shown. Topics included winter driving tactics, drunk driving, CPR certifications, flotation and survival suits, first aid, defensive driving and highway safety. RM Boylan and WB Byrd completed the Coast Guard's "Basic Sailing & Seamanship" course during the year.

A variety of safety training was taken by refuge personnel during the year. Twelve permanent, seasonal and volunteer employees were certified for CPR. A week long spring training session for field personnel included viewing U.S. Coast Guard cold weather/cold water survival films, use of personal flotation and survival suits, use of compass and maps, the care and use of outboard motors and inflatable boats, radio operation and communication procedures, and the operation and maintenance of

the Kittiwake, a 26-foot Boston Whaler used around Adak. All field personnel had a safety tour of the refuge vessel Tiglax, shown the location of all safety and survival equipment and its use discussed or demonstrated. All personnel participated in fire and abandon ship drills. Refuge personnel also supplied small boat training to four people from the Bureau of Indian Affairs who would be working on Agattu Island investigating ANCSA site selections.

Safety related purchases included new batteries for ELTs, new batteries for EPIRB's, pocket survival kits containing flares, dye markers, fire starter kits and signaling mirrors and three large first aid kits. The old first aid kits were checked and old, outdated, contaminated medications/compresses replaced.

Two radios were assigned to each AIU field camp in 1989. One served as the primary communication unit and the other was a backup in the event of failure of the primary unit. Multi-frequency whip antennas were used in all field camps.

All field crews continued to be briefed 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 from Adak to all field camps as well as the Tiglax.

RB Byrd received an eye injury while checking puffin burrows on Buldir Island when a blade of grass struck him in the eye. During medical examination at Adak, several small segments of embedded grass were removed but no lost time occurred.

ORP Cline met with the Adak Search-and-Rescue group to become familiar with response procedures and plans for marking the problematic Gannet Pass route.

A HF radio was installed in the ORP vehicle for mobile communications on 5907.5 and 3215 single sideband. A portable radio was obtained from NAS Security Department for use on NAS and NSGA security frequencies for enforcement activities.

On November 29, the refuge headquarters building (visitor center, office and shop complex) received a safety inspection by the NAS Occupational Safety and Health Inspector. Ten safety deficiencies were noted. Three were immediately rectified and the others, all minor, were being corrected at year's end.

7. Technical Assistance

In mid-September, Adak welcomed a joint delegation of National Park Service officials and Navy personnel who stopped enroute to Kiska and Attu for a land and underwater survey termed "Project Seamark" of Word War II artifacts on the two National Historic Landmarks. Dan Lenihan, Larry Murphy and Michael Eng, divers and archaeologists with NPS's Submerged Cultural Resources Unit

arrived Adak via the Navy's 250-foot diving/salvage vessel Safeguard based in Pearl Harbor. Joining the NPS/Safeguard team at Adak were Alaska NPS historian Sandy Faulkner and archaeologist Susan Morton, FWS archaeologist Chuck Diters and historian/author Stan Cohen who has written over 100 books including The Forgotten War Vols. 1 and 2 about the Aleutian campaign. Cohen was accompanying the group to gather material for Vol. 3 of his series. The night before leaving Adak for Kiska, Cohen presented a slide program on the war in the Aleutians to 70 Adak residents at the Fish and Wildlife Center and autographed copies of his books which raised several hundred dollars for our cooperating association.

Bad weather prevented the Safeguard divers and shore parties from reaching Attu so this year's work was confined to Kiska and Little Kiska islands. RM Boylan and archaeologist Diters led shore parties on islands where artifacts were photographed and videotaped. NPS and Navy divers likewise used still photography and video to document underwater artifacts for the first time.

This year's success with "Project Seamark" will continue in 1990 as the Navy has agreed to participate in the joint venture. Since 1992 marks the 50th anniversary of the war in the Aleutians, NPS is eager to assemble as much material as possible to document these National Historic Landmarks.

Historian Stan Cohen (L.) and RM Boylan examine a World War II Japanese coastal gun on Little Kiska. (MFB)

Upon returning from Kiska, NPS officials and RM Boylan met with NAS Adak's Executive Officer, CDR Bruce Bowling. Adak has been designated a National Historic Landmark since 1987 although no one on Adak was aware of it until this year when the Navy announced plans to raze a World War II chapel, one of the few historic structures remaining. After Adak's NHL designation was discovered and NPS and the State Historic Preservation Office intervened, demolition was cancelled. In their meeting, NPS and FWS officials got the Navy's commitment to historical preservation. Next summer there will be a presentation from NPS to the Navy of a bronze plaque designating Adak as a NHL. Similar plaques will go to FWS recognizing Attu and Kiska.

Refuge Staff initiated efforts by the National Park Service, State Historic Preservation Office and island residents to convince the Navy on Adak not to raze the World War II chapel. The modern Bering Hill chapel is in the background. (MFB)

The 1913 establishing legislation for the Aleutian Islands as a wildlife refuge and subsequent acts have all recognized the importance of these islands to national defense. Despite "Glasnost", military spending shows no sign of decline on the "frontier of freedom". The Navy's $200 million Relocatable-Over-The-Horizon-Radar system (ROTHR) went from its two year construction phase into a operational mode in 1989. Since mid-1987, the military had paid the Service to maintain an employee on Amchitka, some 200 miles west of Adak. Assistant Refuge Manager Donna Dewhurst lived and worked from the Service cabin on Pumphouse Lake. She kept an eye on all construction work to insure environmental compliance with federal and state regulations as well as conducting routine biological surveys.

The Amchitka ROTHR is the Navy's first such operational system, which enables the military to detect and track aircraft and ship targets up to 1,800 miles away with an area of coverage of 1.5 million square miles. ROTHR "sees" over the horizon with ionospheric backscatter radar. A transmitting site provides radar illumination which is bounced off the ionosphere to fall on the ultra sensitive receiving site located at the other end of Amchitka some 30 miles away. The entire ROTHR operation is conducted under a MOA with FWS.

Amchitka operations were delayed due to arrival of the ROTHR hardware from Fleet Surveillance Support Command headquarters in Chesapeake, Virginia. Two commanding officers alternated duties on Amchitka for the Navy with Lieutenant Commander David Louk serving for five months then returning to Virginia while LCDR Rich Franklin took over. At peak of operations, ROTHR is expected to require a staff of 200 people about half of whom will be civilians in the employment of Piquniq Management Corporation (PMC) which contracts with the Navy for support services e.g. lodging, food service, equipment repair.

Our first problem with the new military command on Amchitka occurred just two days after ARM Dewhurst departed. LCDR Louk ordered the unauthorized burning of a World War II hangar adjacent to the runway. The Army Corps of Engineers completed a massive clean-up of Amchitka a few years ago. Structures thought to have historical value were retained until determination by the State Historic Preservation Office (SHPO) and the FWS of their historic value. The hangar that was burned had been determined to have little historic value and was a safety hazard but the Navy's burning of it without notifying responsible agencies was a procedural violation. If burning the hangar immediately after ARM Dewhurst's departure was a sign of things to come, we didn't like the message. RM Boylan notified the SHPO, the EPA and the Alaska Department of Environmental Conservation (which requires burning permits, etc.). The paperwork, permits and documentation required by four agencies following this impulsive military action served notice that just because Amchitka's out of sight doesn't mean it's out of our minds. The Navy apologized for the action and communications improved for the remainder of the year.

Our major problems at Amchitka in 1989 involved logistics. There are only two ways to reach the island - a weekly private charter belonging to PMC and a military flight. Due to their schedules, its essential we be able to fly on both carriers or we'd have to spend at least 10 days each visit. Because there's a commercial carrier between Adak-Anchorage, we've not been allowed to use military flights. In April, RM Boylan initiated a request for FWS personnel to use military flights between Amchitka-Adak only and this was approved mid-year. A similar request to use PMC charters was OK'd pending payment of a delinquent freight bill from 1988. As 1989 ended, we still awaited DFC payment of this nagging bill so we can board the plane to do our job.

Before the first ROTHR system was operational the Navy came to the Service with a notice they intended to erect another system with the same dimensions. Whereas an Environmental Assessment was written for the first unit, the Service required an Environmental Impact Statement on the second to include cumulative effects of both operations. As 1989 ended, refuge staff were providing resource data to Navy consultants for the EIS. A scoping meeting was held in late November in Anchorage to determine public concerns regarding the project.

May 5-6 Boylan visited the village of Atka for a public meeting on the Aleutians West Coastal Resource Service Area Management Plan, accompanying AWCRSA coordinator Darcy Lockhart and planner Jon Isaacs. In September, ARM Klett and ORP Cline again visited Atka; Klett represented the refuge at a public meeting on the AWCRSA plan and Cline arriving aboard Tiglax to conduct a public meeting on proposed sea otter regulations with Wells Stephenson from RO.

RO Archeologist Diters no sooner returned from Kiska and "Project Seamark" than he returned to the Aleutians via Air National Guard to Amchitka to supervise removal of WWII airplane parts under a permit to the Alaska Transportation Museum in Palmer.

In September, Biological Technicians James Fuller and David Blomstrom were detailed for three weeks to Kodiak where they conducted over 150 bird transects by boat as part of monitoring the effects of the Exxon Valdez oil spill.

MW Schulmeister was lost to the station for much of the year. He was detailed for two weeks to the Pribilof Islands to renovate Service housing/office space. Following that detail, Bob was recruited as back-up engineer aboard the Tiglax, a two-week assignment that turned into a month. He'd no sooner returned to Adak from sea duty than he learned he'd been selected for jury duty -- and spent much of October and November in Anchorage.

April 8-10, Boylan met with visiting planners from the Navy's Western Facilities Engineering Command Rolph Busch, Sam Samolis and Luther Thompson to provide ideas for the NAS Facilities Master Plan. At other times, refuge staff have been meeting with DOD planners and contractors from the Soil Conservation Service who are simultaneously completing a NAS Natural Resource Management Plan.

It's hard to believe that a base could be operating as long as Adak -- 30 years -- and not have any written guidance. Now they're trying to get all planning done in two years! While we made substantial comments on the Facility Master Plan regarding organization of the base, historic preservation, maintaining open space and wildlife observation areas, most of our work was saved for the NAS Natural Resources Management Plan. The final product is due September, 1990. The good news is Navy officials will have their direction and jurisdiction spelled-out in one document

which is critical when you're only here two years. The bad news is that jurisdiction over who's responsible for what on Adak has gotten so murky over the years that it's a wonder anything gets done.

FWS completed the Alaska Maritime NWR Comprehensive Conservation Plan (CCP) in 1988 to provide general guidance for the 3.3 million acre refuge. The Navy's plan focuses only on Adak and this gives us a unique window of opportunity to establish once and for all who's responsible for what on Adak, restrictions on military development, the sanctity of the Wilderness Area (south half of island), the importance of historic and cultural preservation and the need for formal Navy cooperation and support of Service management efforts. In short, given the frequent turnover in military personnel, the large budgets they have to play with and the increasing strategic importance of the Aleutians, incorporating Service interests and responsibilities in the Navy's plan is of primary importance. Staff review and technical assistance began early in 1989 and we were working on the draft plan as the year ended. Time will tell if our efforts are worthwhile.

DEC, EPA, USDA and SCS personnel working on the Natural Resources Plan met with RN Boylan and ORP Cline to discuss topics including historic preservation, revegetation and long range potential for minimum impact recreational developments (i.e. issues involving nature trails, environmental garden, cross-country skiing, hunting, bird watching, self-guided tour routes, fishing).

The military on Adak received technical assistance from our office on a number of other projects including siting of a proposed fuel pier, realignment of the road from NAS to NSGA, restrictions on off-road vehicles and snowmobiles and planning of military exercises.

The refuge also worked with Air Force personnel on Shemya to provide technical assistance on projects including fish restocking, relocation of a rock crusher/gravel washer, runway extension and a new warehouse.

ORP Cline participated in a December 6 planning session in Anchorage to develop ideas for an Alaska Maritime NWR visitor center in Homer with interpretive specialists from Kenai, Homer and personnel from Engineering and Refuge Operations.

8. Other

The wreck of the Exxon Valdez on Good Friday, March 24, in Prince William Sound was the worst environmental disaster in 1989 and the worst of the decade for Alaska. While the AIU was not affected directly by oil from the Exxon Valdez, we had our own problems. By the first two months of 1989, a half-dozen ships had run aground in the Aleutians as a result of winter storms and virtually all lost some quantity of fuel or oil.

But our contamination problems were not limited to the sea. In February, military officials discovered at least two major fuel leaks on Adak that had resulted in an estimated two million gallons of JP-5 fuel running into the soil and water. The Adak fuel leaks received substantial publicity not only for the amount but because they'd gone unnoticed or unreported for some time.

Throughout the year, other fuel leaks or spills kept popping up on Adak, many of those attributed to faulty new construction or the aging infrastructure of pipes and lines installed in the 1950's. Containment booms were frequent sights around the mouths of many of the streams near "downtown" Adak as the base's Environmental Specialist tried to prevent fuel from reaching the ocean.

The federal Environmental Protection Agency and state Department of Environmental Conservation hadn't visited Adak in anyone's memory but the news of the fuel leaks got their attention. In May, DEC field inspector Bruce Erickson toured contaminated areas with RM Boylan to ascertain status of the clean-up as well as learn about other military contaminant problems, including issues on Amchitka.

Officials of the State DEC and federal EPA examined Adak's waste storage and directed the Navy to do better. (MFB)

In June, as Captain R.P. Monro was succeeded as NAS Commanding Officer by Captain James Dulin, the new CO had as his first

guests a joint investigative team from the EPA/DEC. The group spent a week inspecting hazardous waste storage, landfills, and other contaminant issues and concluded with a half-day briefing to the CO and his staff. Their message: Clean it up in one year or pay the penalties. Several Notices of Violation were issued but no fines assessed with the provision that corrective measures were being taken. The DEC/EPA said they'd return in a year but with little advance notice. Navy officials promised environmental clean-up restoration would take a higher priority.

Despite its remoteness and designation as a military base with security clearance requirements, Adak receives its share of visitors. A television news team from Anchorage KIMO visited Adak February 4 and anchorwoman Cindy Suryan and a cameraman toured the Fish and Wildlife Center as part of a three-part program about life on Adak.

And while Adak doesn't get many politicians to visit, state representatives Tony Jacko and Sam Cotten (Speaker of the House) visited us November 29 & 30 and toured the Fish and Wildlife Center as part of their visit.

In June, Dr. Tom Laughlin of the National Marine Fisheries Service (NMFS) stopped at Adak when his chartered flight to survey sea lion populations was grounded by weather. RM Boylan discussed cooperative efforts with NMFS, whose aerial surveys substantiated the 60% decrease in sea lion populations estimated by refuge biologists. NMFS is awaiting final data to determine if the northern sea lion should be categorized as "depleted" under the Marine Mammal Protection Act or "threatened" under the Endangered Species Act.

In August, wildlife photographer Steven J. Krasemann visited Adak under military sponsorship to gather photos for his upcoming book, Diary of an Arctic Year. He presented two outstanding wildlife slide programs at our visitor center to 75 persons. Also this month, Adak was visited by Don Miller, a World War II vet who was the cartoonist on the military newspaper The Adakian edited by Dashiell Hammet, better known as author of The Maltese Falcon and The Thin Man. Now a successful artist, Miller was in Alaska lecturing at the Anchorage Museum of Art & History in connection with it's exhibit, "Drawing the Lines of Battle", on war cartoonists. Reeve Aleutian Airways provided free transportation to Adak for Miller, who was hosted by the Adak Historical Society. He pledged his support of the Society's efforts to renovate the old chapel by donating proceeds from the sale of limited edition prints of an original oil painting of the chapel to the Adak Historical Society to be used for renovation of the church.

With a staff of nine and the challenge of managing 1200 miles of islands and the wildlife, historical and cultural resources scattered throughout them, cooperation is the name of the game in the Aleutians. That means cooperating with agencies such as the

state's Division of Fish and Wildlife Protection to combat commercial fishing violations, the National Park Service to prevent violations of archaeological or historical resources, EPA and the State's Department of Environmental Conservation to prevent pollution of air, soil or water and insure legal disposal by the military of hazardous wastes.

For the second year in a row, a visiting Coast Guard helicopter crew provided a day's flight time around the south half of Adak to enable refuge biologists to survey the caribou herd. Some two-dozen caribou were brought to Adak in 1959 for hunting and as an emergency food supply. With no predators, hunting alone keeps their numbers in check. The Navy provides weekly tugboat transportation for hunters to cabins on the south side of the island where most of the harvest occurs. Management plans call for a post-season target of 150-200 animals and our harvest averages 140-150. But we've lacked an accurate pre-season survey method until recently. Last year, on an abbreviated survey, biologists counted at least 350 animals. This year, a comprehensive survey with good weather revealed over 460 animals. The tally after this year's hunt may make some changes mandatory if the Adak caribou herd is to be kept at a manageable size. Caribou surveys are not our only cooperative venture with the Coast Guard; we fly virtually all our seasonal employees and volunteers between Adak-Kodiak on bi-weekly Coast Guard flights and often they stay at the Coast Guard bunkhouse while awaiting their flights. We also use bi-weekly flights each winter to reach Shemya where we survey numbers of emperor geese. Attu Island also has a Coast Guard station where we occasionally require lodging. Thankfully, we were able to repay the "Coasties" for their helicopter time by allowing them to stay at our bunkhouse for a week when an engine malfunction grounded them. Our relationship with the Coast Guard seems to bode well for the future availability of helicopter time to reach heretofore unreachable places.

The Aleutians serve a strategic military purpose and the Navy, Marines, Air Force and Coast Guard are all present. At least every other year a major military maneuver is planned for the Aleutians. This year it was "PacEx `89", Billed as the largest military operation in the Aleutians since World War II involving over 17,000 troops and countless ships, planes and helicopters. There was adequate coordination between the Service and the military so refuge lands weren't impacted. All military vehicles confined their activities to roads on the north half of Adak. An amphibious landing on a beach at Amchitka's Constantine Harbor within the area covered by our Memorandum of Agreement took place without incident. An erroneous newspaper report of the event led to a Sierra Club inquiry. Since an Environmental Assessment had been prepared and followed, the environmental group was satisfied there were no adverse effects to refuge resources.

No sooner had the Navy's first-of-its-kind $200 million Relocatable Over the Horizon Radar (ROTHR) system spanning the 30

mile length of Amchitka Island been completed that they announced they would erect another one on the same island. While an Environmental Assessment was done for the first project, an EIS was required for the second proposal to include cumulative effects of both systems. A public scoping meeting was held on November 30 in Anchorage and two weeks prior to that meeting project engineer Joe DiVittorio and biologist Ron VanBianchi met with refuge staff to discuss issues.

Regional Director Walt Stieglitz paid his first visit to the Aleutians June 26-30. He was accompanied by ARD John Rogers, Refuge Manager John Martin, and pilots Dale Moore of Office of Aircraft Services and Bob Richey from Kenai NWR. On arrival at Adak, they met with Captain Thomas Traughber of Naval Security Group Activity and Captain James Dulin, the new Commanding Officer of NAS Adak. Continuing their tour they met with officials of military bases at Amchitka, Shemya and Attu (where they also visited the Japanese Peace Memorial). They also flew over field camps on Agattu and Buldir as well as the Tiglax. The group left Adak for a stop at the refuge station in St. Paul in the Pribilofs before returning to Anchorage. In this year of the oil spill, we appreciate the extra effort required to make this long trip during an unusually difficult time.

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. Commonly referred to as "The Chain", 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. We have been working with a "no net loss of wetlands" management policy for years. Current management efforts include orienting military development away from lowland 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, was cooperative and sensitive to our suggestions throughout the year.

Assistance continued on Amchitka Island where the U.S. Navy has constructed a Relocatable-Over-The-Horizon-Radar (ROTHR). An EIS is currently being developed to cover the construction of a second ROTHR site on the island. Meetings were held and resource information provided to Naval personnel preparing the EIS. The Navy has agreed to fund a Fish and Wildlife Service biologist to work on-site at Amchitka during the three year construction period. Other discussions involved the removal of 24 transformers containing PCB oils, 40 barrels of waste oil, anti-freeze and diesel fuel malt, left on Amchitka after the construction phase ended on the first ROTHR.

6. Other Habitats

Beach Debris Surveys--Increasing use of man-made materials that are highly resistant to environmental decomposition has resulted in the presence of unprecedented amounts of debris in the oceans. Plastic materials, netting, lines, and other material are deposited on refuge beaches in large amounts, and its effect on wildlife can be harmful (e.g. entanglement, swallowing undigestable material, etc.).

In 1989 we conducted debris surveys and also recorded dead animals along selected beaches on Amutka, Little Kiska, Buldir, and Agattu islands. The purpose of the surveys were to describe the quantity and type of items present and to provide a basis for future comparisons.

We discovered that beaches on the north side of Amutka were relatively clean, nevertheless beaches on the island's south side contained lots of polypropolene line, buoys, plastic floats, bottles, jars, jugs, and pieces of styrofoam. These same items were common on beaches at Little Kiska, Buldir, and Agattu, but all these island beaches also contained pieces of trawl netting and monofilament gillnets.

Oil splotches were recorded infrequently on beaches at all islands surveyed. It was usually in the form of thick black tar on rocks, net, or bird carcasses. Relatively few carcasses were recorded. At Amutka, a group of 19 unidentified seabirds, probably murres, apparently washed ashore during a storm on June 19. At least 15 of the birds were coated with heavy black tar. Furthermore a dead laysan albatross with oil on it was found near Amutka in July. At least 8 oiled bird carcasses (murres and

cormorants) were found on the north side of Buldir in June, and several oiled seabirds (1 whiskered auklet that was completely covered in tar) were found elsewhere in the western Aleutians in summer 1989.

Northern sea lion populations have declined drastically in the Aleutians in the last decade and discarded marine debris, like the netting which nearly severed this sea lion's head is one factor. (GVB)

Winter storms followed us into 1989 and played havoc with ships and shipping. At the end of January our log showed the following:

1. The barge "Kenai" carrying PCBs from Amchitka that went aground in December near Cold Bay was eventually re-floated. It was on its way to Sand Point where the PCBs and other cargo were to be transferred to another barge.

