IZEMBEK NATIONAL WILDLIFE REFUGE

COLD BAY, ALASKA

1993 Annual Narrative Report

Izembek, Unimak, and Pavlof Units

IZEMBEK NATIONAL WILDLIFE REFUGE

Including
Izembek, Unimak and Pavlof Units

Cold Bay, Alaska 99571

ANNUAL NARRATIVE REPORT

Calendar Year 1993

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

REVIEW AND APPROVALS

IZEMBEK NATIONAL WILDLIFE REFUGE

Cold Bay, Alaska

ANNUAL NARRATIVE REPORT

Calendar Year 1993

Fred Zeillemaker — 4/14/94
Refuge Manager — Date

[signature] — 3/30/94
Associate Manager — Date

[signature] — 4/1/94
Regional Office Approval — Date

INTRODUCTION

A December 1960 Public Land Order established the 415,000 acre Izembek National Wildlife Range including Izembek Lagoon and its entire watershed near the tip of the Alaska Peninsula as "a refuge, breeding ground, and management area for all forms of wildlife." Through the Alaska Submerged Lands Act (Public Law 100-395), about 95,300 acres of the refuge including Izembek Lagoon were determined to be state lands and the lagoon was designated the Izembek State Game Refuge in 1972. The December 1980 Alaska National Interest Lands Conservation Act (ANILCA, Public Law 96-487) redesignated the range a National Wildlife Refuge containing the 303,094 acre watershed surrounding Izembek Lagoon, redefined refuge purposes and designated a 300,000 acre wilderness. The federal and state refuges were designated a "Wetland of International Importance" in 1986 by the Convention on Wetlands of International Importance (commonly referred to as Ramsar after the Iranian city in which it was enacted in 1971). The goal of Ramsar is to reduce the global loss and degradation of wetlands and to protect their ecological character. Izembek habitat consists of berry producing low growing bush tundra interspersed with numerous lakes, ponds and streams; thickets of alder brush in discrete zones and in riparian areas; coastal marshes; and barren glacier topped mountains. Dominant plants include crowberry, grass, sedge, cottongrass, moss, alder and willow. Eelgrass dominates lagoon habitats and is critical to staging waterfowl, including the entire fall population of Pacific brant. Elevations range from sea level to the 6,000 foot summit of Frosty Peak.

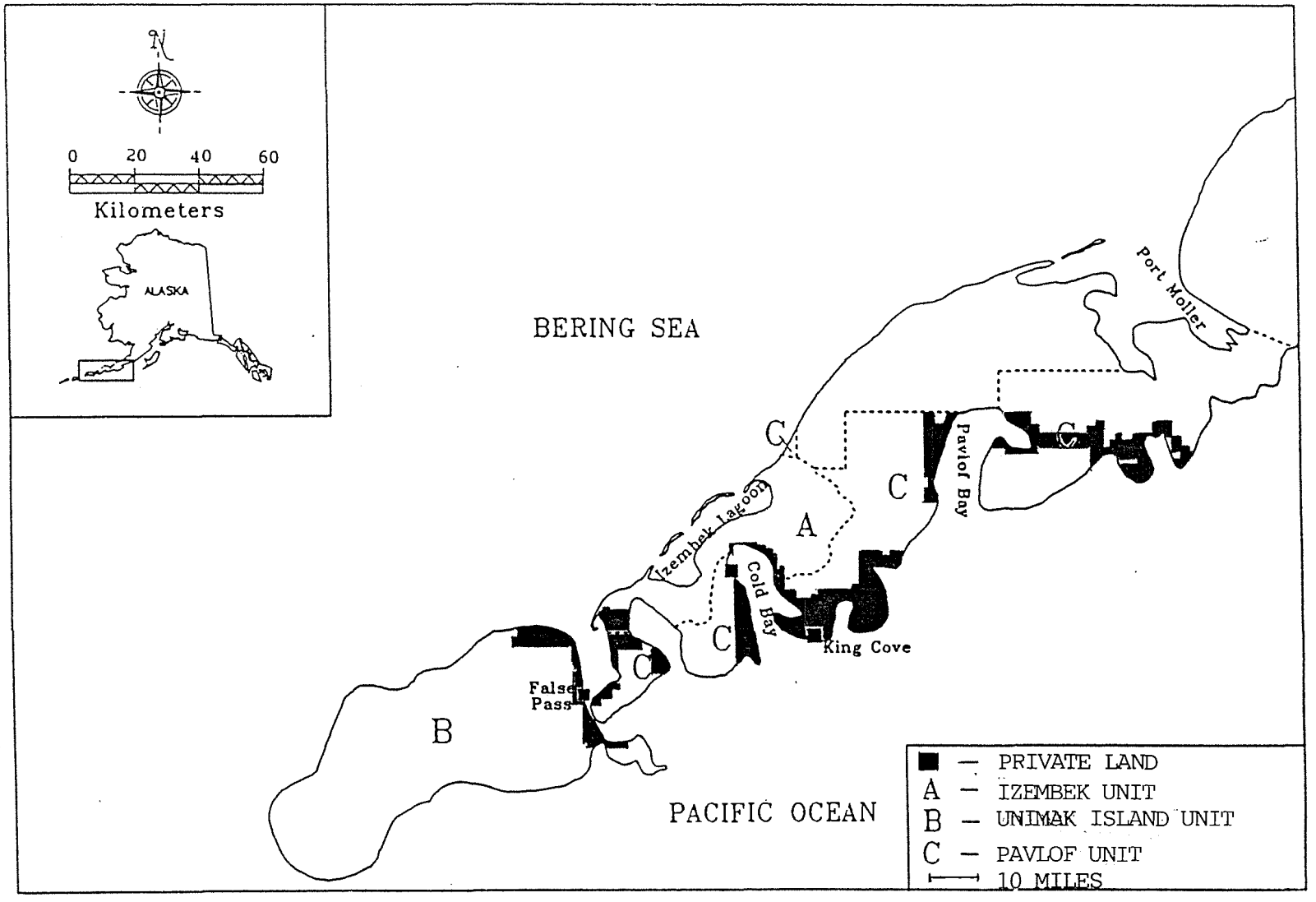
Visitor Center Wall Map of Izembek Unit, Izembek NWR
25 February 1993 CFZ

Refuge headquarters are located at Cold Bay, a small community (148 people in 1990 census, but fewer than 120 by late 1993) adjacent to the refuge and inhabited largely by transient federal and state government employees and their families. The community is rather unique among lower Peninsula villages in that it lacks a fishing industry or a native Alaskan presence. Cold Bay was first settled in recent times just prior to World War II. In excess of 20,000 troops were stationed at what was then called Fort Randall during World War II (evidence of that presence is still apparent on the landscape). Cold Bay is served from Anchorage by two regional airlines and serves as the air transportation hub for three other local villages.

The 978,574 acre Unimak Island, currently a component of the Alaska Maritime National Wildlife Refuge, has been historically administered by the Izembek Refuge staff due to logistics and the fact that the habitat and physiography of the island are very similar to that of the lower Peninsula. Several volcanos, some active, dominate the island's landscape with elevations of the island ranging from sea level to the 9,372 foot summit of active Shishaldin Volcano. Extensive fairly recent lava flows dominate portions of the island and Shishaldin Volcano is a designated National Historic Landmark, as its nearly perfect cone has guided seamen since the days of Russian explorers and undoubtedly the Aleuts before them. About 46,000 acres has been selected or interim conveyed to Alaska regional and village native corporations under the 1971 Alaska Native Claims Settlement Act (ANCSA). False Pass, a fishing village of about 68 people at the eastern end of the island, is the only settlement. Two small military installations on the west end of the island were abandoned prior to 1980. ANILCA designated a 910,000 acre wilderness on Unimak Island.

The 1,500,000 acre Pavlof Unit, currently a component of the Alaska Peninsula National Wildlife Refuge, has been administered by the Izembek Refuge staff since establishment in 1980. The Alaska Peninsula National Wildlife Refuge was created by ANILCA with the Pavlof Unit encompassing the south side of the Alaska Peninsula from Port Moller to the tip of the Alaska Peninsula. Some of the unit's boundary is contiguous with the Izembek Refuge boundary. Terrain of the unit is dominated by volcanic peaks and other mountains that form the "backbone" of the Alaska Peninsula and end abruptly at the Pacific Ocean in rugged cliffs. Elevations of the unit range from sea level to the 8,300 foot summit of active Pavlof Volcano. Nearly seventy-five percent of the Pavlof Unit has been selected or interim conveyed to Alaska regional and village native corporations under ANCSA. The ultimate refuge land holdings in the unit are projected to be about 415,000 acres. King Cove, with a population of more than 650, is the only community within the Pavlof Unit. The village economy is based on commercial fishing and a related canning industry.

An effort to officially incorporate the Unimak Unit and the Pavlof Unit into Izembek Refuge has been underway since 1990. The change is expected to be accomplished through the annually pending Alaska Omnibus Act, but the legislation has failed to work its way completely through Congress to date.



Location of the Izembek National Wildlife Refuge, the Pavlof Unit, and Unimak Island.

INTRODUCTION Page

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G. WILDLIFE

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L. INFORMATION PACKET

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Lower Russell Creek just off the Refuge with Frosty Peak
20 June 1993 CFZ

A. HIGHLIGHTS

- ✓ A record seven wildlife and wildlands research projects were hosted by the refuge in 1993 (Section D.5)
- ✓ Permanent staff instability returned in 1993 as the Administrative Technician resigned and the assistant refuge manager position evolved into an intermittent schedule (Section E.1)
- ✓ In April the Alaska Board of Game passed a regulation to prohibit aircraft landings on portions of the Izembek Unit (Section E.8)
- ✓ Another bird species and another mammal species were added to the refuge lists during the year (Section G.1)
- ✓ The refuge wintering swan population exceeded 400 birds for the first time in the current decade (Section G.3)
- ✓ A record 13,221 Pacific brant spent the winter on the refuge and surrounding area (Section G.3)
- ✓ The 13th consecutive statewide spring emperor goose survey indicated a continuing lack of population increase (Section G.3)
- ✓ Over 98,000 "Category 1" Steller's eiders were counted at Izembek Refuge and Nelson Lagoon in November (Section G.3)
- ✓ Two Neotropical migratory songbird projects were successfully initiated in June (Section G.7)
- ✓ The Southern Alaska Peninsula Caribou Herd population dropped below 2,500 animals, requiring emergency Alaska Department of Fish and Game and Federal Subsistence Board closure of all hunting (Section G.8 and Section H.8)
- ✓ A record 7,136 Steller's eiders were captured for banding between 25 August and 2 October at Cape Glazenap, Neumann Island and Blaine Point (Section G.16)
- ✓ Twenty-three brown bears were sealed by refuge staff during the fall hunting season (Section H.8)
- ✓ Refuge public use roadside maintenance was performed by refuge staff for the first time through the use of a "brushwhacking" attachment to the front-end loader/backhoe (Section I.3)
- ✓ The refuge staff hosted Russian refuge system staff in July and our Refuge Manager visited the Kronotskiy Nature Reserve on the Kamchatka Peninsula in September (Section J.1)

B. CLIMATIC CONDITIONS

Climatic conditions of the southern Alaska Peninsula are typically dominated by low cloud cover, persistent light precipitation, and seemingly incessant winds. Annually about 304 days can be classified as cloudy (80-100% cloud cover averaged each hour of daylight), 49 days as partly cloudy (40-70% cloud cover), and 12 days as clear (0-30% cloud cover) by the National Weather Service. Precipitation averages about 35" annually, primarily being received as light rain. Measurable precipitation (≥.01") falls two out of every three days on average. Daily winds average 17 mph with sustained blows exceeding 45 mph being common each month.

Area temperatures are mild by Alaska standards in both summer and winter due to the moderating effect of surrounding maritime waters. Summer temperatures rarely reach 70° F and often remain in the fifties during days and nights. Winter high temperatures vary considerably depending on the magnitude and direction of travel of the low pressure cells which typically dominate the area's weather. Mid-winter high temperatures range from the single digits to the fifties. Typically, wintertime temperatures range from 25-35° F day and night. The all-time Cold Bay extremes are +78° F and -13° F.

Some say there is no normal weather conditions here, just average conditions. If that is the case, 1993 was notably warmer and wetter than the average year (Table 1). The wetness was important to numerous refuge lakes with permeable bottoms. Barren shorelines diminished considerably throughout the year. There were six clear days (two each in February and March, one each in January and November), 49 partly cloudy days (range three to eight), and 310 cloudy days during the year. The combined 256 days with measurable precipitation and 72 days with a trace of moisture indicated only 37 days were completely dry.

Table 1. Weather Summary for Cold Bay, Alaska, 1993.

	TEMPERATURE (°F)			PRECIPITATION (INCHES)			WINDS (MPH)			
Month	High	Low	Aver.(Deviat'n)	Amnt.(Deviat'n)	#Days(>.01)	Snow	Average	1-Minute*	Gust	Dir.
January	51	-4	27.0 (-1.6)	5.32 (+2.48)	21	6.8	19.7	58	74	SE
February	43	-1	31.1 (+3.7)	3.04 (+0.77)	21	8.6	19.0	49	61	SE
March	43	18	33.1 (+3.2)	1.85 (-0.31)	17	2.3	16.4	43	56	E
April	52	25	37.4 (+4.1)	3.98 (+2.01)	19	2.6	12.4	53	69	SE
May	61	29	41.9 (+2.3)	2.63 (+0.34)	20	T	16.9	47	60	SE
June	64	37	47.2 (+1.5)	3.64 (+1.54)	18		13.8	48	69	SE
July	64	42	52.0 (+1.5)	2.03 (-0.49)	17		16.1	46	55	SE
August	65	42	52.7 (+1.2)	4.94 (+1.70)	24		18.1	46	58	SE
September	58	33	49.0 (+1.3)	5.86 (+1.45)	22	T	16.4	41	55	SE
October	54	28	42.2 (+2.6)	4.48 (+0.14)	25	T	15.0	51	64	SE
November	55	24	38.2 (+3.8)	6.79 (+2.60)	26	5.9	17.3	55	75	SE
December	42	16	31.7 (+0.7)	4.28 (+0.61)	26	16.0	16.8	41	51	SE
Yrly Ave/Totl	45.0	35.6	40.3 (+2.0)	48.84(+12.84)	256	42.2	16.5	58	75	SE

* Greatest sustained wind for a 1-minute period.

C. LAND ACQUISITION

1. Fee Title

Two excess Federal Aviation Administration parcels totalling about 1,300 acres have been available to the Service since 1991. Due to a perception that a small brick World War II incinerator building on the 25 acre parcel could pose a pollution source, the transfer has not been supported by the Service. Transfer of the former U.S. Air Force (USAF) radar site at Grant Point is also pending final cleanup of various materials and a determination of water quality in several sink holes that have developed in the fill covering facility remnants.

D. PLANNING

1. Master Plan

The Izembek National Wildlife Refuge (NWR) Comprehensive Conservation Plan (CCP), mandated by the Alaska National Interest Lands Conservation Act (ANILCA), was completed in 1985. The Izembek Unit is managed under that plan, but the Unimak Unit is managed under the Alaska Maritime NWR CCP and the Pavlof Unit is managed under the Alaska Peninsula NWR CCP. An effort to combine the appropriate portions of the three plans into a single Izembek NWR CCP has been on hold since 1992. Officially incorporating the Unimak and Pavlof units into the Izembek NWR through legislation once again awaited Congressional action as the year ended.

2. Management Plan

The proposed Southern Alaska Peninsula Caribou Herd Management Plan was not completed in 1993 as expected. A final draft was widely distributed in late 1992, but a lack of refuge staff resources, tardy responses by reviewers, and outside pressure resulted in a 1994 reschedule of the final product.

The Izembek NWR Fisheries Management Plan, begun in 1985, became active again in 1993 and a final draft was circulated in September. The completed plan is expected in early 1994.

5. Research and Investigations

Refuge personnel are routinely involved in a number of investigations and surveys which many refer to as "little r" research. Results of studies, surveys and everyday investigations are summarized under the appropriate headings in Section G Wildlife. Details of each refuge survey program are included in the individual annual project reports.

