

**Izembek National Wildlife Refuge  
Cold Bay, Alaska 99571**

**ANNUAL NARRATIVE REPORT  
CALENDAR YEAR 1996**

U.S. Department of the Interior  
Fish and Wildlife Service  
National Wildlife Refuge System

**IZEMBEK NATIONAL WILDLIFE REFUGE**

**Including  
Izembek, Unimak, Pavlof and North Creek Units**

**Cold Bay, Alaska 99571**

**ANNUAL NARRATIVE REPORT**

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

REVIEW AND APPROVALS

IZEMBEK NATIONAL WILDLIFE REFUGE

Including:  
Izembek, Unimak, Pavlof and North Creek Units  
Cold Bay, Alaska

ANNUAL NARRATIVE REPORT

Calendar Year 1996

 10/28/98  
Refuge Manager Date

\_\_\_\_\_  
Associate Manager

\_\_\_\_\_  
Date

\_\_\_\_\_  
Regional Office Approval

\_\_\_\_\_  
Date

## INTRODUCTION

A December 1960 Public Land Order established the 498,000 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), 84,220 acres of the refuge, including Izembek Lagoon, were determined to be state lands. In 1960 the state of Alaska established the Izembek State Game Refuge, including Izembek Lagoon. The December 1980 Alaska National Interest Lands Conservation Act (ANILCA) Public Law 96-487 redesignated the range a National Wildlife Refuge containing the 417,533 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 the Ramsar Convention 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 Unit 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 Frosty Peak's 6,000 foot summit.

Refuge headquarters are located at Cold Bay, a small community (148 people in 1990 census, but fewer than 120 in 1995) adjacent to the refuge and inhabited largely by transient federal and state government employees and their families. The community is unique among lower Peninsula villages in that it lacks a fishing industry base 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 one regional airline and serves as the air transportation hub for three other local villages.

The 1,008,697 acre Unimak Island Unit, 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. 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 island is also a component of the Aleutian Islands Biosphere Reserve.

The 1,447,246 acre Pavlof Unit and 8,452 acre North Creek Unit, currently components of the Alaska Peninsula National Wildlife Refuge, have been administered by the Izembek Refuge staff since their establishment in 1980. The Alaska Peninsula National Wildlife Refuge was created by ANILCA. The Pavlof Unit stretches along the south side of the Alaska Peninsula from Port Moller to the tip of the Peninsula; the triangular North Creek Unit is located on the north side of the Peninsula. The western boundary of the Pavlof Unit is contiguous with the Izembek Unit boundary. Terrain is dominated by volcanic peaks and other mountains which form the "backbone" of the Alaska Peninsula and end abruptly at the Pacific Ocean in rugged cliffs. Pavlof Unit elevations range from sea level to the 8,261 foot summit of active Pavlof Volcano. 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.

Acreage figures presented here are approximate as much of the land is unsurveyed and selection and conveyance process is on-going. The figures are largely calculated by GIS software.



*Beautiful sunset envelops Amak Island*

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## APPENDIX

1.	King Cove Briefing Report .....	Attached at back
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## **A. HIGHLIGHTS**

- \* ✓ After 16 years in Cold Bay, WB/P Dau will transfer to Migratory Bird Management in Anchorage.
- \* ✓ Pavlof erupts; eruption sustained for three months.
- \* ✓ Year ends without finding a new Wildlife Biologist/Pilot.
- \* ✓ New Land Protection Plan for Izembek initiated.
- \* ✓ Resurgence in interest for a road linking Cold Bay to King Cove occurs.
- \* ✓ University of Wisconsin archeology project continues into third summer field season.
- \* ✓ SAR initiated for two University of Wisconsin students associated with research project.
- \* ✓ Isanotski Corporation renews discussion of land exchange.
- \* ✓ A proposal to harvest caribou on federal lands in the southern Alaska Peninsula region was received by the Kodiak/Aleutians Subsistence Council.
- \* ✓ Refuge reviews environmental compliance audit.
- \* ✓ Elephant seal beached in King Cove taunted by local children, killed by local police.

## B. CLIMATIC CONDITIONS

Wind on the southern Alaska Peninsula is a major factor in day to day living. While the average wind speed was 19.04 miles per hour (mph), there was one instance when peak wind speed hit at least 74 mph. Wind blowing from both the south off the Pacific Ocean and north off the Bering Sea results in a moderate maritime climate. The high temperature for the year was 63° F, and the low was only 6° F.

Cloud cover exceeded 80% on 295 days in 1996. Only 16 days were considered to be clear. On clear or partly cloudy days, the Izembek area is spectacular. With 46.94 inches (water equivalent) of precipitation, 1996 was wetter than usual.

Table 1. Weather Summary for Cold Bay, Alaska, 1996

MONTH	TEMPERATURE			PRECIPITATION			WIND		
	High (°F)	Low (°F)	Avg (°F)	Amt (in.)	#Days <sup>1</sup>	Snow (in.)	Avg (mph)	Peak (mph)	Dir <sup>2</sup>
January	46	8	30.0	3.88	21	8.1	18.1	67	SE
February	45	6	29.4	6.97	25	19.3*	22.5	70	W
March	49	19	36.8	2.39	15	2.1	17.3	68	SE
April	21	49	35.8	2.73	21	5	17.9	58	SE
May	59	21	43.2	2.81	11	trace	17	55	SE
June	59	30	45.5	6.81	22	trace	19.9	62	SE
July	63	38	51.0	5.29	19	0	19.1	54	SE
August	62	38	51.7	2.41	17	0	14.6	49	SE
September	58	33	46.0	3.97	24	trace	17.7	67	SE
October	52	25	39.7	2.65	19	0	18	56	N
November	51	17	37.2	5.28	24	3.5	19.6	67	SE
December	45	12	29.9	1.75	17	8.3	19.8	74	E

<sup>1</sup> Total number of days excludes days on which only a trace of precipitation fell.

<sup>2</sup> Wind direction refers to direction of peak wind. Peak wind direction is not always consistent with the monthly average wind direction.

\* Includes hail

## **C. LAND ACQUISITION**

### **1. Fee Title**

Nothing to report.

### **2. Easements**

Nothing to report.

### **3. Other**

The Federal Aviation Administration abandoned operations at Air Navigation Site No. 176. The 25.83 acre site was removed from public land status and turned over to Alaska Peninsula National Wildlife Refuge. Return of the area to the Refuge is in accord with the 1980 Alaska National Interest Lands Conservation Act. The area is bound by King Cove Corporation and State lands.

RM Siekaniec discussed with members of the Aleutians East Borough the possibility of exchanging the restored 25 acres with land elsewhere. The parcel in question has low resource value in comparison to the rest of the Refuge.

In February, a land exchange request was received by Carl Potts, administrator for the Isanotski Corporation. Corporation representatives want to pursue a land/gravel exchange that was originally initiated but failed in 1986. The U.S. Fish and Wildlife Service owns the subsurface rights to the Isanotski Corporation's Unimak Island holdings. The corporation is seeking gravel rights in False Pass and land in Cold Bay in exchange for wetlands in the Big and Middle lagoons area of Morzhovoi Bay. The exchange was not further addressed until December when Isanotski Corporation board members contacted Realty. They requested new discussions because of changes in board membership and a departure of their land manager. RM Siekaniec scheduled January 1997 meetings.

The Aleutians East Borough notified the Refuge of its intent to seek congressional relief from the impasse with the Refuge concerning the construction of a road from King Cove to Cold Bay through the wilderness of Izembek. If passed into law, the "First Conceptional Draft King Cove-Cold Bay Road Legislation" would direct the Secretary of the Interior to enter into an acre-per-acre land exchange with King Cove Corporation. The proposed draft specifically requests exemption from Alaska Native Claims Settlement Act (ANCSA), Alaska Native Interest Lands Conservation Act (ANILCA), and Department of Transportation (DOT) Act. Refuge staff prepared a briefing report (Appendix I) in response to the proposed legislation. No congressional action was taken by year's end.