2. A Japanese freighter was aground in Lost Harbor, Akun Island. It has been abandoned by its crew. The Regional Response Team and the Coast Guard worked out a disposal method for the ship and fuel to minimize environmental disturbance (it was eventually burned in April).

3. Another foreign freighter aground at Kashega Point, Unalaska Island. No word at month's end as to status of vessel or 65,000 gallons of diesel aboard (it was eventually towed off and some damage to terrain and bird life did occur to leaking fuel).

4. Fuel barge aground at Bird Point, Amchitka on January 14, with 78,000 gallons of diesel lost. Barge removed to Constantine Harbor, where fuel pumped into on-shore storage tanks.

7. Grazing

All three grazing operations continue under Special Use Permits. The policy of charging a $100.00 administration fee is working well for everyone. The permittees felt they could afford this fee and the Service resolved the problem of obtaining payment. A request by the owner of Umnak Ranch to expand his 28,000 acres grazing lease by 20%/year over the next five years was denied by RM Boylan in accordance with the approved Comprehensive Conservation Plan. At the same time, a proposed agreement between the rancher and a native corporation to manage reindeer allegedly belonging to the corporation was not recognized since the animals must be marked/branded before the Service or the Alaska Department of Fish and Game will acknowledge "ownership".

12. Wilderness and Special Areas

The Alaska National Interest Lands Conservation Act (ANILCA) designated approximately 1.3 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).

During PacEx 89, refuge staff worked with military planners to insure designated wilderness areas on Adak, Amchitka and other islands were off-limits to military activities. The three-week exercise went off as planned without any damage to wilderness values.

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

AREA	Designation
Aleutian Islands Unit	Biosphere Reserve
Agattu Island	Research Natural Area
Buldir Island	Research Natural Area
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 Places

G. WILDLIFE

1. Wildlife Diversity

Structural habitat diversity on the Aleutian Islands Unit is relatively low so the breeding fauna is restricted to relatively few species. Nevertheless, the geographic location of the Aleutian Islands makes them attractive to a fairly diverse suite of migrant birds, some found nowhere else in North America. In 1989, 45 species considered to be rare, occasional, or accidental visitors to the islands were recorded (Table 4). Of these the narcissus flycatcher and Chinese little bittern were first time North American records. A rufous turtle dove at Attu was the first Aleutian record for that species. An adult Bohemian waxwing seen at Attu was the first Alaska record of the subspecies from east Asia. Also seen at Attu was a female pine grosbeak which provided the first Aleutian record and third Alaska record of the Kamchatka subspecies.

2. Endangered and Threatened Species

a. Aleutian Canada Goose Translocation (excerpted from Byrd, G.V. 1989. Translocation of Aleutian Canada geese from Buldir Island to Little Kiska and Nizki/Alaid Islands in August 1989. Refuge Report. Adak, AK).

The translocation of flightless Aleutian Canada geese (Branta canadensis leucopareia) from Buldir Island, where the largest breeding population remains, to nearby islands which have been cleared of introduced arctic foxes (Alopex lagopus) is a major component of the recovery program for this endangered species. Foxes have been cleared from several islands west of Buldir in the Near Island group, an area where bald eagles (Haleaeetus leucocephalus) are absent. Eagles occur from Buldir east and their predation is proving to be a serious detriment to reestablishing geese after islands become fox-free.

In 1989 the translocation project had two objectives:

1. To bolster a tiny population of nesting geese which have become reestablished west of Buldir at Nizki/Alaid by moving 100-125 geese there from Buldir.

2. To evaluate the impacts of bald eagles on a small group (i.e., 25-30) of geese released at Little Kiska.

A new goose capture method was tested at Buldir in 1989. Border collies were used to try to improve capture efficiently and reduce stress to birds and people.

On 4 dates between August 1-9, 1989 a crew of up to 10 people and 2 border collies captured 146 geese, 143 of which were released on Little Kiska and Nizki/Alaid islands (Table 5). The ages of the 25 goslings released at Little Kiska were nearly ideal; all

Table 4. Sightings of rare to accidental species in the central and western Aleutians in 1989.

Species	Island
Short-tailed Albatross	Buldir, Kiska, Shemya
*Chinese Little Bittern	Attu
Bean Goose	Buldir
Falcated Teal	Buldir
Garganey	Shemya
Tufted Duck	Adak, Alaid, Agattu, Buldir
Barrow's Goldeneye	Amchitka
Smew	Amchitka, Amukta, Attu
White-tailed Eagle	Attu
Northern Harrier	Adak
Merlin	Adak
Mongolian Plover	Attu, Buldir
Semipalmated Plover	Adak, Buldir
Common Greenshank	Attu, Buldir
Wood Sandpiper	Buldir
Gray-tailed Tattler	Agattu, Buldir
Common Sandpiper	Agattu, Attu, Buldir
Terek Sandpiper	Agattu
Far-eastern Curlew	Attu, Buldir
Black-tailed Godwit	Attu
Rufous-necked Stint	Buldir
Little Stint	Buldir
Long-toed Stint	Attu
Curlew Sandpiper	Buldir
Broad-billed Sandpiper	Buldir
Herring Gull	Adak, Amchitka
Iceland(Thayer's) Gull	Adak
Rufous Turtle Dove	Attu
*Narcissus Flycatcher	Attu
Gray-spotted Flycatcher	Buldir
Siberian Rubythroat	Attu, Buldir
Eye-browed Trush	Attu
Black-backed Wagtail	Attu
Yellow Wagtail	Buldir
Bohemian Waxwing	Adak, Attu
White-eyed Junco	Atka
Rustic Bunting	Attu, Buldir, Nizki
Common Reed-Bunting	Attu
Brambling	Agattu, Attu
Pine Grosbeak	Attu
Common Rose Finch	Attu, Buldir
Pine Siskin	Adak
Oriental Greenfinch	Alaid, Attu, Buldir
Hoary Redpoll	Amchitka
Hawfinch	Attu, Buldir

* North American Record

Table 5. Age and sex composition of translocated Aleutian Canada geese in 1989.

Translocation Site[a]	Date Released	Total Geese	Adult Male	Adult Female	Gosling Male	Gosling Female	Approximate Age of Goslings (days) <35	35-39	40-44	45-49
Little Kiska	04 Aug	25[b]	3	0	10	12	1	3	7	11
Alaid	02 Aug	42	3	5	13	21	8	17	8	1
Alaid	07 Aug	40	3	8	11	18	2	2	5	20
Nizki	09 Aug	36	4	2	17	13	3	3	3	21
Alaid/Nizki Subtotal		118	10	15	41	52	13	22	16	42
Totals		143	13	15	51	64	14	25	23	53

[a] See Fig. 1

[b] 3 additional geese died in transport

but 1 were at least 35 days old and most were older than 40 days (Table 5). Moreover, there were slightly more females than males.

Of the 118 geese transported to Nizki/Alaid, 25 (21%) were adults (Table 5). Two had previously been marked in California (FWS 1307-03287 and 1307-03397). Of the 93 goslings released there, 52 (56%) were females, and 86% were over 35 days old (Table 5).

For the first time we saw no signs of paralysis in birds we handled in 1989. Furthermore, there were only 4 cases, none serious, of abrasions to forewings. The lack of injuries and paralysis might be attributed to the relatively short handling and transport time, and to the less stressful capture technique (i.e., herding by border collies).

Border collies Lass (L.) and Cap were used in the Aleutian Canada goose translocation in 1989 to capture more birds in less time. (BR)

Three birds died, all goslings. One was found dead for no apparent reason in the large holding pen at Buldir 12 hours after birds were rleased there. Two goslings did not survive the rough ride to Little Kiska from Buldir. Although there was no apparent cause of death for any of these goslings, they all were from the only group of geese we held for an extended period (30 hours at Buldir) and transported during rough seas.

Immediately after geese were released near the west end of Little Kiska on August 5, 2 birds including 1 adult separated from the rest, ran to the beach, and swam toward Kiska. The others moved inland and initially split into 3 groups. The next day, August 6, a group of 10 geese was found on "Goose Lake". This group was joined by single additional birds each day August 8, 10, and 11 bringing the total to 13 geese (including 1 adult) at Goose Lake. Unfortunately, conditions were such that leg band codes could not be read.

1989 Aleutian Canada goose catchers: (L-R) Lewis with dogs Lass and Cap, Douglas, Knechtel, Hall, Hipfner, Blomstrom, Zuberbier. (GVB)

Although the geese were seen in flight as early as August 12, they remained at Goose Lake until August 18. On August 19-20 the flock containing 12 and 11 birds on respective days was seen in flight elsewhere on the island. Geese could not be found on Little Kiska on August 21-22 or August 26, the last day observations were made.

An active bald eagle nest was located near Little Kiska Head, and possibly another nest occurred near the southeastern part of Little Kiska where 2 adults were seen on 2 consecutive days. We could account for remains of at least 6 different geese killed by eagles during the monitoring at Little Kiska, but the amount of feathers and other body parts in and near the eagle nest at

Little Kiska Head suggests that additional geese were also brought to this nest.

Using available information, we estimate that at least 11 geese including 1 adult were still alive when geese apparently left Little Kiska in late August. A more liberal estimate of 19 geese remaining alive could be obtained by considering the minimum known deaths as the total mortality (i.e., 25 minus 6). If we assume there was relatively high mortality of geese soon after release, then the strategy followed by the flock at Goose Lake was the most successful. They remained in or near relatively tall cover by the lake edge.

Two groups of geese were released on the south side of Alaid, and the third group was released at Nizki. In all cases birds remained in groups and most swam across nearby lakes before bathing, preening, and resting in tall vegetation at lake edges. Many began to feed soon after released. All of the birds appeared to be healthy after their release; none of the birds seemed to suffer from paralysis.

The following summarizes the ways border collies enhanced the capture of geese at Buldir for translocation to other islands:

1. Dogs stopped birds that usually outrun people.

2. A higher percentage of birds seen together were captured than usual, so that there was less of a chance of breaking up families.

3. Dogs found birds we normally do not see, thus the success rate was improved thereby reducing the total capture effort.

4. Chances of injuries to birds and people were reduced because when the dogs circled, the geese tended to hunker down making them much easier to catch.

5. Birds were probably less stressed since they did not get chased nearly so far as usual.

6. Less people are needed to capture birds.

In general, the whole operation went smoother than previously. Since "a load" of birds was caught on every capture day with the dogs, it was possible to transport geese soon after their capture instead of having to "stockpile" birds in the holding pen at Buldir. The capture rate for each group encountered was also high, so that we filled up backpacks much more quickly than usual and were able to transport birds back to camp and transfer them to roomier quarters (i.e., poultry crates). This reduction in the amount of time in backpack cages may have been the main factor in reducing injuries to geese.

Aleutian Canada goose goslings captured on Buldir Island were released on Little Kiska, Nizki and Alaid islands. (BR)

b. Aleutian Canada Goose Nest Surveys--Agattu (excerpted from Byrd, G.V., D. Groves, and V. Klett. 1989. Results of a survey for Aleutian Canada Geese at Agattu Islands in 1989. Refuge Report. Adak, AK).

A primary goal of the recovery program for Aleutian Canada geese (Branta canadensis leucopareia) is to reestablish self-sustaining populations of geese on breeding areas where they had been extirpated by introduced arctic foxes (Alopex lagopus). The recovery plan criterion for considering a reintroduced population "self-sustaining" is that at least 50 breeding pairs occur.

Following removal of introduced arctic foxes and subsequent releases of Aleutian Canada geese at Agattu Islands, 25 pairs were found nesting in the southeastern portion of the island in 1988 (Byrd et al. 1988). In 1989 the Aleutian Canada Goose Recovery Team encouraged the refuge staff to survey areas at the east and west ends of Agattu, where surveys had not been conducted previously, to determine the extent of nesting geese and to determine whether this population could be considered self-sustaining.

Specific objectives of field surveys in 1989 were to census goose

nests in what is considered preferred habitat (i.e., a tall grass and umbelliferous community) in the vicinities of (the west end of Agattu) Krugloi Point and Gillon Pt. (Fig. 1).

At least 52 geese were accounted for in the northeastern study area in June (45 counted by D. Groves and S. Toadvine, 7 reported by R. Drozda, BIA). In addition, 5 nests were found. Of the 52 geese accounted for, 10 were associated with the nests. The others were probably non-breeders. At the western study area, 30-36 different geese were accounted for, but no nests were found. Some of the non-breeders at both study areas appeared to have formed pair bonds and acted as though they were holding territories. This behavior often occurs in 2-year olds. No leg bands or neck collars on geese were observed at either study area.

Subjective assessment indicates that the most extensive areas of "preferred" nesting habitat occur within 0.5 km of the coast between Nile River and Island Cove (Fig. 1). This is the area first occupied by nesting geese after initial releases and also the area where the highest nesting densities now occur.

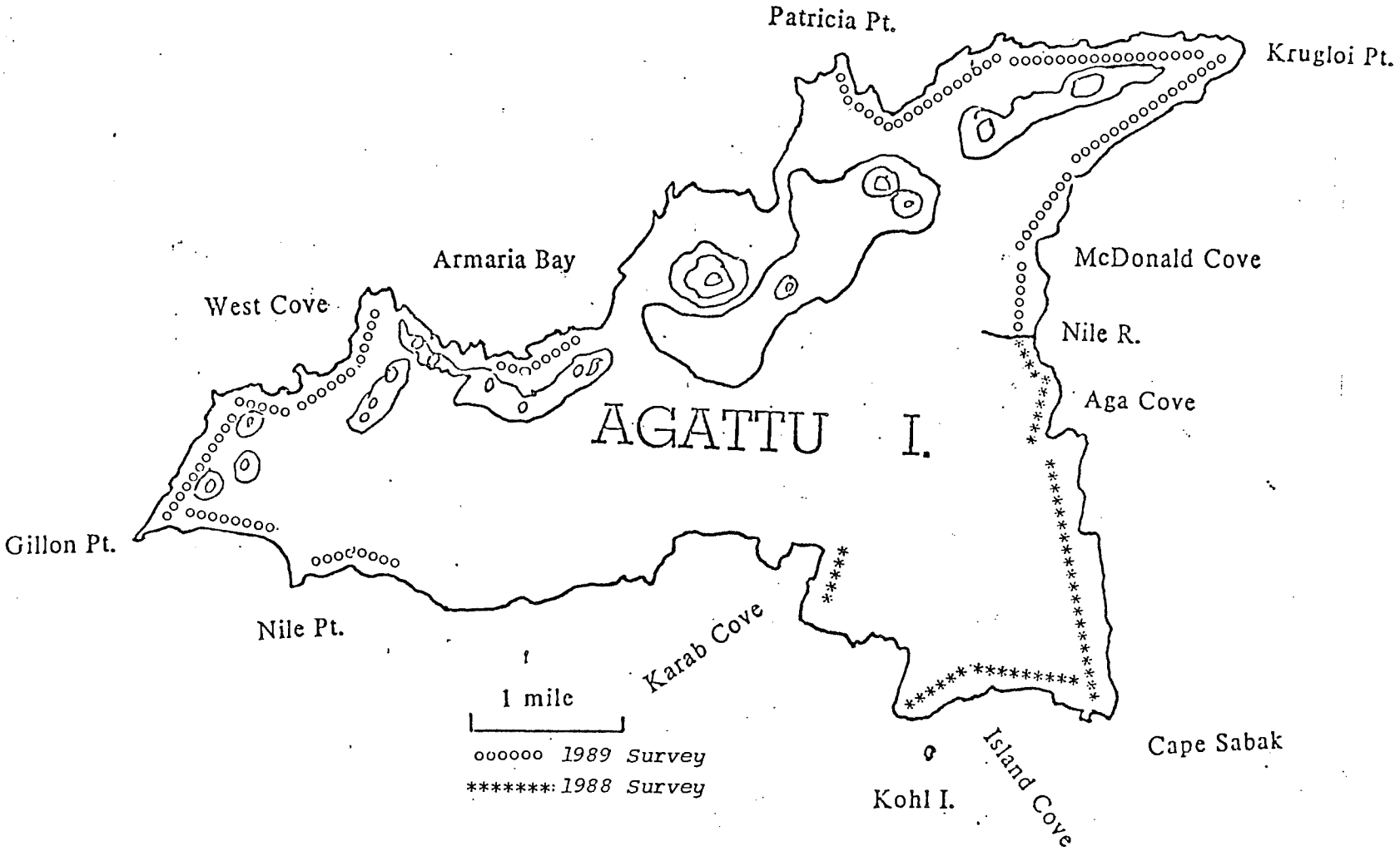
Areas surveyed in 1989 had "preferred" habitat restricted to a narrow (<0.2 km), intermittent coastal band, except for more extensive stands of tall vegetation just east of Nile Pt., at the head of Armaria Bay, and along stream valleys (e.g. at McDonald Cove). Although detailed surveys have not been conducted, there appears to be little nesting habitat between Armaria Bay and Patricia Pt., except at the head of Barnacle Bay (just west of Patricia Pt.). The area west of Karab Cove has not been surveyed, but during boat surveys nearshore, it appears a narrow coastal strip of tall vegetation may occur.

Judging from the information about nesting densities of Aleutian Canada geese at Buldir Island, where the only large breeding population occurs, there is substantial room for more nesting pairs within the "preferred" habitat at Agattu. Furthermore, since bald eagles (Haliaeetus leucocephalus) and other large raptors are absent from Agattu, there may eventually be extensive use of the shortplant uplands at Agattu for nesting. Indeed several nests have been found already in this widespread habitat on the island.

Aleutian Canada geese appear to be well on the way to becoming "self-sustaining" at Agattu. Nevertheless, it seems unlikely that the current nesting population exceeds 35 pairs. If the present rate of increase continues, the breeding population should exceed 50 pairs by 1991 or 1992.

c. Aleutian Canada Goose Nest Surveys-Nizki-Alaid (Excerpted from Byrd, G.V. and M. Amaral. 1989. Observations of Aleutian Canada Geese at Alaid and Nizki Islands May 31-June 3, 1989. Refuge Report. Adak, Ak).

Figure 1. Map of Agattu I., Alaska showing sections of coastline surveyed for Aleutian Canada Geese in 1988 and 1989.



From May 31 - June 3, 1989, most areas of tall vegetation and all pond edges on Nizki and the east end of Alaid islands were searched for nesting Aleutian Canada geese. The purpose of the survey was to determine whether there had been an increase in nesting pairs in this reintroduced population since 1988 when two pairs were found.

In 1989, eight nests were found and at least 30 geese were counted (including the 16 associated with nests). The largest single flock was 9 birds. Seven of the nests were on Nizki; one was on Alaid.

The reestablished population of Aleutian Canada Geese on Nizki and Alaid islands has increased substantially since 1988, but still remains too small to consider it self-sustaining. We probably found most of the nests on the islands so it is unlikely that more than 10 nesting pairs were present in 1989. There is a tremendous potential for expansion, and supplementation of the reproductive output of the 8 nesting pairs with translocated goslings from Buldir should help move this population to secure levels in the near future.

Over two weeks of searching on Amukta Island but only one nest was found. (DG)

d. Aleutian Canada Goose Nest Surveys-Amukta (Excerpted from Blomstrom, D. and G.V. Byrd. 1989. Results of a survey for Aleutian Canada geese at Amukta, Alaska in 1989. Refuge Report. Adak, Ak).

Foxes were removed from Amukta in 1984 in hopes that Aleutian Canada geese would become reestablished on their own from nearby Chagulak Island. All lush areas of vegetation were searched for goose nests between May 31 and June 16, 1989.

A single goose nest was found on Amukta. Besides the pair associated with the nest, three additional sightings were recorded (a flock of 9 on May 23, a flock of 12 on May 28, and a flock of 5 on June 11). The remains of at least two geese, probably killed by eagles, were found June 11.

We judged that roughly 500-750 ha of suitable goose nesting habitat occurred on Amukta, so there seems to be space for a number of geese. Nevertheless, eagle predation will influence the rate of goose pioneering at Amukta, and it remains to be seen if a population will become reestablished.

e. Short-tailed Albatross- Four observations were recorded in 1989: immature brown birds near Seguam Island July 8, and between Shemya and Buldir islands on August 3; an older immature with white back but mottled wing tips on August 3 between Shemya and Buldir; and an adult on August 30 between Buldir and Kiska. Sightings are becoming more frequent as the nesting population in Japan increases.

FWS Botanist Gerald Tande spent a month on Adak stalking the elusive, endangered Aleutian shield fern. (MFB)

f. Aleutian Shield-fern-In July 1989, Gerald Tande, U.S. Fish and Wildlife Service, mapped the distribution of ferns on Mt. Reed, Adak and set up several study areas to monitor population trends. Furthermore, breeding phenology was monitored to predict the best timing for spore collection to attempt greenhouse propagation.

In late August Pat Wagner, University of Alaska, Fairbanks, collected spore bearing fronds from 10 plants on Mt. Reed and took them to her laboratory in Fairbanks. After preparation, the spores were divided among 4 different treatment media and subjected to varying temperatures and photoperiods. Germination of the spores was first observed in November, 61 days after the spores were sown, with production of prothallia in 3 of the 4 treatment media. This represents the first successful "in vitro" germination of P. aleuticum spores. However, sexual reproduction must still occur before plants are produced. It remains to be determined whether successful reproduction can occur since some ferns exhibit natural barriers to inbreeding. Fern population surveys and a complete mapping of the known populations was also completed.

In relation to a quarter, the tiny, endangered Aleutian shield fern is one of the world's rarest species, with its 100+ plants only from Adak in recent years. (MFB)

3. Waterfowl

a. Emperor Goose.--(Excerpted from Byrd, G.V. Observations of Emperor Geese in the Aleutian Islands, October 1988 - April 1989. Refuge Report, AMNWR-AIU).

A refuge inventory plan for emperor geese was initiated in September 1988. This species has declined drastically in the past 16 years, and most winter on the Aleutian Islands Unit. A number of geese have been marked with plastic neck collars near breeding areas on the Yukon Delta NWR, and one of the objectives of our survey was to resight marked birds. Furthermore, we wanted to determine whether collar icing was a problem. Other data recorded included juvenile ratios, general habitat utilization, and fluctuations in numbers of birds along set survey routes. Observations of emperor geese were made at five locations along the "Chain", Unalaska, Adak, Amchitka, Shemya and Attu islands.