Summaries of this year's "Big R" studies conducted at least in part by the staffs of other offices follow:

Izembek NR83-1 "Autumn Staging Ecology of Russian, Canadian and Alaskan Pacific Brant at Izembek Lagoon, Alaska"

Staff of the National Biological Survey (NBS)/Alaska Fish and Wildlife Research Center (AFWRC) continued fall brant work at Izembek Lagoon. Efforts included observing and reading color tarsus bands from various colonies to determine arrival dates, departure dates, and diurnal movements within the lagoon. These observations will hopefully also be of use in estimating survival rates. Participants also made extensive contributions to refuge staff efforts to collect annual brant and emperor goose production data and provided numerous incidental observations of all bird species using the lagoon. See also Section G.3 Waterfowl.

Izembek NR83-2 "Survival and Migration Ecology of Emperor Geese along the Alaska Peninsula"

Refuge staff contributed various aspects of this project dealing with population size, migratory phenology, and annual productivity. Cooperators include the Migratory Bird Management (MBM) in Anchorage, MBM-Fairbanks, MBM-Juneau, and Alaska Peninsula/Becharof NWR staffs. Various cooperators contributed aerial surveys in the spring (April and May) and fall (October) to obtain the required data. Other efforts produced productivity data in September and October. Refuge staff counted emperor geese during all aerial surveys from fall through spring. See also Section G.3 Waterfowl.

Izembek NR90-1 "Range Ecology and Population Limitation of the Southern Alaska Peninsula Caribou Herd"

Field work for the cooperative investigation of the continuing decline of the Southern Alaska Peninsula Caribou Herd (SAPCH) was completed in 1993. Under the Izembek NWR, Alaska Department of Fish and Game (ADF&G), and Alaska Cooperative Fish and Wildlife Research Unit (ACFWRU) agreement, Eric Post, principal investigator under the direction of Dr. David Klein, returned to campus from the refuge 15 April to begin preparation of his thesis, but ended up taking a leave of absence until 1994. The final report was originally scheduled to be available in December 1994, but is expected to be delayed. See also Section G.8 Game Mammals.

Izembek NR93-1 "Population Demographics and Survival of Steller's Eider Based on Banding of Molting Birds at Izembek Lagoon"

A multi-year NBS/AFWRC and the refuge staff project to evaluate the status and trends in the Steller's eider population begun in 1993. Data necessary for these evaluations come from an expanded banding program initiated by refuge staff more than 30 years ago and from aerial surveys performed by refuge staff and cooperators. Fourteen banding drives resulted in over 7,000 captures, including nearly 1,000 recaptures. The data gathered over the next three years will be used to estimate survival and productivity rates. Concurrent aerial surveys during the molting period will help estimate population composition and allow assessment population size and habitat use during fall, winter and spring. See also Section G.3 Waterfowl and Section G.16 Marking and Banding.

Izembek NR93-2 "Evaluation of Izembek Lagoon as a Potential Western Hemisphere Shorebird Network Site"

AFWRC personnel conducted numerous ground and several bi-weekly aerial shorebird surveys of Izembek Lagoon from July to October. The effort will determine species composition, quantify numbers, and delineate seasonal occurrence of shorebirds using the lagoon. Results were pending as the year ended. Indications are that the lagoon will not qualify as a hemispheric reserve, but will qualify as a regional reserve.

Izembek NR93-3 "Harvest of Coho Salmon and Steelhead Trout in Fall Sport Fishery, Russell Creek, Alaska"

King Salmon Fishery Resource Office (KSFRO) personnel conducted a creel census of the lower Russell Creek sport fishery from late August to early November to estimate the angler effort and harvest of adult coho (silver) salmon and steelhead. In addition, they conducted a mark/recapture study of the coho population to estimate the population size and determine the exploitation rate of the sport fishery. The fall run of Russell Creek coho has been a mix of wild and hatchery-produced fish. Increased fishing effort for hatchery cohos caused concern about the conservation of the wild coho stock. There was also concern that the coho fishery has increased the harvest on the small steelhead population in the stream. Results were pending as the year ended.

Izembek NR93-4 "Coastal Habitat Classification of Izembek National Wildlife Refuge, Alaska"

A field survey by Region 7 Resource Support staff, headed by Steve Talbot, to record the floristic composition and structure of plant communities of the refuge in a variety of major coastal types within Izembek Refuge, to classify the coastal vegetation into types on an ecosystem basis, to document plant species zonation and correlate zonation with gradients in the environment, relate coastal plant community types and their associated environmental variables, and establish representative study sites to be used as ground reference data for aerial photointerpretation. Products received by the end of the year included a collection of 640 vascular plant specimens, about 1300 moss (bryophyte) specimens, and over 500 lichen specimens. The "very preliminary" vascular plant list totalled more than 276 species, the also "very preliminary" bryophyte list totalled 241 species and the "preliminary" lichen list totalled 168 taxa. See also Section G.14 Scientific Collections.

E. ADMINISTRATION

1. Personnel

Refuge Manager Fred Zeillemaker
04 September 1993 Melly Zeillemaker

Deputy Refuge Manager Mark Chase
27 July 1992 CFZ

Wildlife Biologist/Pilot Chris Dau
16 January 1993 CFZ

Maintenance Worker Bob Schulmeister
15 June 1993 MAC

Biological Technician Lisa Krajcirik
01 August 1993 CFZ

1993 Staff

1.	C. Fred Zeillemaker	Refuge Manager GS-0485-12, PFT	11/17/91-Present
2.	Mark A. Chase	Deputy Refuge Manager GS-0485-11, PFT	05/07/89-Present
3.	Julie E. Chase	Assist.Refuge Manager GS-0485-7, PI	10/07/90-Present
4.	Christian P. Dau	Wildlife Biologist/Pilot GS-0486-12, PFT	01/30/81-Present
5.	Natalie J. Schlichten	Administrative Technician GS-0303-5, PFT	Resigned 07/10/93
6.	Robert P. Schulmeister	Maintenance Worker WG-4749-8, PFT	02/10/91-Present
7.	Lisa M. Krajcirik	Biological Technician GS-0404-7, TFT	05/16/93-09/25/93
8.	Britt J. Ford	Biological Technician GS-0404-5, TFT	06/01/93-06/14/93

9. Rob Barto	Refuge LE Officer GS-1802-5, TFT	09/15/93-11/01/93
10. Bill Ambridge	Painter Worker WG-4102-5, TFT	07/25/93-09/19/93
11. John Mach	Painter Worker WG-4102-5, TFT	07/25/93-11/07/93

Assistant Refuge Manager (ARM) Julie Chase resumed intermittent duty a few months after the February birth of her baby. Due to the lack of day care services here, she does not anticipate returning to full time status.

Natalie Schlichten, our Administrative Technician (AT), was only able to stay with us eleven months before having to resign due to the health needs of her son that could not be met in a community without a doctor, let alone a specialist. She relocated to the Seattle, Washington, area.

Two seasonal biological technicians were hired to conduct Neotropical songbird banding projects and other biological duties. Lisa Krajcirik exceeded expectations, which resulted in a highly successful program despite the fact that the second position was vacated after one pay period due to various factors including the starkness of the local environment.

We once again arranged for seasonal law enforcement officer Rob Barto to be detailed to Izembek NWR after his appointment at Kenai NWR was completed on 15 September. His continual presence afield through most of the high public use season was very helpful.

Due to a multiple page list of backlogged maintenance tasks, we sought a seasonal maintenance assistant. Two applicants were so closely qualified that both were hired. Many important projects were completed as a result. The Izembek NWR five year staffing summary is indicated in Table 2.

Table 2. Izembek NWR five Year Staffing Pattern, 1989-1993.

	PFT	PPT	PI	Temporary	Total FTE's
FY-1990	5	-	-	-	5
FY-1991	5	-	1	2 (YCC)	5.5
FY-1992	6	-	-	3 (YCC, LE)	6.0
FY-1993	5(4)	-	1	5 (BT, LE, MW)	6.0
FY-1994	6(5)	-	1	4 (BT, LE, MW)	6.0

4. Volunteer Program

The Izembek NWR volunteer program is typically limited to one or two local residents each year, usually spouses of refuge employees. Although we invariably have plenty of work to keep a volunteer busy year-round, the logistics of travel and lodging precludes the use of non-local people. Melly Zeillemaker, wife of Refuge Manager (RM) Zeillemaker, assisted in swan banding, wildflower photography, shorebird transect surveys,

Neotropical Migratory Bird (NTMB) banding, the Christmas Bird Count (CBC) and other wildlife surveys during the first half of the year (she took a job in July). Jens and Niels Dau, sons of Wildlife Biologist/Pilot (WB/P) Dau, ably assisted with swan banding in July.

5. Funding

Fiscal year 1994 operations and wildlife project funding looked pretty good after negotiations in November. As the year progressed, however, we learned that numerous reductions appeared in the final cut. The year will bring additional challenges, but somehow we always manage to pull it off (probably sending the wrong signal). The Maintenance Management System (MMS) funds this fiscal year will provide for a long overdue safety related rehabilitation of the refuge headquarters building. A five year refuge funding summary is indicated in Table 3.

Table 3. Izembek NWR five year funding summary, fiscal years 1990-1994.

($x000)	1260 (-MMS)	1260 MMS	1230	1260 Subsist	1411	(8610)	TOTALS*
FY-1990	424	(4)	0	0	0	(47)	424
FY-1991	504	(76)	0	0	0	(33)	504
FY-1992	477	(37)	1.5	18	2	(20)	498.5
FY-1993	517	(84)	7	5	0	(14)	529
FY-1994	472	(250)	7	5	0	(29)	484

* - Totals exclude MMS and 8610 (quarters maintenance) funds

6. Safety

No lost time accidents occurred in 1993. Staff safety meetings were conducted periodically throughout the year as staff was available. Topics included airplane safety, fire safety, winter driving, and earthquake safety. All staff was certified in bear and boating safety per regional policy prior to the field system. Safety Officer Mark Chase attended OSHA safety training at Fort Richardson (Anchorage) in March. Deputy Refuge Manager (DRM) Chase, WB/P Dau, AT Schlichten, and MW Schulmeister became certified rabies vaccinators under a program sponsored by the Alaska state government throughout rural Alaska where rabies is always of concern. DRM Chase (a student) and MW Schulmeister (an instructor) also attended a watercraft safety "train the trainer" session at Homer. The course was excellent, especially due to the two days of hands on boat operation training in the marine and riverine environments.

8. Other Items

Refuge Review

Assistant Regional Director/Refuge and Wildlife Rowan Gould and Deputy Associate Manager-Staff Art Wemmerus conducted an annual refuge review 07-9 September. We believe the visit was very productive, but a report had not been received by the end of the year. Both "inspectors" also provided assistance for a major Steller's eider banding effort on Izembek Lagoon.

Special Regulations
A incident occurred in 1992 that destabilized the aircraft access ban promoted through the refuge's 1985 CCP. An uninformed pilot landed in a perceived no-landing area and blew the lid off the fact that no refuge regulations have been in place since being abolished by ANILCA in 1980. We eventually soothed the anger of all our bear guides (we had held the restriction on them through the years) and, after realizing that the Service would not propose refuge regulations, proposed a state managed "Controlled Use Area" regulation for Right-Hand and Left-Hand valleys of the Izembek Unit to the Alaska Board of Game. The Board approved the regulation in April and there were no known violations or conflicts during the fall 1993 bear season.

Annual review: Art Wemmerus, Rowan Gould and John Pearce (AFWRC)
08 September 1993 CFZ

F. HABITAT MANAGEMENT

1. General

Protection of natural habitat (ecosystem) integrity is the management strategy of this station. The areas administered from the Cold Bay office are wilderness in the adjective sense, with a large portion also being wilderness in the legal sense. For these reasons, active management in conventional terms (e.g., water level manipulations, farming, etc.) is not appropriate to meet refuge goals and objectives. Instead, habitat integrity is maintained primarily through the management of human

activities on the refuge and the monitoring of biodiversity. To date, demands have concentrated on the fisheries and wildlife resources rather than habitat resources (e.g., mining or oil/gas development).

Of the three refuge units (see map in INTRODUCTION section), most management challenges have resulted from the confounding land status along the lower Alaska Peninsula brought about by Alaska Native Claims Settlement Act and ANILCA. Native and state selections and conveyances have been particularly widespread in the Pavlof Unit. Though specific land development plans by the villages and corporations are not known, they will surely center on economic return for the shareholders. Roads, harbors, canneries, gravel mining and hydro-electric development have all been mentioned as potential uses. Increased development adjacent to the refuge will surely place additional demands on the refuge itself. Fortunately, most of the Izembek and Unimak units are designated wilderness.

"Mirror" Pond and Frosty Peak in the Izembek Wilderness
11 July 1993 CFZ

2. Wetlands

The premier wetlands of the lower Alaska Peninsula are Izembek Lagoon and associated habitats. Nearly the entire Pacific brant population stages on the lagoon each fall to fatten up on eelgrass prior to migrating south to winter haunts in Mexico. The lagoon also hosts significant numbers of Canada geese, emperor geese, Steller's eiders, a small semi-migratory population of tundra swans, a variety of other ducks, a variety of shorebirds, sea otters and harbor seals throughout the year. Each fall a

variety of species seek out Izembek Lagoon and other refuge wetlands for the abundant food resources necessary to build fat reserves required for the arduous southward migration and/or long winter season. The eelgrass beds within the lagoon are probably the largest of their kind in the world. Izembek Lagoon eelgrass is estimated to produce and export (in the form of detached plants) 166,000 metric tons of carbon, 7,400 metric tons of nitrogen and 1,660 metric tons of phosphorous to the Bering Sea each year.

Through its attraction to hundreds of thousands of waterfowl from both sides of the Pacific, contributions to the Bering Sea food web, and its contributions to the international commercial fishing industry, Izembek Lagoon truly is a "Wetland of International Importance" and was so recognized in 1986. Although Izembek Lagoon and other local lagoon systems are the wetlands of primary concern, the variety of other refuge wetland types are important as well. Excluding the lagoon, Izembek is nearly 87% wetlands. Approximately 61% of the Izembek Unit is berry producing low growing bush tundra; 19% is ponds, lakes and streams; and 7% is grass/sedge marsh. These associated wetlands are critical to the health of the lagoon through their contributions to the quality of water entering the lagoon. The Pavlof and Unimak units contain substantially smaller proportions of wetlands, since the terrain of those areas is dominated by mountains. Their important wetlands are riverine and lagoon systems with associated grass/sedge meadows. As with the Izembek Unit, "management" is through preservation of the natural ecosystems.

6. Other Habitats

Tundra

For yet another year the USAF did not complete water sampling and/or take corrective action at Grant Point (Izembek Unit) where suspected contaminants have been observed in the past. Letters received from the U. S. Army Corps of Engineers in February and September indicate that site cleanup of former Department of Defense installations at Scotch Cap and Cape Sarichef (Unimak Unit) is scheduled for some time in fiscal year 1995.

12. Wilderness and Special Areas

Large portions of the Izembek Unit (300,000 acres) and the Unimak Unit (910,000 acres) are designated wilderness. The non-designated portions of all three refuge units are also "managed" as wilderness. There have not been any serious threats to lands designated wilderness or otherwise to date. There are several areas within the Pavlof Unit that meet wilderness criteria and are contiguous with the Izembek Wilderness. One area includes Pavlof Volcano and the surrounding uplands which are important brown bear denning areas. Designation procedures will be initiated as soon as all ownership conveyances are complete and current conveyances are finalized.

American Bay and much of the Pavlof Unit is of wilderness quality
23 June 1993 MAC

G. WILDLIFE

1. Wildlife Diversity

There have been 183 species of birds and 30 species of mammals recorded on or adjacent to the three Izembek Refuge units. At least 41 species of fish have also been documented, with most being marine for at least some part of their lives. Species added to the lists in 1993 included the bristle-thighed curlew, marbled godwit, Baird's sandpiper, long-billed dowitcher, unidentified hummingbird (most likely rufous), and Baird's beaked whale.