## **D. PLANNING**

### **1. Master Plan**

The Izembek National Wildlife Refuge 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 National Wildlife refuge (NWR) CCP and the Pavlof and North Creek units are managed under the Alaska Peninsula NWR CCP. An effort to combine the appropriate portions of the three plans into a single Izembek NWR Complex CCP has been on hold since 1992. Incorporating the three additional units into the Izembek Refuge through legislation once again failed to work its way through Congress as the year ended.

### **2. Management Plan**

The Izembek Land Protection Plan (LPP) was initiated in February. Cyndi Wolfe and Danielle Jerry (Realty) held public meetings in King Cove, Cold Bay, and False Pass to discuss the LPP.

Responding to a Service-wide recommendation, the Izembek NWR staff began updating the Refuge goals. Interim Refuge Goals and Objectives were developed with the assistance of Maggi Arend and Mikel Haase from Regional Office Planning in December. Finalization of the Goals and objectives is expected next year. A list of ten goals has been defined. These goals range from wilderness and wildlife conservation to public education to facilitating public use to ensuring water quality on the Refuge.

### **4. Compliance with Environmental/Cultural Resource Mandates**

A University of Wisconsin-Madison interdisciplinary research crew returned to Cold Bay for a third field season. The group headed by Dr. Herbert Maschner of the anthropology department includes anthropology undergraduate students, a geography graduate student, and a geology graduate student. The anthropology group surveyed Morzhovoi Bay, Kinzarof Lagoon, and Izembek Lagoon for evidence of human occupation. They have located several previously unmapped house areas as well as known sites. Archeological sites tend to be located at or near the mouths of salmon streams. A goal of the project is to relate human migration and settlement to environmental changes.

Geology Ph.D. candidate Tina Dochat continued field work examining Quaternary deposits and landforms to determine the glacial environments and climate change during the last 100,000 years in the Cold Bay and surrounding region. Geography Ph.D. student Jim Jordan continued his study of sea-level fluctuations and climate change during the



last 10,000 years. Two U.S. Geological Survey (USGS) geologists, Frederic Wilson and Florence Weber, joined Jim and Tina for a week. Land coverage was greatly enhanced by the use of a USGS-funded helicopter for 2 days. USGS is continuing work as part of the Alaska Mineral Resource Assessment Program under Section 1010 of ANILCA.

A second group of University of Wisconsin anthropology students lead by Ph.D. candidate Brian Hoffman continued excavation of an Aleut house site that dates from the 1700s at Peterson's Lagoon on Unimak Island.

## **5. Research and Investigations**

Refuge personnel are routinely involved in a number of investigations and surveys which are cooperative or supported in part by the refuge. Results of studies, surveys, and investigations are summarized below. Details of most refuge and cooperative survey projects are reported individually in Section G. Wildlife.

### **Izembek: "Winter Ecology and Population Composition of Pacific Brant at Izembek Lagoon, Alaska"**

The intensive fall aspects of this project involving National Biological Service/Alaska Science Center (NBS-ASC), now the USGS, shifted to winter observations in 1994 and continued through 1996. Brant Project Leader David Ward cooperated with Refuge staff in planning inventories of the growing numbers of over-wintering Pacific brant (see Section G.3).

### **Izembek: "Survival and Migration Ecology of Emperor Geese along the Alaska Peninsula"**

Refuge staff contributed to aspects of this project dealing with population size, migration phenology, and annual productivity. Cooperators include staff members from Migratory Bird Management (MBM)-Anchorage and MBM-Fairbanks who contributed or assisted with analysis of aerial survey data in spring (April and May) and fall (October). Productivity data were collected in September and October by MBM-Anchorage and the Refuge. Refuge staff counted emperor geese during all aerial surveys from fall through spring (see Section G.3).

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

This project was inactive in 1996 with the exception of the maintenance of two 10 m<sup>2</sup> exclosures west of the Outer Marker road. An evaluation of the wintering range of the Southern Alaska Peninsula Caribou Herd (SAPCH) is planned for 1997 (see Section G.8).

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

The fourth field season of a multi-year US Geological Survey-Biological Research Division (USGS-BRD) and Refuge project to evaluate survival status and trends in the Steller's eider population was completed in 1996. In addition to sites within Izembek Lagoon, capture efforts were expanded to Nelson Lagoon for the second year. Data necessary for aspects of this project come from a banding program initiated by Refuge staff more than 30 years ago and from aerial surveys performed by Refuge staff and cooperators since 1975. These data and that gathered over the next few years will be used to estimate survival and productivity rates for the species. Concurrent aerial surveys during the molting period help estimate population composition and allow assessment of population size and habitat use during fall, winter and spring (see Section G.3 and Section G.16).

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

King Salmon Fishery Research Office (KSFRO) personnel conducted continuing efforts to monitor the fall population size and the juvenile:adult ratio during the to September "Russell Creek Silver Salmon Derby" from August 31 to September 2 (see also Section G.11).

### **Izembek NR94-1 "Inventory, Population Structure and Migratory Phenology of Fisheries of the Joshua Green River Watershed"**

KSFRO personnel completed their third field season on the project in 1996. Efforts concentrated on obtaining information on the timing, magnitude and age structure of the silver salmon run especially late in the season (see Section G.11).

## **E. ADMINISTRATION**

### **1. Personnel-1996 Staff**

- |    |                       |  |                    |
|----|-----------------------|--|--------------------|
| 1. | Gregory E. Siekaniec  | Refuge Manager<br>GS-0485-12, PFT              | 05/15/95 - Present |
| 2. | Susan D. Schulmeister | Refuge Operation Specialist<br>GS-0485-11, PFT | 11/13/94 - Present |
| 3. | Christian P. Dau      | Wildlife Biologist/Pilot<br>GS-0486-12, PFT    | 01/30/81 - Present |

4.	Kathryn A. Hermann	Administrative Technician GS-0303-06, PFT	05/15/94 - Present
5.	Robert P. Schulmeister	Maintenance Worker WG-4749-08, PFT	02/10/91 - Present
6.	Tracy A. Schafer	Biological Technician GS-0404-05, TFT	05/13/96 - 09/27/96
7.	Brenda Eliason	Student Trainee GS-0404-04, TFT	06/01/96 - 10/22/96
8.	Harlan Heinrich	Maintenance Worker WG-4749-05, TFT	06/03/96-08/28/96

Table 2. Izembek Refuge five-year staffing pattern, 1992-1996.

	PFT	PPT	PI	Temporary	Tot. FTEs
FY-1992	6	-	-	3 (YCC, LE)	6.0
FY-1993	5	-	-	5 (2 BT, LE, 2 MW)	6.0
FY-1994	5	-	1	4 (2 BT, LE, MW)	6.0
FY-1995	5	-	-	4 (2 BT, LE, MW)	5.0
FY-1996	5	-	-	3 (2BT, COOP)	5.0



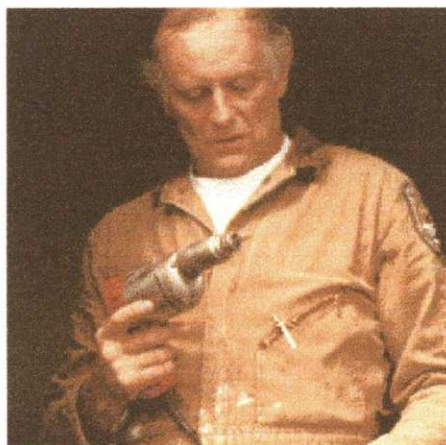
Refuge Manager Greg Siekaniec



Refuge Operations Specialist Susan Schulmeister



Wildlife Biologist/Pilot Chris Dau



Maintenance Worker Bob Schulmeister





Administrative Technician Kathryn  
Hermann



Maintenance Worker Harlan Heinrich



Biological Technician Tracy Schafer



Student Trainee Brenda Eliason

#### 4. Volunteer Program

The Izembek refuge volunteers continued their great work. The group of volunteers was again increased by the recruitment of the University of Wisconsin research crew. The Refuge had 22 volunteers in 1996, including 13 from UW. Cold Bay residents continued to show support for the Refuge by volunteering their services. Jens, Karin, and Niels Dau, Jim Jordan, Robert Nielson, Casey, Claire, and Janelle Siekaniec, and Cheryl Willis assisted in a variety of Refuge activities. We are very appreciative of the help the volunteers render.