Emperor geese were sighted on Adak, Shemya, Amchitka, Attu and Unalaska islands in the AIU. (MFB)

Juvenile ratios recorded at various sites and dates for the 1988-1989 winter were highly variable with no obvious pattern. Ten different collared birds were recorded with at least one being seen at each island. Ice build up on collars was never seen in the 14 instances in which this information was recorded. Unlike

mainland Alaska, the Aleutians weather may be too warm for this to be a serious problem.

Emperor geese began arriving for the 1989-1990 winter in October 1989, throughout the central and western Aleutians. Preliminary results from the data collected October - December 1989, indicate that approximately 20% of the geese observed in the western Aleutians were young-of-the-year, nearly identical to the estimate of 22% young observed in the central Aleutians. Five collared geese were observed during surveys at Shemya Island in December 1989. Two of these same individuals had been sighted on Shemya during the 1988-1989 winter, suggesting that the emperor geese may have winter territories and return to them yearly. No collared geese have yet been seen this winter at Adak where four were seen last winter.

b. Other Waterfowl--The primary nesting species include the "Aleutian" green-winged teal, mallard, northern pintail, common eider, greater scaup, and red-breasted merganser. Breeding pair surveys have not yet been established for any of these species. Indicies to relative abundance and seasonal occurrence of wintering waterfowl are provided by periodic surveys at Shemya and Adak islands. Generally wintering ducks arrive in October or early November and remain into April. Common eiders and harlequin ducks were the most abundant species at Shemya again this winter (Table 6), whereas harlequins, greater scaup and common goldeneyes were particularly common at Adak (Table 7).

After foxes were removed, nesting red-throated (above) and common loons noticeably increased on AIU islands. (EVK)

Table 6. Waterfowl observed along the coast at Shemya Island, Alaska in 1989.

Species	April 13	April 14	December 6	December 7	December 8	Total
	[a]					
Emperor Goose	11	9	343	291	268	912
Green-winged Teal	-	12	6	21	1	40
Mallard	11	44	14	16	19	104
Northern Pintail	21	14	19	1	17	72
Common Eider	529	642	229	-	354	1754
Stellar's Eider	-	-	3	-	3	6
Harlequin	393	625	105	-	298	1421
Oldsquaw	1	1	-	-	-	2
White-winged Scooter	-	-	6	-	-	6
Eurasian Wigeon	4	4	1	1	1	11
Canvasback	1	1	-	-	-	2
Bufflehead	4	7	-	5	-	16
Gadwall	-	-	4	4	4	12
Common Goldeneye	-	-	-	31	-	31

[a] Dashes indicate no birds seen

Table 7. Waterfowl observed during weekly vehicle surveys at Adak in 1989.

Species	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT[a]	NOV	DEC	TOTALS
Emperor Goose	325	329	125	9	-[b]	-	-	-	-		1	112	901
Green-winged Teal	26	7	26	87	55	43	49	61	2		3	2	361
Mallard	1	29	22	20	15	4	9	-	7		11	-	118
Northern Pintail	-	76	167	114	43	-	-	2	6		-	-	408
Eurasian Wigeon	4	-	-	2	2	-	-	-	-		-	-	8
American Wigeon	-	-	-	1	-	-	-	-	-		-	-	1
Canvasback	-	8	-	-	-	-	-	-	-		-	14	22
Tufted Duck	-	8	6	3	3	-	-	-	-		-	-	20
Greater Scaup	128	189	151	140	75	28	28	17	8		2	-	766
Common Eider	6	-	-	-	-	-	-	13	5		-	-	24
Steller's Eider	-	1	-	-	-	-	-	-	-		-	-	1
Harlequin Duck	112	118	270	263	134	100	9	-	25		400	173	1604
Oldsquaw	63	44	6	3	2	-	-	-	-		17	-	135
Black Scoter	9	86	21	17	-	-	-	-	-		-	-	133
White-winged Scoter	-	2	5	2	2	-	-	-	-		-	-	11
Common Goldeneye	99	99	56	72	4	-	-	-	-		2	25	357
Bufflehead	3	13	9	23	1	-	-	-	-		-	32	81
Smew	1	-	-	-	-	-	-	-	-		-	-	1
Common Merganser	-	-	-	2	-	-	-	-	-		-	-	2
Red-breasted Merganser	35	17	30	27	13	16	2	14	-		-	-	154
Numbers of Surveys	(1)	(3)	(1)	(2)	(2)	(2)	(1)	(2)	(2)	(0)	(1)	(1)	

[a] No surveys conducted

[b] Dashes indicate no birds seen

4. Marsh and Waterbirds

The primary marsh and waterbirds found on the refuge in winter are loons and grebes, both found primarily in nearshore waters in the Aleutians.

Common and red-throated loons were probably reduced to very low levels on many of the Aleutian Islands because of predation by introduced arctic foxes. After foxes were removed from Amchitka, Agattu, and Nizki/Alaid, there was a noticable increase in breeding loons. For example, only 1 or 2 pairs each of common and red-throated loons were found on Nizki and Alaid in the mid-1970's by J.L. Trapp. By 1984, the number of nesting red-throated loons had doubled to include about 14 birds on Nizki. We saw at least 12 red-throated loons on Nizki in 1989 indicating the density has remained high. Besides the red-throated loon, we found 4 pairs of common loons on Nizki in 1989, at least twice as many as in the mid-1970's.

5. Shorebirds, Gulls, Terns, and Allied Species

a. Ledge-nesting Seabird Monitoring--(Excerpts from Byrd, G.V. and H.D. Douglas. 1989. The status of ledge-nesting seabirds at monitoring sites in the Aleutian Islands, Alaska in summer 1989. U.S. Fish and Wildlife Service Report, Adak, Alaska).
Fulmars, cormorants, kittiwakes, and murres were the ledge-nesting seabirds monitored at selected sites on the refuge in 1989. Relatively intensive monitoring was carried out at Agattu and Buldir islands in the western Aleutians, and less intense surveys were conducted at Amukta, in the Central Aleutian Islands, and Aiktak, in the eastern Aleutians.

Results from 1989 surveys suggest that fulmars continue to expand their nesting range at Buldir. Such an increase has apparently been underway since the mid-1970's. In contrast, red-faced cormorants probably have declined at Buldir since the mid-1970's. Counts of black-legged kittiwakes at Agattu and Amukta islands were similar in 1989 to earlier years, but this species and red-legged kittiwakes, have increased at Buldir since the mid-1970's. Common murres appear to be increasing slightly at Agattu since the late 1970's, and thick-billed murres have increased since the mid-1970's at Buldir. Murre counts at Amukta were slightly higher in 1989 than in 1982, but at Aiktak less than 200 murres were present on cliffs in 1989 that had contained 13,000 in 1980. Presumably this represents a seasonal absence, due to poor food resources near the colony, not a population crash.

Reproductive performance was monitored for red-faced cormorants at Agattu, where they had lower than average success in 1989. Black-legged and red-legged kittiwakes had very poor reproductive success in 1989 at Buldir (5% and 10% respectively, of the nesting pairs produced fledglings). Success was also poor for the black-legged kittiwakes on Amukta. Apparently, the food web was more adequate at Agattu, where about 28% of the pairs of

black-legged kittiwakes produced young in 1989. This rate is similar to 1988 rates at Agattu and Buldir, but well below the level of reproductive output that has been demonstated in relatively productive years.

b. Puffin Monitoring--(Excerpts from Byrd, G.V. and H. Douglas. 1990. Results of monitoring studies for puffins in three locations in the Aleutian Islands in summer 1989. U.S. Fish and Wildlife Report. Adak, AK).
Following the death of thousands of tufted and horned puffins in drift gill nets near the western Aleutian Islands, we began an incidental study of puffins at Buldir and Agattu islands where crews were involved in other surveys in 1988 and 1989. Buldir and Agattu breeding populations were closest to the drift net fishing, therefore impacts were probably most severe at these breeding sites.

Plots designed to detect changes in density were established at Buldir and Agattu and at control sites in the cental and eastern Aleutians. Futhermore, delineation of nesting locations at all study sites was begun.

To understand the influence of environmental factors on changes in populations, we also gathered data on nesting phenology, reproductive success, chick growth, and food habits.

In 1989, data were gathered on tufted puffins primarily at Kohl Island near Agattu, and at Buldir Island. Plots were also established at Aiktak Island in the eastern Aleutians. Horned puffins could be monitored only at Buldir. We found that tufted puffins occupied about 60% of the burrows in plots on Agattu and 61% to 83% in different plots at Aiktak in 1989. From 75%-85% of the tufted puffin eggs hatched at Buldir and Agattu in 1989 and in 1988, and over 80% of the chicks fledged at each island in 1989. This was an improvement over 1988 when there was relatively high chick mortality at Buldir.

Horned puffins had about 85% hatching success at Buldir in 1988 and 1989, and chick survival was also high. We discovered that horned and tufted puffins brought primarily sandlance, squid and greenling in the 5-11 cm range to chicks at Buldir and chicks of both species grew at a rate of about 8-9 grams/day in 1989. In contrast, tufted puffin chicks at Agattu were fed sandlance almost exclusively. These fish were larger (8-14 cm) than at Buldir, and chicks grew faster at Agattu (13.5-16.3 grams/day in 1988 and 1989 respectively). Perhaps Agattu, which is situated on a relatively broad shelf so that it is surrounded by shallow water, provides a more stable and productive food web for puffins than Buldir which is surrounded by deep water. This type of understanding is needed to assess reasons for observed changes, thereby identifying resource problems.

Tufted puffin chicks at Agattu feed mainly on sandlance and had an 80% fledging rate in 1989. (EVK)

One of the objectives of the 1989 field surveys was to try to delineate the current nesting distribution of tufted and horned puffins so that at least large changes may be detected,. We were able to cover only small portions of Buldir and Agattu, and it became apparent that covering broad areas will require directed, not incidental, efforts.

Better results were obtained from counts of tufted puffin burrows in defined plots. We now have a good start on baseline data for changes in density of tufted puffins. Furthermore, our time-lapse photography resulted in accurate descriptions of the daily activity patterns of horned puffins at their nesting colonies. There is clearly an evening peak in attendance during which counts of birds on a series of plots should provide an index for assessing trends among years. Additional studies are planned to develop a suitable monitoring program for this crevice-nesting seabird.

Gulls and Others--Glaucous-winged gulls and cormorants were the most abundant species observed in this category at Adak and Shemya (Tables 8 & 9). Gull numbers peaked in August and September and decreased in December and January at both Islands.

Table 8. Shorebirds, gulls, terns and allied species observed during Adak surveys, 1989.

Species	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOT
	b												
Pelagic Cormorant	42	26	19	28	17	21	2	1	6		66	37	2(
Cormorant species	26	20	45	9	-	-	-	-	-		9	-	1(
Black Oystercatcher	-	1	-	1	1	2	-	1	-		-	-	
Ruddy Turnstone	-	-	-	-	-	-	-	13	-		-	-	
Sanderling	27	-	-	-	-	-	-	-	4		17	27	
Rock Sandpiper	54	-	-	1	4	2	-	5	-		-	-	(
Phalarope species	-	-	-	-	1	9	20	-	-		-	-	
Parasitic Jaeger	-	-	-	-	4	8	-	11	3		-	-	
Glaucous-winged Gull	63	139	95	127	159	205	131	373	396		175	24	18
Arctic Tern	-	-	-	-	-	2	11	2	-		-	-	
Aleutian Tern	-	-	-	-	-	13	26	16	-		-	-	
Murre species	-	1	-	-	-	1	-	-	-		-	-	
Pigeon Guillemot	6	9	17	16	8	13	-	26	6		-	-	1(
Murrelet species	-	-	-	1	3	-	2	-	1		-	-	
Number of Surveys	(1)	(3)	(1)	(2)	(2)	(2)	(1)	(2)	(2)	(0)	(1)	(1)	

a
No survey conducted
b
Dashes indicate no birds seen

Table 9. Shorebirds, Terns, Gulls and allied species observed along the coast of Shemya Island, Alaska in 1989.

Species	April 13[a]	April 14	December 6	December 8	Total
Pelagic Cormorant	45	32	98	139	314
Red-faced Cormorant	115	91	111	128	445
Unidentified Cormorant	-	-	623	731	1354
Rock Sandpiper	35	1	-	-	36
Glaucous-winged Gull	301	294	717	840	2152

[a] Dashes indicate no birds seen

6. Raptors

A total of 15 bald eagle carcasses were retrieved on Adak in 1989. At least 12 of these were electrocuted, one was killed by an airplane, and two died from unknown causes. The majority of the electrocutions occurred on power poles not equipped with artificial perches, however electrocutions occasionally occurred on poles with perches. After an eagle is electrocuted on a pole not equipped with a perch, a request is put in to the Navy and a perch is installed shortly thereafter. Electrocutions have decreased over the past years, reflecting the installation of perches (Figure 2). The Navy's Resource Management Plan for Adak due to be completed in September, 1990, calls for all utility poles to be equipped with perches to prevent electrocutions, rather than installing them after the fact.

One adult bald eagle and two immatures were rehabilitated and released either at the Adak office, or at the Arctic Animal Hospital in Anchorage.

7. Other Migratory Birds

The 22nd annual Adak Christmas Bird Count was conducted on December 16, 1989. This year's count established a new record in most individual birds (5785). Unusual species observed included a merlin, herring gull, and a pine siskin (during count week).

8. Game Animals

Caribou were introduced to Adak in 1958 and 1959. The herd grew quickly and within ten years many islanders were hunting caribou. A record bull (over 700 pounds) was taken at Adak in 1968. Since no natural predators or disease exist on the island, population control is accomplished through sport hunting. U.S. Navy boat transportation for military hunters is necessary to maintain adequate harvests.

An aerial caribou survey was conducted in October, 1989 thanks to support from a U.S. Coast Guard helicopter. We were very fortuate to have the same pilot for the survey as in 1988. Due to confusion about whether one herd was counted twice, the total is expressed as a range; 434 and 467. If we adopt the conservative total, and add the known animal harvest from September to early October (30 animals), we arrive at a pre-season total of 464 animals. The survey was conducted under nearly ideal conditions, and there was excellent coverage of all areas where caribou normally occur. At least a few animals probably escaped detection, but it seems unlikely that substantial groups were missed.

Alaska Department of Fish and Game has set the pre-calving population objective for the Adak herd at 150 animals. One-hundred and seventeen caribou were reported harvested from

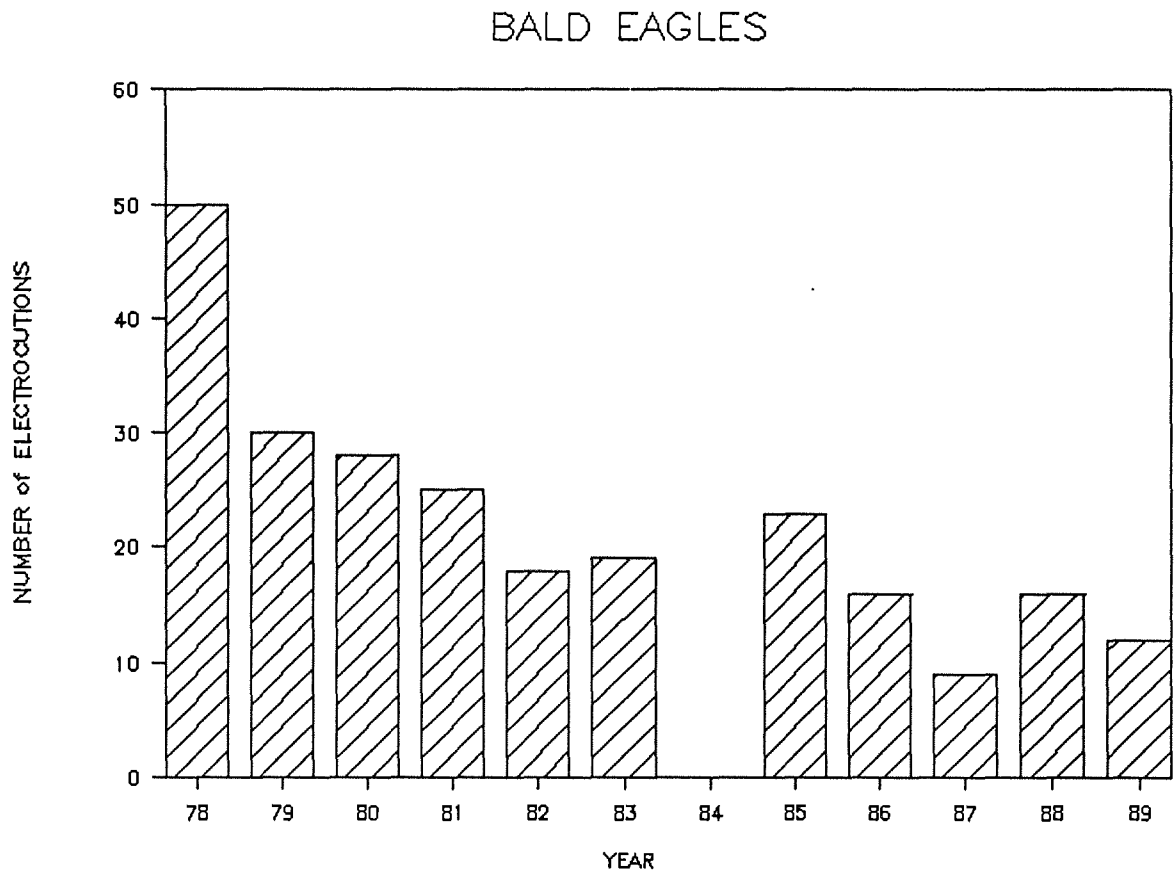


Figure 2. Number of bald eagles electrocuted at Adak 1978-1989.

September 1, 1989 to December 31, 1989. This is similar to the rate of harvest from 1984-1986, but higher than 1987-1988 (Fig. 3). Generally over 60% of the total harvest occurs by the end of December, so the total harvest for the 1989-90 season should exceed 140 animals. With the conservative estimate of 464 caribou on Adak in August, it appears the post-season population will exceed the management objective again this year. Due to the non-stressful environment in which the Adak caribou live, the number of deaths from natural causes is probably extremely low. Nevertheless, if annual harvests remain over 140 animals, the pre-calving population objective may be safely revised upward.

Annual helicopter surveys courtesy of the Coast Guard are essential for managing the Adak caribou herd. (MFB)

9. Marine Mammals

a. Whales--Only one beaked whale was reported washed ashore at Adak in 1989, compared to 2 in 1988. Remains of an unidentified baleen whale were found on Agattu Island in late May.

b. Sea Lions-(Excerpts from Byrd, G.V. 1989. Observations of Northern Sea Lions at Ugamak, Amukta, Buldir, and Agattu Islands, Alaska. U.S. Fish and Wildlife Service Report). As part of a combined Soviet/United States survey of northern sea lions (Eumetopias jubatus) throughout their breeding range in 1989,

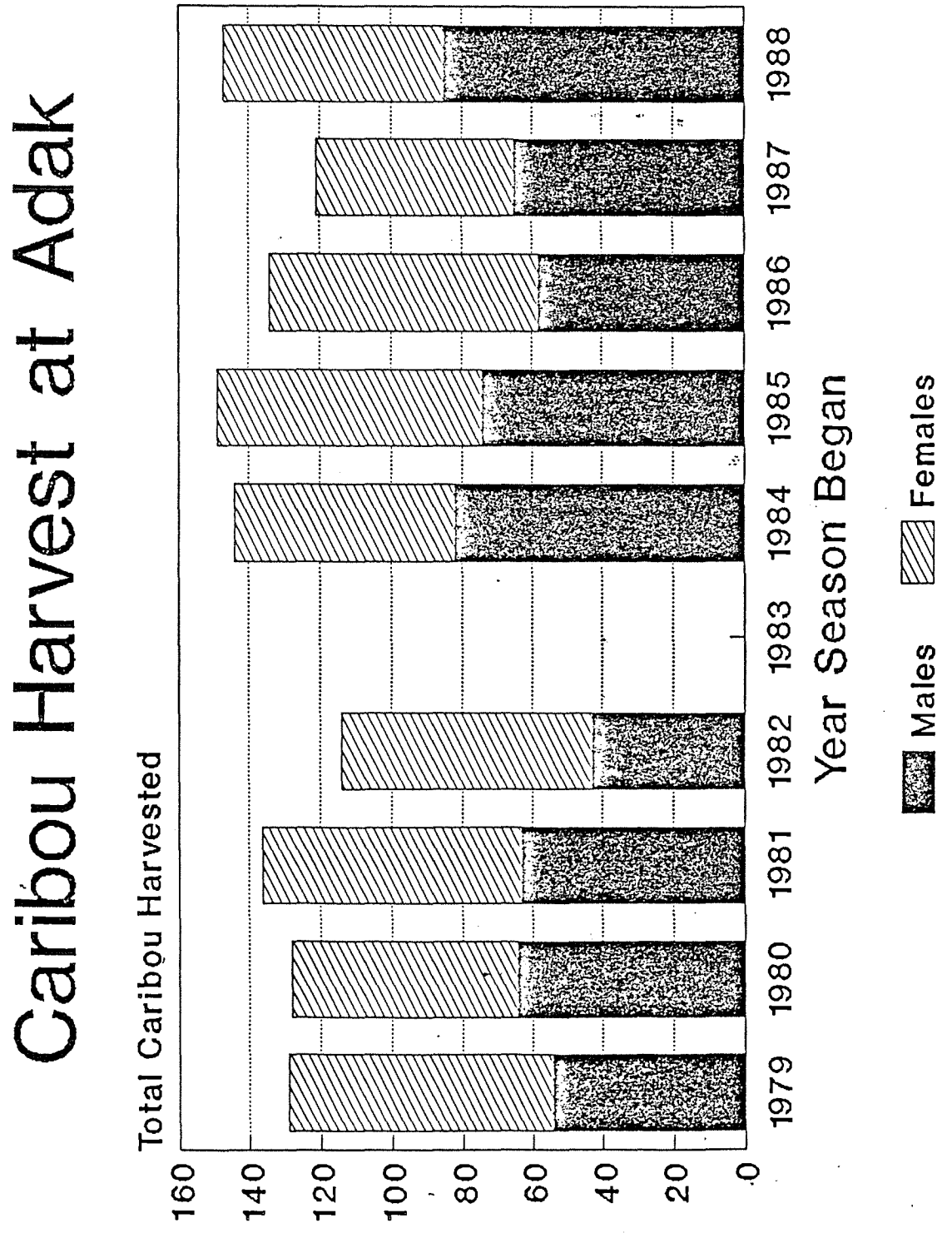


Figure 3. Number of caribou harvested at Adak in different seasons 1979-1988 (note relative proportion of bulls and cows in the harvest).

refuge biologists surveyed rookeries at Agattu, Buldir, Ugamak, and Amukta. At Agattu, bull and pup counts were down as much as 15% from 1988, however, cow/subadult counts were similar to 1988. Surveys at Buldir showed an even greater decline, 25.6% in bull and cow/subadult counts. Pup counts were also lower than 1988. Counts conducted at Ugamak were lower than totals in 1986 (when the latest counts were conducted) on all but one area. Amukta surveys indicated severe declines since 1984. In 1989, counts averaged 71 sea lions (bulls, cows/subadults, and pups), compared to 220 adults recorded in 1984.