2. Endangered Species

The threatened Aleutian Canada goose was verified at Izembek Refuge in 1987 and the arctic peregrine falcon was verified in 1992. Neither form was recorded in 1993. The U.S. Fish and Wildlife Service (Service) classified the Steller's eider as a "Category 1" species (threatened species status warranted, but precluded from listing at the time by higher listing priorities) in 1992. Izembek NWR is a major wintering site for Steller's eiders.

3. Waterfowl

Izembek Refuge supports an abundance of waterfowl in species diversity as well as total numbers. Most of the "typical" North American species as well as species and populations from the Old World visit the refuge. Eurasian wigeon and common/Aleutian green-winged teal are regular annual visitors. Tufted ducks have also been recorded and a drake smew was observed by nearly all refuge staff in March 1993. Common and king eiders regularly winter on the refuge, but are not ever considered abundant except very locally. In mild winters, common eiders tend to be the most numerous, while in harsh winters (when the south edge of the Bering Sea ice pack approaches the southern end of the Alaska Peninsula), an influx of king eiders occurs. The Steller's eider is the most abundant duck observed at Izembek Refuge throughout the fall and winter. This area may be the center of abundance for the species during those times of the year.

Other sea ducks wintering at Izembek Refuge include white-winged and black scoters, common goldeneye, bufflehead, oldsquaw, greater scaup, harlequin duck, and common and red-breasted mergansers. Far less common are the surf scoter and Barrow's goldeneye. The refuge also supports wintering populations of a few thousand brant and emperor geese. Greater white-fronted geese and snow geese are uncommon visitors during the fall staging period, being most often observed amidst flocks of emperor and Canada geese.

Tundra Swan

Tundra swans are an important and visible component of refuge wetland habitats. An inventory program begun in 1977 using tundra swan as a primary indicator species continues to be our most valuable index of the health and stability of refuge fresh-water wetlands. Surveys include aerial assessments to determine spring population size, distribution, habitat use, nesting density, production and wintering distribution. To facilitate and augment these investigations, numerous swans have been neck collared for individual identification. Visibly marked swans have not only aided our evaluations during the nesting and brood rearing seasons, but have also identified migratory and non-migratory trends in birds from various parts of the refuge.

Historically, the lower Alaska Peninsula population of semi-migratory tundra swans has numbered 500-600 individuals, with most wintering in the Peterson Lagoon area of Unimak Island. It appeared that the summer population on the Unimak Unit was less than 100 individuals even during the population peak. The Izembek Unit contributed another 200-250 birds (242 in 1993), so the historic wintering population likely included birds from adjacent breeding areas on the Pavlof Unit where 500-700 swans spend the summer. The wintering population using Unimak Island has fluctuated between fewer than one hundred birds to over 500 during the past decade due to emigration.

Wintering tundra swans at Unimak Island, unique for Alaska
02 February 1993 CFZ

Annual refuge breeding population surveys were conducted on the Izembek Unit 17 May and on the Pavlof Unit 20, 23 and 29 May. Totals of 242 birds and 25 nests were tallied on the complete survey of the Izembek Unit. Marshlands within six 1:63,360 scale quadrangle maps on and adjacent to the Pavlof Unit comprise the sample for that portion of the refuge and a total of 571 swans and 72 nests were observed. Eight (32%) of the nests found on the Izembek Unit were known to hatch. Six (75%) of the broods produced survived into age classes II or III. Although individual broods were not marked and could not be followed post-fledging, it appears that a minimum of three (38%) of the 1993 broods survived to flight stage.

Tundra swan captures were conducted 16 July at VOR Lake and 21 July at Lake 187. Four (1♂, 3♀) of four molting adults were banded (48; 03, 05, UM) at VOR Lake and seven (3♂, 4♀) of 16 were banded (60, 72, 84; IM, 3P, 7T, 15) at Lake 187. Four birds in these flocks were previously collared on the refuge.

In 1993 (winters of 1992-93 and 1993-94), 12 Izembek Refuge swans were reported wintering in the "Lower 48" states (Oregon and/or Washington) and Canada (Alberta). Tundra swans are found on the refuge throughout the winter with their numbers and distribution determined by the extent of ice cover. Most spend the winter at spring fed lagoons on Unimak Island, however, the population began a dramatic distributional shift in the late 1980's. Many collared birds were found wintering in the Pacific Northwest and even further south, while fewer than 100 (compared to the usual 500-600) remained to winter at Unimak Island. A corresponding decline in the

Izembek Unit nesting population accompanied the change in migratory behavior. These trends slowly reversed and the summer population is now in excess of the long-term average. Wintering numbers on the Unimak Unit followed suit with 426 birds present in early February 1993. Of these, 77 (18%) were hatching year birds (suggesting good recruitment on the Pavlof Unit and possibly the Unimak Unit, as Izembek Unit recruitment was low).

Brant

Essentially the entire Pacific Flyway brant population uses Izembek Refuge for up to three weeks each spring and eight weeks each fall. They breed in arctic Canada, arctic and sub-arctic areas of Alaska, and arctic regions of Russia. The short duration spring staging period is characterized by a gradual influx that includes a direct flight low over the waters of Cold Bay, a brief slightly elevated direct passage over the Alaska Peninsula (refuge lands) between Kinzarof Lagoon and Izembek Lagoon, and a dispersed stopover all across Izembek Lagoon. The process begins in late March or early April, with peak numbers present from the last week of April to mid-May. By mid-May most have departed for northerly breeding grounds. Spring movement is complete by the first week of June. A few rarely remain at Izembek Lagoon into early summer (90 birds on 28 June 1983). Those birds are either non-breeders failing to complete the spring migration or are returning failed breeders undergoing molt, although flightless birds have not been observed.

In spring, brant may begin arriving at Izembek Lagoon from wintering areas in late March. In 1993 the first migrants detected were on 16 April when a "large flock" was heard arriving at night. Small flocks were observed arriving during daylight hours on 17 and 18 April, and a flock of 5,000 was observed at the mouth of the Joshua Green River on 22 April. From 30 April to 5 May the refuge staff cooperated with Migratory Bird Management (MBM) - North in performing an annual Southwestern Alaska Coastal Waterfowl Survey with brant numbers totaling 77,505 (primarily at Izembek Lagoon).

In fall, the first birds normally arrive during the third week of August. The first sighting this year was on 21 August (the 17 year average is 19 August). The population builds to a peak in mid-September and remains at the peak level until departing for wintering areas in late October or early November. The fall migration from Izembek Lagoon is largely en masse under the cover of darkness. After a 55 hour 3,300 mile flight, the birds arrive in coastal Baja California, Mexico. Brant investigations by the refuge staff and NBS/AFWRC and MBM cooperators are primarily directed toward the collection of productivity and population data in the fall. These data are collected through a variety of ground and aerial surveys. Productivity and family group counts have been conducted during the fall here for 31 consecutive years. This year production counts were obtained from 01 September to 21 October, with a total of 135,196 individuals classified to age. Juveniles comprised 23.6 percent (n= 31,942) of the total compared to the long-term average of 22.7 percent. Refuge surveys indicated that 1993 brant productivity was 43 percent above the 1992 level (16.5 percent juveniles) and 4.0 percent above the 31 year average (22.7 percent juveniles). Family group size data are collected here concurrently with

age ratio counts for productivity appraisals. A total of 979 individual families were observed with an average of 2.8 juveniles/family.

As the fall brant staging population at Izembek Lagoon includes birds from Alaskan, Canadian, and Russian breeding areas, our counts provide a representative sample of the entire Pacific Flyway population. Color banding at selected breeding locations is helping qualify the extent of mixing of the population components, their seasonal movements, and fidelity for specific estuaries or parts of estuaries within the Izembek Lagoon complex. More importantly, this extensive marking and resighting effort, organized and performed by NBS/AFWRC staff, will provide the first accurate indicator of age and sex related survival for the various breeding components of the population. In 1993, efforts continued to determine the ratio of dark-bellied (Alaskan and Russian breeders) to light-bellied (Canadian breeders) brant. At Neumann Island, 7.2% of the birds seen in September (n= 6,391) and 17.1% of the birds seen in October (n= 10,274) were light-bellied. At Moffet Point, just east of Neumann Island, light-bellied birds made up 12.6 percent of a sample of 3,949 birds in October. Only one sighting of a light-bellied bird was reported from the large numbers of birds observed in other portions of Izembek Lagoon.

Brant departed Izembek Lagoon for wintering areas on 31 October and 13 November, with fewer than 20,000 leaving on the 31st and approximately 100,000 leaving on the 13th. This year's peak departure of brant was nine days later than the 35 year average of 4 November. On 30 November, 21,249 brant remained in the Izembek Lagoon area. Three aerial surveys of wintering brant at the refuge suggested that at least 13,221 (26 January 1994) did not migrate. Other winter counts were 7,580 (19 January) and 8,942 (15 February). Ice conditions affect the numbers of brant using the survey area in winter, but does not appear to disperse birds out of the greater general area. The demography of the wintering brant population at Izembek Lagoon was investigated for the first time this year (1993/94). A total of 4,962 birds were included in age ratio counts 16-20 February with juveniles comprising 30.6% (n= 1,516). During the same period 44 unique tarsus banded brant, primarily from arctic banding locations, were observed. Higher proportions of juveniles in winter versus our fall inventories (i.e., 23.6%) suggest factors, such as migratory phenology, nutrition, or disturbance, could be affecting the ability of juvenile brant to assimilating the body reserves necessary to perform the strenuous fall migration to Mexico. A similar scenario may be affecting adult brant from the arctic which arrive at Izembek Lagoon later in the fall and hence have a shorter period to assimilate necessary body reserves. We have evidence that adult brant lose approximately 30 percent of their body weight during the fall flight from here to Mexico. Similar data for juveniles are few.

The refuge staff continued to provide assistance to the Pacific Flyway (specifically MBM-Juneau) by monitoring numbers of brant over-wintering in Izembek and adjacent lagoons. Personnel with MBM-Juneau coordinate with Region 1 personnel (at Portland, Oregon) to annually complete the mid-winter waterfowl survey along the west coast of Mexico. Izembek NWR data are important in assessing the distribution and abundance of brant flyway wide. Three aerial surveys were conducted by refuge staff during the

1993/94 mid-winter survey period: 7,580 on 19 January, 13,221 on 26 January, and 8,942 on 15 February. The peak count of 13,221 is the largest number of brant ever observed over-wintering at the refuge. In the past 13 years an average of 6,708 brant (range 2,075-13,221) have over-wintered at Izembek NWR. This contrasts with subjective reports from the 1950's to the 1970's when brant apparently over-wintered only in the hundreds, although people who grew up on Sanak Island 50 miles south of Cold Bay reported that small numbers of brant regularly wintered there in the 1950's and 1960's (the village has since been abandoned).

The January 1994 mid-winter survey count of 116,825 brant south of Alaska (100,265 in Mexico) plus 13,221 at Izembek Refuge gave a total of 130,046 birds, 7.3 percent below the fall average at Izembek. The total was 4.5 percent above last winter's level. The estimated flyway population based on an average of 13 counts during the peak of the fall staging period at Izembek Refuge was 140,291 birds. Interestingly, when the three year running average of mid-winter inventories approached the "stop hunting threshold" of 120,000 birds in 1992/93, the Pacific Flyway Council decided to begin including counts from Izembek Refuge in the mid-winter inventory.

Emperor Goose

Emperor geese transit through the Izembek Lagoon complex each fall and spring, with some birds also overwintering there and elsewhere in the area. The first fall observation of 37 at Moffet Bay (Izembek Lagoon) was on 23 August. MBM-North (Rod King) and Alaska Peninsula NWR (Donna Dewhurst) staff conducted the annual fall southwest Alaska emperor goose survey 23-26 October and tallied 71,051 birds which was used to estimate the composition of the fall population. The fall 1993 population was 13.7 percent below the 1992 fall level of 82,292 birds. The average of 15 counts during the peak fall staging period at Izembek NWR was 3,787 (range 623-5,378). The 1992/93 winter count peaked at 7,871 (16 January 1993) and the 1993/94 winter count peaked at 6,246 (30 November 1993).

Since 1981, Izembek Refuge and MBM-Fairbanks staffs have cooperated in performing an annual spring emperor goose aerial survey of coastal areas from the Yukon-Kuskokwim (Y-K) Delta to Unimak Island, including the north and south sides of the Alaska Peninsula. The 13th consecutive survey was flown 30 April to 5 May 1993. A total of 52,478 emperor geese were observed in the survey area, which decreased the 3-year average to 64,923. Resumption of emperor goose hunting may be considered when the spring population reaches 80,000 birds based on a 3-year moving average. In 1993, the population decreased 26.4 percent based on the spring survey and 13.7 percent based on a similar survey in the fall. The Pacific Flyway Management Plan for emperor geese identifies a population goal of 150,000 birds, which is comparable to historic levels for the fall population. Our only historic indicator of spring population size is 139,000 birds observed during a 1964 survey.

Emperor goose productivity counts were performed this year by Izembek NWR, NBS/AFWRC, and MBM staffs during the period 7 September to 28 October. Combined aerial and ground productivity counts through October in the Izembek area resulted in 16,152 emperors being classified to age, with

2,176 (13.5%) being juveniles. Aerial photographic surveys by MBM staff throughout all fall staging areas along the Alaska Peninsula sampled 5,735 birds with 1,372 (24.2%) being juveniles.

Canada Goose

Taverner's Canada geese are an important component in the fall Izembek Refuge waterfowl concentration. The first 1993 fall arrivals were observed 16 August. Aerial surveys suggested the peak population was in excess of 70,000 birds in October. The average of 12 aerial surveys during the peak fall staging period was 54,156 birds. The Canada goose is the primary species in the hunter's bag here, making up 78.5% of the estimated goose harvest and 60.5% of the total estimated waterfowl take at the refuge in 1993. The adult to juvenile ratio in the hunter harvest based on our bag check data was 2.3:1. Adult males were 61.4% and juvenile males were 39.2% of the respective takes of adults and juveniles. The Canada geese fall departure from the refuge area began during the night 31 October/1 November. The remainder of the population departed on 13 November. Only 50 birds could be found on 16 November.

Steller's Eider

Steller's eiders are the subject of increasing research and investigation by refuge staff and cooperators. The Steller's eider is an obscure species that has received banding and survey emphasis at Izembek Refuge since 1961 and 1975, respectively. In 1992 the Steller's eider was designated a Category 1 species for Threatened status. In 1993 the Service proposed the Alaska breeding population receive official Threatened Species status. The importance of the available historical data, such as that from Izembek Refuge, is now being realized.

In the fall, large numbers of Steller's eiders arrive at Izembek Refuge from arctic breeding areas (primarily in Russia) to molt throughout Izembek and adjacent lagoons. From 1961 to 1992, a total of 7,709 birds were banded on the refuge. In 1993, Izembek staff cooperated with NBS/AFWRC personnel to capture 7,136 (6,180 newly banded in 1993) for banding between 8 September and 2 October. Of those, 209 (2.9 percent) were recaptures from previous years. Bands on 55 recaptured birds were so worn that they could not be read without chemical etching by the Bird Banding Laboratory. The etching was still pending at the end of the year.

The Steller's eider is currently a rare breeding species in Alaska, remaining in small numbers only on the North Slope of the state. The species is totally absent from historical range on the Y-K Delta. The situation is cause for considerable concern, even though the species continues to be common in greatly reduced numbers at spring and fall staging and wintering areas due to the presence of birds from Russia. The Service was finally proceeding with the process of listing the Steller's eider as a Threatened Species (see Section G.2 Endangered Species) as the year ended.

Aerial survey data for Steller's eiders, collected routinely by refuge staff since 1975 and MBM personnel since 1980, suggest a population decline that may be continuing at Izembek Refuge and other staging and wintering

areas in southwest Alaska. In 1993, MBM continued intensified monitoring efforts for spring staging populations in southwest Alaska. Three aerial surveys of the Y-K Delta and Alaska Peninsula indicated population sizes of 88,636 (4-9 April), 77,198 (25-27 April) and 76,857 (3-8 May).

During the year refuge staff completed 17 replicate Steller's eider counts in the Izembek NWR survey area and eight in the Nelson Lagoon survey area (Table 4).