#### 5. Funding

Table 3. Izembek Refuge five year funding summary, FY 1992-1996.

(\$x000)	1260 -MMS	1260 MMS	1230	1260 Subsist	1411	(8610)	TOTALS*
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
FY-1995	465	(299)	7	11	0	(40)	483
FY-1996	555	( 26)	3	11	0	(44)	480

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

#### 6. Safety

No lost days due to work-related accidents occurred in 1996.

Refuge Manager (RM) Siekaniec conducted bear and firearm safety training for staff and volunteers. Aviation safety training was conducted by Jim Schofield (OAS, Anchorage) for the same group.



*RM Siekaniec instructs archeology volunteer, Abe Smith, in the location of the kill zone of a bear during firearm safety training.*

A search and rescue mission was launched on July 15 for two volunteers with the University of Wisconsin anthropology crew at Peterson Lagoon on Unimak Island. Ty Beck and Ben Cichowski went hiking on July 14 and failed to return that evening. Wildlife Biologist/ Pilot (WB/P) Dau and RM Siekaniec flew to Unimak to search for the missing hikers but were unable to locate them. Flying the Forward Looking Infrared Radar (FLIR)-equipped State King Air 200, Troopers Ron Kmiecik and Fred Cooper and FLIR operator Glen Godfrey located the pair in good condition on the beach about a mile from camp.

RM Siekaniec, Refuge Operation Specialist (ROS) Schulmeister, Maintenance Worker (MW) Schulmeister, Biological Technician (BT) Schafer, and Maintenance Helper (MH) Heinrich participated in Pinch Hitter Training in August. Bart Stone (OAS) administered the practical in the Refuge Super Cub as well as the classroom training.

## **8. Other Items**

Gilco Construction, Inc. defaulted on their contract for construction of an Alaska Department of Transportation (ADOT) search and rescue building at the Cold Bay Airport and on a special use permit issued for gravel. Gilco had agreed to provide a gravel stockpile for the Refuge at the rate of one stockpiled yard for each yard used in construction. The Refuge received approximately 50% of the contracted allotment of gravel prior to the default.

### **a. Staff Activities**

Refuge staff returned to work on January 8 following a furlough that began in December.

RM Siekaniec attended a Law Enforcement refresher course in Arizona.

The King Cove-Cold Bay Road proposal continued to demand the staff's attention. A briefing report was prepared and meetings were held with the road's proponents.

RM Siekaniec attended Bear Safety Training, Performance Management Training, and RCRA Training in Anchorage in February.

RM Siekaniec represented the Refuge at a Kodiak/Aleutian Subsistence Regional Advisory Council Public Meeting. The group was advised that the Refuge would not support a caribou hunt in Game Management Unit 9(D).

RM Siekaniec traveled to Washington, D.C. to participate in the State Department's "Working Together for Wetlands" conference celebrating the 25th anniversary of the Ramsar Convention.

BT Schafer attended mist netting, banding, and safety training sessions in King Salmon. The sessions were sponsored by the Alaska Peninsula/Becharof NWR Complex.

AT Hermann and ROS Schulmeister attended a pre-retirement seminar in Anchorage.

An attempt to obtain extra housing by relocating an "excessed" FAA house to the Refuge housing compound was dissolved. Budget constraints prohibited the FAA from honoring the initial agreement.

RM Siekaniec, RM Hood (Alaska Peninsula/Becharof Refuge), and Doug Vandegraft of Realty redefined the boundary line between the Pavlof and Chignik Units. Discrepancies had existed between the ANILCA map and the Federal Register description.

WB/P Dau accepted a WB/P position in the Anchorage Migratory Bird Management Field Office. He will be greatly missed when he concludes his duties in Cold Bay in early 1997.

Administrative Technician (AT) Hermann received additional training in budget tracking from Ruth Johnson, Region 7 (R7) Administrative Officer.

RM Siekaniec attended ANILCA training in Anchorage.

WB/P Dau attended the Office of Aircraft Services pilot ground school.

RM Siekaniec filed forms to upgrade the Maintenance Worker position to Maintenance Mechanic.

#### **b. Refuge Review**

R7 Administrative Officer Ruth Johnson conducted a quarters review and Imprest Fund audit while in Cold Bay to provide AT Hermann with additional training. All funds were correctly accounted for.

Charles Grant and John Harris from the regional engineering office conducted a regional environmental compliance audit from July 15 to 17. Despite our state of transition resulting from the incomplete new shop (no storage shelves, cabinets, or containers yet), they were pleased with the effort put forth by the staff to follow correct procedures. They noted a few discrepancies listed below.

1. The Refuge does not have a contract with the landfill management. (This cannot be corrected until the City of Cold Bay and Aleutians East Borough decide who is responsible for landfill.)
2. Not all solid waste loads were covered or contained.



3. The Refuge is not in compliance with drinking-water testing regulations. Drinking water must be tested for lead and copper at five locations every six months for two sessions unless excess lead is found. Drinking water must be tested for organic compounds every three years and for nitrates annually.
4. The refuge does not have a Pollution Prevention Plan.
5. Wood shelving in the fuel storage building was thinner than the required 1".
6. The headquarters gasoline tank dike area does not have a required drainage system.
7. Compressed gases (oxygen and acetylene) are incorrectly stored together and are not secured. "No Smoking" signs are not posted.
8. There is no record of proper disposal of used oil solvents.
9. The documentation of radon tests was not located until after the auditors left Cold Bay.
10. Multiple containers were unlabeled (most of which were empty).
11. Not all boxes in the storage building could be checked because the area was overstocked. Many of the items in the storage area will be moved into the new shop.

On a more positive note, the Refuge was in compliance with the following.

1. The necessary CFRs were located on the internet.
2. MSDSs were correctly located and contain a thorough inventory.

A bridge inspection was conducted by RM Siekaniec and John Harris (Regional Engineering Office). One erosion problem and several minor repairs were noted. MW Schulmeister repaired the bridges and temporarily eliminated the erosion problem by placing a large rock upstream of the problem area.

### **c. Special Regulations**

No refuge special regulations were in place.

## **F. HABITAT MANAGEMENT**

### **1. General**

Maintaining the integrity of natural habitats continues to be the "ecosystem" management strategy of this station. The areas administered from the Cold Bay office are wilderness in the adjective sense, with over 90 percent of the Izembek and Unimak Units being wilderness in the legal sense as well. Habitat integrity is maintained primarily through the management of human activity and monitoring biodiversity on the Refuge. To date, human demands have concentrated on the fisheries and wildlife resources rather than the habitat resources (e.g., mining or oil development) with the exception of gravel extraction near Cold Bay.

Most management challenges have resulted from the confounding land status brought about by ANCSA and ANILCA legislation. Native and state selections and conveyances have been numerous, especially in the Pavlof Unit where land development plans will likely center on economic returns. A resurgence in interest in a road linking King Cove and Cold Bay continued in 1996, a topic occupying a considerable amount of time by refuge and RO staffs in the preparation of a "Briefing Report".

## 2. Wetlands

The premier wetlands of the lower Alaska Peninsula are the 85,000 acre Izembek Lagoon and associated watershed habitats. Essentially, the entire Pacific brant population stages on the lagoon each fall to feed on eelgrass prior to migration. The lagoon also hosts significant numbers of Canada geese, emperor geese, Steller's eiders, a portion of the local semi-migratory population of tundra swans, several species of dabbling ducks, seaducks, and a variety of shorebirds during migration, and hundreds of sea otters and harbor seals throughout the year. The eelgrass beds within the lagoon are the largest in the world.