11. Fisheries Resources

Pink salmon are the most numerous and heavily harvested of the four anadromous fish species utilizing Adak's streams, though the Dolly Varden and landlocked silver salmon are also harvested. Abundant red and silver salmon runs occur at Adak and surrounding islands, and even years runs are stronger than those in odd years.

Fishery Survey--(Excerpted from Baxter, B., Baxter, K.-Trip Report Agattu, Adak, Semisopochnoi, and Poperechnoi islands, Alaska Maritime National Wildlife Refuge. July 27-September 8, 1989). A fishery resource survey of streams and lakes on Agattu, Adak, Semisopochnoi and Poperechnoi Islands was conducted from July 27 to September 8, 1989. The majority of effort was directed to surveying streams on Agattu, with only one water body being surveyed on each of the other three islands. The purpose of the surveys was to gather baseline fishery information about the species using refuge streams and lakes as part of an ongoing survey of the Aleutian and Alaska Peninsula Units, Alaska Maritime NWR, by the Kenai Fishery Assistance Office.

14. Scientific Collection

Ten glaucous-winged gulls were collected by the Aleutian Islands Unit staff for Douglas Bell, University of California, Berkley, to aid in his taxonomic gull study.

Table 10. Scientific specimens salvaged, 1989.

Species	Location	Number Salvaged
Aleutian Canada Goose	Buldir	3
Bald Eagle	Adak	15
Peregrine Falcon	Adak	1
Least Auklet	Adak	1
Crested Auklet	Adak	1
Common Raven	Adak	3
Sea Otter	Adak	7
Harbor Seal	Adak	1

15. Animal Control--(Excerpts from Bryd, G.V. 1989. Removal of Introduced Arctic Foxes from Igitkin, Chugul, and Umak Islands, Aleutian Islands, Alaska, December 1988-April 1989. Refuge Report). The single biggest threat to native wildlife on this unit is the continued presence of introduced arctic foxes on many islands. Stocked on nearly every Aleutian Island by 1930 for fur farming purposes, this predator has decimated many species of native birds.

The area was designated a wildlife refuge in 1913, but fox leases were issued until just prior to WWII. The procedure was to introduce foxes to "bird islands" so the fur-bearers could use this natural food. Then in winter the foxes were trapped. Either enough animals were left for replenishing stocks or more animals were introduced the next spring. Some of the lease holders went so far as to introduce fox food after bird populations declined (e.g. ground squirrels were introduced on Kavalga I.).

Government officials became concerned about the devastation of the birds, and in 1936 and 1937 Olaus Murie came to the Aleutians to determine which islands had enough native birds left to be taken out of fox production and reserved for birds. What Murie found in most areas were fox dens full of bird remains and only remnant populations of native species. He repeatedly heard from natives that there used to be large colonies of seabirds on various islands before foxes were put there. Although Murie recommended a number of islands revert from "fox islands" to "bird islands", the only action taken was to revoke leases. Apparently he expected foxes to die if lessees quit managing stocks, but this seldom happened. Arctic foxes proved adept at survival although islands probably support lower populations of foxes. After accessible birds were extirpated, the foxes remain and keep bird populations from becoming reestablished.

Obviously, not all species of birds were extirpated after fox introductions. The larger, more conspicuous species that nest on the surface of the ground (e.g., geese, ducks, gulls) or in burrows (e.g., storm petrels, ancient murrelet, Cassin's auklet, puffins) were most severely impacted.

There is no way to know the magnitude of the damage done to native birds by introduced foxes, but a comparison of avifaunas on the few islands where foxes were never introduced with those containing foxes provides some insight. Furthermore, the response of bird populations to removal of foxes on islands where that has been accomplished is instructive.

Although increases cannot be quantified, former refuge manager Robert Jones reported an amazing increase in nesting ducks and ptarmigan at Amchitka following fox removal. Rock sandpipers are also noticeably more abundant on Amchitka than on islands with foxes. Amchitka has by far the largest nesting colonies of

Aleutian and arctic terns in the Aleutians, and these species have apparently reoccupied the island after foxes were removed. On Nizki/Alaid Island, researchers found that ground nesting species increased an average of 1500% within 5 years after foxes were removed.

The most recent example of response of native species to removal of introduced arctic foxes is Kiska Island. Most foxes were removed in late winter 1986. By summer 1988 increases were reported in ancient murrelets, tufted and horned puffins, and rock ptarmigan. The idea that introduced arctic foxes have caused problems in the Aleutian Islands has been relatively well publicized in connection with the endangered Aleutian Canada goose, but this is only the tip of the iceberg. It is clear that a number of other species have also been severely depleted by the foxes, and it is equally clear that if foxes are removed, at least some of the species become reestablished or increase quickly from low population levels.

To try to restore natural habitat conditions on the wildlife refuge, the Fish and Wildlife Service has an ongoing program of introduced fox removal. During the winter of 1988-1989 the islands of Igitkin, Chugul, and Umak were selected for restoration.

From December 5, 1988 to April 25, 1989 up to 14 live traps were continuously employed at 3 locations on Igitkin Island. Day trips were made from Adak in a 25-foot long Boston Whaler to check and rebait traps. Large amounts of bait were placed in traps so that foxes would have plenty of food after they were captured. Foxes were quickly dispatched with a pistol. Attempts were made to check traps at least weekly, but weather conditions restricted boat travel for longer periods occasionally.

From December 27, 1988 to January 1, 1989 2 volunteers, Bob Bruff and John Fink, camped on Igitkin. They were able to check traps twice daily, and they set several traps on Chugul Island. A total of 21 foxes were captured at Igitkin (7 male, 7 female, 7 unsexed) between December 8, 1988 and February 26 (none were seen or caught thereafter). All were "blue" except for one "white" fox. The greatest capture rate occurred during the week when the volunteers were camped on the island; they took 12 foxes in 5 days. After February 26 a crew checked all beaches for tracks on 6 different dates and none were found. Furthermore, the carcass of an electrocuted bald eagle was placed on the island in mid-march, and no signs of foxes were found at or near this bait.

No foxes were captured at Chugul during the initial efforts in late December, 1988 and no fox sign was found in the coves of the island during later checks. To try and be sure that foxes had died out on Chugul, we placed carcasses of salvaged birds on the island in February. Checks in March and April indicated no fox sign. Although foxes were present on Chugul as recently as 1980, they apparently have become extirpated sice then. Winter

mortality is normally high among foxes on these islands, and near-record accumulations of snow in 2 of the past 5 winters may have made food particulary difficult to obtain.

Introduced arctic fox were removed by staff and volunteers from four islands near Adak. (GVB)

In early January, 8 traps were moved from Igitkin Island to Umak Island. Up to 12 traps were employed at Umak from January 2 to April 25. Only 2 foxes (1 of each sex), were captured on Umak; one white and one blue. Perhaps 3 other fox were taken in traps washed away by storm waves soon after they were set. After February 9 no additional fox sign was seen in Umak Bight or at a trap site near the southeastern tip of the island.

The same conditions that may have caused the extirpation of foxes at Chugul possibly caused reduced populations on Umak. Neither Chugul nor Umak possess extensive broad beaches upon which winter food, like marine mammals and bird carcasses, may be deposited. In contrast, Igitkin has at least 3 such beaches, and this may have accounted for the relatively large over-wintering population of foxes we found there.

In fall 1989 we began initial trapping efforts on Little Tanaga Island. Volunteers Mark Wojcikiewicz and John Fink spent one week on the island, and were able to trap eleven foxes using both live and leg-hold traps. Trapping efforts resumed at Little Tanaga by refuge staff in October, and by the end of the first

week in November, an additional 15 foxes were removed from the island, bringing the total to 26. Volunteers Paul Fisher and Bruce Martin camped on Little Tanaga from November 9 to November 12. No foxes were trapped, though fresh sign was seen. From December 21 to December 26, 1989 volunteers Jack Hodnick and James Baker camped on Little Tanaga. They trapped 3 foxes and found fresh sign during their last three days on the island. They both felt that few if any foxes remained.

By the end of December, 1989 a total of 33 foxes had been removed from Little Tanaga. Thorough checks around the entire island on December 28 produced no fox sign, even though fresh snow had fallen the night before. A few live traps were left on the island, and follow-up checks will continue.

16. Marking and Banding

The major AIU banding effort resulted in the marking of 139 Aleutian Canada geese (ACG) with metal leg bands, and yellow or blue plastic leg bands, on Buldir Island. These birds were translocated to fox free islands. Observations on wintering areas in California will provide information about survival rates. Red-and black-legged kittiwakes were banded on Buldir Island in 1989. Eleven red-legged kittiwakes were marked with metal and green plastic leg bands. Three black-legged kittiwakes were marked with metal and yellow plastic leg bands. This was the second season in which nesting kittiwakes were banded. The objective is to estimate average annual adult survival rates through resightings in subsequent years. This is feasible since birds tend to return to the same nest site. We need to know something about adult survival so that we can predict levels of reproduction needed to maintain stable populations. This information will suggest whether recent reproductive failures signal serious problems.

H. PUBLIC USE

1. General

1989 was the first full year's operation of our new visitor center. Many favorable comments have been received from residents and visitors. Planning has been initiated for additional inside and outside displays.

Our new outdoor recreation planner Cheryl Cline arrived in March. After attending her first FWS Law Enforcement Refresher at Marana, Arizona, Cheryl accompanied the vessel Tiglax to the western Aleutians including visits to the Aleut community of Atka, where she participated in a public meeting on the proposed rule change on the native taking of sea otters, and worked with school personnel to arrange more cooperative ventures between Adak/Atka school including preliminary arrangements for Atka students to visit Adak and a visit by an Aleut teacher to Adak's

Ann C. Stevens elementary school.

Refuge staff made numerous visits to the village of Atka to discuss coastal zone planning, sea otter harvests and educational opportunities. (MFB)

Throughout the year, Adak residents read refuge events via columns in local newspapers published on alternate weeks, the military Eagle's Call and the privately-owned Ptarmigan Ptimes. Illustrations by local volunteer Mike Venglar add quality to our Eagle's Call page, "From the Wildside". Local volunteer Greta Johnson contributed a column to our Ptarmigan Ptimes feature, "The Nature of Things", after a harrowing experience with nesting eagles near a housing area. Other major articles focused on the use of border collies in our annual Aleutian Canada goose translocation project; "Project Safeguard", a joint study of underwater WWII artifacts at Kiska and Attu islands by U.S. Navy, National Park Service and Fish and Wildlife Service personnel; hunter safety, recycling, bald eagle nuisances in housing, and volunteers.

RM Boylan was a guest on the "Captain's Call" television program February 17 where Naval Air Station CO R.P. Munro was presented a "Take Pride in America" award and Director's Commendation Award in recognition of NAS's efforts to clean-up Adak including an innovative "Adopt-A-Trail" program which resulted in military maintenance and signing of hiking trails on the island.

Activities at the visitor center included two successive semesters of the University of Alaska "Alaska Mammals" course, (29 students), three Alaska Hunter Safety classes (41 students) sponsored by Adak Sportsman Association, Adak NAS "Blue Card/firearms safety" lectures (1,775 people), orientation lectures for new arrivals on island (385), movies (1,739), special showings of Alaska at War and Report from the Aleutians videos (154), "Basic Sailing and Seamanship Class" taught by Adak Coast Guard Auxiliary (10) and routine visitation by 12,000 people, 2,000 more than came in 1988.

We also hosted meetings of the Ducks Unlimited Board of Directors, Adak Historical Society, NAS Resource Conservation Team and Adak Coast Guard Auxiliary. The visitor center was open an average of three nights a week.

A big "Thank You" is presented to our volunteers. Without the help of two Student Conservation Resource Assistants (Dana Roth and Kathleen Kelso) and 20 local volunteers, our information/environmental education program would be just above water, not floating high at it's present level. Two pot-lucks were held in the new bunkhouse (April and August) where appreciation awards and certificates were presented to our volunteers.

2. Outdoor Classrooms

SCA volunteer Kathleen Kelso organized two weeks of National Wildlife Week activities at the Fish & Wildlife Center. Two classes a day brought 245 students to the center on March 14-16 and again on March 21-23 where they watched a film on predators followed by a self-guiding quiz through the exhibit area. We received local television coverge of the events. Educational packets were mailed to four other Aleutian schools. Yukon Delta goose calendars were sent to all Aleutian elementary schools. The visitor center in return received posters with poems about geese and an illustrated story about the life of a goose.

The refuge was a key to this year's "Sea Week" activities for 475 students at the Adak elementary school. An assembly for 100 kindergartners was followed by a round robin of activities for 175 first thru third graders and finally an activity "bazaar" for the 200 fourth thru sixth graders. The scheme was orchestrated by ORP cline assisted by refuge staff including RM Boylan and CT Sweeting who manned stations during the final activity. ORP Cline subsequently accompanied the Adak's fifth grade classes to the Palisades tide pools for a half-day field trip.

Summertime "Youth activities", coordinated with the Navy's Morale, Welfare and Recreation Division (MWR) included programs on: biological diversity, general taxonomy, bird identification, minimum impact camping, plant collecting procedures, resource management and Aleutian Canada goose relocation project. Two nature walks were also conducted through MWR's "Out Crowd"

programs (programs established to get the young enlisted people out of the barracks).

SCA assistant Dana Roth visited the Atka school in September and presented a program on "Marine Polution & Debris" to 19 students.

Adak elementary teacher Colleen Smith leads her class in an outdoor investigation. (CLC)

3. Outdoor Classrooms - Teachers

ORP Cline made a trip to Atka in September to visit the school and become acquainted with the teachers, and residents. Upon her return, she provided the school with resource materials to use in their environmental education program. She also assisted in the conceptual planning of objectives, themes and curriculum assistance for the Adak seventh and eighth grade outdoor education summer school programs.

The "Conservation Teacher of the Year" award for the Alaska Wildlife Federation was presented to Deb Panian of Ann Stevens Elementary School by RM Boylan at a school assembly.

A resource orientation was provided by ORP Cline for 12 new Adak teachers at the beginning of the school year.

5. Interpretive Tour Routes

Initial planning was initiated to develop background materials for an auto tour route around Clam Lagoon including adapting interpretive signs designed for trails at Kodiak and Izembeck NWRs for use at Adak.

Information signs indicating direction and location of the refuge visitor center were purchased from Anchorage and installed on Adak's "main road" by personnel from the Navy Public Works Department.

6. Interpretive Exhibits/Demonstrations

The new 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 6th largest community. Annual visitation by military and civilian personnel from other locations swells 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, bookstore and technical assistance are a welcome relief from military duties and provide insight into an unusual area of a unique state.

Plexiglass wall exhibits featuring photos and text on the Aleutians were shipped to the Coast Guard Station at Attu and the airport terminal at Dutch Harbor. The exhibits arrived with last summer's visitor center package but we were unable to find transportation to those two destinations, the farthest west and eastern communities in the chain. A Coast Guard C-130 delivered the Attu exhibit while the Tiglax took the other when it visited Dutch Harbor in July.

Local high school teacher and refuge volunteer Jack Hodnick, who teaches taxidermy for an adult education class, began preparing an arctic fox exhibit for the visitor center to interpret the predation problems posed by this introduced species.

A large caribou rack was mounted for display in the visitor center. It will be augmented with an interpretive panel explaining Adak's introduced caribou herd.

7. Other Interpretive Programs

ARM Klett presented a "Wildlife of Adak" slide show/quiz to 150 Cub Scouts and parents at the annual Blue and Gold Banquet. He also met with 20 Boy Scouts and two adult leaders for a presentation on environmental conservation related to merit badge projects.

Three orientation programs were given to new arrivals on Amchitka by ARM Dewhurst. She also presented six evening programs to all island residents on the Atomic Energy Commission era on Amchitka and the islands wildlife and senic beauty. A U.S. Fish and Wildlife Service/Refuge brochure/poster display was set up in the camp's recreation room. Plans were initiated for the camp store to sell Alaska state fishing licenses. Additioanl efforts at Amchitka were put on hold following ARM Dewhurst's transfer in February.

RM Boylan and ORP Cline were instumental in forming the Adak Historical Society in June to help save a WWII chapel that had been scheduled for demolition by the Navy.

One of very few WWII structures remaining on Adak in its original condition, the Navy reconsidered destroying the historic structure only after they were notified that NAS Adak had been designated a National Historic Landmark February 27, 1987. Regional Archaeologist Chuck Diters, National Park Service Historian Sandy Faulkner and the State Historic Preservation Office assisted RM Boylan in convincing the Navy no further removal of buildings should proceed without an inventory of their historical value.

Renovating the WWII chapel became a focal point for the Adak Historical Society which began holding monthly meeting at the visitor center. The Aleutians' role in WWII is recognized in our CCP as a "Special Value" of the refuge and insuring the preservation/documentation of this history is part of our management responsibilities. On September 16, over 100 volunteers participated in a "Chapel Clean-Up Day" to scrape, clean and polish the historic structure. Since the building was in need of technical repairs, the Navy announced it would commit $60,000 to its restoration.

RM Boylan assisted the Adak Historical Society in showing artist Don Miller around the island. Miller served on Adak during World War II as cartoonist on the Adakian newspaper edited by author Dashiel Hammett of Maltese Falcon and Thin Man fame. Moved by the society's efforts to save the historic Adak chapel, Miller offered to donate proceeds from a limited-edition painting of the chapel to its restoration. Miller visited Adak following his lecture at the Anchorage Museum of Art and History as part of an exhibit on World War II.

SCA volunteer Kathleen Kelso organized two weeks of National Wildlife Week activities at the Fish & Wildlife Center. Two classes a day brought 245 students to the center March 14-16 and again March 21-23 where they watched a film on predators followed by a self-guiding quiz through the exhibit area. We received local television coverage of the events.

In conjunction with "Sea Week" activities, 41 elementary students participated in a program on birds at the visitor center with WB

Byrd and ORP Cline.

Cathey and Stoney Wright of the State Division of Agriculture discussed developing community interest in native plants on Adak with Cline, including a presentation to the Adak Historical Society. SCA volunteer Dana Roth spent a day assisting in locating species and collecting specimens for propagation. In line with the same program, DEC, EPA, USDA and SCS members of the Navy's Natural Resources Management Planning Team met RM Boylan and ORP Cline to discuss issues including revegetation and potential for minimum impact recreational developments including nature trails, auto tour routes, environmental garden, x-country skiing, hunting, historical interpretation, wildlife viewing areas and fishing.

A big event for the Adak community was hosting the Chilian schooner, Esmeralda. ORP Cline and CT Wheeler provided organized programs for two groups of 36 sailors, complete with translators, and met the needs of a constant stream of visitors during the tall ship's stay.

Dorothy Wheeler and Chilean sailors from the tall ship Esmerelda which visited Adak in July. (CLC)

In late May and early June, refuge staff met passengers from the commercial tour group ATTOURS, Inc. as they disembarked at Adak while their charter planes refueled on the way to Attu, ORP Cline distributed brochures and answered questions of some 100 "life-listers" who pay some $4,000 each to participate in world-class birding each spring.

ORP Cheryl Cline was invited to attend the Naval Security Group Activity's "Blue Card" outdoor orientation lecture where she provided suggestions on possible improvements to a good program; LE officers Boylan, Klett and Cline also met with Navy Conservation Team volunteers at their monthly meeting at the Fish and Wildlife Center.

Photographer/Publisher Stephen J. Krasemann presented two slide programs on "Wildlife of the World" for 75 persons on Saturday and Sunday, August 19 and 20 respectively. Krasemann visited Adak in conjunction with a book he is publishing entitled, Diary of an Arctic Year. Krasemann's entry to Adak was sponsored by the Navy. At year's end, Krasemann provided the refuge 400 original slides of Adak wildlife and scenery.

Stan Cohen Author/Publisher of two of our better selling volumes of The Forgotten War was on island to accompany the National Park Service personnel on their inventory of Kiska Island. Prior to departure, he presented a talk on early WWII activities by the Japanese in the Pacific and the Aleutian Islands. In spite of heavy rain, 53 people attended.

For the second year, the refuge co-sponsored a "Waterfowl Workshop" in cooperation with the local Ducks Unlimited chapter. The two evening sessions garnered 40 participants and promoted information on waterfowl regulations prior to the October 8 opening.

8. Hunting

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

The Adak waterfowl and caribou hunts are followed closely given the large human community with great interest in hunting. 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 provide transportation to hunters on the south side of the island. This support is vital to the refuge's ability to manage the caribou herd.

The 1988-89 caribou season ended on March 31. A total of 147 animals were taken (85 males and 62 females) 352 permits were issued over that season. The 1989-90 season began on September 1.

Pre-season publicity of regulations and visible LE patrols may have contributed to no waterfowl violations. For the first time, the Adak post office sold out it's supply of federal duck stamps. We obtained an emergency supply from Kenai NWR to help us through until the post office was replenished.