Table 4. Steller's eider aerial survey results, southern Alaska Peninsula,1993.[1]

Izembek Lagoon, St.Catherine Cove (Unimak Island), Hook Bay, Morzhovoi Bay and Kinzarof Lagoon														
16JAN	26FEB	08MAR	24MAR	06APR	06AUG	23AUG	03SEP	17SEP	23SEP	01OCT	15OCT	24OCT	26OCT	28OCT	02NOV	30NOV
32,766	35,830	27,789	38,235	48,679	22,065	1,019	14,984	42,279	47,785	24,370	29,727	30,655	21,172	39,706	35,254	75,992
Nelson Lagoon, Mud Bay (Herendeen Bay) and Kudobin Islands														
	03MAR	12MAR		06APR					22SEP		18OCT		26OCT		01NOV	02DEC
	27,500	16,952		23,297					46,692		25,295		29,179		37,701	22,440
AREA TOTALS																
	63,330	44,741		71,976					94,477		55,022		50,351		72,955	98,432

[1] Observers: 16JAN,26FEB,03MAR,08MAR,06APR,02NOV C.Dau/F.Zeillemaker; 24MAR,03SEP,15OCT,30NOV,02DEC Dau/M.Chase; 12MAR C.Dau/R.Schulmeister; 06AUG,23AUG,03SEP,22SEP,18OCT C.Dau/R.Gill; 23SEP,01OCT C.Dau/D.Ward; 26OCT,28OCT,01NOV C.Dau/J.Mason; 24OCT,26OCT R.King/D.Dewhurst

Other Waterfowl

Izembek Unit waterfowl breeding populations were determined during a 3 June aerial survey. The refuge Supercub was used to sample an estimated 350 mi^2 area of wet marsh habitats through 19 north-south transects (0.25 mile wide) established in 1992. Transect length varied due to the distribution of lowland habitats. North-south transects were established at 1 mile intervals from a random starting point with alternate transects flown. In 1992 transects were divided into one mile increments, but due to the low bird densities encountered, that aspect of the methodology was discontinued in 1993. Individual observations were recorded on portable tape recorders and later totaled for individual transects. A total of 29.0 mi^2 or 8.3% of the total estimated lowland area (350 mi^2) was sampled. The greater scaup was the most abundant species observed in 1993, followed by mallard and black scoter. Mallard numbers had exceeded greater scaup numbers in 1992. Expanded population totals calculated using established visibility ratios indicated 6,530 mallards, 3,779 greater scaup, 1,917 green-winged teal, 1,619 northern pintail, 1,225 black scoters, 330 gadwall, 231 Eurasian wigeon and 39 red-breasted mergansers were present. Estimated greater scaup breeding pair density (2.66/mi^2) was the highest observed, followed by mallard (2.28), and black scoter (1.28). The densities exceeded 1992 levels by 83, 25, and 42 percent, respectively. Northern pintail (0.45), gadwall (0.10) and red-breasted merganser (0.03) were observed in low densities in both 1992 and 1993, with green-winged teal (0.24) and Eurasian wigeon (0.07) being added as potential low density breeders in 1993. Before this survey was begun, little was known about species composition, distribution and abundance of breeding ducks at the refuge. The surveys conducted on the Izembek Unit in 1992 and 1993, and additional efforts planned for 1994, will be used to design an efficient annual monitoring program to estimate duck population composition, number, and trends for the lower Alaska Peninsula.

The Izembek Refuge staff also conducted duck brood surveys to monitor production and provide trend data on lakes in the Izembek Unit known to be important to ducks. Two mallard broods were at Bluebill Lake 13 July, with three mallard broods, two green-winged teal, one northern pintail and one

Oldsquaw, one of 19 "sea duck" species recorded at Izembek Refuge
06 March 1993 CFZ

greater scaup broods being observed there on 9 August. Two mallard and seven greater scaup broods were also recorded at Red Salmon (Lamprey) Lake on 14 July.

Seasonal aerial surveys for geese and eiders also provided other waterfowl numbers for established survey areas on or adjacent to the Izembek, Pavlof and Unimak units of the refuge throughout the year. In total, data for one swan species, four goose species, and 20 duck species are collected during those flights.

4. Marsh and Water Birds

Common and red-throated loons; red-necked and horned grebes; double-crested, pelagic, and red-faced cormorants; and sandhill cranes occur regularly in our area. The annual Breeding Bird Survey (BBS) 15 June, annual CBC 28 December, and almost daily incidental observations provide indices of population trends, production, and habitat use by a variety of unstudied refuge bird species. Common loons and sandhill cranes were encountered during the 1993 BBS. Pacific, common and yellow-billed loons, both grebes, and all three cormorants were found during the 1993 CBC. All noteworthy marsh and water bird observations are reported quarterly to the

Alaska regional coordinator for use in compiling material for American Birds. Therefore, those records for this station considered significant in the context of the entire state are published.

5. Shorebirds, Gulls, Terns and Allied Species

Semipalmated plovers and rock sandpipers are our most common breeding shorebirds. Some rock sandpipers remain through the winter. Shorebirds peak during the fall migration, with a less intensive peak in spring. Extensive refuge inter-tidal flats strewn with detached decaying eelgrass provide ideal shorebird foraging habitat year-round. Through a cooperative effort to evaluate the refuge for nomination to the Western Hemisphere Shorebird Reserve Network, AFWRC biologist Robert Gill and his co-workers conducted extensive and intensive surveys of Izembek Lagoon throughout fall 1993 (see also Section D.5 Research and Investigations). In addition to good numbers of several shorebirds already known to occur on the refuge, they added bristle-thighed curlew, marbled godwit and Baird's sandpiper to the list and confirmed the presence of long-billed dowitcher. Additionally, refuge staff conducted 22 censuses at three Cold Bay area sites accessible from the Cold Bay road system from 10 April to 28 July.

The annual BBS 15 June, annual CBC 28 December, and almost daily incidental observations provide indices of population trends, production, and habitat use by a variety of unstudied refuge bird species. Semipalmated plovers, least sandpipers, rock sandpipers, a short-billed dowitcher, common snipes, mew gulls and glaucous-winged gulls were encountered during the 1993 BBS.

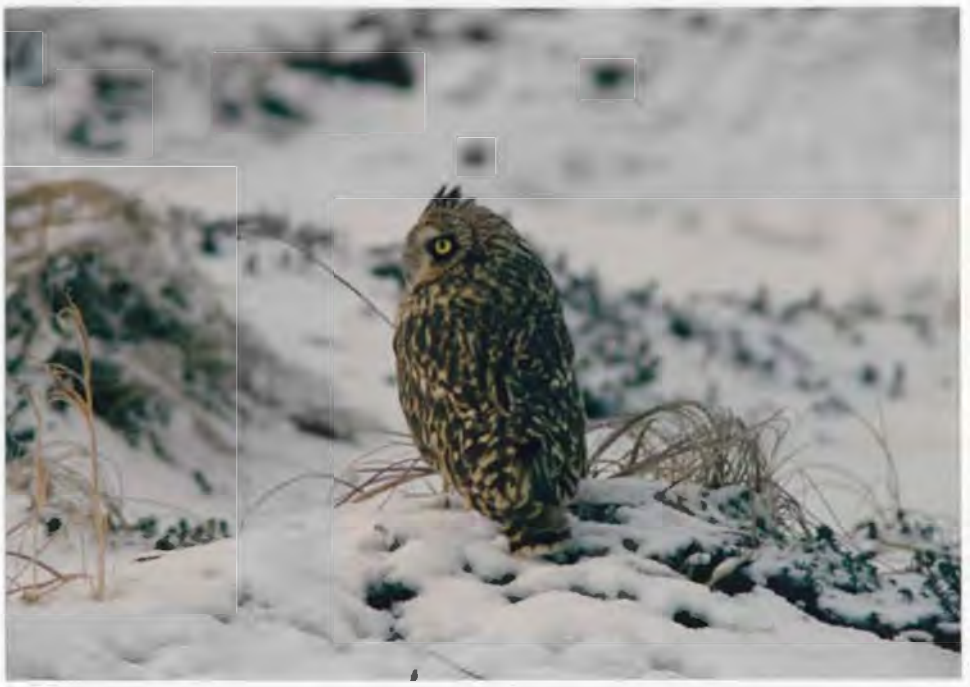
Rock sandpiper with two of three chicks near nest, Frosty Road
10 July 1993 CFZ

Sanderlings, rock sandpipers, glaucous-winged gulls, common murres and pigeon guillemots were found during the 1993 CBC. All charadriiform observations are reported quarterly to the Alaska regional coordinator for use in compiling material for American Birds. Therefore, those records for this station considered significant in the context of the entire state are published.

6. Raptors

Although no specific raptor studies are conducted by refuge staff, known aeries are monitored annually. Bald eagle, rough-legged hawk, golden eagle, gyrfalcon and short-eared owl nests have been recorded in previous years on the refuge. All five species are uncommon and apparently only the bald eagle is a regular breeder. We once again monitored a bald eagle nest near Cold Bay. Both adults were observed feeding three (!) large nestlings at the nest atop a large rock near Frosty Road in mid-July. All three eaglets were banded 16 July.

The annual BBS 15 June, annual CBC 28 December, and almost daily incidental observations provide indices of population trends, production, and habitat use by a variety of unstudied refuge bird species. Bald eagles and short-eared owls were encountered during the 1993 BBS. Bald eagles, gyrfalcons and a snowy owl were found during the 1993 CBC. All raptor observations are reported quarterly to the Alaska regional coordinator for use in compiling material for American Birds. Therefore, those records for this station considered significant in the context of the entire state are published.



Short-eared owl, Mortensen's Road, an unusual mid-winter record
23 December 1993 CFZ

7. Other Migratory Birds

The refuge BBS was rerouted and expanded from 30 stops (not meeting national criteria) to 50 stops (meeting national criteria) and officially conducted after 10 June (to meet regional criteria) in 1993. To allow a possible link with the former route (All former stops were incorporated into the revised route), WB/P Dau and DRM Chase conducted a "practice" BBS on 2 June. WB/P Dau and RM Zeillemaker conducted the official census along 24.5 miles of the Cold Bay road system on 15 June. A total of 28 species and 696 individuals were observed and/or heard. Species detected during the preliminary count, but not official count were red-throated loon, northern shoveler, black-legged kittiwake and red-necked phalarope, but the shoveler and kittiwake do not nest in the count area. The later (official) count did not add any species, but resulted in more representative numbers of nesting songbirds, including neotropical migrant yellow warblers.

Summer and fall projects included Monitoring Avian Productivity and Survivorship (MAPS) and post-breeding banding of NTMB, specifically small landbirds. Details are included in Section G.16 (Marking and Banding). Breeding NTMB's here include bank swallow, yellow warbler, and Wilson's warbler. Orange-crowned warblers are transients.

Bank swallows, Neotropical Migratory Birds, nest commonly on the Refuge
07 June 1993 CFZ

The 1993-1994 (28th) CBC was conducted by RM Zeillemaker, WB/P Dau and Volunteer Zeillemaker 28 December. A total of 7,353 individuals of 41 species (tied the record high) were observed. Three species were observed

on the CBC for the first time (double-crested cormorant, red-faced cormorant and Barrow's goldeneye). A short-eared owl was missed by five days (see Section G.6 Raptors). In addition, eight species observed had record high numbers for the CBC. For the second consecutive year, the record high numbers were thought to be the result of favorable weather and broad vehicle coverage due to the general lack of snow below 100 foot elevation.

Steve and Sandy Talbot, Resource Support, observed a hummingbird on multiple occasions within an hour along Grant Point Road 8 August. A rufous hummingbird was recorded within three weeks in the eastern Aleutian Islands. Almost daily incidental observations also provide indices of population trends, production, and habitat use by a variety of unstudied refuge bird species. Those records, BBS results, and CBC results are reported quarterly to the Alaska regional coordinator for use in compiling material for American Birds. Therefore, those records for this station considered significant in the context of the entire state are published.

8. Game Mammals

Big game species found on units of the Izembek refuge include brown bear, caribou, moose, wolf and wolverine. Of these, moose are rare while wolverine, although fairly common, are the most seldom observed. Moose are regularly seen in low numbers in the eastern portion of the Pavlof Unit where willow (Salix spp.) is common. The taller species of willow preferred by moose are rare on the remainder of the Pavlof Unit or the Izembek and Unimak units. Hence moose do not prefer our area, but one or two are occasionally reported by residents of False Pass, Unimak Island.

Fur bearers hunted on the refuge include arctic ground squirrels, gray wolves, red foxes and wolverines. Coyotes were thought to be slowly pioneering into the area, but it has been a few years since any reports have been received. Red foxes are commonly hunted on the refuge, with most taken by people who are also engaged in trapping activities. There is essentially no harvest of ground squirrels on the refuge, as Aleut people have not traditionally used their pelts for clothing here.

The interest in game mammals on the refuge by both consumptive and non-consumptive users centers primarily on brown bears and caribou. Both species are hunted, with non-resident hunters accounting for most of the bear harvest, while local residents formerly the primary users of caribou. Declining herd size, due to low recruitment and poor survival in the SAPCH, resulted in the closure of the subsistence caribou harvest in 1993.

Brown Bear

Management activities associated with the lower Alaska Peninsula brown bear population in 1993 consisted of aerial surveys of study areas on the Izembek and Unimak Units and continued monitoring of the sport harvest. The sport harvest of brown bears is allowed during the spring in even years and the fall in odd years on the Peninsula. In 1993 the season was 7-21 October (no spring hunt). Annual spring (10-25 May) and fall (1-21 October) seasons are allowed on Unimak Island via drawing permits (15 per

year, 7 in spring and 8 in fall). The Izembek Refuge staff monitors hunter activity on the refuge and surrounding areas. The activity is primarily by commercially guided non-resident hunters. The refuge, in cooperation with ADF&G, is a designated sealing office for brown bears (hide and skull must be sealed prior to transport outside Alaska). A total of 23 brown bears were sealed by the refuge staff in 1993.

Crepuscular aerial surveys (daylight periods when bears are most active) provide an index of population size and productivity on both the Izembek and Unimak units. In 1993, the indicated population size of the Izembek Unit was 30% above the 1992 level and the 1978-1993 average. Similar data for northeast Unimak suggests a population 42% below 1992 and 20% below the 1978-1993 average. A population index was not obtained for the southeast Unimak sample area in 1992, however, the 1993 total of ten bears was 27 percent below the 1976-1991 average. Available survey data indicate considerable annual variability and are only trends that suggest brown bear populations in these remote areas are healthy.

Caribou

The SAPCH has been in steady decline since 1983. The herd ranges primarily from Herendeen and Canoe Bays southwest to the tip of the Alaska Peninsula (Izembek and Pavlof units). The main portion of the herd winters in the Cold Bay area (Izembek Unit), with smaller wintering populations occurring north of Pavlof and Morzhovoi bays. Normally in March and April the herd migrates to calving and summer ranges between the Black Hills and Trader Mountain (Pavlof Unit), while up to 100 animals summer in the Morzhovoi Bay area.

Since a peak of roughly 10,200 animals in 1983, the herd has declined due to poor recruitment and low survival of both calves and adults. Cooperative work by ADF&G and Refuge staff was intensified beginning in 1990 in an effort to more closely monitor population trends and to determine the cause, or causes, of the decline. The low rate of recruitment observed in the SAPCH (average 11%) appears to be due to low survival resulting from poor nutrition in both pregnant cows and their calves and to a lesser extent a combination of predation and hunting mortality. A final draft management plan for the SAPCH was completed by the refuge staff in 1993. When internal comments and those of the ADF&G are incorporated, we believe the document will provide the guidance necessary to manage this herd.

In 1993, the Refuge and ADF&G financed graduate study through the ACFWRU, University of Alaska Fairbanks, was completed. This year's field work was initiated in January and completed in mid-April. Primary emphasis of the study was the relationship between qualitative and quantitative characteristics of range vegetation in the Caribou River flats and Black Hills summer use areas. Data analysis and a final report are in progress.