Due to the importance of these estuarine habitats to hundreds of thousands of waterbirds from the arctic, Bering Sea and both sides of the Pacific Ocean and the Bering Sea food web which supports a large international commercial fishing industry, Izembek State Game Refuge (SGR) and Izembek National Wildlife Refuge are truly a Ramsar Convention *Wetland of International Importance*, recognized in 1986 as the first such site in the U.S. Additionally, in recognition of the area's value to migratory shorebirds, Izembek NWR and Izembek SGR are being considered as an area for an international designation as a Western Hemispheric Shorebird Reserve Network (WHSRN) *Reserve of International Importance* and as the first Alaska, and U.S., East Asian-Australasian Shorebird Reserve Network site. Bob Gill and Lee Tibbitts, USGS-Biological Research Division-Alaska Science Center (BRD-ASC) have drafted a report summarizing recent biological information they have collected in cooperation with the Izembek staff relating to these nominations.

Under Project 02.05-21, Aleutian Chain Biodiversity, of the U.S.-Russia Agreement on Cooperation in Environmental Protection, Area V, Protection of Nature and the Organization of Reserves, the governments of Russia and the United States have recognized the Izembek NWR and the Kronotskiy State Biosphere Reserve in Kamchatka as the first "Sister Refuges" in the U.S. Ecosystem relationships and processes within very similar critical habitats provided the primary justification for this still unofficial relationship.

Field personnel at both Izembek and Kronotskiy hope to find official approval for this cooperative relationship in 1997 and towards this end a joint "Chronicle of Nature" (the Russian version of the annual narrative report) is being drafted. This report will provide

descriptions of the two areas and suggest specific topics for cooperative studies or support.

Terrestrial habitats within the Izembek NWR are composed of nearly 87 percent wetlands. Approximately 61 percent of the Izembek Unit is ericaeous tundra; 19 percent are ponds, lakes or streams; and 7 percent is grass/sedge marsh. These wetlands are critical to the health of Izembek Lagoon and other estuaries which they surround. The Pavlof, North Creek and Unimak units contain substantially smaller proportions of wetlands, since the terrain of those areas is dominated by mountains or other upland features.

In 1996, Tom Jennings and Jerry Tande (Alaska Natural History) of the National Wetlands Inventory (NWI) came to Cold Bay to field check wetlands mapped at the Cold Bay Long Range Radar Site (LRRS). NWI was contracted to map wetlands on U.S. Air Force lands at 21 radar sites throughout Alaska. The investigators identify prospective wetlands on black and white and color infrared aerial photographs and then field check their observations adding information about vegetation and hydrology. Because the LRRS is small, there was time to examine other wetland sites around Cold Bay.

## **6. Other Habitats**

A U.S. Army Corps of Engineers site cleanup at former Department of Defense installations at Scotch Cap and Cape Sarichef at the west end of the Unimak Unit was scheduled to begin in 1996. However, remediation funding was not received this year.



***Pavlof Volcano*** began erupting September 15. Lava flowed down the northwestern flank nearly reaching the base. Ash and molten material reportedly as big as Volkswagens exploded from the summit cone. The eruption was sustained through December, becoming the longest sustained eruption of Pavlof recorded. RM Siekaniec, ROS Schulmeister, and MW Schulmeister accompanied members of the Alaska Volcano Observatory (AVO) on an observation flight. AVO provided the Refuge with a video taken during the flight. Pavlof is the most active volcano in the Aleutian Arc.

## **12. Wilderness and Special Areas**

Over 90 percent of the Izembek and Unimak Units of the Refuge are designated wilderness. There are several areas within the Pavlof Unit that meet wilderness criteria

as well as being contiguous with the Izembek Wilderness. One area includes Pavlof Volcano and the surrounding uplands which is geologically significant and provides important, high density denning habitat for brown bears.

The Unimak Island Unit is a component of the Aleutian Islands Biosphere Reserve. The island's dominant feature, Shishaldin Volcano, is designated a National Natural Landmark.

## **G. WILDLIFE**

### **1. Wildlife Diversity**

There have been 186 species of birds and 30 species of mammals recorded on or adjacent to the four Izembek NWR Complex units. At least 41 species of fish (most being marine for at least some part of their lives) have also been documented. No new species were added during 1996.

### **2. Endangered Species**

The U.S. Fish and Wildlife Service (Service) formally proposed the Steller's eider as a threatened species in 1993. Data collection and other related tasks continued to date. Final designation as threatened was expected in late 1996 or early 1997. By year's end, no decision had been made. Steller's eider remains a Category I species. Izembek NWR Complex is a major wintering site hosting at times up to 70% of the estimated world population.

Steller's sea lions occur commonly in coastal areas adjacent to the refuge. Currently classified as threatened, populations of this species continue to decline. The population in the southern Alaska Peninsula and eastern Aleutian Islands has stabilized at a depressed level while that in the central and western Aleutians continues to plummet and may be proposed as endangered. The refuge continues to provide lodging and logistic support for National Marine Fisheries biologists monitoring these populations.

### **3. Waterfowl**

Izembek Refuge Complex supports a large variety and abundance of waterfowl throughout the entire year. Peak populations are present in spring (March/April) and fall (September/October). The primary goose species present include Pacific brant, Taverner's Canada geese and emperor geese with lesser numbers of cackling Canada geese. Canada geese are abundant in the fall and rarely if ever seen in the spring.



Aerial population surveys are conducted year-round however more intensive efforts are made throughout September and October to enumerate the number of brant and emperor geese, as well as other waterfowl species, in the Izembek area. Fall 1996 surveys resulted in estimated average populations of 118,188 brant (n=7), 2,381 emperor geese (n=8) and 43,841 Canada geese (n=7). In comparison to 1995 population estimates, these data suggest decreases of 22.4, 23.6 and 34.6 percent, respectively for brant, emperor geese and Canada geese. In addition to tremendous concentrations of these species during staging periods, the Refuge also supports important wintering populations of Pacific brant and emperor geese.

The Steller's eider is the most abundant sea duck observed in estuaries of the Refuge Complex through the fall, winter and early spring. Steller's eider breeds primarily in Russia; only a small portion of the Steller's eiders breed in Alaska. The area from Port Moller to the tip of the Alaska Peninsula may be the center of abundance for the species during those seasons of the year. The Alaska breeding population is proposed as threatened. Available data on the species suggests a possible decline of more than 50% during the past 30 years.

### **Tundra Swan**

The lower Alaska Peninsula tundra swan population is an important and visible component of Refuge wetland habitats. The population is unique in North America because very few members of the population migrate. This characteristic coupled with the relatively small size of the population has resulted in this population being excluded from several proposals for permit hunts over the years. Only those hunters using the Cold Bay road system or aircraft access provided by commercial guides would have the opportunity to harvest a swan. Thus, the proposed hunt presents a dilemma in that the swan population could support a small harvest; however, most hunting would likely occur in areas used by most visitors to view wildlife. Inequities in harvest potential arise due to difficult logistics often limited to small aircraft. Refuge staff will work with the Alaska Department of Fish and Game to insure these concerns are discussed.

The Refuge continues an inventory program for the tundra swan population on the Izembek Unit begun in 1977 and on and adjacent to the Pavlof Unit begun in 1984. Several phases of this program have helped meet management needs and have been down-sized to a basic Wildlife Inventory Procedure designed to provide indices of health of the fresh-water aquatic ecosystem.