9. Fishing

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

Fishing pressure is heaviest in slamon streams close to the base on Adak. Weekend and evening patrols by the Navy Conservation Team and refuge officers minimize violations. The Navy commands continue to assist in managing the fishery by posting some streams for fly-fishing only or as closed. NSGA retained the precautionary Paralytic Shellfish Poisoning closure at Clam Lagoon, although no PSP cases have been recorded.

National Marine Fisheries Service angent Guy Hollstein visiting from Kodiak with the Coast Guard conducted a two-hour discussion on commercial halibut regulations to 12 commercial fishermen at the Fish and Wildlife Center on Sunday evening, April 29.

In July the staff hosted a meeting between local commercial fishermen and Commissioner Listowski of the State Commercial Fisheries Entry Commission and ADG&G biologists. The officials were passing through after a session in Atka addressing a limited entry salmon fishery and other Aleutian fishery permits.

On Sunday, October 29 at 7 p.m. Alaska Fish & Wildlife Protection Troopers Don Starbard and Galen Carpenter addressed 17 commercial fishermen at the Fish & Wildlife Center. After discussing at length the complex state commercial fishing regulations and seasons, the troopers invited their audience to tour their enforcement vessel the Wolstad, which had made its first stop at Adak. At the same time, the troopers returned 45 illegal crab pots to their owners with warnings. With appearances by enforcement agents from NMF and ADFG withing six months, Adak's commercial fishermen were made aware that commercial fishing would be more closely regulated in the future.

10. Trapping

The trapping season for fox ran from November 10, 1988 to February 28, 1989. Free refuge permits were issued to 18 trappers on Adak during the year. Though a few of the participants invest a serious amount of time in trapping, for the most part it is recreational trapping.

11. Wildlife Observations

A list of Adak residents interested in unusual natural history observations was compiled by local volunteer Donna Venglar. This data is the basis of a "phone tree" information operation now in effect.

The Audubon Christmas Bird Count was held December 16 at Adak. Twenty-seven observers in eight parties found 38 species and 5785 individuals. Highlights were a merlin and mew gull, both rare in the central Aleutians. Early in the count week, a pine siskin was found in the Adak "National Forest". This is the first record of the species west of Unimak Pass in the Aleutians. The day-long event was concluded with a potluck at the refuge bunkhouse to tally the day's results. Alaska Natural History Association paid participant's entry fees and provided chili for the potluck.

13. Camping

The entire AIU (except Buldir, Chagulak and Bogoslof islands) is open to camping. Most use, however, occurs on Adak where five FWS backcountry cabins are available on the south portion of the island on a first come, first served, reservation basis. As in past years, the cabins received moderate to heavy use by backpackers, fishermen, and caribou hunters. MWR's "gear issue" is well stocked with camping items to rent at a very reasonable rate, to those residents who want to get out and explore Adaks beauty but do not own tents, pots/pans, stoves, etc.

15. Off-road Vehicling

ORV's weren't a problem in the past when "Adak mobiles" were typically rusted-out two-wheele drive sedans. But now that the Navy ships personal vehicles out with accompanied personnel, Adak looks like southern California with the growth of new vehicles including its share of 4WD pick-ups.

Newspaper articles and television spots were the focus of our preventive enforcement efforts armed at keeping vehicles on the roads rather that on the tundra where they leave scars that take years to heal.

To combat the increase in off-road vehicle traffic, MW Schulmeister converted surplus utility poles into ORV barriers at

three strategic entry points. The first of an estimated dozen barriers needed at badly eroded sites, their installation was covered by local newspaper and television.

The ATV's found the unbarricaded "roads" and continued their activities. RM Boylan investigated a case where one vehicle ran into a deep hole in the tundra and could not get out. Another 4-wheel drive vehicle attempted to pull the first vehicle out of the hole and became stuck also. Both drivers were issued citations and their vehicles rfrozen until they paid a wrecker service to extricate them. Two other incidents were reported to us by NAS security, but after investigation, did not warrant citations. An agreement with the Navy's Judge Advocate now enables us not only to cite violators with fines, but to refer the most heinous offenders to the court for suspension/revocation of driving privileges.

Off-road vehicles are cited by refuge officers; when the vehicles are towed to avoid further tundra damage, the offender loses another $100. (MFB)

16. Other Non-Wildlife Oriented Recreation

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

17. Law Enforcement

RM Boylan, ARM Klett and ORP Cline attended the 40 hour Refuge Law Enforcement Officer refresher training session in Marana, Arizona in March. While some speaker/topics left room for improvement, the superior facilities including firing range made this a very worthwhile effort. The addition of the Physical Efficiency Battery (PEB) is long overdue. The opportunity to meet Region 2 personnel and visit Buenos Aires NWR provided welcome insight into the Service's activities in the southwest.

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, ORV's) 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. Military police from the two dominant commands on Adak, Naval Air Station and Naval Security Group Activity, took an increased role in helping refuge officers monitor ORV and other resource-related violations.

As in past years, the Naval "Conservation Team" of the NAS Security Department was very active. The Conservation Team provides qualified volunteers to check sportsmen on the Naval Reservation for compliance with state and federal fishing and hunting regulations. Conservation Team volunteers have authority to issue citations for game law violations, since all state and federal laws are covered under Navy regulations, but as a rule merely take information and turn that over to refuge officers for disposition. In the past, left to the discretion of military officials, resource violations were not handled consistently and our set fines allow for consistency while maintaining high visibility for the Service. We also objected to resource violations being handled through the military chain-of-command, feeling enforcement actions do not relate to subject's employment since this is not the case in civilian circumstances.

The Navy's Conservation Team "wardens" held their first meetings this season at the visitor center April 2 and 30. RM Boylan and ORP Cline gave presentations on fishing regulations and law enforcement protocol to the 18 members. The volunteers did an excellent job monitoring fishing activity at problem areas on the military reservation. All Conservation Team volunteers carry picture ID cards, work in pairs and carry no weapons. In the past, persons reported common fishing violations (i.e. snagging salmon in fresh water, keeping too many fish, or taking fish with illegal gear) to us. But with 20 hours of daylight and a maximum of two officers available at any time, by the time refuge personnel arrived there was little evidence of a violation or the alleged perpetrators were gone. Conservation Team members were able to promptly collect information on violations they observed

with the subjects subsequently interviewed by a refuge officer who then issues a Notice of Violation if required.

A Bald Eagle Protection Act possession case developed from astute observation and cooperation by Reeves Aleutian Airways employees who spotted a subject with several bald eagle feathers in his hand-carried luggage as souvenirs. The case was handed over to Special Agents in Anchorage.

Routine law enforcement patrols included trips to Gannet Pass, Lake Bonnie Rose, Shagak Bay, Finger Bay, Lake Andrew and Clam Lagoon checking caribou hunters and fishermen. Approximately a dozen citations were issued for hunting, fishing and off-road vehicle violations including one wanton waste (caribou).

In September, Refuge Officers Klett, Cline and Boylan qualified with Service revolvers at the Naval Air Station's outdoor range, shooting the FLETC practical pistol course under the watchful eye of the military's range officer.

During September, October and November, refuge officers checked licenses and permits of hunters returning on the Navy tugboat each Tuesday evening from the south end of the island. This half-hour spent with returning hunters seems to help compliance and provide a better return of information as well as giving us a current count of hunters' success.

Weekend checks of waterfowl hunters occured early in October, but no citations were issued. Pre-season publicity of regulations and visible patrols may have contributed. For the first time, the Adak post office sold out its federal duck stamps. We obtained an emergency supply from Kenai NWR to help us through one weekend until the post office was replenished.

18. Cooperating Associations

This year's operation was one of creation of operational stability in the new visitor center and exploring opportunities for growth and development in the future. For the fourth year the Adak, Branch of the Alaska Natural History Association has been the highest selling refuge branch. Military exercises brought many extra personnel on island during the fall and probably accounted for the high sales month of $5,800 during September. The peak day brought in $750. Total sales for the year were $36,500, up $2,500 from last year.

Cooperating association sales increase visitors' appreciation of the refuge and their understanding of conservation issues.

Our small visitor center staff deserved credit for the increased success of operations. ORP Cline improved the record and inventory system, increased the number of items carried, and insured shelves were well stocked. CT Wheeler provides a contagious enthusiasm at the front counter that makes it hard for

visitors to not buy something. Both SCA and local volunteers manned the visitor center on weekends and helped during busy hours and with inventories.

ANHA sales items were offered at the USFWS booth at the Adak Spring Fling. This Saturday event brought in an additional $350 in addition to important visibility. Two other "special events", lecture/slide programs, also contributed to increased sales: one by National Geographic photographer Stephen Krasemann and the other by author/publisher of The Forgotten War, Stan Cohen. A successful Christmas sale boosted December's ANHA receipts to $4,500 ending the first quarter of FY 90 with sales of $12,000- a local record.

Vital to everyday success is the character of the visitor center in the community as the location of interesting activities. For residents and visitors alike, a day on the island frequently includes a stop at the FWS Center.

Two important sales items went out of print this year: 1,000 Mile War, and The Aleutians. Many new items were added to the inventory, most notably the video tape Report from the Aleutians of which 80 copies were sold. Three other videos were also stocked including Alaska at War, Alaska-A History in Five Parts and Americas Biggest Oilspill. Forty-two separate book titles were sold. The postcard series of 10 Adak scenes was republished as well as a new larger postcard of the refuge's vessel Tiglax. Articles in the two Adak newspapers attracted buyers to stop in to see the new titles stocked.

There was some excitement as the bank notified us that February's $1200 deposit was lost in the mail. After five weeks searching in vain, a `stop payment' was issued on the cashier's check (which had been sent registered mail) March 30 and you guessed it--the original deposit was received March 31.

Sales proceeds (85% returing to the refuge) were used in many ways: incentives for the volunteer staff, presentation of "special events", purchase of new wildlife videos, donations to Duck's Unlimited for fundraising, fees for participants in the Christmas Bird Count and refreshments, donations to the elementary school for their "sister school" in Japan, and support interpretive and environmental education activities.

It is hoped that the future operation will yield improvements besides increased sales. Much time this year was spent in organizing the sales system. Utilizing computers for inventory control and sales records is the next step. The further expansion of inventory is planned including providing some rotating inventory to meet changing seasonal markets. Several new sales items will be developed: a new shirt line, endangered species slide set, an Aleutian calendar, reprinting the Adak Recreation Map, and publishing a Natural History Guide to Adak. Proceeds will be used for publishing interpretive brochures and

for supporting environmental education teacher training as well as enhanced exhibits and visitor center services. The number of "special events" provided at the visitor center should increase in number and quantity.

I. EQUIPMENT AND FACILITIES

1. New Construction

Several improvements were made this year to refuge residences. The Aleutians terrible weather quickly takes its toll on sub-standard housing and the trick is to combine sturdy, comfortable accommodations with a reasonable degree of attractiveness. The Service has six housing units including three single-family residences, two duplexes (two families each) and a four bedroom/two bath bunkhouse.

Our bunkhouse is the nicest (and most expensive) house on Adak and probably in the Service. The house was completed and our first seasonals and volunteers moved in October, 1988, but landscaping wasn't part of the construction package. This summer, we purchased enough fine gravel to create a wide driveway and parking area in front of the house. Ivan DeWitt, local manager for Dar-Con Construction Co. of Anchorage who renovated our visitor center in 1988, offered to hydroseed a lawn around the structure for the cost of seed. For $36, the Service had an entire new lawn planted one afternoon which complements our beautiful new bunkhouse.

Local contractor Ivan DeWitt voluntarily hydroseeded a new lawn at the AIU bunkhouse when we provided the seed. (MFB)

2. Rehabilitation

Construction work for the rehabilitation of the heating systems in housing units 1 and 2 began in September and was completed by October 9th. Hankal Construction of Anchorage installed hydronic heating systems complete with boilers, radiators, plumbing, and electrical work. Most of the old and noisy electric wall heaters were removed by the refuge maintenance staff. Holes in the walls were repaired with sheetrock and the repaired areas painted. Three of the old heaters were left in place to keep the house heated in the winter in case of a boiler shutdown. Two of the old heaters were placed one each in the boiler rooms to keep water in the boilers warm in case of winter shutdown. Considering the non-availability of supplies on Adak and the fact that this was the contractor's first job on Adak, they did a quality job in a very timely manner. The only problem surfacing by year's end were a few minor air leaks into the fuel line at housing unit 1. Once the leaks were found and the fittings tightened the system ran extremely well. Housing unit 3 needs the same heating system change-over but funds were not available to complete the work at this time.

The new heating systems attached to residences are virtually indistinguishable from original construction. (MFB)

The D.C. emergency lighting system in the refuge headquarters and shop building was replaced by a new system. The old units had failed and replacement chargers and batteries were no longer

available. The new units required a change-over from a direct wire set-up to a duplex plug-in at all stations. The new system was requested both by fire department and OSHA safety inspector.

Housing unit 5B had an interior face lift in preparation for occupancy by the new Outdoor Recreation Planner. Interior walls had holes and cracks repaired with a follow-up paint job. Carpets, appliances, and cabinets were cleaned. The kitchen garbage disposal and stove were repaired.

The exterior surface of the four large shop doors at the refuge headquarters were painted. All the springs and chain pulleys were adjusted and track wheels were lubricated. One of the pulley systems for the manual door opener had to be rebuilt and the lifting cable replaced.

Several surplus Navy bunkbeds were obtained for use in our new bunkhouse with metal frames sandblasted and painted to match the orange bedroom trim. Virtually new mattresses were obtained from our Amchitka field station from a Navy contractor who was going to discard them.

Landscaping work had to be done around the bunkhouse at the FWS housing complex here at Adak. Over 100 cubic yards of fill and 50 cubic yards of gravel were used to build up low areas in the lawn and parking lot. Small ponds would form around the bunkhouse after rains or snowmelt and would persist for days. The lawn area was leveled, rocks removed and then hydroseeded late in the summer for the cost of the seed by a former refuge contractor. The grass appears to have matured enough to withstand the winter weather.

Many old World War II roads traverse the tundra around the Naval Air Station with numerous paths and trails leading off these roads. These all seem to develop an irresistible urge in people with 4-wheel drive vehicles to illegally drive across the tundra on these paths. To curb this activity, barriers are being put up anywhere people have started this illegal 4-wheeling. The Navy has an excess of old telephone poles which MW Schulmeister cut in six foot sections and placed them upright in the ground as ORV barriers. "With authority comes responsibility", goes the saying and this year we began asserting our authority--and responsibility--for protecting the tundra in the face of a growing problem with ORV's.

In addition to rehabilitation work at Adak, MW Schulmeister spent three weeks doing rehabilitation work at the bunkhouse located at the Alaska Maritime NWR's St. George field station. (This information can be found in the Bering Sea Unit section of the narrative).

Local Navy Broadcasting Service (NBS) did a feature story on the problems with ORV's and refuge enforcement efforts. (MFB)

3. Major Maintenance

Repairs and regular maintenance of furnaces in the refuge headquarters, bunkhouse and seven residences is a constant work load. Due to cool year-round temperatures the furnaces, boilers and circulating pumps run 365 days a year. This year one air compressor motor, three circulating pump motors, five circulating pump couplers and two electronic control modules had to be replaced. In addition three pneumatic valves and two pneumatic thermostats had to be rebuilt. In addition to equipment failure on 16 separate occasions, furnace filters, pumps and injection nozzles had to be cleaned after the Navy fueled the furnace storage tanks. In the spring of 1990 work will be done on the tanks to install drainable water traps and larger filter systems in order to prevent some of the furnace shut-downs caused by water and dirt in the fuel.

No major maintenance occurred on vehicles this year. Many small repairs like starter, alternator and carburetor repair or replacement plus normal tune-up and lubrication were completed.

The 25-foot Boston Whaler had a vigorous work schedule from January to April and again from September until the end of the year. The drive shaft on one of the 115 hp Evinrude engines

broke in half. In addition to putting in a new shaft all seals in the lower unit had to be replaced. Both electric motors for the trim tilt units on the boats engines had to be replaced. Coils, power packs, voltage regulators, and fuel/oil injection pumps were also replaced. All of this was original equipment since the boat was purchased in 1983. A new water pump kit installed on the engine with the new driveshaft boosted water pressure for cooling the engine. A Force 10 kerosene heater was installed in the cabin to help keep occupants warm during winter field work and to help keep moisture out of the electronic equipment such as the radios, radar, and depth sounder. In addition to the Whaler and it's engines over 30 small outboards ranging from 10 hp to 35 hp were continually serviced and maintained for the Refuge Stations at Adak, Homer and St. George with assistance given to motors on the Tiglax. Both lower units of the 140 hp Johnson motors on the Homer Whaler were brought to Adak, rebuilt and sent back to Homer.

Electronic repairs and adjustments were made on VCRs, large screen video and the sound system for the refuge visitor center, equipment that has received constant use since installation two years ago.

The 30 KW generator that operated the refuge office/residence at our Amchitka field station broke down. The engine was rebuilt at nearly $2500 by the Piquniq Management Corporation on Amchitka and ran fine. However, when it was hooked back up to the generation unit no electrical output developed. The generator was sent to Anchorage for determination of the problem and repair then returned to Amchitka. At year's end the unit's status was still questionable since we no longer have an employee on Amchitka while the refuge was trying to work-out payment for an outstanding bill for $1,300 for shipping it to Anchorage!

A 1981 Dodge pick-up from Adak was sent out to Amchitka via a Coast Guard C-130 in exchange for a 1976 Dodge that was in need of numerous repairs and a paint job from Amchitka. The Amchitka vehicle will be rehabilitated and used at the Adak station.

In addition to local maintenance, MW Schulmeister worked on equipment at Homer and St. George along with filling in as engineer for three weeks on the refuge 125-foot vessel the Tiglax. (Work done in these areas will be listed under the Homer or Bering Sea sections of the narrative).

4. Equipment Utilization and Replacement

In February, a new Dodge Caravan ordered in October of 1986 finally arrived. It is the refuge's only non 4-wheel drive vehicle so will have limited use in the winter. It will be extremely useful for all the volunteers, bio-techs and visitors in the spring, summer and fall.

J. OTHER ITEMS

1. Cooperative Programs

January saw Amchitka island's Relocatable-Over-the-Horizon-Radar (ROTHR) project going from construction to operational mode. Facilities maintenance and administration was to be handled by 20 Navy personnel and 40 contractor personnel from Ratheon and Piquniq Management Corporation (PMC). The radar equipment will not be operational until August 1990.

Our resident Assistant Manager Donna Dewhurst transferred from Amchitka on February 22. Shortly after her departure, we received word through unofficial channels, later confirmed by the Navy, that the Amchitka Commanding Officer Lieutenant Commander David Louk burned down the north hanger as a safety hazard on February 25. A World War II structure, the hangar was being considered by the state as a low-priority candidate for the National Register of Historic Places and belonged to the Service. The RO was notified of the Navy's action as well as all interested parties including the State Historic Preservation Officer and DEC. RM Boylan notified Navy officials by memo of the Service's concern and engineering and environmental compliance personnel from Chespeake, Virginia came to Adak to discuss the precipitous action. Since the refuge viewed the hangar as a potential liability, we were partly relieved to see it go but would have liked to have seen precedures followed. The SHPO and State DEC kept the Navy busy for quite some time providing documentation of the structure.

We were notified in October that a second ROTHR was being planned for Amchitka and the Service required a full Environmental Impact Statement be prepared to cover the construction not only of this second unit but the cumulative effects of both (an EA was done for the first). Navy planning personnel spent November 15-16 on Adak discussing the proposed project with refuge staff and gathering information from refuge files for the EIS. Part of the project costs include Navy funding of a Service Biologist on Amchitka during the construction phase of this second ROTHR.

As the Amchitka construction phase ended, ARM Dewhurst recorded 40 barrels of waste oil, anti-freeze and diesel fuel malt left on island. Twenty-four transformers containing PCB oil were still awaiting removal. An apparent leak was discovered in the Navy's sewage lagoon.

Since 1983, Bureau of Indian Affairs (BIA) archaeologists have conducted investigations of claims by the Aleut Corporation of ancient Aleut villages and cemetery sites. These claims were allowed under section 14(h)(1) of the Alaska Native Claims Settlement Act of 1971.

This year, BIA made arrangements to charter the FWS M/V Tiglax for the month of June to conduct investigations of 14(h)(1) claims (historical/cemetery sites) in the western Aleutians. Four archaeologists arrived on Adak on May 23 to catch the Tiglax as it left to establish FWS field camps on Buldir and Agattu islands. They were to establish a field camp on Agattu and investigate 10 sites for validity. They also checked one site on Buldir Island while the FWS field camp was being established and gear/supplies were being off-loaded. This group was on Agattu from May 31 to July 30.

Archaeologists from the Bureau of Indian Affairs (BIA) chartered the refuge vessel Tiglax to survey native claims in the AIU in 1989. (MFB)

On June 1, the Tiglax picked up an additional nine BIA archaeologists who worked from the boat through June 23. During the 23 day period they checked over 21 sites on Alaid, Nizki, Buldir, Kiska, Segula, Rat, Little Sitkin, Tanaga, Kanaga and Adak islands. The MOA between the FWS and BIA calls for continued cooperation for the next two years.

In another cooperative venture with BIA, the AIU participated in the "Resource Apprenticeship Program for Students" (RAPS) in 1989. Aimed at providing Alaska native youths experience with federal resource agencies and thereby encouraging them to seek careers in resource management, RAPS participants receive $5/hour for eight weeks work. Their salary is paid by BIA while the FWS

provides the position. Our first RAPS participant was Brian Rankin, a senior at Unalaska H.S. in the eastern Aleutians. Brian did a excellent job helping field crews with fox trapping, locating the Aleutian shield fern, marine mammal surveys, routine maintenance and the Aleutian Canada goose translocation. He visited a dozen islands aboard the vessel Tiglax and was a sound, enthusiastic worker for the summer.