Aerial radio tracking flights performed by Izembek Refuge and ADF&G staffs determine the distribution and habitat use by collared animals and those in association with them. The percentage of calves in fall and winter is

Caribou numbers fell below the no hunting threshold in 1993
23 December 1993 CFZ

determined to estimate overall survival rates. The timing of calf losses is determined by the monitoring of radio collared cows. Fourteen radio transmitters on female caribou were active in June of 1993 (i.e., post-calving). Six of the marked cows were known to have produced calves. Two of the calves were lost during June and only one still survived in September. By mid-winter 1993/94 two radio marked females had died (150.190, 150.620) and only nine animals were known to be alive.

The first calves of the year were observed on 29 May. Productivity surveys were conducted by the refuge staff on 8 and 23 June to obtain an indication of population size and calf recruitment in the Black Hills/Trader Mountain (BH/TM) and Caribou River/David River (CR/DR) areas. Early in the calving period (8 June) samples of 489 caribou at BH/TM and 142 at CR/DR indicated calf percentages of 7.6 and 21.8, respectively for these two components of the herd. Similar estimates on 23 June for these areas were 9.9 (n=192) and 28.2 (n=39) percent, respectively. Herd components had mixed during a 21-22 October survey by ADF&G with calf compositions of 15.4 (n=76) and 17.1 (n=669), respectively for the BH/TM and CR/DR areas. ADF&G observed approximately 1,500 caribou during this survey and the estimated total herd size may be 2,000 animals. The SAPCH merges to a large extent during the winter in the Cold Bay area where ground counts from 16 November to 3 December suggested calf composition of 11.5 percent (n=157).

The age structure of the hunter harvested animals from 1986-1992, in conjunction with calving rates, was another indicator of the sustained poor recruitment to the SAPCH. Over this period 77% of the reported caribou

harvest was estimated to be of animals five years old or older. The 1990/91 and 1991/92 harvest was restricted to bulls, of which 50% (n=9) and 20 percent (n=2), respectively were five years old or older. Based on late January census information (1,929 animals) and counts conducted in April by ADF&G personnel, the remaining hunting season (a subsistence hunt for residents of the unit) and subsequent hunts were closed.

9. Marine Mammals

Gray whales are common spring and fall migrants in nearshore waters along both the Bering and Pacific sides of the Alaska Peninsula. They prefer shallow water during migration and are occasionally seen in estuaries including Izembek and Nelson lagoons. First spring reports for Cape Sarichef (west end of Unimak Island) have typically occurred during the last week of March and Izembek Lagoon area early reports typically occur during the first week of April, however, this year WB/P Dau and RM Zeillemaker observed eight along the north shore of Unimak Island on the unexpected date of 2 February. Spring migration normally ends by mid-June. Fall migrants are less commonly reported, but that passage may extend well into October or even November.

Sea otters occur in all salt water areas and are common to abundant. Harbor seals are also commonly observed, with small concentrations (usually <50) of hauled out animals frequently occurring in Izembek and Kinzarof lagoons.

Steller (northern) sea lions were observed during the annual winter Unimak Island survey 2 February. Two medium sized orcas (killer whales) were off Saltwater Lagoon 12 March. The Baird's beaked whale was added to the refuge mammal list on 13 October through a beached carcass in Izembek Lagoon. WB/P Dau sent details to the National Marine Fisheries Service.

10. Other Resident Wildlife

Tundra hares were once again observed during the year in alder on the lower seaward (southeastern) slopes of Pavlof Volcano and in alder ½ mile west of First Bridge near and on Frosty Road. The first Arctic ground (parka) squirrel of the year appeared on 16 March and the last sighting of the year was 9 November. Red fox were more evident this year than in recent times. Two successful dens were right at the edge of Cold Bay area roads.

Willow ptarmigan are abundant in the lowlands of the lower Alaska Peninsula and Unimak Island. Rock ptarmigan are uncommon and occur only at higher elevations. Neither species is studied by the refuge staff. Their harvest levels are also not monitored; however, an index to their general abundance is obtained from our annual BBS and from ADF&G collections of subjective impressions of small game abundance from a randomly selected sample of hunters in various geographic areas of the state. Casual observations of broods during the summer and hunter contacts in the fall suggest 1993 was another excellent year for willow ptarmigan production on the lower peninsula. Along with the apparently larger numbers of ptarmigan, high numbers of voles and ground squirrels were also observed in 1993. The

strong numbers are possibly related to a formerly depressed red fox population caused by 1990 and 1992 rabies outbreaks.

Red foxes successfully denned at the edge of Frosty Road
24 July 1993 CFZ

11. Fisheries Resources

Primary resident and anadromous fish species include arctic char, Dolly Varden, pink (humpback) salmon, sockeye (red) salmon, coho (silver) salmon, and chum (dog) salmon, threespine stickleback and, in much smaller numbers, steelhead and chinook (king) salmon. The marine species have been found in Izembek Lagoon and Cold Bay. Although the anadromous fisheries resources are not directly "managed" by the refuge staff, they are of particular interest in that they are an extremely important part of the Izembek Lagoon and Cold Bay drainage food chains, especially for brown bears and bald eagles. KSFRO staff have conducted field work on and near Izembek Refuge in 1985, 1986, 1992 and this year.

14. Scientific Collections

No scientific bird or mammal collections occurred in 1993; however, several specimens were salvaged from beaches, obstacle strikes, or donated by hunters. An American dipper specimen was prepared for display in the office/visitor center and another 12 birds and 4 mammals were prepared as study skins during the year. The refuge maintains a collection of local fauna for use during school programs, visitor inquiries and pre-season waterfowl seminars, as well as scientific purposes.

Flora collections are maintained for all three units of the refuge. The specimens are used in a fashion similar to the vertebrate collections. Although the herbarium provides examples of all common and most of the uncommon species, the refuge staff endeavors to make additions and fill some voids each year. Steve Talbot's project greatly expanded the inventory of vascular and nonvascular plants on the refuge. His crew collected over 640 vascular plant specimens (n=276+ species, with several grass specimens awaiting identification), over 500 lichen specimens (n=168 species), and over 1,300 moss specimens (n=241 species).

16. Marking and Banding

Tundra Swan
A tundra swan banding effort was continued in 1993. Refuge staff and volunteers banded and placed individually coded neck collars on four swans at VOR Lake 16 July and seven birds (of 16 present) on a Lake 187 (next to Bug Lake) on 21 July. See also Section G.3 **Tundra Swan**.

Steller's Eider
Fourteen Steller's eider banding drives were performed in 1993 between 25 August and 2 October at Cape Glazenap, Neumann Island and Blaine Point. A total of 7,136 birds were processed, including 6,180 newly banded birds and 209 recaptures of birds banded previously at Izembek. Bands on 55 of the recaptures are being chemically etched by the Bird Banding Laboratory. Post-banding life spans of 19 years for males and 16 years for females have been confirmed.

Monitoring Avian Productivity and Survivorship
Long and short-term declines of migrant landbirds have been well documented in the United States and Canada. The species undergoing the greatest declines are long-distance migrant species that winter in neotropical Central and South America. In spring 1993 we were able to employ two seasonal biological technicians to establish a ten mist net MAPS station on accessible King Cove Corporation lands (with permission) adjacent to the refuge. Although one of the technicians decided he didn't like it here and left two weeks after arrival, the other one picked up the slack and we had a very productive program.

The MAPS station was composed of ten mist nets near Cold Bay (Latitude 55° 12′ 33" N, Longitude 162° 42′ 48" W), Alaska, during the period 2 June to 9 August 1993. The station is located a few feet above sea level downstream of the former Russell Creek Fish Hatchery facilities on King Cove Corporation lands in a riparian mosaic of alder (Alnus crispa) thicket, grassland and heath habitat. The objectives of the program were: 1) to provide long term data on population and demographic parameters for select target landbird species, 2) to develop annual indices of adult population size and post-fledging productivity, annual estimates of adult population size, adult survivorship, and recruitment into the adult population through capture-recapture data on adult birds, and 3) to provide estimates of adult population size through point counts in the vicinity of the MAPS station.

Steller's eiders (1650+) awaiting banding by refuge and AFWRC staffs
08 September 1993 CFZ

One or two refuge employees and a refuge volunteer conducted the program on eight net days (nine dates) for 440.18 net hours and a daily average of 55.02 net hours. One netting effort consisted of two partial days (20 and 22 June) due to the development of unacceptable weather conditions an hour into the initial attempt. A total of 266 birds of nine species were captured (229 banded, 37 recaptured) for a 60.4 birds per 100 net hours yield. Three notable recaptures occurred: a male Savannah Sparrow (SAVS) recaptured four times throughout the summer after being banded 2 June (the first day of the project), a male Golden-crowned Sparrow (GCSP) recaptured in September after being banded and recaptured in June (a migrant through the MAPS site that nested at a higher elevation?), and a brooding female Black-billed Magpie banded at Refuge headquarters 2 km to the north in February 1992.

Although comparisons with 1970 to 1972 banding in the area by then Refuge Biologist Ed Bailey are generally not possible due to the incompatibility of sampling techniques, a comparison of species composition can be made (with caution). The three sparrows (Fox, GCSP and SAVS) encountered in 1993 have apparently increased during the past 20 years, the most notable being the seven percent increase of SAVS. Of the three Neotropical migrant species (Bank Swallow, Yellow Warbler (YWAR) and Wilson's Warbler (WIWA)), only the Bank Swallow population apparently maintained its percentage of the avian community 20 years later. Neither warbler is as well represented in the avifauna, however, with the Yellow Warbler apparently decreasing from 16 percent to 14 percent and the WIWA decreasing from seven percent to less than one percent in 1993. WIWA peaked 28-30 August 1970-1972 (as many

as nine captured per day), but in 1993 the two WIWA captured (one banded) were encountered on 1 August (indicating fall migrants).

Post-breeding Migration Stations

Izembek Refuge staff operated two fall migration stations near Cold Bay (Latitude 55° 12′ 33" N, Longitude 162° 42′ 48" W) during the period 19 August to 8 September 1993. The Russell Creek ("lower") site of five mist nets is located a few feet above sea level near the former fish hatchery facilities on King Cove Corporation and Refuge lands three km south of Refuge headquarters. The Frosty Road ("upper") site of three mist nets is at about 100 m elevation north of First Bridge/Frosty Creek on Refuge lands 8 km southwest of Refuge headquarters. The sites are about 8 km apart, with the lower site located in riparian alder (Alnus crispa) thicket-grassland-heath habitat and the upper site located in the Frosty Peak alder thicket-heath mosaic habitat belt. One net at each site was also operated experimentally in 1992. The objectives of the program were: 1) to study the timing of the fall landbird migration using mist nets and banding, 2) to study the relationship between the timing of migration, breeding and molt, and 3) to obtain an estimate of landbird productivity.

One or two refuge employees and a refuge volunteer conducted the program on two dates at the lower site and four additional dates at the upper site for a total of six net days and 74.96 net hours and a daily average of 12.50 net hours. A total of 60 birds of eight species were captured (58 banded, 2 recaptured) for a 80 birds per 100 net hours yield. Some interesting comparisons between the two single net sites of 1992 and the multiple net sites operated in 1993 are possible. The most common species captured in 1992 was the YWAR at the lower site and the GCSP at the upper site, while the GCSP was the most common species captured at both sites in 1993. The most interesting capture of the project was the 19 August recapture of a Black-capped Chickadee (BCCH) in the center of the upper site nets that was banded at the highest of the upper site nets (a distance of 160 m from the recapture site) on 6 September 1992 (11.5 months earlier). BCCH are not currently known to be resident at Izembek Refuge. Records from 1963 to 1993 indicate that the species is present in the area only during the fall (extremes 15 August 1992 and 26 November 1963). The birds evidently disperse from some unknown breeding area farther up the Alaska Peninsula and retreat as food resources and/or climatic conditions require. Also noteworthy were the absence of Orange-crowned Warblers and the reduced numbers of YWAR and WIWA this year.

17. Disease Prevention and Control

Very few outbreaks of rabies were documented in the red fox population during 1993 and no other disease problems were known to have occurred during the year.

H. PUBLIC USE

1. General

The majority of Izembek NWR public use is received from the residents of Cold Bay, King Cove, False Pass, and, to a lesser degree, Nelson Lagoon and Sand Point. Consequently, our public use and interpretive programs are geared primarily for that audience. Non-local public use is nearly exclusively from the hunting and fishing fraternity with September and October being the high-use period. The refuge also hosts a few hardy (wealthy?) birders each year.

Refuge staff coordinated the second annual "Take Pride in Cold Bay Day" on 16 May, which was celebrated with a trash pick up event and cook-out afterwards. ARM Julie Chase took the lead in coordinating the event and enlisted the assistance of the school and local businesses. During the entire week leading up to 16 May, refuge staff members accompanied local school classes as they picked up trash around the outlying areas of the community, including local wetlands and streams.

5. Interpretive Tour Routes

Although Izembek NWR has no tour route per se, the road system does provide recreational access for visitors and thus provides another "avenue" for interpretive information dissemination. Four covered "L.C. Haney" billboard/bulletin board-type signs are maintained on Grant Point Road, Outer Marker Road, and Outpost Road. Maps, hunting information, general interpretive materials, and general refuge information are posted on each billboard. Displays are changed frequently so that information remains current and the public remains interested. The billboards are disassembled over winter to reduce wear-and-tear. The road to Grant Point terminates at the Grant Point Wildlife Observation Facility. The octagonal building contains bird identification, local history, physiography, and lagoon ecosystem interpretive panels. Deck binoculars housed in the facility are mounted on a locking pedestal and swivel to provide 360° viewing through the seven picture windows and even the door. The former substandard optics were replaced by a zoom spotting scope in 1993.

6. Interpretive Exhibits/Demonstrations

The refuge has several year-round interpretive displays located at Cold Bay. Large plexiglass map panels with accompanying wildlife/habitat panels describing the Izembek Refuge are on permanent display at the Reeve Aleutian Airways terminal. Some of the smaller wildlife panels and a Service shield emblem are displayed at the smaller MarkAir terminal. Bulletin boards at the Reeve terminal and the local store provide information about the refuge, the Service, and local wildlife events.

7. Other Interpretive Programs

As an ongoing effort to keep the user public informed, several outreach activities are routine to the Izembek Refuge staff. Open houses, periodic letters to box-holders, visits to local communities, assistance to area teachers, and participation in school activities are all informal public relations activities.

The environmental education (EE) initiative of the station continued in 1993. As part of the total EE program, the refuge staff developed an EE resources library that makes materials available to the educators in the Aleutians East Borough School District. Response to the program has been steadily increasing as more teachers begin to utilize the service.

Beverly Farfan (RS) visited the area in late Marcdh to conduct EE sessions during planned teacher inservices at King Cove and Cold Bay schools. Aprroximately 90% of the teachers attended Beverly's sessions and provided valuable feedback.

Refuge staff participated in the Cold Bay School's "mini week" once again in 1993. During this activity each year, "crash courses" are offered to the students in subjects ranging from jewelry making to chess competition to hunters safety. Wildlife Biologist Dau taught a porcupine quill jewelry making class.

Butterflies do not occur locally, so Cold Bay School students raised their own while studying insects and participating in the Refuge EE program
08 September 1993 CFZ

DRM Mark Chase presented two sessions at the "Quest of the Fisherman" symposium at the Cold Bay school 28-30 April. The symposium was organized for all high school students from the Aleutians East Borough School District's small schools. A variety of sessions ranging from the U.S. Coast Guard's mission to the Regional Planning Teams and fish taxes were presented to the students. DRM Chase presented a session on the importance of fish populations to other refuge resources and what specifically the refuge does as far as fisheries are concerned. Sampling techniques, population estimations, and water chemistry analysis were discussed. A brief session on job opportunities with the Service was also conducted. Twenty-nine students and seven adults attended the two sessions

Refuge staff members visited the Cold Bay School on two occasions during the year. RM Zeillemaker along with AT Schlichten and Volunteer Melly Zeillemaker discuss passerine birds and what the refuge was doing with the mist nets set up around the road system. The presentation included a mist net demonstration in the classroom, which the students enjoyed tossing a foam "bird" into. ARM Julie Chase, along with KSFRO staff, visited the school to discuss fish and associated subjects. The highlight of that visit was the construction of "bugs" out of potato parts by the students. National Wildlife Week occurred 19-25 April this year. Refuge staff distributed National Wildlife Week packets to all area educators. This year's theme was "Endangered Species - We're All In This Together."