Aerial surveys are conducted in spring to determine distribution, habitat use, population size and demography; in summer to record nesting success and productivity; and in winter to determine population size, distribution and survival. To facilitate and augment these investigations, numerous swans have been banded and color marked. A marked population of known-aged birds has enabled us to document seasonal habitat fidelity,



production and survival of cygnets, and brood movements and to identify migratory and non-migratory trends in sub-populations using various areas of the Refuge Complex. Historically, 500-600 tundra swans have wintered on the lower Alaska Peninsula and Unimak Island, with most concentrated in the Peterson Lagoon area (Unimak Island). The summer population on the Unimak Unit of the refuge complex is less than 100 individuals. The Izembek Unit contributes an average of 212 birds (209 in 1996), so the wintering population also includes birds from adjacent breeding areas on the Pavlof Unit where 450-700 birds breed (699 in 1996). The Unimak Island wintering population has fluctuated from fewer than 100 birds to nearly 600 birds over the past decade.

Annual Refuge Complex breeding population surveys were conducted on the Izembek Unit 14 May and on the Pavlof Unit 16-20 May (Tables 4 and 5). Totals of 209 birds (up 32.3 percent from 1995) and 22 nests (up 10.0 percent from 1995) were tallied on the Izembek Unit survey. 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. A total of 699 swans (up 31.4 percent from 1995) and 59 nests (up 11.3 percent from 1995) were observed. Eggs in eleven (50 percent) of the nests found on the Izembek Unit were known to hatch. Six (54.6 percent) of the broods produced survived to age class II; 2 broods were known to fledge.

Table 4. Tundra swan breeding population survey, Izembek Unit, Izembek NWR<sup>1</sup>

Date	Number of Swans Observed (% of total)					Total		Density <sup>2</sup>	
	Single	Single + Nest	Pair	Pair + Nest	Flocks	Nests	Swans	Est. Breeding Pairs (n) <sup>3</sup>	Swans
1996 (5/14)	3(1)	0	50(24)	44(21)	112(54)	22	209	0.12(51.5)	0.50
Average									
1979-96	9.4(4.6)	0.9(0.4)	62.6(29.9)	48.2(42.1)	90.5(42.1)	25	211.6	0.15(61.1)	0.48
n = 18									

<sup>1</sup> Survey area Bechevin Bay to Cathedral River. All wetlands  $\leq 500$  feet ASL, 413.9 mi<sup>2</sup> (1076.1 km<sup>2</sup>).

<sup>2</sup> Birds/mi<sup>2</sup>

<sup>3</sup> Estimated breeding pairs = Observed pairs + 1/2 Singles (Note: Singles w/nests counted as breeding pairs).

Table 5. Tundra swan breeding population survey, Pavlof Unit, Izembek NWR<sup>1</sup>

Date	Number of Swans Observed (% of total)						Total		Density <sup>2</sup>	
	Single	Single + Nest	Pair	Pair + Nest	Pr + Brood	Flocks	Nests	Swans	Est. Breeding Pairs (n) <sup>3</sup>	Swans
1996 (5/16-20)	44(6)	8(1)	340(49)	102(15)	0	205	59	699	0.35(251)	0.99
Average										
1987, 1989-96	49.0 (8.5)	12.0(2.1)	242.5 (42.0)	97.8 (16.9)	0.3 (0.05)	175.9 (35.5)	60.9	577.4	0.29 (205.6)	0.82
n = 8										

<sup>1</sup> 1:63,360 survey maps, 1987, 1989 to present (Port Moller C-5,6;D-3,4,5,6) 707.6mi<sup>2</sup>.  
All wetlands ≤500 feet ASL.

<sup>2</sup> Birds/mi<sup>2</sup>

<sup>3</sup> Estimated breeding pairs = Observed pairs + 1/2 Singles (Note: Singles w/ nests counted as breeding pairs).

## **Brant**

Essentially the entire Pacific brant population uses lagoons and bays within the Izembek NWR Complex for up to three weeks each spring and eight weeks each fall. Up to 14,000 brant winter here in recent years (Table 6). Pacific brant breed in arctic Canada and in arctic and sub-arctic areas of Alaska and Russia.

NBS/ARC biologist David Ward visited Kinzarof Lagoon on February 29<sup>th</sup> to gather brant age ratio data and read tarsus bands. Ward read 35 bands from a single flock of 1000 birds.

A short duration spring staging period is characterized by a gradual influx of birds passing low over the water of Cold Bay. A stopover in Izembek Lagoon usually begins in late March or early April. The influx peaks between the last week of April and the middle of May. The first noted migrating brant in 1996 were observed over Cold Bay on April 6. Additional flocks were observed on April 12<sup>th</sup>, 13<sup>th</sup>, 17<sup>th</sup>, 18<sup>th</sup>, and 22<sup>nd</sup>. An estimated 38,532 birds were observed on Izembek Lagoon on April 18<sup>th</sup> suggesting a significant influx had occurred prior to that date. By mid-May most departed for northerly breeding grounds. Spring movement is complete by the first week of June. From April 27<sup>th</sup> to 30<sup>th</sup>, WB/P Dau conducted the annual spring emperor goose survey with Rod King from MBM-Fairbanks in coastal areas of southwestern Alaska. They counted 51,506 brant, most of which were in Izembek Lagoon.

In fall, the first birds normally arrive during the third week of August. The first sighting in 1996 was on August 20<sup>th</sup> (the 25 year average is August 19<sup>th</sup>). The population peaked in late September and most are estimated to have departed on November 6<sup>th</sup> (estimated  $\leq 70,000$ ). Smaller departures likely occurred on October 23<sup>rd</sup> and 31<sup>st</sup>. Brant winter in coastal areas from British Columbia to Mexico. The estimated 55 hour flight to wintering areas covers a maximum of 3,300 miles.

Table 6. Aerial surveys of goose populations on Izembek and adjacent lagoons, 1996.

Date	Number of Birds			Observer
	Brant	Canada Goose	Emporer Goose	
4 Sept.	69,505	8,332	2,211	C. Dau/G. Siekaniec
16 Sept.	119,439	47,487	2,265	C. Dau/M. Petersen
25 Sept.	142,809	45,958	2,290	B. Larned/T. Tiplady
26 Sept.	92,044	45,213	1,173	C. Dau/P. Flint
28 Sept.	181,361	38,570	2,162	R. King/B. Eldridge
9 Oct.	99,724	42,177	1,665	C. Dau/D. Ward
14 Oct.	117,474	48,098	4,757	C. Dau/D. Ward
22 Oct. <sup>1</sup>	74,463	39,382	2,284	C. Dau/G. Siekaniec
8 Nov. <sup>2,3</sup>	41,650	9,024	2,450	C. Dau
Ave. of Peak Surveys (n) <sup>4</sup>	118,188 ± 69,460 <sup>5</sup> (7)	43,841 ± 7,515 (7)	2,381 ± 2,056 (8)	

<sup>1</sup> Partial departure of brant and Canada geese occurred on 23 and 31 October.

<sup>2</sup> It appears most of the brant may have departed on 6 November.

<sup>3</sup> Izembek and Kinzarof lagoons only.

<sup>4</sup> Brant and Canada geese 16 Sept. - 22 Oct., emperor geese 26 Sept. - 8 Nov.

<sup>5</sup> SE(95%)

Cooperative 1996 fall brant investigations by the Refuge and USGS-BRD staffs were directed toward the collection of data on productivity as well as on population size. These data are collected through a variety of ground and aerial surveys. Productivity surveys of brant and emperor geese have been conducted annually for 34 years by Izembek NWR Complex staff (Table 7). USGS-BRD staff contributed to and greatly expanded the efforts beginning in the mid-1980s. The 1996 data were collected during August, September, and October. A total of 19,349 brant were age classified during ground counts. This included only 4,201 (21.7 percent) juveniles, 6.1 percent below the long-term average of 23.1 percent and well below the near record 1995 production of 36.1 percent. Average family- group size for brant was 3.0 juveniles/family (n=50 families), with 2.7 the 31 year average.

Table 7. Brant and emperor goose production and family group counts, Izembek NWR, 1996.