Unalaska H.S. senior Brian Rankin was the AIU's first participant in the FWS/BIA "Resource Apprenticeship Program for Students" in 1989. (MFB)

The Exxon Valdez/Prince William Sound oil spill's effects reached Adak in April as we received word the vessel Tiglax, originally scheduled to arrive here May 1 to transport field crews, would be diverted to spill activities delaying it's arrival at least until May 21. ARM Klett was detailed April 26 to Kodiak NWR for two weeks to assist with administrative duties while refuge staff were occupied with the oil spill.

As April was coming to an end, military, civilian personnel and contractors continued work on two major fuel spills that have plagued Adak since February. One leak near the storage tanks may have released over a million gallons of JP-5 aviation fuel into the soil and water. Another leak has unknown quantities of JP-5 trapped beneath the housing area. EPA and DEC are being kept informed as contractors and Navy personnel work on the clean-up. Containment booms have been placed at all outlets to prevent additional fuel from reaching the ocean.

In May, RM Boylan accompanied Bruce Ericson of DEC on an inspection of the contaminated sites. Boylan and Ericson also discussed DEC's concerns with other contaminant issues, including those on Amchitka.

Officials of the Federal Environmental Protection Agency (EPA) and Alaska Department of Environmental Conservation (DEC) investigated fuel and hazardous waste at Adak in June. The seven officials toured the fuel spill areas with military representatives and RM Boylan as well as examining World War II debris targeted for future clean-up efforts. A final briefing brought a pledge for continued cooperation in improving the island's environment still marred by decades of neglect.

Decades of improper disposal of military debris earned Adak the attention of federal EPA and state DEC environmental inspectors in 1989.

Yet another fuel spill was reported in September as an undetermined amount of JP-5 was lost from a leaking line with much of the fuel running into the small boat basin and Sweepers Cove near refuge headquarters. By month's end, military officials were still trying to ascertain the volume of fuel lost and corrective measures were in place and proper authorities notified.

A research design was provided to this station by the National Park Service for a September 5-22 underwater survey of Attu and Kiska battlefields, both National Historic Landmarks. A Special Use Permit was issued and RM Boylan participated in the unique project along with Service Archaeologist Chuck Diters, personnel from NPS' Submerged Cultural Resources Unit and author/historian Stan Cohen. Dubbed "Project Seamark", the Navy has loaned NPS the specially-equipped salvage vessel Safeguard from Pearl Harbor, Hawaii and divers who utilized side-scan sonar and remote-controlled underwater vehicles to inventory and photograph the WWII remains at both sites.

FWS archaeologist Chuck Diters (L.) and historian/author Stan Cohen examine a Japanese World War II shrine on Kiska Island. (MFB)

Through still photos and video, NPS and Navy divers got excellent coverage of underwater remains within the National Historic Landmark while shore parties documented land artifacts. Stan Cohen, author of numerous books including The Forgotten War (Vol. I, II) accompanied the group to gather material for Volume III.

Prior to departing Adak for Kiska, NPS officials Dan Lenihan, Sandra Faulkner and RM Boylan met with NAS Executive Officer Bruce Bowling to plan a NPS inventory of sites on NAS Adak, also listed as a National Historic Landmark. The NPS officials visited the 1943 Adak Chapel, which is being refurbished by volunteers and Navy Public Works personnel after a reprieve from the wrecking ball through the intercession of refuge staff, NPS and the SHPO.

NPS' Sandy Faulkner and historian/author Stan Cohen watch as volunteers restore the Adak chapel, part of the National Historic Landmark. (MFB)

Largely as a result of renewed interest in Adak's history due to the controversy surrounding saving the chapel, an Adak Historical Society formed and began holding monthly meetings and programs at the Fish and Wildlife Center. Short-range plans call for an educational effort to interpret and preserve Adak's military heritage, a goal keeping with the Service's mandate which recognizes the World War II history and artifacts of the Aleutians as a "Special Value" of the refuge.

Documentation that NAS Adak was designated a National Historic Landmark in February, 1987 was provided to NAS administration in April by refuge staff. Military personnel on Adak, as well as refuge staff, were unaware of the historic status until it was discovered by archaeologist Chuck Diters. The National Register designation apparently resulted from National Park Service efforts in Washington with little local coordination.

Information on Aleutian wildlife was sent to the National Park Service in November for submission to the BBC, which may film next year's NPS work on submerged WWII artifacts in Kiska Harbor. The BBC was urged to recognize that there is more in the Aleutians than war remains and stories such as the recovery of the endangered Aleutian Canada goose, some of the world's greatest seabird colonies and the impact of introduced arctic fox on native birds are equally dramatic.

Special Use Permits issued during the year included the following:

1. March - U.S. Bureau of Indian Affairs to conduct investigation of ancient Aleut village/cemetary sites selected by the Aleut Corporation in the western Aleutians.

2. May - Steven C. Levi to visit Attu to gather information for an article in a fall/winter issue of Alaska Magazine and University of Alaska to collect selected bird species on Attu for taxonomic/biogeographical studies and for the University of Alaska museum.

3. April - National Marine Fisheries Service to collect dead birds during summer sea lion surveys; Attours, Inc. for it's annual spring birding trips to Attu Island; and U.S. Air Force for continued use of a remote bore site tower on Alaid Island.

4. June - Explosive Ordnance Detachment personnel to visit Tanaga Island to investigate reports of explosives thought to have been left during a 1984 military exercise. No explosives were discovered.

5. September - National Marine Fisheries Service for the installation of temporary radio receivers in the eastern Aleutians to assist in studying migration of northern fur seals from St. Paul.

6. October - Adak Elementary school teachers (2) to collect plants/grasses for use in plant identification class and the methods used in making Aleut baskets.

7. December - U.S. Army's 6th Infantry Division, Anchorage, AK, for a training exercise on Amchitka Island and NAS Adak's Morale, Welfare and Recreation Department to operate two snowmobiles to carry skiers up Mt. Moffett.

Several snowmobiles were purchased before the conflict with refuge regulations was brought to the attention of NAS Commanding Officer James Dulin, who suspended operations until an agreement could be reached which limited the number of snowmobiles and their area/time of use. Private snowmobiles had been used on Adak in the past but are now prohibited from operation off-road by refuge regulations and on-roads by military regulations.

3. Items of Interest

The personal effects of Corporal Carl Houston, the World War II soldier whose remains were discovered on Buldir Island last summer, were returned to the refuge by his sister in April. Jacqueline Gitchel of Rothschild, Wisconsin donated her brother's wallet, knife, comb, watch and other items to the refuge for inclusion in an exhibit on the war in the Aleutians. Negotiations continue with the U.S. Army to display Cpl. Houston's rifle and other military-issue items. Navy Broadcasting Service covered the story of the return of Cpl Houston's effects to Adak.

July 4, 1989: Visiting FWS personnel entered a refuge vehicle in the local parade. Ya do the best with what you've got... (DR)

4. Credits

The 1989 Narrative Report was authored by the following:

Introduction: Mike Boylan
A. Highlights: Mike Boylan
B. Climatic Conditions: Van Klett
D. Planning: 1,4 and 6 Van Klett, 5 James Fuller
E. Administration: 1-5 Mike Boylan, 6-8 Van Klett
F. Habitat Management: 1,2, 7 & 12 Van Klett, 6 Vernon Byrd
G. Wildlife: Vernon Byrd and James Fuller

H. Public Use: Cheryl Cline
I. Equipment & Facilities: Bob Schulmeister
J. Other Items: Van Klett
K. Feedback: Mike Boylan

Word processing, computer entry, photo placement and collating of text was accomplished by Dorothy Wheeler. Final editing was provided by Mike Boylan.

K. FEEDBACK

The desk shudders, office windows rattle and a picture falls off the wall. At first it seems like just another Adak earthquake, common in the Aleutians. But a glance out the window and the deafening roar 500-feet over the headquarters/visitor center reveals the routine departure of a Navy four-engine P3 Orion sub-chaser carrying on another real-life "Hunt for Red October".

Two hundred miles away sits Amchitka Island, another navy base and also part of the Aleutian Islands Unit, Alaska Maritime NWR. Amchitka is home to the Navy's first Relocatable-Over-The-Horizon-Radar (ROTHR) which allows them to watch the Soviet over a 1.5 million square mile area. Before the first ROTHR was operational the Navy announced plans to build a second one, also on Amchitka. The two radar sites will bring at least 400 people to the island and open the door for countless new military exercises in the Aleutians.

Amchitka has a history of military experimentation. In the 1970's, Amchitka was rocked by three underground nuclear tests including the deepest ever recorded. A World War II network of roads and runways coupled with its strategic location make Amchitka a natural for the latest high-tech hardware.

On a wildlife refuge where military activity is routine, it's easy to take it for granted. But there are moments, like three weeks this summer when 17,000 troops and countless ships and planes converged on the Aleutians in the largest military effort since Word War II, that the notion of "compatibility" seems beyond credibility. But after nuclear testing, what's a few thousand soldiers?

Apparently the AIU is not alone. A General Accounting Office (GAO) report of 428 refuges showed more than 70% listed at least seven secondary uses with 60% reporting at least one harmful use such as military activities. A 1982 FWS report identified nearly 7,000 individual "threats" on refuges.

The idea of compatibility, at least when viewed from places like Adak is a Faustian notion that opened refuges to a spectrum of undesireable activities and compromised their ability to preserve wildlife to say nothing of their credibility. Spend time on Adak and it's obvious that what's needed is a law that specifies only activities that <u>further</u> wildlife, wildlife-oriented recreation and interpretation/education shall be allowed on refuges.

Managing a refuge containing a military base is fighting a losing battle. As another P-3 rumbles overhead and the office shakes, it's hard to believe this is what Teddy Roosevelt had in mind in 1903...

We've ended another successful if inefficient year of fox trapping in the Aleutians. Arctic fox were introduced to most of

these 200 islands for 100 years prior to World War II by trappers. Although the war and low fur prices wiped-out the trappers, the fox persisted feeding on native birds. The major management program in the Aleutians is the dangerous work of transporting staff and volunteers by a small boat through the worst weather in the world to trap foxes weeks at a time, one island at a time. It is dangerous, labor-intensive and inefficient but all we can do. Several years ago we cleared 70,000 acre Kiska Island of foxes with no adverse effects using Compound 1080 under an experimental permit from EPA. The experiment was a success but we're still not allowed to use the 50,000 1080 pellets stored a quarter-mile from our office and no indication we ever will. Two years ago we asked to use M-44's but that's still in the bureaucracy. So each October thru March refuge staff and volunteers continue to challenge the world's roughest weather using 18th century technology to solve wildlife management problems in the 21st century. There's got to be a better way...

BERING SEA UNIT

ALASKA MARITIME NATIONAL WILDLIFE REFUGE

Homer, Alaska

ANNUAL NARRATIVE REPORT

Calendar Year 1989

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 through most of coastal Alaska and extend from Forrester Island in southeast Alaska along the Gulf of Alaska to the Aleutian Islands and northward until near Barrow in northwest Alaska. There are over 3,000 islands, islets, and pinnacle rocks within the refuge which are used annually by millions of seabirds of at least 30 species. The Maritime Refuge has five units with all former refuges in designated subunits.

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

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

Long-term refuge objectives include establishing a seabird monitoring scheme 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 1989 monitoring was conducted at three sites: St. Paul and St. George islands in the Pribilof islands (refuge personnel), and Bluff (University of Alaska personnel under contract from the Migratory Bird Management office in Anchorage).

There are significant 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 occur near refuge seabird colonies.

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A. HIGHLIGHTS

Shipwrecks at St. Matthew and St. Paul cause oil spills. (Section F.6)

Red-legged kittiwakes have complete reproductive bust at both St. Paul and St. George islands. (Section G.5)

Reindeer census at Hagemeister Island indicates a reduction in reindeer numbers. This is welcome news for this overgrazed island. (Section F.7)

Regional Director, Walt Stieglitz visits Pribilof Islands and flies over St. Matthew as part of the Alaska Maritime Refuge tour. He is the first Regional Director to visit either area. (Section E.8)

B. CLIMATIC CONDITIONS

All but January and November were warmer than normal at St. Paul Island. At Nome, eight out of twelve months were warmer than normal. If indeed, we are in a long term warming trend in the Bering Sea it may effect wildlife populations.

Table 1. January to December 1989 temperatures at St. Paul Island.

Month	Average Temp. (°F)	Departure from Average (°F)
Jan	22.3	-4.0
Feb	34.1	12.2
Mar	30.4	7.1
Apr	33.8	6.1
May	37.8	3.0
Jun	42.6	1.7
Jul	47.3	1.6
Aug	49.8	2.3
Sep	47.1	2.6
Oct	40.2	2.6
Nov	30.2	-3.1
Dec	29.4	1.3

Table 2. January to December 1989 temperatures at Nome.

Month	Average Temp. (°F)	Departure from average (°F)
Jan	-15.2	-21.0
Feb	22.5	19.2
Mar	13.2	6.6
Apr	24.7	6.8
May	31.4	-4.3
Jun	46.8	1.4
Jul	49.8	- .7
Aug	50.6	.7
Sep	46.3	4.0
Oct	30.1	2.1
Nov	9.7	-6.5
Dec	12.5	8.1

D. PLANNING

1. Master Plan

See Homer Office section.

2. Management Plan

See Homer Office section.

5. Research and Investigations

AMNWR-NR89. Monitoring disturbance to seabirds from harbor construction and other activities at St.Paul Island.

Paul J. Wagner, City of St. Paul, St. Paul Island, Alaska.

Ref: Wagner, Paul J. 1989. Seabird monitoring: a study of population, productivity and disturbance factors of cliff-nesting seabirds and observations of Salt Lagoon, Saint Paul Island, Alaska 1989. Draft report, City of St. Paul.

This study was the sixth consecutive year of observations of seabirds near the city of St. Paul designed to determine if harbor construction or other man-caused activities were

causing damage to seabird populations. Since the report is still in draft form, it would be improper to summarize the conclusions here. We were allowed to use data from city plots to supplement the refuge's monitoring effort in the Pribilofs. The fact that the city continues to monitor seabirds near the harbor site is an impressive example of local concern for wildlife resources.

AMNWR-NR89. Seabird monitoring at Bluff.

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

Ref: Murphy, E.C. 1989. Chapter 6. Bluff. In V. M. Mendenhall (ed.) Draft Report: Monitoring of populations and productivity of seabirds at St. George Island, Cape Pierce, and Bluff, Alaska.

As part of a joint Minerals Management Service and Fish and Wildlife Service/ Migratory Bird Office cooperative project seabird monitoring continued at Bluff in 1989. Methods were standardized as much as possible between comparable studies at Cape Pierce (Togiak National Wildlife Refuge), St. George and St. Paul islands, and Bluff (Alaska Maritime National Wildlife Refuge).

Kittiwakes and murres were censused on the same plots as had been done in previous years. Numbers of black-legged kittiwakes were the lowest recorded in all years except 1984. Murre counts on plots suggested that murre numbers have not increased or decreased in the last decade and that fluctuations among years have been positively associated with differences in reproductive success. Murre numbers had declined in the 1970's.

Black-legged kittiwake productivity at Bluff in 1989 were 0 for the plots monitored. Few kittiwakes even laid eggs in 1989. Murres fledged about .48 chicks per site w/ egg. This is lower than the previous two years, when it was about .66.

AMNWR-NR89 Differences in breeding success of common murres based on nesting density.

Jay H. Schauer, University of Alaska, Fairbanks

AMNWR-NR89. Energetics of kittiwakes and murres: density dependent factors. (74500-BSU-49208)

Schauer was not in the field in 1989 and is in the process of completing his thesis.

George Hunt, University of California, Irvine

Hunt did not have crews on the Pribilof Islands during the summer of 1989, but did have observers on the Vessel Alpha Helix on the waters off the Pribilofs.

The pelagic work consisted of a series of radial transects in which bioacoustics were used to estimate food supplies and the transects were used to estimate seabird numbers at sea. Analysis of data is currently being done and no final reports have been received from this project as of yet.

E. ADMINISTRATION

1. Personnel

See Homer Office Section

4. Volunteer Program

See Homer Office Section

5. Funding

See Homer Office Section

6. Safety

See Homer Office Section

7. Technical Assistance

Sowls worked with Paul Wagner, the wildlife monitor for the City of St. Paul harbor construction to insure comparability of data.

8. Other

Regional Director Walt Stieglitz, Assistant Regional Director John Rogers, accompanied by Refuge Manager John Martin visited the Pribilof Islands and flew over St. Matthew Island as part of a whirlwind tour of the Refuge. They were the first Director and Assistant Director to visit either location.

At St. Paul they were able to observe refuge lands, our biological monitoring program in action, and view the National Marine Fisheries Service Fur Seal rookeries. A quiet flight to St. George allowed them to meet the Mayor of St. George and to view the historic wash-house building of the National Marine Fisheries Service where our field crew stay.

Two Special Use Permits were issued for commercial operations in the Bering Sea Unit: Flying Tomato Productions received a permit for commercial cinematography on Otter and Walrus islands. Noel Floyd received a permit to cross refuge land while salvaging equipment from the grounded F/V Terminator on St. Paul Island.

F. HABITAT MANAGEMENT

6. Other Habitats

Two ships connected with commercial fishing went aground on parts of the Bering Sea Unit of the Refuge in 1989. Oil spills from each vessel caused the death of some birds, but numbers are believed to be small due to the fact that they occurred in the winter when the major concentrations of marine birds are away from the colony areas.

The F/V Terminator went aground near Southwest Point of St. Paul in March.

The M/V Milos Reefer a 485-foot Greek cargo ship went aground on St. Matthew Island near Glory of Russia Cape on November 14, 1989. Apparently shifting winds caused the ship to drag its anchor. About 240,000 gallons of oil and fuel were spilled and another 140,000 gallons remained in unbroken fuel tanks. Efforts to remove the remaining fuel, oil, and other toxic substances such as paints will be delayed until spring when weather improves and sea ice leaves the area. Plans to salvage the ship or to remove it entirely from the shoreline will wait until the vessel is inspected further.

These two shipwrecks demonstrate two things: 1) the increasing commercial fishing effort in the Bering Sea makes it much more likely that ships will go aground, and there will be more oil spills, trash washing ashore, and visual pollution from abandoned vessels along the coast, and 2) the high cost of logistics for the Bering Sea makes it very difficult for the refuge to adequately respond to such situations.

7. Grazing

On May 24, 1989 Jack Hotchkiss, assisted by bio-technician Diane Campbell and volunteer Vern Burandt conducted the annual aerial census of Hagemeister Island for reindeer.

This date was later than previous year's surveys due to aircraft and numerous weather delays. Counts made during the

census and from photographs taken during the census that were later counted. They were very similar, 784 and 785 respectively, but more calves were identified in the photographs. The best estimate for adults was 724.

This represented a 28% reduction in numbers from the previous year and hopefully a renewed interest of Jack Gusak, the reindeer owner to harvest the herd. The refuge would like to see the herd reduced to below 100 animals to allow the range to recover.

Harbor construction at St. Paul Island is continuing, with expected completion in the summer of 1990. Already there are increased ship visits to the island. 8/89-18B ALS

The F/V Terminator went aground on St. Paul Island in March of 1989. Fortunately, most seabird nesting species had not yet returned to the islands and the resulting oil spill probably had little effect on marine birds and mammals. 6/89-18B ALS

G. WILDLIFE

The information summarized in this section comes from reports mentioned in the Planning Section (e.g. Wagner 1989, Murphy 1989 and the refuge monitoring program in the Pribilof Islands), and personnel communications from Ian Jones, graduate student at Queens University, Toronto, Canada and refuge volunteer. The refuge Pribilof monitoring program was able to continue in 1989 even though many other refuge programs were disrupted by the crisis of responding to the Exxon Valdez oil spill.

4. Marsh and Water Birds

Northern fulmar Information was gathered on this species only in the Pribilofs. Counts were slightly higher on monitoring plots at St. Paul, but numbers were near the average for the last five years. No statistically significant change in numbers could be detected.

Cormorants For St. Paul, red-faced cormorants had an average clutch size of 3.08 eggs per clutch and an overall productivity of 1.23. No cormorants were present on our plots at St. George Island in 1989.

5. Shorebirds, Gull, Terns, and Allied Species

Black-legged kittiwake 1989 was a very poor year for kittiwakes at all sites monitored in the Bering Sea. At the Pribilof Islands, out of a total of 407 nests monitored, no more than 15 chicks fledged. None fledged at all on our plots on St. George Island.

Numbers of birds on population plots at St. Paul were down to the lowest recorded for the eight years for which data are available. Numbers at St. George were similar to what they have been in recent years.

At Bluff, few kittiwake eggs were laid in 1989 and most of the eggs that were laid were lost before hatching. No chicks fledged from Murphy's study plots. Of 14 years of data on kittiwake productivity at Bluff, this is the third total failure. Complete failures also occurred in 1984 and 1985.

Study plots are located partly with the aid of photographs marked to show plot boundaries. 8/89-C1 DB

Observation points for plots are indicated with a USGS style marker. 8/89-C1 ALS

Data collected at Cape Pierce (Togiak National Wildlife Refuge) also had kittiwakes with low productivity of 0.06 chicks per nest. Combined with those areas monitored by the Maritime Refuge it gives a good geographic distribution data which probably indicates a kittiwake breeding failure for all the Bering Sea.

Red-legged kittiwake 1989 was a total reproductive failure on both St. Paul and St. George islands (red-legged do not nest at Bluff). Out of 240 nests monitored, only one chick

hatched and it died about half grown. This is the worst productivity recorded in all 15 years for which data are available.

Population numbers on our monitoring plots were the lowest ever recorded at St. George Island. They are half of the 1976 numbers, and 75 percent of the 1984 numbers. Numbers at St. Paul Island were up slightly, but there are relatively few red-legged kittiwakes there and our St. Paul counts are of a small sample size.

While the previous year had good productivity, it was the only good year in the last ten. Unless more chicks are fledged, populations will probably drop dramatically. Most red-legged kittiwakes must be quite old and we expect mortality rates of adults to increase.

Murres Common murres reproductive success at St. Paul and St. George Island were lower than average, both within the normal variations seen. Population counts on St. Paul study plots appear to have stabilized at about 30 percent of 1976 numbers. Numbers at St. George appear to be stable or possibly may have increased slightly.