8. Hunting

Waterfowl

Waterfowl hunting is responsible for the majority of public use occurring on the refuge. The 1993 waterfowl season opened on 1 September and continued through 16 December. For all practical purposes, the season is "over" when the brant and Canada geese initiate the migration out of the area in late October or early November. In 1993, Canada geese began filtering out of the area on 31 October and had completed their exodus by 16 November. Most brant departed on 13 November.

Hunter effort seemed to be somewhat reduced in 1993 from the 1992 level. Success, as measured in terms of Canada geese bagged, was also down. In 1993, we again intensified our efforts to enforce regulations and collect harvest information by employing a seasonal law enforcement officer from 15 September to 31 October. Rob Barto, who had been working at Kenai NWR during their summer high public use season, was detailed to Izembek Refuge for the busy portion of the waterfowl season. Although we have two collateral duty officers at the station, other commitments prevent us from devoting more time to waterfowl regulation enforcement. Although hunter checks typically yield much more biological information than evidence, enforcement is a full time job during the peak of the season. Six waterfowl hunting cases were made this year including one for the perennial problem of late shooting.

Brown Bear

The Unimak Island brown bear hunting season opened 1 October and continued through the 21st. Four permit holders checked in en route to the island,

and one bear was taken. Two non-resident permit holders were unable to hunt on Unimak Island because no guide was permitted to use the area under both the State and federal systems. The guide who holds the refuge permit for Unimak Island is working toward rectifying the situation.

The Unit 9(D) (lower Alaska Peninsula) brown bear hunting season opened on 7 October and closed on the 21st. Under the newly established permit system, six guides operated on refuge lands in GMU 9(D). Twenty-two bears were sealed at refuge headquarters, 13 of which were boars and nine of which were sows. One bear skull measured 28", the minimum Boone and Crocket score required for book entry. There was one "Defense of Life or Property" shooting this season. A guide and client were charged by a sow that had three yearling cubs. Her carcass was 14 feet from the two men when the smoke cleared. Overall, the fall season progressed much as expected, with few very large boars being taken and a higher percentage of sows in the bag. One Notice of Violation was issued during the bear season for littering.

Caribou

Following close monitoring of the 1993 caribou crop for the SAPCH, the decision was made to recommend a closure of the subsistence hunting season for 1993. Sustained poor calf recruitment for the past 10+ years, and high adult mortality continue to cause the herd to decline. Under the present conditions, we do not feel any harvest from the SAPCH can be justified, as all indications are that the herd will continue to decline for the next several years. Following what was essentially a bust year for calves in 1989, the calf recruitment has slowly increased but is still around a dismal 15% and can not begin to offset the adult mortality. Protection of the calves born after 1989 is essential to the future reproductive potential of this herd. The Alaska Federal Subsistence Board closed the Game Management Unit (GMU) 9D and GMU 10 subsistence caribou season late in the day on August 10, the opening day of the season.

DRM Chase visited Sand Point, King Cove, and Nelson Lagoon 29, 30 and 31 July, respectively, to discuss the proposed caribou closure and document local public reaction. Rather than attempt to schedule formal meetings during the fishing season, Mark travelled to the villages during a fishing closure and contacted people informally, primarily at the boat harbors. While we did not expect people to like our recommendation, we did want them to understand why we believed it was a necessary action. The vast majority of folks contacted agreed with our assessment and reluctantly supported our proposed action. A trip to False Pass scheduled for 5 August had to be cancelled due to weather. DRM Chase then telephoned community leaders and available citizens to discuss the proposal. A larger percentage of False Pass and Nelson Lagoon residents conveyed their need for caribou and expressed the desire that the season not be closed, but be limited to one animal for each household. Under the current condition of the herd, even a limit of one per household could not be biologically justified.

DRM Chase conducted a meeting in Cold Bay on 3 August to discuss the proposed caribou closure. One person attended. RM Zeillemaker provided

one concerned resident, who was not in the community during the meeting, all information by telephone.

9. Fishing

Sport fishing within Izembek Refuge proper is somewhat limited due to access and is basically confined to Frosty Creek, upper Russell Creek, and a few lakes. The majority of sport fishing in the area is concentrated on lower Russell Creek and to a lesser extent, Trout Creek. Both of these streams flow out of the refuge onto state or private lands where the majority of fishing activity occurs.

Sport fishing high-use seasons are basically the months of June through October. Non-local use is typically greatest in September when fisherman can combine their trip with some goose hunting. Silver, or coho, salmon are the species of primary interest.

Abuse of the silver salmon resource continued in 1993. Non-local parties come to Cold Bay for a limited time with the only apparent intent of taking home as many fish as possible through snagging and "double-dippin'." Since the fishing is off-refuge, staff LE officers have been unable to take action against blatant violators. Attempts to convince Alaska Fish and Wildlife Protection (FWP) Officers, who are in Cold Bay for the commercial fishing season through 30 August, to stay in town until mid-September have been ongoing since 1989. We believe the extra two weeks would be well worth their while. To date, the FWP officers have been unable to stick around for any period in September. Numerous requests to pursue a State commission for Refuge Officer Chase, including the writing of issue papers and a draft policy covering the subject, have fallen on deaf ears. Consequently, the spawning stocks of salmon, destined for refuge waters, continue to suffer. Due to past Russell Creek Hatchery practices and the timing of the sport fishing effort, the wild stock of Russell Creek silver salmon may be in jeopardy. A KSFRO study along lower Russell Creek in 1992 and 1993 provided valuable opportunities for Service interaction with local and non-local fishing interests.

Three activities were sponsored by the refuge in conjunction with National Fishing Week (NFW). A water chemistry seminar and fly fishing clinic were hosted in addition to the traditional Cold Bay Youth Fishing Derby. This was the third year for the fishing derby which was enjoyed by eight children. Incredibly, three separate reports for NFW activities needed to be completed this year.

10. Trapping

Izembek Unit (Izembek NWR) and the Unimak Unit (Aleutian Islands Unit of Alaska Maritime NWR) require trapping permits per 50 CFR Part 36. No permits were issued for the Unimak Unit and only one was issued for the Izembek Unit during the 1993/94 trapping season. All trapping is basically "recreational" in nature. The total trapping harvest on the Izembek Unit for the 1993/94 season was ten mink, two red fox, and two river otters.

11. Wildlife Observation

Wildlife observation is a common past-time for Cold Bay residents. With the road system access, many people drive the area year-round to view and photograph wildlife. Bears, fox, caribou and a variety of birds are of primary interest for this activity, since many folks here come from outside of Alaska and have never seen large mammals or great concentrations of waterfowl before. Although this use is difficult to measure, it appears that non-consumptive recreational use is increasing, especially at the Grant Point wildlife observation facility during the spectacular fall concentrations of waterfowl. Even with the high cost of getting to Cold Bay, a few birders appear each year to track down some species that are difficult to observe during a short visit elsewhere.

Brown bears are popular Cold Bay wildlife observation subjects
(it appears that photographers are popular subjects to the bears as well)
17 September 1993 CFZ

15. Off-Road Vehicles

All-terrain vehicles (ATV) are a common mode of transportation in Cold Bay and other area villages, so the potential for off-roading problems is high. Actual problems are typically isolated instances of people driving off-road to retrieve a caribou or people off-roading in an ATV for a short distance to gain access to the beach. The latter is most common at the end of the Pintail Lake Loop where it is less than 100 yards to the beach. Most of the off-roading occurs during waterfowl season by hunters who are too lazy to walk. Use of the beach within the Izembek State Game Refuge (SGR) with any wheeled vehicle requires a permit from the State of Alaska. Permits

for wheeled vehicle access to the SGR are issued by the ADF&G Habitat Division in coordination with the refuge staff.

Vehicle travel is limited to the designated Cold Bay road system through 50 CFR and is also included in the preferred alternative of the Izembek Refuge CCP. The preferred alternative of the CCP also provides for refuge maintenance of the existing road system without any further road construction on the refuge. The current road system was so designated at a public meeting in the 1970's. The drivable portions of the roads remaining from military occupations during the 1940's and 1950's remained open and were designated the Cold Bay road system. At that time Cold Bay vehicular traffic was mainly passenger four-wheel drive vehicles, as ATV's were unheard of in those days. If a portion of a road had become impassable to a 4x4 passenger vehicle, it was closed at that point. With the surge in ATV popularity, a few challenges to the decision have occasionally cropped up. As the road system stands now, access is excellent for all refuge public use activities. Opposition to points where a road has been closed is occasionally voiced by a few individuals wanting to drive somewhere else to hunt or trap, but the system has remained unaltered.

16. Other Non-Wildlife Oriented Recreation

Beachcombing is a popular pastime among local residents. The beaches of the Pacific Ocean and Bering Sea in the local area are littered with "treasures" and junk from nature and civilization, past and present. Much of the beachcombing is accomplished during the summer when temperatures are warm and in the fall in conjunction with waterfowl hunting. The beachcombers are usually content to find a small glass fishing float and call it a day. There are also a few very serious beachcombers who concentrate their efforts on the outer beaches in the late spring. The primary trophies of interest are walrus tusks and large (12-16 in) glass fishing floats. The idea is to get out to the outer beaches in the spring as soon as the weather permits, thereby having first crack at the bounty brought ashore or exposed by winter storms.

Most of the animal parts collected on the beaches must be registered pursuant to the Marine Mammal Protection Act of 1972. The Izembek Refuge office is a designated sealing agent for beach found marine mammal parts. A new procedure for sealing beach found walrus ivory was initiated in 1991. The process includes lead seals and ultra violet markers, instead of engraving as in the past.

17. Law Enforcement

This fall Robert Barto was once again detailed from Kenai NWR to work waterfowl law enforcement during the peak of the hunting activity. Rob is a summer seasonal at Kenai and we simply extended his tour during the period mid-September through October.

Seven Notices of Violation were issued in 1993. Infractions of the regulations included rallying waterfowl (2), and one case each of late

shooting, possession of lead shot, guiding without a permit, no federal duck stamp, and littering.

Izembek NWR law enforcement staff continued to support the Region 7 policy on enforcement of migratory bird hunting during the closed season (spring waterfowl hunting) in 1993. No evidence of spring hunting was observed on the southern Alaska Peninsula.

RM Zeillemaker and DRM Chase attended the annual refresher training at Marana, Arizona, in March.

19. Concessions

The only "concessioned" activity on the refuge is big game guiding. Extensive changes in the way Region 7 selects big game guides were initiated in 1992. A competitive bid process was developed and implemented to select big game guides that receive special use permits on Alaska National Wildlife Refuges. Five individual guides were awarded permits for the areas under our jurisdiction in 1993. After a bumpy start, with everyone learning along the way, things seem to be running smoothly. The fall 1993 brown bear season was the first conducted under these new permit regulations and everything went fairly well. A new fee schedule was also implemented in 1993 to charge the commercial guides a client user-day fee in addition to the long standing administrative fee.

Special Use Permitting: Seven permits were issued for big game guiding, one for waterfowl guiding and three for gravel removal.

I. EQUIPMENT AND FACILITIES

2. Rehabilitation

Headquarters Facilities
The refuge headquarters building (office and visitor center) became fully wheelchair accessible through the installation of a wooden ramp in 1993. Our facilities are the only wheelchair accessible public buildings in the community. Four Quarters 4 picture windows were replaced by the maintenance staff during the summer.

Road System
A safety team of regional office and contract engineers inspected all bridges along Frosty Road. A potential problem with the footing on First Bridge will be rectified during the summer of 1994. Other recommendations of the team included the need for signing and guard rails for all three bridges. The above ground aviation fuel storage tank at Blinn Lake was repainted and received proper signs during the summer.

Grant Point Facilities
The sliding doors on both ends of the Grant Point Quonset hut were rebuilt or replaced during the year. The facility will hopefully hold together

until it is replaced at some point in the future. The Grant Point wildlife observation facility became fully wheelchair accessible through the installation of a concrete ramp and the substandard "deck binoculars" were replaced with a high quality variable magnification spotting scope.

3. Major Maintenance

A "brushwhacker" attachment to the refuge's Case backhoe/loader was installed and used during the summer. The attachment was acquired to allow us to provide public roadway maintenance, excluding bridge repair and replacement, for the first time since committing to such a program through the refuge CCP in 1985. Using the equipment in July, MW Schulmeister, assisted by seasonal employees Mach and Ambridge, mowed encroaching alder from the sides of Baldy Mountain Road and Frosty Road. With supplemental chain saw work, Frosty Road between Third Bridge and Forth Bridge became easily passable to passenger vehicles (without scratching paint) for the first time in years.

"Brushwhacker" attachment at work widening refuge public use roads
26 July 1993 CFZ

MW Schulmeister also rehabilitated the Baldy Mountain Bridge (culvert) to once again allow safe passage. And, the Alaska Department of Transportation staff completed the upgrade of the last .9 mile of the Grant Point Road begun in 1992. Rock fill was added to the mud holes and a thin layer of topping material have made this section "all-weather" as is the remainder of the road. They also resurfaced the two Grant Point boat ramps and hauled off the wooden foundation from a former building.

Before: refuge public use roads had become badly overgrown
30 July 1993 CFZ

After: refuge staff removed brush along Frosty and Baldy Mt roads
11 August 1993 CFZ

4. Equipment Utilization and Replacement

The rebuilt N745 Supercub was returned to service at Cold Bay on 9 May. Prior to the plane's return, the Selawik NWR Supercub was borrowed for winter survey work.

A new extended cab Chevrolet pickup truck and Chevrolet Suburban were received in August to replace a 1981 Dodge pickup and a 1980 Jeep Cherokee which had seen better days, but which still retain enough life to be transferred to NBS for use seasonally for the numerous research projects.

The station's "antique" copy machine was finally replaced in 1993; good riddance to that "antique."

5. Communications Systems

Four portable radios with telephone patch capabilities were received in 1993 to complete an MMS project.

A plain paper fax machine was also acquired in 1993 to replace an older roll-paper machine. It was money well spent.

6. Computer Systems

An additional 486 desk top computer was acquired to replace the ARM's dying 386 unit. She went from a clunky monochromatic monster to color with windows.

7. Energy Conservation

Electricity costs were reduced in 1993 by approximately ten percent. The decrease can be attributed to conscientious conservation practices by the refuge staff.

8. Other

A replacement shop building is the station's number one priority Refuge Needs Information System project. A replacement facility would allow all refuge vehicle maintenance to be performed without requiring the removal of a building's contents before beginning work or working outside in the case of the larger pieces of equipment, and would provide for the storage of the new Ford dump truck, a Case backhoe/loader, a boat with trailer, and a Bobcat loader. The Grant Point Quonset hut and Air Force storage buildings also need to be replaced.

J. OTHER ITEMS

1. Cooperative Programs

Alaska Volcano Observatory

Refuge staff continued to monitor the Westdahl volcano on the west end of Unimak Island for the Alaska Volcano Observatory. The observatory staff has been very complimentary of our efforts.

U.S.-Russia Environmental Agreement/Protocol

The tempo of the ongoing "sister refuge" program between the Izembek Refuge and Kronotskiy Nature Reserve of Kamchatka, Russia, staffs increased dramatically in 1993. In June, Refuge Manager Zeillemaker participated in a "Conference on Coordination of Conservation Assistance to Russia" in Philadelphia. In July, Natalya Danilina, Deputy Director of the Main Directorate for Nature Reserves of the Russian Ministry of Environmental Protection and Natural Resources (and I thought we had long titles!); Natalya Dobrovolskaya, Executive Secretary for the Russian side of the U.S.-Russia Environmental Agreement (International Affairs); Evgeni Lobkov, chief ornithologist for Kronotskiy Reserve; and Steve Kohl, Service International Affairs visited Izembek Refuge. They were able to view Izembek Lagoon from the refuge Supercub, observe brown bear, and participate in songbird banding at the MAPS station during their visit.