Species	Month	Production		Family Group Size		
		Sample <sup>1</sup> Size	Juveniles (%)	Number of Families	Number of Juveniles	Ave
Brant	Sept.	9,289	2,210(23.8 )	34	115	3.4
	Oct.	10,060	1,991(19.8 )	16	37	2.3
	Total	19,349	4,201(21.7 )	50	152	3.0
Emperor Goose	Sept.	2,503	342(13.7)	86	224	2.6
	Oct.	1,256	289(23.0)	39	106	2.7
	Total	3,759	631(16.8)	125	330	2.6

<sup>1</sup> Total number of geese classified to age.



Aerial population surveys were flown throughout September and October to estimate the number of brant, emperor geese, Canada geese, and other waterfowl species, in the Izembek area. Refuge staff performed five surveys and MBM personnel conducted two additional counts prior to the first migratory departures on October 23. Fall 1996 surveys resulted in estimated populations of 118,188 brant (n=7), 2,381 emperor geese (n=8), and 43,841 Canada geese (n=7). In comparison to 1995 population estimates, these data suggest decreases of 22.4% brant, 34.6% emperor geese, and 23.6% Canada geese. The population estimate for brant, in combination with production counts, was used to estimate the composition of the fall population (Table 8).

Table 8. Brant population composition, Izembek NWR, 1996.

Parameters	Est. Number of Birds	% Change	
		from 1995	from 16-yr-average <sup>1</sup>
Total Count <sup>2</sup>	118,188	-22.4	-12.5
Est. No. of Juveniles (i.e. 21.7% of total)	25,647	-53.4	-8.2
Est. No. of Families (i.e. Total Juv÷3.0 Juv./Fam)	8,436	-57.1	-19.1
Est. No. of Breeding Adults (No. of Families x 2)	16,872	-57.1	-19.1
Est. No. of Sub-adult and Non and Failed Breeding Adults (i.e. Total Count Minus Juveniles and Breeding Adults)	75,669	-23.3	-12.2

<sup>1</sup> Average 1981-1996.

<sup>2</sup> Average of 7 surveys, 16 September to 22 October.

Because the fall Izembek Lagoon brant population 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 has aided in determining the extent the population components mix, their seasonal movements, and fidelity to specific estuarine habitats within the Refuge. The extensive marking and resighting effort, organized and performed by USGS-BRD staff, is providing the first accurate indicator of age and sex related survival for the various breeding components of the population. In 1996, efforts continued to determine the ratio of dark-bellied (Alaskan and Russian breeding) to light-bellied (Canadian Arctic breeding) brant. At Neumann Island and Moffet Point, light-bellied brant (n=45) made up 1.6% of 2,873 brant classified. Juveniles made up 36.9% of all observations at Neumann Island and Moffet Point and 28.9% of the light-bellied brant sampled.

On November 8, 41,650 brant were observed during an aerial survey of Izembek and Kinzarof lagoons. Our next aerial survey on December 19 resulted in a count of 7,460 brant. Ice cover, >85 percent during the January survey, affected the distribution of brant during winter months, but based on observations of previous years, the ice cover does not appear to cause the birds to disperse from the general area.

Refuge staff continued to provide assistance to the Pacific Flyway Council by providing a mid-winter estimate of the number of brant in Izembek and adjacent lagoons. Izembek NWR Complex data are important in assessing the distribution and abundance of brant flyway wide. The estimated flyway population (based on an average of seven counts during the peak of the fall staging period at Izembek NWR Complex) was 118,188 birds.

### **Emperor Goose**

Essentially all of the Pacific Flyway and world's population of emperor geese migrate through the Izembek NWR each fall and spring, with several thousand overwintering. Refuge staff and cooperators perform aerial surveys to estimate the population size on and adjacent to the refuge from fall arrival through spring departure (Table 9).

Since 1981, Izembek NWR and MBM-Fairbanks staffs have cooperated in performing an annual spring emperor goose aerial survey of coastal areas from the Yukon-Kuskokwim Delta to Unimak Island, including the north and south sides of the Alaska Peninsula. The Pacific Flyway Management Plan for emperor geese identifies a population goal of 150,000 birds (comparable to historic levels for the fall population) and directs management decisions based on the annual spring survey.

The 16th consecutive survey was flown April 27 to 30, 1996 by Rod King, MBM-Fairbanks, and WB/P Dau. A total of 80,035 emperor geese were observed in the survey area. This estimate is the first time in 15 years the count has exceeded 80,000. This year's data brought the 3-year moving average to 64,051. Resumption of emperor goose

hunting will be reconsidered when the spring population reaches 80,000 birds based on a 3-year moving average. The only historic indicator of spring population size is the 139,000 birds observed during a 1964 survey.

Table 9. Emperor goose population composition, 1996.

Parameters	Est. Number of Birds	% Change	
		from 1995	from 16-yr-average <sup>1</sup>
Total Count <sup>2</sup>	87,018	-4.4	+12.1
Est. No. of Juveniles (i.e. 17.1% of total)	14,880	-35.9	-15.6
Est. No. of Families (i.e. Total Juv÷2.6 Juv./Fam)	5,723	-21.1	-5.5
Est. No. of Breeding Adults (No. of Families x 2)	11,446	-21.1	-5.2
Est. No. of Sub-adult and Non and Failed Breeding Adults (i.e. Total Count Minus Juveniles and Breeding Adults)	60,692	+13.9	+26.6

<sup>1</sup> Survey conducted throughout southwest Alaska. Data provided by Rod King, MBM-Fairbanks.

<sup>2</sup> Percent juveniles in the population estimated during aerial photographic surveys conducted by Bill Larned and Tim Tiplady, MBM-Anchorage. Family group size data from Izembek NWR.

<sup>3</sup> Average 1981-1996.

The average of eight counts during the peak fall staging period at Izembek NWR was 2,381 (range 1,665-4,757). The 1995/6 and 1996/7 winter counts peaked at 5,325 (March 4) and 9,451 (December 23), respectively.

Refuge and USGS-BRD personnel cooperated to collect emperor geese productivity and population data at Izembek in 1996. These data are collected from ground and aerial surveys as has been the tradition for 30 years at the Izembek NWR (Table 10). The 1996 data were collected during August, September, and October. A total of 3,759 emperor geese were classified to age with 631 (16.8%) being juveniles, 29.7% below the long-term average of 23.9%. Sampling of the emperor goose population throughout all Alaska Peninsula fall staging areas suggested 17.1% were juveniles (Tim Tiplady, MBM). Emperor goose family group size averaged 2.6 juveniles/family (n=125 families); the 30 year average is 2.9.

### **Canada Goose**

Taverner's Canada geese are plentiful fall migrants at the Izembek NWR but utilize other migration routes in spring (Table 11). Cackling Canada geese make up a small but increasing proportion of the fall staging population. The rare presence of Aleutian Canada geese in autumn is based on the sighting of one tarsus banded bird in the late 1980s. Spring observations of Canada geese, assumed to be Aleutian Canada's, are rare and usually of single birds or small groups.

First fall arrivals were observed August 19. Aerial surveys suggested the peak population was 48,098 birds on October 14. The average of seven fall aerial surveys was 43,841 birds. Canada geese are the primary bird in the hunter's bag (67.4 percent of the total estimated goose harvest in 1995). The age composition of the harvest, based on hunter bag check data, was 2:0:1. Males made up 63.9 percent of the adult harvest and 66.7 percent of the juvenile harvest.

Canada geese departed in large numbers on October 25 (25%) and November 11 (75%) on their long, rapid fall flight to the Pacific Northwest, primarily to Oregon's Willamette Valley. Aerial surveys performed by Refuge staff confirmed these departures. On November 20 and December 1, only 113 and 2 Canada geese, respectively were observed on the Refuge.

### **Steller's Eider**

The Steller's eider receives considerable attention by the refuge and USGS-BRD during the molting and staging periods. In 1992, the Service designated the Steller's eider as a Category 1 species. In 1993, the Alaska breeding population was proposed for threatened species status. The process continued through 1994 and 1995 when a moratorium on new Endanger Species Act (ESA) listings and congressional pressure to

alter the act left the Steller's eider on hold. Threatened species designation was expected late in 1996 but has yet to be made. During 1996, Refuge staff and cooperators completed 15 and 8 replicate Steller's eider counts in the Izembek NWR and Nelson Lagoon survey areas, respectively (Table 12). These data are collected to provide long-term trend data on population size and an appraisal of migratory phenology.