Information gathered on common murres at Bluff show that numbers were very similar to recent years data and that from the late 1970's. Laying at Bluff was later in 1989 than the previous two years. June 30 was the median laying data of all eggs observed in 1989. Reproductive success was about .4 chicks per egg laid.

Thick-billed murres reproductive success was about average at both St. George and St. Paul Island. Population count data suggests that numbers on St. Paul appear to be about 70 percent of 1976 levels and at St. George to have stabilized at about 77 percent of 1976 levels.

Auklets Ian Jones, volunteer with the Refuge continued his research on St. Paul Island on behavior of least auklets. Field work is not planned to continue beyond 1989 and data will be written up as Ian's thesis for his Ph.D. dissertation and various scientific papers. We feel this research will help in devising methods to monitor auklets.

14. Scientific Collections

George Hunt crew collected 2 common murres and 8 thick-billed murres at St. Paul Island; 16 thick-billed murres at St. George Island and 7 black-legged kittiwakes at sea off the Pribilof Islands.

Horned puffins are a favorite bird of tourists who visit the Pribilofs. 7/89-P16 ALS

Parakeet auklets are an alcid restricted to the North Pacific and popular with the "listers" who often come long distances to "bird" at the Pribilofs. 7/89-P12 ALS

H. PUBLIC USE

1. General

Susanne Swibold of Flying Tomato Productions was again back to the Pribilof Islands making another in their series of films about the Pribilof Islands. Their major project for 1989 was to continue working on their seabird film.

Native subsistence egging of murres again took place on St. Paul Island. There was some local concern that the Valdez oil spill had somehow caused the eggs to be smaller. Unfortunately these concerns were stated too late to allow us to measure eggs, but it may be possible for us in the future to work more closely with the eggers and get data on egg size. Murre egging is a fairly limited activity and we feel does not significantly affect total murre productivity on the Pribilof Islands.

7. Other Interpretive Programs

Wildlife Biologist Sowls recorded two sessions with the local radio for broadcast on the Pribilof Islands. The first, at the beginning of the field season, explained what we were doing in monitoring seabirds at the Pribilof Islands. The second was at the end of the summer and explained the results we had found during the summer.

12. Wildlife Observation

Exploration Holidays Tour Company which had been conducting wildlife tours at St. Paul Island for many years went out of business. The Pribilof tours are now under the local ownership of the Tanadgusix Native Corporation. They revamped the hotel, purchased new buses, and hired native tour guides. The number of tourists was less than expected in 1989, being about 800. A few tourists (probably less than 50) also visited St. George Island.

In addition to the tourists who visit the Pribilofs, there is a great influx of other new visitors, many of which are interested in viewing wildlife. The harbor construction project has also brought in many workers temporarily to the area. The breakwater construction has made St. Paul a much more preferred port for the Bering Sea commercial fishing fleet and hundreds of additional people come ashore than did just a couple of years ago. We expect rapid development at St. Paul with increased ship traffic and on shore processing of seafood products.

A black-legged kittiwake fledging, a rare sight in the Pribilof in 1989 as a near total breeding failure occurred for both kittiwake species. 8/89-1012 ALS

I. EQUIPMENT AND FACILITIES

1. New Construction

The Pribilof "Terms and Conditions", an agreement signed by the Native Corporation and the Secretary of Interior, indicates corporations are to provide buildings for the Refuge on one-acre leased administrative sites on each island. While discussions between the Tanadgusix Corporation and the U.S. Fish and Wildlife Service have occurred, no resolution to this problem has yet occurred.

More information on new construction is also available in the Homer Office section.

4. Equipment Utilization and Replacement

See Homer Office Section.

6. Computer Systems

The portable Corona computers which were used in the Pribilofs for data storage and analysis for several years were replaced with Zenith 286 laptop computers. The new computers work well and are much easier to transport to and from the islands.

J. OTHER ITEMS

3. Items of Interest

See Homer Office Section

4. Credits

The report was written and typed by Sowls, and edited by Blenden and Andrew-Miller. Weather data was summarized by Sue Schulmeister.

CHUKCHI SEA UNIT

ALASKA MARITIME NATIONAL WILDLIFE REFUGE

Homer, Alaska

ANNUAL NARRATIVE REPORT

Calendar Year 1989

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-limitable population of black guillemots, a species which normally is found in the north Atlantic, extends as far south as Cape Thompson and may be increasing. The most common species of bird nesting on the low barrier islands between Cape Lisburne and Point Barrow is the common eider. One of the refuge islands, Solivik Island, has the largest eider colony in the Chukchi Sea (>500 birds).

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

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Unfortunately no seabird monitoring occurred in the Chukchi Sea Unit during 1989. Budget problems and lack of personnel due to the Exxon Valdez oil spill and need for extra personnel in Prince William Sound and the Gulf of Alaska to respond were the reason. (Section G.5)

Cape Thompson seabird monitoring by Alaska Fish and Wildlife Research Center in 1988 report is completed. (Section G.5)

B. CLIMATIC CONDITIONS

Data from the National Weather Service at Kotzebue probably best represents weather conditions for the Chukchi Unit. Weather for 1989 was warmer than average with nine months having departures from average to above normal (Table 1).

Table 1. Temperatures at Kotzebue in 1989.

Month	Average Temp. (°F)	Departure from Average (°F)
Jan	-19.9	-16.9
Feb	17.7	23.8
Mar	5.3	5.9
Apr	21.0	8.7
May	29.6	-2.0
Jun	44.1	.3
Jul	54.2	1.1
Aug	53.9	2.0
Sep	45.6	4.0
Oct	23.6	.8
Nov	.4	-7.7
Dec	5.6	9.8

D. PLANNING

1. Master Plan

See Homer office section.

2. Management Plan

See Homer office section.

4. Compliance with Cultural Resource Mandates

Archaeological Services, a cultural resources contracting firm from Pennsylvania, investigated the Pingasagruk archaeological site at Point Franklin, Chukchi Sea Unit, in 1986 (Contract No. 14-16-0007-86-6612). A final report on this project has not yet been received by the Fish and Wildlife Service, but is expected in 1990 or 1991.

E. ADMINISTRATION

1. Personnel

See Homer office section.

4. Volunteer Program

See Homer office section.

5. Funding

See Homer office section.

6. Safety

See Homer office section.

7. Technical Assistance

See Homer office section.

8. Other

Two Special Use Permits were issued during the year in the Chukchi Sea Unit. One permit was issued to Phil Driver of Midnight Sun Adventures for his commercial guiding operation which encompasses Cape Thompson and Cape Lisburne. Another Special Use Permit was issued to the Bureau of Land Management for cadastral survey of Native allotments on refuge land between Topkok Head and Cape Darby.

G. WILDLIFE

5. Shorebirds, Gulls, Terns and Allied Species

No seabird monitoring was done in the Chukchi Sea Unit in 1989. All refuge planned activities in the Chukchi Unit in 1989 were cancelled due to budget problems and lack of available personnel due to the massive Exxon Valdez oil spill and U.S. Fish and Wildlife Service response in Prince William Sound and the Gulf of Alaska.

Results of seabird work done in 1988 by U.S. Fish and Wildlife Service's Alaska Fish and Wildlife Research Center (through a Minerals Management Service contract) were completed. Information from this report are summarized below:

Murres Correlation analysis between 1988 data and the previous studies done in 1960 and 1982 reveal negative trends in murre attendance at all Cape Thompson colonies. Common murres declined at a more rapid rate than thick-billed murres from species composition counts. Breeding productivity of murres was about average in 1988 at about 0.47 young per pair. Murres were apparently feeding on arctic cod and sand lance which were distributed widely, but in low concentrations.

Black-legged kittiwakes Population count data for kittiwakes showed no significant trend between 1960 and 1982 or between 1960 and 1988. All fluctuations in kittiwake numbers documented between years were within normal year to year variability.

Kittiwake productivity was very poor in 1988 at .15 young per pair. The breeding failure of kittiwakes at Cape Thompson in 1988 was part of a pervasive syndrome of failure in this species observed throughout the Bering Sea, Chukchi Sea, and Gulf of Alaska in recent years.

Kittiwakes, like murres, were feeding on arctic cod and sand lance. Since kittiwakes cannot dive deeply below the water surface as can murres, prey is harder for them to get. This probably accounts for the lower reproductive breeding success of kittiwakes than murres.

Cape Thompson taken from the Fish and Wildlife vessel Tiglax in 1988. No work was done in this unit in 1989. 8/88-19C JP

H. PUBLIC USE

8. Hunting

In 1989 a permit was again issued to Phil Driver, a registered hunting guide, for the Cape Thompson and Cape Lisburne refuge lands.

17. Law Enforcement

See Homer office section.

I. EQUIPMENT AND FACILITIES

4. Equipment Utilization and Replacement

See Homer office section.

J. OTHER ITEMS

3. Items of Interest

See Homer office section.

4. Credits

The report was written and typed by Sowls and edited by Blenden and Andrew-Miller.

GULF OF ALASKA UNIT

ALASKA MARITIME NATIONAL WILDLIFE REFUGE

Homer, Alaska

ANNUAL NARRATIVE REPORT

Calendar Year 1989

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

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

This unit has the only forest habitat on the Maritime Refuge. Spruce-hemlock forests are the dominant plant community on nearly all the islands outside Cook Inlet. The transition zone occurs in the Barren Islands, where there is only a small forested area on Ushagat Island, with alpine tundra being the dominant vegetation type. 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. Besides terrestrial habitat, submerged lands also occur around Afognak and some waters around Kodiak Island.

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

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H. PUBLIC USE (cont.)

I. EQUIPMENT AND FACILITIES

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K. FEEDBACK

A. HIGHLIGHTS

The tanker T/V Exxon Valdez runs aground on Bligh Reef on March 24 at 0004 hours. By morning, it has spewed approximately 11 million gallons of North Slope crude oil into Prince William Sound. (Section J.3).

Refuge biologists selected as principal investigators for oil spill damage assessment projects. (Section J.3)

The Seldovia Native Association decides not to sell Gull Island to Alaska Maritime National Wildlife Refuge. (Section C.3).

B. CLIMATIC CONDITIONS

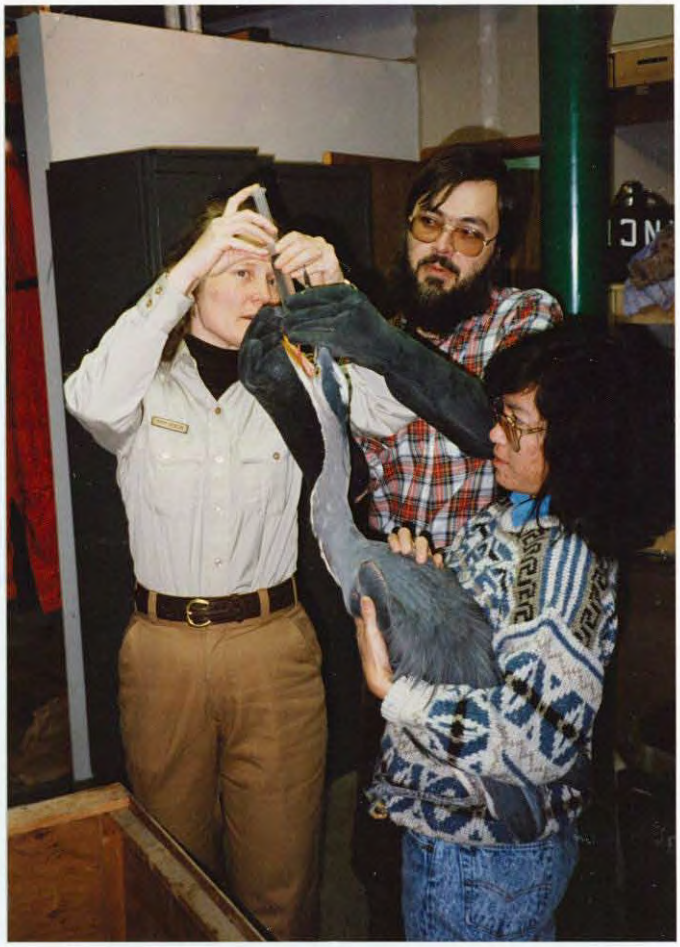
Although it does not extend as far south as the Aleutians, the Gulf of Alaska has the most moderate climate among the units of the Alaska Maritime National Wildlife Refuge. Winter temperatures normally remain above 0°F except for lands adjacent to the Kenai Peninsula. The temperate climate in southeast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

The year began with a new record low of -24°F in January, registered at the airport. The wind chill factor caused temperatures to plummet as low as -45°F. The cold snap continued through February. An exceptionally warm and clear spring began in March. The good weather continued through most of the summer, resulting in an equally exceptional season. Highs reached 75°F in August, and there was little precipitation throughout the spring and early summer. Homer experienced a wetter August than normal, with 2.8 inches of precipitation, 0.44 inches above normal. Oil spill damage assessment work was slowed by frequent gales, especially in the Barren and Chiswell Islands. September was also unusually wet and warm, with 3.95 inches of precipitation and a high temperature of 66°F on the 8th. October was a typical weather month, with an average temperature of 38°F and the first snow fall of the winter. Temperatures in November and December continued to plummet, as is typical for that time of year, and December saw a total of 10.6 inches of snow.

Homer experienced a long cold snap in January resulting in a record low temperature of -24°F that froze waters at the small boat harbor and adjacent areas. 1/89 MLN

Table 1. Meteorological Data - Homer 1989

	Temperatures			Precipitation		
Month	Max.	Min.	Avg.	Dep. Norm.	Total	Snow
Jan	40	-24	11.0	.25	1.90	9.0
Feb	44	-7	25.8	-1.66	.27	1.5
Mar	49	7	27.4	-1.25	.03	.5
Apr	57	23	37.9	-.18	1.13	T
May	56	28	43.5	.05	1.12	0
Jun	66	37	50.2	-.39	.66	0
Jul	73	41	55.2	.63	2.10	0
Aug	75	40	56.7	.44	2.80	0
Sep	66	35	50.9	1.23	4.09	T
Oct	55	20	38.1	.80	4.08	2.6
Nov	49	1	25.8	-1.71	1.20	3.6
Dec	47	2	30.4	.07	2.65	10.6



Outdoor Recreation Planner Benson and Biological Technicians Dragoo and Bain rehabilitate a great blue heron that was found starving in Kachemak Bay during the cold snap in January. 1/89 MLN

C. LAND ACQUISITION

3. Other

Ascertainment reports and associated documents were prepared for the Service's attempt to purchase Gull Island from the Seldovia Native Association. Dee Butler, Realty, was in Homer from June 14-16 to appraise Gull Island and discuss its purchase with the Native Association. We were notified in September that the Seldovia Native Association was no longer interested in selling Gull Island to the refuge. Gull Island is four miles east of the Homer Spit and provides nesting habitat for approximately 18,000 common murres, black-legged kittiwakes, glaucous-winged gull1s, and tufted puffins. Because this is the 1argest concentration of nesting seabirds in Kachemak Bay, it is frequentl1y visited by tour boats. We feel that it would be an important addition to the refuge.

D. PLANNING

1. Master Plan

See Homer office section.

2. Management Plan

See Homer office section.

5. Research and Investigations

AMNWR NR89AKM-[GET NUMBER FROM BLENDEN] "Seabird population monitoring, Middleton Island, Alaska summer 1989"

Personnel of the Alaska Fish and Wildlife Research Center (Scott Hatch, Brian Fadely, Bay Roberts, and two volunteers, Don Garnier and Sara Lenoe) conducted seabird studies on Middleton Island from 2 April to 20 August 1989. This was the third year of a continuing study of black-legged kittiwakes (Rissa tridactyla). Electronic balances were installed at eight kittiwake nest sites on the S.S. Coldbrook, an aging shipwreck used by several hundred pairs for nesting. Balances recorded weights of the attending birds at 10-minute intervals throughout the summer. The data collection system was enhanced this year through the use of radio telemetry. A small (5 g) single stage radio transmitter was tail-mounted on each of 14 individuals in the study, and presence/absence data complementary to the weight records were collected continuously using an automatic scanning receiver and data collection computer. Further application of these systems is anticipated for the 1990 field season.

Over-winter survival of adult kittiwakes was estimated by resighting a large (>300) sample of individually color-banded kittiwakes on plots on the east side of Middleton Island. Estimated survival in 1989 was 93 percent. Kittiwakes had poor success raising young for the fifth straight year -- overall productivity was estimated at 0.02 young per nest. The number of nests on the island was just over 40,000 in 1989, down from 52,000 in 1988, and only 48 percent of the maximum count (83,000 nests) obtained on Middleton in 1981. Other seabird species, including pelagic cormorants (Phalacrocorax pelagicus), thick-billed (Uria lomvia) and common murres (U. aalge), and glaucous-winged gulls (Larus glaucescens), are increasing on the island, as is the recently established breeding population of dusky Canada geese.

E. ADMINISTRATION

1. Personnel

See Homer office section.

4. Volunteer Program

See Homer office section.

5. Funding

See Homer office section.

6. Safety

See Homer office section.

7. Technical Assistance

Wildlife Biologist Nishimoto provided status of refuge work on marbled murrelets to Dr. Vivian Mendenhall, regional seabird coordinator. The information was used to respond to a letter from a conservation group.

We provided information of seabirds at Flat Island, near the entrance of Kachemak Bay to the Alaska Department of Fish and Game who used the data for a planning document.

Nishimoto reviewed a draft letter, prepared by Western Alaska Ecological Services, to the Corps of Engineers concerning Koncor's request for a log transfer facility in Kazakof Bay, Afognak Island. We suggested that the letter indicate an alternate site be used to avoid sand lance habitat. Research has shown that sand lance make up 32-57 percent of the diets of nesting puffins in the Kodiak archipelago.

8. Other

In accordance with Marine Mammal Protection Act regulations, Refuge Clerk Fellows registered and tagged one minke whale baleen, two sea lion teeth, one sea lion rib, one fur seal tooth, two walrus skulls with both tusks, one single walrus tusk, one complete sea otter skeleton, five sea otter skulls, and four sea otter skins in 1989.

Twenty-eight Special Use Permits were issued for maintenance of seismic stations, cattle grazing, set net fishing, guiding, commercially-guided waterfowl hunts, guiding of photographers and fishermen, operation of outfall lines, bathymetric mapping,

commercial photography and cinematography, paleontology, cadastral survey, strain accumulation survey, placement of a windsock, geologic survey, archaeology, and operation of a seismic station. Of the total, six oil spill-related permits were issued from this office for operation of radio relay stations, oil spill clean-up on refuge lands, and biological survey of intertidal areas on the Barren Islands.

The oil spill-related permits are as follows: Exxon was issued a permit to maintain a temporary radio relay station on Rugged Island in Resurrection Bay, adjacent to the U.S. Coast Guard radio facility; Exxon was issued a permit to maintain a temporary radio relay station on Ushagat Island in the Barrens; Exxon was issued a permit to monitor the movement and status of oil on the beaches of Foul Bay, Alinchak Bay, and Ushagat Island, with helicopter access allowed; Exxon was issued a permit to monitor the movement and status of oil on Ushagat Island, Morning Cove, Hoof Point, Wildcat Cove, and Kitten Pass, with helicopter access allowed; Alaska Department of Environmental Conservation was given permission to conduct shoreline assessment studies, place markers, and land helicopters on the Pye, Harbor, Chiswell, Natoa, and Matushka Island groups; and Exxon was given permission to clean oiled beaches on lands belonging to the Maritime Refuge.

F. HABITAT MANAGEMENT

3. Forests

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

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

Plywood was nailed to one of the wall tent frames at East Amatuli Island to provide a reasonably dry cook tent. 7/89 MLN

At Amatuli Cove, Biological Technician Beringer and Volunteer Ferraro anxiously await the arrival of the M/V Surfbird which would return them to Homer. 7/89 MLN

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

The Afognak Native Corporation constructed a low gradient slide log transfer facility at Kazakof Bay, Afognak Island during the fall of 1988. An inspection of the site by personnel from the Western Alaska Ecological Services office in the summer of 1989 found that the logging operation used an unauthorized log storage site. They also have not complied with several administrative stipulations and these deficiencies have been reported to the Refuge Manager. The Right-of-Way permit also requires creation of artificial reefs and eelgrass transplants. Although the data on the amount of mitigation required were collected in the 1989 dive, the refuge has not ordered the permittee to construct reefs or transplant eelgrass due to the demands of the oil spill.

The Afognak Native Corporation's log transfer facility at Kazakof Bay was first of two similar structures constructed in Kazakof Bay, Afognak Island. The refuge owns the waters and submerged lands around the island, but most of the island is owned by Native groups. 5/90 MLN

In 1989, Koncor, Inc. continued their efforts to obtain a Right-of-Way permit to construct a log transfer facility within four miles from the Afognak Native Corporation's project at Kazakof Bay. They had originally planned to develop a barging facility, but in 1989 decided to also develop a low gradient slide. A second underwater survey was conducted at Lookout Cove in the summer of 1989 to locate a site that would minimize impacts to eelgrass beds and sand lance habitat. The first dive in 1988 determined that the preferred site would occur on sand lance habitat. This species is a major forage fish for seabirds. Several seabird colonies occur within this bay.

This year, Martin and Nishimoto met with Peter Olsen, Afognak Native Corporation, to discuss a tidal crossing for a logging road. We pointed out that, under the Refuge Comprehensive Conservation Plan, such a request could be considered. We pointed out that others, such as Western Alaska Ecological Services, would also be receiving the project plans. We also discussed how he could make amendments to the present Right-of-Way permit that his corporation held.

12. Wilderness and Special Areas

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

Below is a breakdown of these areas:

Island	Acres	Designation Date
Forrester	2832	10/23/70
Hazy	32	10/23/70
St. Lazaria	64	10/23/70
Tuxedni	5547	10/23/70

G. WILDLIFE

1. Wildlife Diversity

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

2. Endangered and/or Threatened Species

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

3. Waterfowl

Migrating and wintering waterfowl are abundant around the Pye Islands, Afognak Island, Womens Bay at Kodiak Island and in the Barrens. Canada and white-fronted geese as well as brant visit the Barrens in migration. While checking Sud Island for oil, two yellow-banded brant were spotted on the north side of the island. According to Dr. Dirk Dirksen, Alaska Fish and Wildlife Research Center, these were the first color-banded brant reported away from the Yukon Delta where they were banded. Populations of common eiders and white-winged scoters can be found in waters around Duck and Chisik islands.