Steve Kohl, Natalya Dobrovolskaya, Evgeni Lobkov, Natalya Danilina (l to r)
08 July 1993 CFZ

In September, RM Zeillemaker joined Kodiak RM Jay Bellinger and Fairbanks Special Agent Al Crane for a visit to Kronotskiy Reserve. The trio learned that there is a world of difference between administration of wildlife "reserves" in the two countries. We are up to our ears in public use and other intrusions of the habitat. They are not! Russian "zapovedniks" are virtually hands-off sanctuaries. Only reserve staff and Russian Academy of Sciences researchers regularly "use" their reserves. As a result the Russians are dealing with very much unaltered ecosystems, but at a price. They have very little, if any, local support due to the inability of the public to enjoy the wildlife and scenic wonders of the reserves, and funding is currently below the level necessary to cover staff salaries. Some ecotourism is occurring in the Valley of Geysers within Kronotskiy Reserve which results in a little direct funding for staff salaries, but for the most part our colleagues have very little, if any, field equipment, including radios, and other "tools" we take for granted. For example, we conduct bear surveys with aircraft, while they conduct bear surveys on snowshoes.

Refuge Manager Zeillemaker upon arrival at Kronotskiy Zapovednik, Russia
22 September 1993 Jay Bellinger

3. Items of Interest

This report was produced with a Hewlett Packard LaserJet Series II printer using Mead Harmony paper containing 50 percent (10% post consumer) recycled fiber.

4. Credits

Photos: CFZ - RM Zeillemaker
MAC - DRM Chase

Introduction	Zeillemaker
A (Highlights)	Zeillemaker
B (Climate)	Zeillemaker
C (Acquisition)	Zeillemaker
D (Planning)	Zeillemaker
E (Administration)	
1-2	Zeillemaker
4-5	Zeillemaker
6	M. Chase
8	Zeillemaker
F (Habitat)	Zeillemaker
G (Wildlife)	
1-2	Zeillemaker
3	Dau
4-7	Zeillemaker
8	Dau, Zeillemaker
9	Dau
10-11	Zeillemaker
14	Dau
16	Dau
17	Zeillemaker
H (Public Use)	M. Chase
I (Equip/Facilities)	M. Chase
J (Other)	Zeillemaker
K (feedback)	Zeillemaker
L (Info Pack)	Chase
Typing	Zeillemaker, M. Chase, Dau
Layout and Editing	Zeillemaker
Final Edit	J. Chase

K. FEEDBACK

With all its faults, our National Wildlife Refuge System is still the best such system this writer has experienced. That is not to say we can't make it better, but on the whole it is pretty special. Now if appropriate funding and staffing levels could somehow be realized!

L. INFORMATION PACKET

Current public leaflets and handouts follow.

CFZ/cfz
ANR\ANR-1993.ALL

GETTING TO IZEMBEK NATIONAL WILDLIFE REFUGE, COLD BAY, ALASKA

The Izembek National Wildlife Refuge, near the tip of the Alaska Peninsula, includes the 315,000 acre Izembek Unit (containing the entire Izembek Lagoon watershed), the 415,000 acre Pavlof Unit (containing volcanic peaks of the Aleutian Mountain Range and Pacific shorelines), and the Unimak Unit containing 932,000 acres of Unimak Island (the easternmost island of the Aleutian Island Chain). The only vehicle access to the refuge is via the gravel 40 mile Cold Bay road system that serves the Izembek Unit and small portions of the Pavlof Unit. Aircraft and boats are required for access elsewhere within the refuge. No commercial guides offer wildlife viewing or wilderness trips on the refuge.

Tours are not conducted on the refuge, but rental vehicles are available for use on the better roads near the community of Cold Bay and maps and wildlife information are available at refuge headquarters on the east side of town. There are no designated walking trails, as such, on the refuge, but unimproved trails used by hunters and wildlife observers are available at various locations on the Izembek Unit of the refuge.

Airline transportation to Cold Bay from Anchorage, Alaska, (there are no roads to Cold Bay) is via:

> Reeve Aleutian Airways, 4700 West International Airport Road, Anchorage, Alaska 99502 (907-243-4700 or 1-800-544-2248) or P.O. Box 5, Cold Bay, Alaska 99571 (907-532-2380), or
>
> MarkAir, 6441 S. Airpark Place, Anchorage, Alaska 99502 (907-243-6275 or 1-800-478-0800) or P.O. Box 70, Cold Bay, Alaska 99571 (907-532-2555).

Scheduled and charter air service is also available from Anchorage to Cold Bay and around the Cold Bay local area via:

> Peninsula Airways, 4851-A Aircraft Drive, Anchorage, Alaska 99502 (907-243-2323 or 1-800-448-4226) or P.O. Box 132, Cold Bay, Alaska 99571 (907-532-2485 or 1-800-478-2484).

A round trip airline ticket from Anchorage to Cold Bay costs about $600 per person.

Designated wilderness covers 300,000 acres of the Izembek Unit and 910,000 acres of the Unimak Unit, accessible from the communities of Cold Bay and False Pass, respectively. Hiking across uneven tundra, marshy ground, and streams can be difficult. Refuge lowland vegetation gives way to barren scree, snowfields and even glaciers at relatively low altitudes on the refuge. Wilderness users should make arrangements for contact should they not return to the departure community by a specific time.

CFZ/cfz:17MAR94
IZMBACCES.403

HUNTING AND FISHING: IZEMBEK NATIONAL WILDLIFE REFUGE

The Izembek National Wildlife Refuge, near the tip of the Alaska Peninsula, includes the 315,000 acre Izembek Unit containing the entire Izembek Lagoon watershed, the 415,000 acre Pavlof Unit containing volcanic peaks of the Aleutian Mountain Range and Pacific shorelines, and the Unimak Unit containing 932,000 acres of Unimak Island (the easternmost island of the Aleutian Island Chain). Refuge wildlife is varied and abundant, but access is limited and, in some cases, difficult. The only vehicle access is via the gravel 40 mile Cold Bay road system which serves the Izembek Unit and small portions of the Pavlof Unit. Aircraft and boats are required elsewhere.

Refuge hunters and fishermen can access the shoreline of Izembek Lagoon, the shoreline of Cold Bay, Russell Creek and the lower flanks of 6,000 foot Frosty Peak from the Cold Bay road system. Izembek Refuge is best known for it's waterfowl hunting. The refuge was established due to its attraction to the Pacific black brant during migration, especially in the autumn (September-October). The great fall waterfowl concentration and spawning salmon attract numerous consumptive users to the area. The refuge also provides opportunities for big game hunting, ptarmigan hunting, and arctic char/Dolly Varden fishing.

Goose and duck hunting is at its peak from late September to late October. The largest numbers of waterfowl are usually present on the refuge then and the weather tends to be more stable in autumn than it is later in the year (although cool temperatures, high wind and rain are possible any time). Popular areas include the Izembek Lagoon shoreline and islands (especially for brant) and berry producing tundra and fresh water wetlands within a few miles of Izembek Lagoon (especially for Canada geese). There are no commercial guides offering waterfowl hunting trips.

Brown (grizzly) bear hunting is available on the Izembek and Pavlof units on an alternate spring-even-year (1992, etc.) and fall-odd-year (1993, etc.) schedule. Annual spring and fall Unimak Unit brown bear hunts are available through a drawing permit system. "Nonresident brown bear hunters must be accompanied by a guide/outfitter or a resident relative within second degree of kindred."

Due to recent significant declines in the "Southern Alaska Peninsula Caribou Herd," ALL HUNTING has been CLOSED on federal lands, including the entire refuge (Game Management units 9(D) and 10 Unimak Island). The herd, which once numbered near 10,000 animals, is currently at or below 2,000 animals. The hunting/no hunting threshold is 2500 animals.

Unguided willow ptarmigan and rock ptarmigan hunting is available from August to April. Large scattered flocks of willow ptarmigan occur in the vicinity of lowland food and cover during the winter months.

Red (sockeye) and pink (humpback) salmon are most abundant in June and July. Silver (coho) salmon are most numerous from August to early October. Fishermen frequent Cold Bay area streams throughout the fall, but guiding services are no available. A Cold Bay (Russell Creek) silver salmon derby occurs over the Labor Day week-end in September.

Izembek Refuge is adjacent to Cold Bay (population about 130 people). The natural environment consists primarily of low brush tundra, alder thickets, willow patches, numerous lakes and marshes, and the network of gravel roads. Rental vehicles are available for use on the better roads around the community of Cold Bay. There are no designated walking trails, as such, but there are unimproved trails used by hunters and wildlife observers at various locations on the Izembek Unit of the refuge.

Visitors any time of the year should be prepared for cool temperatures, rain and wind. Unguided primitive camping is allowed on the refuge at no charge. Campers must provide all of their own equipment. It is best to visit refuge headquarters and visitor center for staff assistance in selecting the better camping areas (there are no trees, designated camp sites or camp facilities), hunting areas and access trails and hunting areas. A refuge map is available within the general refuge brochure.

The only Cold Bay restaurant, grocery store, and motel ($90-$120 per night for two) are operated by Pavlof Services, Inc., P.O. Box 111, Cold Bay, Alaska 99571 (telephone 907-532-2437). Rental vehicles are available from Cold Bay Truck Rental, P.O. Box 74, Cold Bay, Alaska 99571 (907-532-2404). Airline transportation to Cold Bay from Anchorage, Alaska, (there are no roads to Cold Bay) is via Reeve Aleutian Airways, Inc., 4700 West International Airport Road, Anchorage, Alaska 99502 (907-243-4700 or 1-800-544-2248) or P.O. Box 5; Cold Bay, Alaska 99571 (907-532-2380) or MarkAir, Incorporated; 6441 S. Airpark Place; Anchorage, Alaska 99502 (907-243-6275 or 1-800-478-0800) or P.O. Box 70; Cold Bay, Alaska 99571 (907-532-2555). A round trip ticket costs about $600 per person. Scheduled and charter air service is also available from Anchorage and around the Cold Bay local area via Peninsula Airways; 4851-A Aircraft Drive; Anchorage, Alaska 99502 (907-243-2323 or 1-800-448-4226) or P.O. Box 132, Cold Bay, Alaska 99571 (907-532-2485 or 1-800-478-2484).

Brown bears are relatively common away from the Cold Bay road system, particularly along streams during salmon runs and in berry producing areas. Refuge visitors should use caution whenever approaching or entering brushy areas or other areas with restricted visibility. The Cold Bay area received extensive military use during and after World War II. A former refuge camp site is closed due to the presence of unexploded ordnance. Refuge visitors should use caution in the vicinity of former military sites.

CFZ/cfz:17MAR94
IZMHUNTF.403

WILDLIFE GUIDE FOR IZEMBEK NATIONAL WILDLIFE REFUGE....
....ALONG THE COLD BAY ROAD SYSTEM, COLD BAY, ALASKA

BIRDS	LOC	JAN FEB MAR	APR MAY JUN	JUL AUG SEP	OCT NOV DEC
Red-throated Loon	cnw		ammmmj	a	d
Pacific Loon	c	jj	m	a ss	oOOONNNnddddd
Common Loon	cw	jj	aaaammmmjjjj	jjjjaaaassss	ooonnnnddddd
Yellow-billed Loon	c	jjj m	a		n nnddddd
Horned Grebe	c	JJJJFFFFMMMM	AAAAM	a	OOOONNNNDDDD
Red-necked Grebe	cw	jjjjffffmmmm	aaaa	as s	oooonNNnddddD
Short-tailed Shearwater	c			a a ssss	
Fork-tailed Storm-Petrel	c			s s	
Double-crested Cormorant	c				o d
Pelagic Cormorant	c	JJJJFFFFMMMM	AAAam m j	j aaassss	oooonnnnddDD
Red-faced Cormorant	c	f			d
Tundra Swan	msw	fffmmmm	aaaammmmjjjj	jjjjaaaasSSS	OOoonn d
Grtr.White-fronted Goose	i		x		
Snow Goose	i				
Emperor Goose	cimo	jjjjffffmmmm	aaaammmm	SSSS	OOOONNNnddddd
Brant	cio	jjjjffffmmmm	aaaAMMMMJjjj	jjjjaaaASSSS	OOOONNNnddddd
Canada Goose	itw		mm	aaSSSS	OOOONN
Green-winged Teal	imsw	f	a ammmMj jj	a a sss	ooonn d
Mallard	imsw	jjjjffffmmmm	AAAAMMMMjjjj	jjjjaaaASsss	oooonnnnddddd
Northern Pintail	imw	j ffmmmm	AAAAMMMMjjjj	jjjjaaaassss	oooonnnn d
Northern Shoveler	iw		a m j		o
Gadwall	isw	mm	aaaammmmjjjj	jjjjaaaassss	oooonn d
American Wigeon	sw		a	assss	ooo
Eurasian Wigeon	iw		mmmm		nnn
Greater Scaup	isw	jj ff mmm	aaaAMMMMJJJJ	JJJJAAAASSSS	OOOOnnnnddddd
Common Eider	ci	jjjjffffmmmm	aaaamm	ss	ndddd
King Eider	ci	jjjjffffmmmm	aa a		ndddd
Steller's Eider	cim	JJJJFFFFMMMM	AAAAmmmm	aaaassss	oooonnnnddDD
Harlequin Duck	c	JJJJFFFFMMMM	AAAAMmmm j	jjjj aassss	OOOONNNNDDDD
Oldsquaw	ci	JJJJFFFFMMMM	AAAam		ooonnnnddDD
Black Scoter	ciw	JJJJFFFFMMMM	AAAAMMMMJJJJ	JJJJaaaasssS	OOOONNNNDDDD
White-winged Scoter	cis	JJJJFFFFMMMM	AAAAmmmmj j	j a assss	ooOONNNNDDDD
Common Goldeneye	cisw	JjjJFFFFMMMM	AAAAMm		OOOONNNNDDDD
Barrow's Goldeneye	mow	f m			n d
Bufflehead	isw	jjjjffffmmmm	aaaamm		OOONNNNDDDD
Smew	sw	xx			
Common Merganser	irw	jjjjffffMMMM	Aaaamm		onnnnddddd
Red-breasted Merganser	cims	jjjjffFfmmmm	AAAAmmmmj j	assss	oooonnNnddddd
Osprey	w		x		
Bald Eagle	a	JJJJFFFFMMMM	AAAAMMMMJJJJ	JJJJAAAASSSS	OOOONNNNDDDD
Northern Harrier	tw		m	j j assss	o
Rough-legged Hawk	ft	f	aammmmjjjj	jjjjaaaassss	n
Golden Eagle	t	f m	aam m		o
Merlin	t	jj f fmm		a	n d
Peregrine Falcon	ti	j fff m	a m m	j assss	o o n n d
Gyrfalcon	irt	jjj f ffmm m	aa am m j	jj jaaaassss	OOOONNNN d
Willow Ptarmigan	hlr	jjjjffffmmmm	aaaAMMMMJJJJ	JJJJAAAASSSs	ooOONNnnddddd
Rock Ptarmigan	ft		m j	j	
Sandhill Crane	w		aamm jjj	j jaaa s	
Black-bellied Plover	ino			ss	o
Lesser Golden-Plover	it		aam	jaaaASsss	oo
Semipalmated Plover	eiu		aamMMMJJJJ	JJJJaaaa	
Greater Yellowlegs	w		j	jjjjaaaas s	o
Wandering Tattler	m		m	ja a	
Ruddy Turnstone	iu			jjaaaassss	o
Red Knot	u		m		
Sanderling	c	f m			
		JAN FEB MAR	APR MAY JUN	JUL AUG SEP	OCT NOV DEC