The Steller's eider is a rare breeder on Alaska's North Slope and is seldom seen during the breeding season in its historical range on the Yukon-Kuskokwim Delta. The species is common, but in greatly reduced numbers at spring and fall staging areas and wintering areas of Alaska. Steller's eiders breed throughout the Russian Arctic but numbers and population trends are unknown.

In late summer, large numbers of Steller's eiders arrive from arctic breeding areas to molt at Izembek Lagoon. Banding operations begun in 1961 were greatly expanded through cooperative efforts with USGS-BRD beginning in 1993. Steller's eiders are long-lived; several of our recaptured birds have reached a minimum age of 20 years. Recaptures confirmed that both Russian and Alaskan segments of the breeding population are represented at the Izembek NWR. From 1961 to 1992 a total of 7,709 birds were banded at Izembek Lagoon. Expanded efforts from 1993 to 1996 added 19,176 new birds (3,241 in 1996) to the Izembek Lagoon banding total. In 1996 there were 2,487 previously banded birds recaptured. This brings 1993-96 recapture total to 8,398; fewer than five of these were birds banded at other locations. This very large data set will be used to generate survival estimates for the population.

At Nelson Lagoon, banding efforts were begun in 1995 and continued in 1996. Nelson Lagoon is an important molting site approximately 65 miles northeast of Cold Bay. The degree of intermixing of the Izembek and Nelson Lagoon molting populations needed to be determined prior to estimation of survival rates. Of 11,080 Steller's eiders captured at Nelson Lagoon fewer than 50 ( $\leq 0.4\%$ ) were banded at Izembek Lagoon in previous years. In 1996, 1,603 birds were recaptured at Nelson Lagoon; the proportion of Izembek birds is yet to be determined. These data confirm a high degree of molting-site fidelity within and between lagoons and that it is appropriate to consider these as essentially closed populations for the purpose survival analysis.

Aerial survey data for Steller's eiders, collected routinely by the refuge since 1975 and MBM since 1980, suggest fluctuating but generally declining winter and spring staging populations in southwestern Alaska. In 1993 and 1994, MBM intensified aerial survey efforts during the spring staging period in southwestern Alaska. Due to funding limitations, this effort was not continued in 1995 or 1996. Thus the estimates collected during the spring emperor goose survey over the same area provide the long-term index-of-population trend. This index of 36,004 birds was down 25.9 percent from 1995.

Table 12. Steller's eider aerial survey data, Izembek NWR, 1996.

Date	Observers <sup>1</sup>	Izembek Complex	Nelson Lagoon	Total	Flock Composition (%) <sup>2</sup>			
					Male	Female	Equal	Total Flocks
12 Jan.	CPD/RPS	14,043			2(3.7)	7(13.0)	45(83.3)	54
1 March	CPD/GES		33,679		0(0)	1(3.3)	29(96.7)	30
				74,140				
4 March	CPD/DHW	40,461			6(6.9)	0(0)	81(93.1)	87
18 March	CPD/GES	45,750			15(7.9)	3(1.6)	172(90.5)	190
18 April	CPD/GES	34,670			4(4.1)	0(0)	94(95.9)	98
28 April	RJK/CPD		NA		1(6.3)	0(0)	15(93.7)	16
				NA				
29 April	RJK/CPD	NA			0(0)	0(0)	10(100)	10
4 Sept.	CPD/GES	17,521			-	-	-	-
16 Sept.	CPD/MRP	19,235			-	-	-	-
				55,890				
19 Sept.	CPD/MRP		36,655					
25 Sept.	WWL/TT	3,577			-	-	-	-
26 Sept.	CPD/PLF	16,768	33,679	50,447	-	-	-	-
28 Sept.	RJK/WDE	NA	NA	NA	-	-	-	-
9 Oct.	CPD/DHW	15,420			8(18.6)	5(11.6)	30(69.8)	43
14 Oct.	CPD/DHW	25,483			11(14.5)	15(19.7)	50(65.8)	76
22 Oct.	CPD/GES	12,064			8(21.6)	3(8.1)	26(70.3)	37
23 Dec.	CPD/GES	11,119			9(11.8)	3(4.0)	64(84.2)	76

<sup>1</sup> CP Dau, WD Eldridge, PL Flint, RJ King, MR Petersen, RP Schulmeister, GE Siekaniec, T Tiplady, DH Ward.<sup>2</sup> Flock composition based on pilot observations only.



## Other Waterfowl



*Two Oldsqualls take flight from Cold Bay.*

In 1996, the Refuge continued a project begun in 1992 designed to estimate the size of breeding duck populations and provide annual indices on the Izembek Unit of the Izembek National Wildlife Refuge Complex. The Pavlof Unit of the refuge was added to the survey procedure in 1994. Data collected from 1992-94 on the Izembek Unit were used to refine the survey area boundary. The new boundary is defined by observed waterfowl use rather than being extended to include all wetland habitats identified using satellite imagery. The three year data set from the Pavlof Unit, 1994-96, will be used for the same purpose. A sampling protocol and wildlife inventory procedure is being drafted to guide monitoring species composition and population trends.

Waterfowl population surveys were performed on and adjacent to the Izembek and Pavlof Units of the Izembek National Wildlife Refuge on May 31 and June 1 and 10, 1996, respectively. The refuge Piper PA-18 was used to sample 18.0 mi<sup>2</sup> or 6.3% of the 284 mi<sup>2</sup> of lowland, wet marsh habitats of the Izembek Unit and 40.6 mi<sup>2</sup> or 5.7% of the 707.7 mi<sup>2</sup> area on and adjacent to the Pavlof Unit.

Mallard, greater scaup, and black scoter were the most abundant species observed on both the Izembek and Pavlof Units. Expanded population totals and densities for the Izembek Unit calculated using established visibility ratios were 4,553 mallards (16.0 birds/mi<sup>2</sup>), 6,069 greater scaup (21.4 birds/mi<sup>2</sup>), and 1,767 black scoter (6.2 birds/mi<sup>2</sup>). Averages for the Izembek Unit, 1992-96, were 5,489 mallards (19.3 birds/mi<sup>2</sup>), 4,404 greater scaup (15.5 birds/mi<sup>2</sup>), and 2,006 black scoters (7.1 birds/mi<sup>2</sup>). Expanded population estimates and densities on the Pavlof Unit in 1996 were 7,264 mallards (10.3 birds/mi<sup>2</sup>), 17,011 greater scaup (24.0 birds/mi<sup>2</sup>), and 13,419 black scoters

(19.0 birds/mi<sup>2</sup>). Averages for the Pavlof Unit, 1994-96, were 7,963 mallards (11.3 birds/mi<sup>2</sup>), 15,317 greater scaup (21.6 birds/mi<sup>2</sup>), and 12,844 black scoters (18.2 birds/mi<sup>2</sup>).

Densities of estimated breeding pairs on the Izembek Unit were highest for greater scaup (4.00/mi<sup>2</sup>) followed by black scoter (2.67/mi<sup>2</sup>) and mallard (2.00/mi<sup>2</sup>). On the Pavlof Unit breeding pair densities for the three primary species were black scoter (6.45/mi<sup>2</sup>), greater scaup (6.03/mi<sup>2</sup>), and mallard 1.28/mi<sup>2</sup>. Northern pintail, gadwall, green-winged teal, wigeon, bufflehead, white-winged scoter, red-breasted merganser, common merganser, and harlequin ducks occur in low densities.

Izembek staff also conducted duck brood surveys to provide production trend data on two lakes off the Cold Bay road system (Izembek Unit) known to be important to ducks. In 1996, only the late period survey on our small index plots were completed. Data indicate above average production in mallard (+58%) and greater scaup (+122%). Only single broods of pintail and black scoter were observed. BT Schafer and Volunteer Dochat surveyed Bluebill Lake on 2 August and Lamprey (Red Salmon) Lake on 5 August.