4. Marsh and Water Birds

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

Cormorants Pelagic (Phalacrocorax pelagicus) and Red-faced (P. urile) cormorants were surveyed on Gull Island and Sixty-foot Rock during June of 1989. The number of Gull Island pelagic cormorant nests was 12.6 percent higher than the mean number of nests from the previous years. Red-faced cormorant nests were 15.4 percent greater than the mean of the three previous years. At Sixty-foot Rock, three pelagic nests were found for the first time since monitoring of this colony began in 1984. However, these nests did not produce any young. An average of 30 adult pelagic cormorants were observed at Gull Island, and an average of 12 adult pelagic cormorants at Sixty-foot Rock. No nesting cormorants were observed at East Amatuli Island in July, although historically, there has been a pelagic cormorant colony of about 75 pairs 100 meters north of Amatuli Cove. A few cormorants were observed sitting on the water.

Storm-petrels Fork-tailed storm-petrels (Oceanodroma furcata) were studied on East Amatuli Island in 1989 as one of the T/V Exxon Valdez oil spill damage assessment studies. However, we cannot discuss this study due to pending litigation.

5. Shorebirds, Gulls, Terns, and Allied species

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

Glaucous-winged gulls We estimated that 726 adult birds inhabited Gull Island, based on two counts in late June of 1989. For comparison, 442 birds were counted in 1985. We did not count adults during 1986-88. The numbers were more

consistent at Sixty-foot Rock; we counted 95 gulls, and this is nearly the same number of birds observed during the past three years. The gull colony on East Amatuli Island was also censused, but numbers were low. On July 10, 13 empty nests were found, along with one nest with two chicks, and one nest with two warm eggs. There were 84 gulls flying or sitting on the west ridge. Fifty-nine more gulls were counted on the beach and rocks in Amatuli Cove. On August 27, 14 gulls were counted, including two fledglings, at the east stream in Amatuli Cove. We made a second count on August 31, and 15 adults and two fledglings were observed.

Fork-tailed storm-petrel chicks at East Amatuli Island were weighed in a damage assessment study. 9/89 MLN

Volunteer Betsy Jay effortlessly climbs a 500-foot ridge to search storm-petrel burrows on East Amatuli Island. 9/89 MLN

Murres As the Exxon Valdez oil spill and seabird nesting seasons progressed, concern was especially acute for common murre populations in the northern Gulf of Alaska. Murres were studied at the Chiswell Islands and Barren Islands as one of the damage assessment studies. Results of this work cannot be discussed due to pending litigation.

Puffins A few tufted puffins were observed at Gull Island and Sixty-foot Rock, but no effort was directed specifically at censusing puffins there. Four tufted puffin transects were monitored on East Amatuli Island during July. The pooled burrow density in 1989 was 0.18 burrows per m2. The density of occupied burrows (pooled) was about the same for the two preceding years. Puffins did not seem to be greatly affected by the oil spill; they arrived at their colonies later than murres, and therefore avoided the most toxic stages of the spill.

Pigeon Guillemots We estimated that there were 24 pigeon guillemots at Gull Island in June of 1989. This is probably an overestimate of the population, since there is an adjacent colony on the southside of Kachemak Bay.

Black-legged kittiwakes were first observed at Gull Island on March 29. On June 20, 1989, we found 85 percent of the nests on the north side of the main island with at least one egg. On the south side, 95 percent of the nests had eggs. An average of 1082 adult birds were counted, a 26.9 decrease from the previous year, whereas nests declined by 61.0 percent. When conditions for breeding are poor, we would expect a greater decline in nests rather than in adult birds, as was the case in 1987. It is not clear whether the oil spill or boat traffic associated with the oil spill had an effect on kittiwakes.

The Gull Island colony continued to be a consistent producer of kittiwakes. All but one plot produced at least 0.33 prefledging chicks per nest. However, reproductive success was 0.13 prefledging chicks per nest less than in 1988. At Sixty-foot Rock, we counted 351 adults and 281 nests in 1989. This represents a 15.2 percent decline in adults, but no change in nests compared to 1988. The colony generally failed; it produced only 0.16 prefledging chicks per nest.

Murrelets Nishimoto attempted to continue an ongoing study to develop a methodology to monitor murrelets at sea, which would be useful for our work on refuge areas like Afognak Island. However, the refuge's effort had to stop when refuge biologists were detailed to work on damage assessment projects. However, Kachemak Bay was used as a control site for the marbled murrelet damage assessment project.

Scoters In February, several oiled scoters were reported by a resident of Port Graham. The birds were collected and sent to the Alaska Department of Environmental Conservation.

6. Raptors

Bald eagles nest on many of the islands. In early 1989, Bain conducted bald eagle surveys on the Homer Spit. A high of 452 eagles was counted in February. Over 400 eagles were counted each week of March. This dropped to less than 200 eagles by the end of April.

The Homer Spit bald eagle survey resumed in November of 1989. Of particular interest was the number of bald eagles and the effect that the oil spill had on their distribution. This study is currently in preparation.

7. Passerines

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

8. Game Mammals

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

9. Marine Mammals

Sea otters and harbor seals are common in Kachemak Bay and around the Barren Islands. Four sea otters were found dead on the beach in Homer in January and were sent to the National Wildlife Health Lab for necropsies.

H. PUBLIC USE

1. General

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

6. Interpretive Exhibits/Demonstrations

See Homer office section.

17. Law Enforcement

See Homer office section.

I. EQUIPMENT AND FACILITIES

4. Equipment Utilization and Replacement

A 25-foot Boston Whaler used to survey Gull Island, Sixty-Foot Rock and Chisik Island had Loran-C and depth recorder installed.

5. Communications Systems

See Homer office section.

J. OTHER ITEMS

3. Items of Interest

On March 24, 1989, the oil tanker Exxon Valdez went aground on Bligh Reef in Prince William Sound. She spilled about 11 million gallons of Prudhoe Bay crude oil and the oil eventually drifted southwesterly beyond the Sound, along the Kenai Peninsula and then to Kodiak Island and the Alaska Peninsula. This was the nation's largest oil spill.

No one was prepared for a spill of this magnitude. Alyeska, a consortium of oil producers, which manages the oil terminal at Valdez did not send out containment booms to the Exxon Valdez until 15 hours after the spill. The contingency plan for the Sound calls for a five hour response. It soon become evident that the spill was too large to be cleaned up.

Government agencies were equally unprepared. There were no plans in place to recover dead and dying wildlife. The International Bird Rescue and Research Center was under contract by EXXON to operate bird rescue centers. There was confusion between International Bird Rescue and the Service over the responsibility of recovering dead and dying birds. Eventually International Bird Rescue assumed this role and the Service took custody of the dead birds. However, bird recoveries were haphazard and it was difficult to determine locations where birds were recovered. Nevertheless, more than 30,000 dead birds of 90 species were retrieved by August 1, 1989. Murres, other alcids and seaducks had the highest mortality. Data on sea otters are currently restricted due to pending litigation.

The refuge staff had limited involvement in Prince William Sound since that area was outside the boundary of the refuge. On March 31, the Kenai Fjords National Park asked Nishimoto for help in conducting wildlife surveys before the oil had reached the Park. When Nishimoto arrived at the Kenai Fjords National Park headquarters in Seward, he was selected as an aerial survey team leader for the Incident Command Team that was recently established. After conducting aerial surveys, he assisted the shoreline survey team.

During the first week of April, biological technicians Bain and Dragoo also assisted the Park in conducting pre-oil beach surveys. They discovered oil on the Chiswell Islands on April 5. After completing the first of two boat surveys, the shoreline survey team discovered oiled murres near refuge lands at Seal Rocks and the Chiswell Islands. The team collected

several specimens for evidence. After returning to Seward, the birds were placed in the custody of Park Service investigators since there were no U.S. Fish and Wildlife Service Law Enforcement agents or Service holding facilities in Seward at that time.

Between wildlife surveys, Nishimoto provided advice to the Incident Command Team on sensitive wildlife areas along the Kenai Fjords and Alaska Maritime Refuge. He also initiated efforts in organizing bird collection efforts and later assisted Law Enforcement personnel with morgue activities when they arrived in Seward.

Wildlife Biologist Bailey surveyed beaches of the Barren Islands on April 6, before oil hit this area. He found only a dead gull and two sea otters. The Barrens was to be the largest seabird colony hit by oil. This group of islands support about 500,000 seabirds representing 18 species. It had a breeding population of 130,000 murres prior to the oil spill.

Service personnel worked out of a sparsely furnished basement in Seward during the first months of the oil spill. 5/89 MLN

On April 11, six days after oil hit the Chiswell Islands, Public Use Specialist Patterson arrived in Seward as the official Service representative. Refuge Biological Technician Beringer arrived in Seward on April 11 and assisted on the second shoreline survey and assisted Law Enforcement personnel in the morgue. Fisheries Management Services Biological Technician Dean Cramer arrived on April 12. He would help transport otters from the field to rescue centers through the summer. By April 17, the Incident Command Team began to demobilize. They would be replaced by an Exxon team. The Incident Command Team did an excellent job. Most residents and government agencies were apprehensive about their departure.

On April 14, Bailey found oil in the Barren Islands and eight dead murres. He made three additional surveys in April. He made three trips in May and established a camp on Ushagat Island on May 20. Volunteers Tony Flaherty and Jeff Wraley remained at this camp until June 16. Peak numbers of oiled birds occurred at the end of April when the number of oiled birds jumped from 74 on April 19 to 1453 during the period of April 27-May 2. By June 15 a total of 2162 dead birds were recovered from the Barrens. Murres made up 79 percent of the mortalities.

The Seward bird rescue center was completed on April 19. The Service finally selected Tom Early as an on-site coordinator to replace Patterson. Early is the Refuge Manager at Kanuti National Wildlife Refuge and less than six months earlier served as Deputy Refuge Manager for the Alaska Maritime National Wildlife Refuge.

After leaving Bellingham, Washington on April 24, the M/V Tiglax surveyed offshore transects (408 ten-minute transects) in the northern Gulf of Alaska and Shelikof Strait between 1 and 7 May. The team, led by John Piatt, surveyed these waters for oiled birds and to document oil distribution. Hydroacoustic gear was also used, with unverified success, to locate submerged oil in the Shelikof Strait. In an attempt to quantify the recovery percentage of oiled birds, 100 oiled carcasses were marked and set adrift between the Barren and Chugach Islands.

On May 5, Nishimoto and National Marine Fisheries Service Biologist Ron Morris participated in the first Seward Shoreline Clean-up Assessment Team survey. The purpose of this trip was to identify shoreline that required immediate clean-up. Surveys at seabird colonies and sea lion rookeries were given high priority to minimize disturbance to breeding and pupping. However, it was already too late for the seabirds. Black-legged kittiwakes were present in large numbers at the Chiswell Islands and the helicopter used in the survey flushed them off the cliffs. Nishimoto directed the helicopter pilot to cease

surveys near seabird colonies. However, before returning to Seward, we landed on a barge and inspected Natoa and Matushka islands via skiff. Oil was present at Matushka where clean-up crews were already working. On May 8, Jerry Cegelske left Seward. He was the last of the Law Enforcement agents who worked out of Seward.

By May 10, an otter rescue center had been completed, after many logistic and bureaucratic setbacks, in Seward; by then the otter rescue efforts were concentrated on the southeastern coast of the Kenai Peninsula anyway, by virtue of the path taken by the oil spill. As soon as the otter center was completed, overflow from the Valdez center was transferred to Seward, and a hold order on the otter capture boats which had been in place because of the lack of facilities, was lifted. By May 12, the Seward otter center was filled to capacity, with 81 otters; another hold order was issued, while the proposed site in Little Jakolof Bay was examined and approved.

Facilities for the seward bird rescue center was finally completed about two weeks after oiled birds began arriving in Seward. 5/89 MLN

Outdoor facilities of the Seward bird rescue center. 5/89 MLN

In early May, Nishimoto and Beringer created databases for the morgue data and bird and otter rescue data. While working on these data, we discovered poor recording practices at the bird rescue center. There were also some problems with the morgue data. Nishimoto and Beringer left Seward on May 15 to begin work on a Fork-tailed storm-petrel damage assessment project. Nishimoto was selected as principal investigator for that project. They were the last refuge personnel to be stationed in Seward.

No Alaska Maritime Refuge personnel was stationed in Kodiak, but oil related management decisions on refuge lands around Afognak Island and Kodiak Island were made by the Kodiak Refuge. Kodiak Refuge Manager, Jay Bellinger, served as the Service's on-site coordinator in Kodiak.

Sea otter pens at the Seward otter rescue center. 5/89 MLN

Otter tank at the Seward otter center. 5/89 MLN

Common loons in a tank at the outdoor bird rescue facility. Loons reportedly had a poor survival rate at the rescue center. 5/89 MLN

A heavily oiled beach at the Pye Islands. 7/89 JLM

Oil splatters near Yalik Bay. 4/89 MLN

Hot/cold water washing in the Pye Islands. 8/89 TJE

Oil coming ashore on the Barren Islands. Four wildlife refuges were hit by oil. Over 250 miles of beaches on the Alaska Maritime National Wildlife Refuge were affected. 1989 PB

The Barren Islands were the hardest hit of refuge seabird colonies. Over 2000 carcasses, a fraction of the total affected, were removed from the islands which are home to a half million seabirds. 1989 PB

Supervisory Wildlife Biologist Nysewander was also selected as a principal investigator on a damage assessment project that assessed seabird populations in Prince William Sound, the Kenai Peninsula, Barren Islands and colonies along the Alaska Peninsula. Bailey worked on the Kenai Peninsula portion of this project as well as another study that censused seabirds along random transects off the Kenai Fjords National Park and refuge lands.

In late June, Exxon requested permits to conduct cleaning activities on the Pye and Barren Islands. These permits were issued and work began in late June in the Pye Islands and late July in the Barrens. Norm Olsen, Planning Architect, Refuges and Wildlife, served as a Service monitor on Ragged Island, one of the Pye Islands. Clean-up work on Ushagat Island, one of the Barren Islands, was monitored by: Bill Kirk, Botanist, Resource Support; George Constantino, Associate Refuge Manager, Refuges and Wildlife; and Gail Baker, Chief, Resource Support. During August, the refuge borrowed assistance from several other programs to assist in monitoring Exxon's performance under their special use permit to clean oiled refuge beaches. Gail Baker monitored work in the Barren Islands. Mike Reardon, Assistant Manager/ Pilot of Yukon Delta National Wildlife Refuge and Phil Feiger, Refuge Manager at Innoko National Wildlife Refuge, monitored work in the Pye Islands. Our appreciation goes out to all of these people who, usually on short notice, were willing to go into the field and look out for the refuge's interests during this hectic time.

On September 23, a team on the Tiglax, led by Gerald Sanger, conducted at-sea seabird population counts between Kachemak Bay and the southern Kodiak Archipelago, and beach surveys around Kodiak Island and on the Alaska Peninsula. The Tiglax completed its work on October 14. Data from this survey cannot be released due to pending litigation.

See the Homer Section for oil spill activities at the refuge headquarters in Homer.

4. Credits

Sections A,B and C were written by Student Conservation Association Volunteer Ashley. Blenden and Hagglund prepared Section E. Nishimoto wrote Sections F, G and J. Section H was written by Benson. Nishimoto and Blenden prepared Section I. The report was edited by Blenden and Andrew-Miller.

Pigeon Guillemot

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

AUKS & PUFFINS

____ Common Murre on . . . .
____ Thick-billed Murre on . .
____ • Pigeon Guillemot n . . . .
____ • Marbled Murrelet on . .
____ • Kittlitz's Murrelet on . .
____ Ancient Murrelet on . . .
____ Cassin's Auklet on . . . . .
____ Parakeet Auklet on . . . .
____ Least Auklet on . . . . . .
____ Whiskered Auklet on . .
____ Crested Auklet on . . . . .
____ • Tufted Puffin on . . . . . .
____ • Horned Puffin on . . . . .

CUCKOOS & OWLS

____ X Common Cuckoo t . . . .
____ Snowy Owl ta . . . . . .
____ Short-eared Owl t . . . . .

SWALLOWS

____ Tree Swallow w . . . . . .
____ Bank Swallow w . . . . . .

RAVENS & WRENS

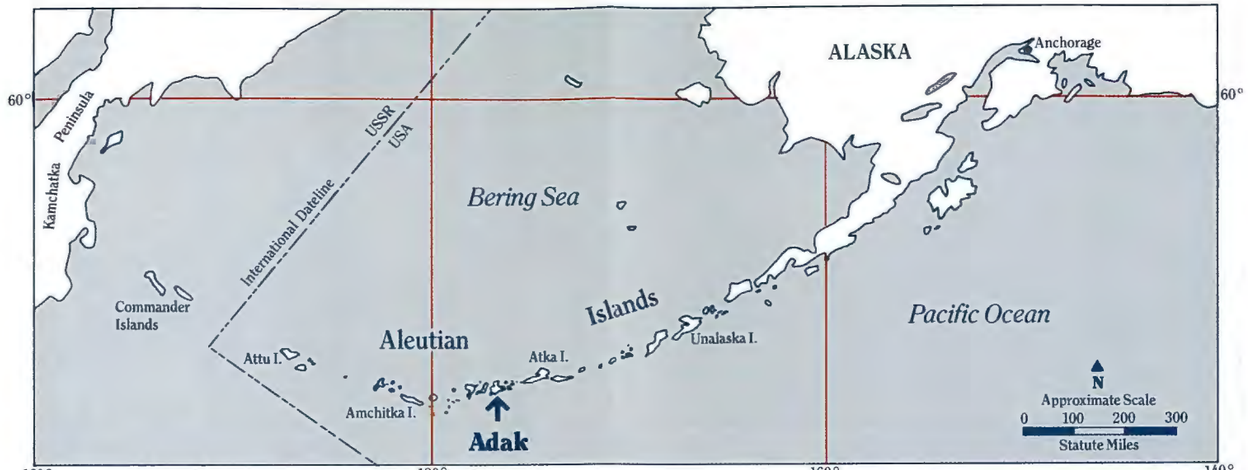
____ • Common Raven nwsta . .
____ • Winter Wren s . . . . . .

THRUSHES

____ Northern Wheatear ta
____ X Dusky Thrush t. . . . . .

WAGTAILS & PIPITS

____ X Black-backed Wagtail s
____ Water Pipit t . . . . . .



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

WAXWINGS & SHRIKES

____ Bohemian Waxwing t . .
____ Northern Shrike t . . . . .

SPARROWS

____ Savannah Sparrow t . . .
____ • Song Sparrow st . . . . . .
____ • Lapland Longspur t . . .
____ X Rustic Bunting t . . . . . .
____ • Snow Bunting bsta . . . .

FINCHES

____ X Brambling t . . . . . .
____ • Rosy Finch sta . . . . . .
____ X Common Rosefinch t .
____ White-winged Crossbill t
____ Common Redpoll t . . . .
____ Hoary Redpoll t . . . . . .
____ X Hawfinch t . . . . . .

Rosy Finch

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Alaska Maritime National Wildlife Refuge
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April 1987

Birds of Adak Island

Aleutian Islands Unit

Alaska Maritime National Wildlife Refuge

Bald Eagle

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

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

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

Good birding!

ABUNDANCE CATEGORIES

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

• — nests on Adak
X — Asiatic species

HABITATS

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

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

LOONS

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

GREBES

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

TUBENOSES

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

CORMORANTS

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

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

SWANS & GEESE

____ Tundra Swan nw
____ XWhooper Swan nw
____ XBean Goose n
____ Greater White-fronted Goose n
____ Emperor Goose ons
____ Brant n
____ Canada Goose (Aleutian) nw

DUCKS

____ •Green-winged Teal (Aleutian) nw
____ XFalcated Teal nw
____ •Mallard nw
____ XSpot-billed Duck nw
____ •Northern Pintail nw
____ XGarganey n
____ Blue-winged Teal n
____ Northern Shoveler n
____ Gadwall nw
____ XEurasian Wigeon nw
____ American Wigeon nw
____ XCommon Pochard nw
____ Canvasback nw
____ Ring-necked Duck w
____ XTufted Duck nw
____ •Greater Scaup nw
____ Lesser Scaup w
____ •Common Eider n
____ King Eider n
____ Steller's Eider n
____ Harlequin Duck ns

Harlequin Duck

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

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

____ Barrow's Goldeneye n
____ Bufflehead nw
____ XSmew nw
____ Hooded Merganser w
____ Common Merganser nw
____ •Red-breasted Merganser nw

EAGLES, HAWKS & FALCONS

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

Peregrine Falcon

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

GAME BIRDS

____ •Rock Ptarmigan ta
____ Sandhill Crane t

PLOVERS

____ Black-bellied Plover b
____ Lesser Golden-Plover bt
____ XMongolian Plover b
____ XCommon Ringed Plover b
____ •Semipalmated Plover w

SHOREBIRDS

____ •Black Oystercatcher s
____ Greater Yellowlegs b
____ Lesser Yellowlegs b
____ XSpotted Redshank b
____ XWood Sandpiper b
____ Wandering Tattler nbs

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

____ XGray-tailed Tattler b
____ XCommon Sandpiper b
____ Whimbrel b
____ Bristle-thighed Curlew b
____ XFar Eastern Curlew b
____ XBlack-tailed Godwit b
____ Bar-tailed Godwit b
____ Ruddy Turnstone bs
____ XGreat Knot b
____ Red Knot b
____ Sanderling b
____ Western Sandpiper b
____ XRufous-necked Stint b
____ XLong-toed Stint b
____ Least Sandpiper b
____ Baird's Sandpiper b
____ Pectoral Sandpiper b
____ XSharp-tailed Sandpiper b
____ •Rock Sandpiper bst
____ Dunlin b
____ XBroad-billed Sandpiper b
____ XRuff b
____ Long-billed Dowitcher b
____ XPin-tailed Snipe w
____ •Red-necked Phalarope nw
____ Red Phalarope n

JAEGERS

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

GULLS & TERNS

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