BIRDS	LOC	JAN FEB MAR	APR MAY JUN	JUL AUG SEP	OCT NOV DEC
Semipalmated Sandpiper	gu			a	
Western Sandpiper	ciotu		Jj	JJJJAAAAssss	o
Least Sandpiper	uw		mmmjjjj	jjjjaa	
Baird's Sandpiper	i				x
Pectoral Sandpiper	i				o
Sharp-tailed Sandpiper	iw				oooo
Rock Sandpiper	cimtu	jjjjffffmmmm	aaaammmmjjjj	JJJJAAAASSSs	oooonnnnddddd
Dunlin	gouw		ammmmjjjj	jjjjaaaa	ooo
Short-billed Dowitcher	iu		mmmj j	j aaaas	
Long-billed Dowitcher	i			ss	
Common Snipe	rw		ammmmJJJJ	j aaaAsss	o n
Red-necked Phalarope	uw		mj	jjaa	
Parasitic Jaeger	iw		mmjjjj	jjjjaaaass s	
Long-tailed Jaeger	n			j	
Mew Gull	iosw	j j fffmm	aammmmjjjj	JJJJaaaassss	o o d
Slaty-backed Gull	c			x	
Glaucous-winged Gull	acmis	JJJJFFFFMMMM	AAAAMMMMJJJJ	JJJJAAAASSSS	OOOONNNNDDDD
Black-legged Kittiwake	ci		mmj j	JAAAASSSS	o o n
Arctic Tern	iw		mmjjjj	jjjjaa??	
Aleutian Tern	ci		mmjjjj	jjjjaa??	
Common Murre	ci	jjjjfff m	a j	as	dd
Pigeon Guillemot	c	JJJJFFFFMMMM	AAAAMMMMJJJJ	JJJJAAAAssss	oooonnnnddddd
Marbled Murrelet	c			as s	o o
Kittlitz's Murrelet	c		a	j a a ss	o d
Ancient Murrelet	c			aa assss	
Crested Auklet	i				x
Tufted Puffin	c			a	
Horned Puffin	c		mjjjj	jjjjAAAASSSS	o
Snowy Owl	fgot	jjjjff f m	a		d
Short-eared Owl	fgt		mmj jj	j j	d
Belted Kingfisher	rw			j a as	ooo n
Tree Swallow	d		mjjjj	jjj	
Bank Swallow	fstw		MJJJJ	JJJJAaa	
Black-billed Magpie	dflr	JJJJFFFFMMMM	AAAAMMMMJJJJ	JJJJAAAASSSS	OOOONNNNDDDD
Common Raven	ad	JJJJFFFFMMMM	AAAAMMMMJJJJ	JJJJAAAASSSS	OOOONNNNDDDD
Black-capped Chickadee	fhv			a ss	o oo
American Dipper	fr	j fm	aa a m j	a a	n dd
Hermit Thrush	fh		jjjJ	JJJJaaaass	
American Robin	r		x		
American Pipit	ft		ammmmjjjj	JJJJAAAASs	
Northern Shrike	fltv	jjjjffffmm m		jj jaaaas ss	oooonnnnddddd
Orange-crowned Warbler	fh		mj j	a s	
Yellow Warbler	fhlr		JJJJ	JJJJAAAAs	
Wilson's Warbler	flr		j jj	jj jaAAAs	
Savannah Sparrow	fhlr		mMMMJJJJ	JJJJAAAASSSs	o
Fox Sparrow	fhlr		am MJJJJ	JJJJAAAAss	
Song Sparrow	c			s ss	ooo
Golden-crowned Sparrow	fhlr		mmmmJJJJ	JJJJAAAASSs	o
White-crowned Sparrow	gil		a	a	
Lapland Longspur	nt		aammMMJJJJ	JJJJAAAASSSs	o
Snow Bunting	bdt	JJJJFFFFMMMM	AAAammmmj	j s	oooonNNNDDDD
McKay's Bunting	dt	jjjjffffmmmm	aaa		nndddd
Pine Grosbeak	fh		x	xxxxxxx	
Rosy Finch	cdf	JJJJFFFFMMMM	AAAammmmjjjj	jjjjaaaa	ooNNNNDDDD
Common Redpoll	fhlr	ff	jjjj	JJJJAAAASSSs	ooo
Hoary Redpoll	fh		a jj		
113		JAN FEB MAR	APR MAY JUN	JUL AUG SEP	OCT NOV DEC

MAMMALS	LOC	JAN FEB MAR	APR MAY JUN	JUL AUG SEP	OCT NOV DEC
Dusky Shrew	f			j	d
Tundra Hare	fh		aa j	j a	
		JAN FEB MAR	APR MAY JUN	JUL AUG SEP	OCT NOV DEC

MAMMALS	LOC	JAN FEB MAR	APR MAY JUN	JUL AUG SEP	OCT NOV DEC
Arctic Ground Squirrel	dfgot	mm	AAAAMMMMJJJJ	JJJJAAAASSSs	oooonn
Tundra Vole	ct	jjj fff mm	a j	j j a sss	o o dd
Porcupine	glt	jjjjffffmmmm	aaaammmmjjjj	jjjjaaaassss	oooonnnnddddd
Killer Whale (Orca)	cs			s	o
Harbor Porpoise	cs		m		
Gray Whale	cs		a		
Red Fox	cgto	j ffffmmmm	aaaammmmjjjj	jjjjaaaassss	oooo
Gray Wolf	t	jj f			
Alaskan Brown Bear	dfort		mjjjJ	JJJJAAAASSSS	Oooonnnn
Mink	r			a	
River Otter	w	m		a	o
Sea Otter	cims	JJJJFFFFMMMM	AAAAMMMMJJJJ	JJJJAAAASSSS	OOOONNNNDDDD
No.(Steller) Sea Lion	c			j a	o
Harbor Seal	ci	JJJjffffmmmm	aaaammmmjjjj	jjjjaaaassss	oooonnnnddddd
Caribou	got	jjjjffffmmm		s	nnddDD
17		JAN FEB MAR	APR MAY JUN	JUL AUG SEP	OCT NOV DEC

FISH ("fresh" adults)	LOC	JAN FEB MAR	APR MAY JUN	JUL AUG SEP	OCT NOV DEC
Pink/Humpback Salmon	r+			jjJaa	
Chum/Dog Salmon	fr+		j	JJJJAAAASS	
Sockeye/Red Salmon	m+		jjjj	JJJJAAaa	
Coho/Silver Salmon	r+			AASSSS	oooon
Chinook/King Salmon			jj	Jjjj	
Steelhead (Rainbow Trout)	r			assss	oo
Dolly Varden/Arctic Char	rw+	JJJJFFFFMMMM	AAAAMMMMJJJJ	JJJJAAAASSSS	OOOONNNNDDDD
7		JAN FEB MAR	APR MAY JUN	JUL AUG SEP	OCT NOV DEC

"LOC"= LOCations (see map):

a. Anywhere
b. Baldy Mountain Road
c. Cold Bay (including dock & adj.shoreline)
d. Developed areas (including town and dump)
e. GravElly areas (including roadways)
f. Frosty Road (incl.Frosty Crk/First Bridge)
g. Grant Point Road
h. High elevation alder thickets ("belt")
i. Izembek Lagoon (including Grant Point)
l. Low elevation alder thickets
m. Mortensen's Lagoon/Marsh/Road
n. IN the air
o. Outer Marker Road
p. OutPost Road
r. Russell Creek & Nurse Lagoon
s. Swan Lake
t. Tundra areas
u. MUd flats (saltwater tidal areas)
v. Baldy Village Road
w. Wetlands/Lakes (fresh water)
+. Streams near town (Stapp,Trout,etc)

"JAN, FEB, MAR, APR, MAY, JUN," etc.= JANuary, FEBruary, MARch, APRil, MAY, JUNe, etc.
"x"= species considered accidental along the Cold Bay Road System (or entire area).

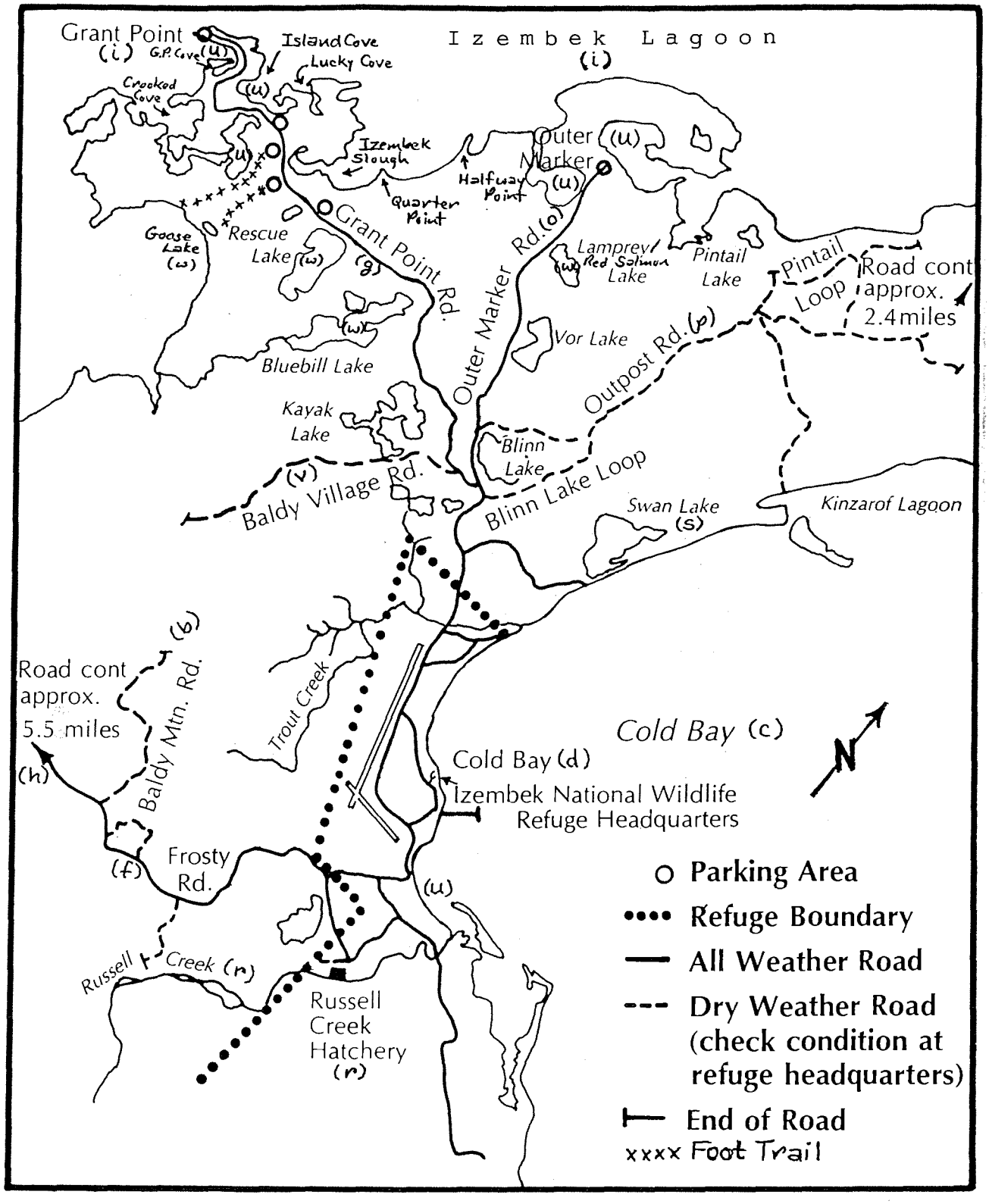
As an example, "jjjj, FFFF, Mmmm," indicates a species occurs during each of 4 weekly periods (1-7, 8-14, 15-21 and 22-end) for January through March, with the "J, F and M" indicating better than a 50-50 chance of seeing a species, and the "j and m" indicating less than a 50-50 chance of observing the species during the appropriate weeks.

Species having completely blank status lines have not been observed/reported along the Cold Bay Road System since this effort began in December 1991, but have been observed along the roads previously. Please report any sightings that would add information or change the status indicated in this guide to:

Fred Zeillemaker, Refuge Manager
Izembek NWR, P.O. Box 127
Cold Bay, AK 99571-0127

(907) 532-2445

CFZ/cfz:13APR94
IZM\IZMROADG.404



COLD BAY ROAD SYSTEM

MAMMALS OF IZEMBEK NATIONAL WILDLIFE REFUGE

Insectivora/Soricidae	
Masked (Common) shrew	Sorex cinereus
Dusky shrew	Sorex monticolus
Lagomorpha/Leporidae	
Tundra hare	Lepus othus
Rodentia/Sciuridae	
Arctic ground (parka) squirrel	Spermophilus parryii
/Muridae	
Northern red-backed vole	Clethrionomys rutilus
Tundra (root) vole	Microtus oeconomus
Brown lemming	Lemmus trimucronatus
Collared lemming	Dicrostonyx groenlandicus
/Dipodidae	
Meadow jumping mouse	Zapus hudsonius
/Erethizontidae	
Porcupine	Erethizon dorsatum
Carnivora/Canidae	
Coyote	Canis latrans
Gray wolf	Canis lupus
Red fox	Vulpes vulpes
/Ursidae	
Brown (grizzly) bear	Ursus arctos
/Mustelidae	
Short-tailed weasel (ermine)	Mustela erminea
Least weasel	Mustela nivalis
Mink	Mustela vison
Wolverine	Gulo gulo
River (land) otter	Lutra canadensis
Sea Otter	Enhydra lutris
/Otariidae	
Steller's (northern) sea lion	Eumetopias jubatus
Northern fur seal	Callorhinus ursinus
/Odobenidae	
Walrus	Odobenus rosmarus
/Phocidae	
Harbor (hair) seal	Phoca vitulina
Artiodactyla/Cervidae	
Moose	Alces alces
Caribou	Rangifer tarandus
Cetacea/Eschrichtiidae	
Gray whale	Eschrichtius robustus
/Balaenopteridae	
Minke whale	Balaenoptera acutorostrata
/Ziphiidae	
Baird's beaked whale	Berardius bairdii
Stejneger's beaked whale	Mesoplodon stejnegeri
/Celphinidae	
Killer whale (orca)	Orcinus orca
/Phocoenidae	
Harbor porpoise	Phocoena phocoena

Taxonomy follows Jarrell, G.H and S.O. MacDonald. 1989. Checklist to the Mammals of Alaska. University of Alaska Museum.

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FISH OF IZEMBEK NATIONAL WILDLIFE REFUGE

Arctic lamprey	Lampetra japonica
Pacific lamprey	Lampetra tridentata
Pacific herring	Clupea harengus pallasi
Rainbow trout (Steelhead)	Salmo gairdneri
Arctic char	Salvelinus alpinus
Dolly varden	Salvelinus malma
Pink (humpy) salmon	Oncorhynchus gorbuscha
Sockeye (red) salmon	Oncorhynchus nerka
Chinook (king) salmon	Oncorhynchus tshawytscha
Coho (silver) salmon	Oncorhynchus kisutch
Chum (dog) salmon	Oncorhynchus keta
Surf smelt	Hypomesus pretiosus
Rainbow smelt	Osmerus mordax
Arctic smelt	Osmerus dentex
Capelin	Mallotus villosus
Eulachon	Thaleichthys pacificus
Walleye pollock	Theragra calcogramma
Pacific cod	Gadus macrocephalus
Saffron cod	Eleginus gracilis
Threespine stickleback	Gasterosteus aculeatus
Ninespine stickleback	Pungitius pungitius
Masked greenling	Hexagrammos octogrammus
Whitespotted greenling	Hexagrammos stelleri
Rock greenling	Hexagrammos lagocephalus
Ribbon snailfish	Liparis cyclopus
Pacific staghorn sculpin	Leptocottus armatus
Warthead sculpin	Myoxocephalus niger
Great sculpin	M. polyacanthocephalus
Sculpin	Myoxocephalus mednius
Silverspotted sculpin	Blepsias cirrhosus
Brightbelly sculpin	Microcottus sellaris
Northern sculpin	Icelinus borealis
Padded sculpin	Artedius fenestralis
Sharpnose sculpin	Clinocottus acuticeps
Coastrange sculpin	Cottus aleuticus
Slimy sculpin	Cottus cognatus
Yellow Irish lord	Hemilepidotus jordani
Red Irish lord	H. hemilepidotus
Bering poacher	Occella dodecaedron
Tubenose poacher	Pallasina barbata
Sturgeon poacher	Agonus acipenserinus
Pacific sand lance	Ammodytes hexaptesus
Crescent gunnel	Pholis laeta
Rock sole	Lepidopsetta bilineata
Yellow fin sole	Limanda aspera
Longhead dab	Limanda proboscidea
Starry flounder	Platichthys stellatus
Arctic flounder	Liopsetta glacialis
Pacific halibut	Hippoglossus stenolepsis

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