#### **4. Marsh and Water Birds**

Red-throated, Pacific, common, and yellow-billed 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) June 15, annual Christmas Bird Count (CBC) December 30, and incidental observations provide our only indices of population trends, production, and habitat use by a variety of these otherwise unstudied species. Three common loons and two lesser sandhill cranes were observed during the 1996 BBS. A single common loon, both horned and red-necked grebes, and pelagic cormorants were found during the 1996 CBC. All noteworthy marsh and water bird observations are reported quarterly to the Alaska regional coordinator for use in compiling material for *National Audubon Society Field Notes*.

#### **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 populations peak during fall migration and to a lesser extent in spring. Extensive inter-tidal flats provide ideal shorebird foraging habitat year-round. Refuge staff conducted a number of ground surveys at three sites accessible from the Cold Bay road system between early June and early August to document seasonal species composition, abundance, and migration phenology. These surveys are done in support of the Pacific Flyway Project administered by the Point Reyes Bird Observatory in California. Additionally, data collected during a cooperative Refuge/NBS-ASC evaluation of breeding and migratory shore bird populations in 1993 and 1994 were summarized in a report drafted to support the designation of the refuge as Western Hemispheric Shorebird Reserve Network (WHSRN) and/or Austral-Asian Shorebird Reserve Network sites.

The annual Breeding Bird Survey and Christmas Bird Count, and incidental observations provided indices of population trends, production, and habitat use by a variety of these otherwise unstudied species. Semipalmated plovers, least sandpipers, rock sandpipers, common snipe, mew gulls and glaucous-winged gulls were tallied during the 1996 BBS. Only glaucous-winged gulls and pigeon guillemots were found during the 1996 CBC. All charadriiform observations are reported quarterly to the Alaska regional coordinator for use in compiling material for *National Audubon Society Field Notes*.

## 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 on the Refuge. All five species are uncommon and only the bald eagle and rough-legged hawk are confirmed regular breeders. Both eaglets at a bald eagle nest monitored each year near Cold Bay were banded on July 24.

The annual BBS and annual CBC and incidental observations provide indices of population trends, production, and habitat use by a variety of otherwise unstudied raptor species. Numerous bald eagles and two gyrfalcons were encountered during the 1996 CBC. All raptor observations are reported quarterly to the Alaska regional coordinator for use in compiling material for *National Audubon Society Field Notes*.

Refuge staff provided care for a juvenile bald eagle found incapacitated in a tar/oil pit on State of Alaska DOT land near the Cold Bay airport in August 1996. The bird was washed following

instructions provided by the Anchorage Bird Training and Learning Center (BTLC). After three hours of basting with canola oil and dawn dish washing detergent and a night at the Refuge headquarters, the eagle was sent to BTLC for rehabilitation.



*Vol. Dochat, BT Schafer, and MW Schulmeister preparing to baste juvenile bald eagle.*



*MW Schulmeister holds and restrains bald eagle while BT Schafer and Vol. Dochat attempt to remove tar and oil from the feathers and talons.*



## **7. Other Migratory Birds**

A pair of pine grosbeaks were observed on June 5 between 1st and 2nd bridges on Frosty Road by WB/P Dau, ST Eliason, and BT Schafer. One pair was observed at other times throughout the summer.

The official BBS was conducted on June 15 by WB/P Dau, BT Schafer, and ST Eliason. To allow for comparison with historical efforts conducted earlier, the same staff conducted a "practice" BBS on June 6. A total of 27 species and 733 individuals were observed and/or heard during the official effort versus 22 species and 475 individuals during the practice run. BT Schafer summarized historical BBS data and prepared a report comparing early versus mid June surveys.

Summer and fall songbird projects included operating a MAPS station and three post-breeding neotropical migratory bird (NTMB) banding stations. Breeding neotropical birds include bank swallow, orange-crowned warbler, yellow warbler, and Wilson's warbler.

The 1996-97 (31st) CBC was conducted by DRM Schulmeister, MW Schulmeister, and WB/P Dau on December 30. A total of 3,294 individuals of a total of 32 species were observed.

The BBS results, CBC results, and many incidental daily records are reported quarterly to the Alaska regional coordinator for use in compiling material for *National Audubon Society Field Notes*.

## **8. Game Mammals**

Big game species found on units of the Izembek NWR Complex include brown bear, caribou, moose, wolf, and wolverine. Of these, moose are rare (at the eastern edge of the complex), while wolverine, although fairly common, are seldom observed due to their nocturnal behavior. Shrub willow preferred by moose is common only in the eastern portion of the Refuge.

Furbearers on the Refuge include arctic ground squirrel, wolf, red fox, mink, wolverine, and river otter. Coyotes were once thought to be pioneering into the area, but several years have passed since the last observation. Red foxes are commonly observed roaming the community.

The interest in game mammals on the Refuge by both consumptive and non-consumptive users centers primarily on brown bear, which is the primary species hunted. Most hunting is by non-resident hunters using commercial big game guides in remote areas on and adjacent to the refuge. Caribou, once a very popular game animal, are experiencing depressed population levels. The caribou hunting season has been closed since 1992.

### **Brown Bear**

Management activities in 1996 associated with the lower Alaska Peninsula brown bear population consisted of aerial surveys of study areas on the Izembek and Unimak units. The Refuge continued to monitor the sport harvest by sealing hides and skulls.

The sport harvest of brown bears on the Izembek Unit is allowed during spring of even years and fall of odd years. In 1996, the season was from May 10 to 25. Annual spring (May 10-25) and fall (October 1-December 31) 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 all Refuge Complex units and surrounding areas. The refuge, in cooperation with ADF&G, is a designated sealing office for brown bears (hide and skull must be sealed within 30 days of harvest). About 25 brown bears were sealed by the refuge staff in 1996.

Crepuscular aerial surveys (visible period when bears are most active) provide an index of population size and productivity on both the Izembek and Unimak units. On a September 9 survey of the northeast third of the Izembek Unit, 111 bears were observed, down from the record high of 168 bears in 1995. This count was 14.0 percent above the 1976-96 average for the 164 mi<sup>2</sup> area. Brown bear surveys on the northeast (September 10) and southeast (September 11) study areas of the Unimak Unit resulted in total counts of 53 and 13 bears, respectively. These trend surveys were 5.2% and 9.7% below the respective long-term averages for these areas (n=14 years northeast, n=13 years southeast). Although considerable annual variability occurs, the local brown bear populations appear healthy throughout the Refuge.

## Caribou

The southern Alaska Peninsula Caribou Herd (SAPCH), estimated at approximately 1,800 animals in March 1996 [ie. 1,403 counted in main wintering herds plus an estimated 200 animals each elsewhere in Game Management Unit (GMU) 9D and on Unimak Island], remained below the 2,500 animal threshold for hunting with no sign of improvement. The herd ranges primarily from



*Caribou graze near town during the winter months.*

Herendeen and Canoe bays at the eastern edge of the Refuge Complex to the tip of the Alaska Peninsula, and includes the estimated 200 animals on Unimak Island. The main component of the herd winters in the Cold Bay area. Smaller wintering populations occur north of Pavlof and Morzhovoi bays. Normally during March and April the herd moves toward calving and summer ranges between the Black Hills and Trader Mountain and in the Caribou River lowlands. Fewer than 100 animals summer near Morzhovoi Bay. The Unimak Island animals appear to summer and winter in the same areas of the island. The SAPCH is managed via a plan drafted by the refuge and Alaska Department of Fish and Game (ADF&G) Area Biologist Sellers in 1994.

Winter inventories of the herd declined from a peak of approximately 10,200 animals in 1983 to the current low due to poor recruitment and low survival of both calves and adults. In cooperation with ADF&G, the refuge staff intensified monitoring efforts beginning in 1990 to more closely document population trends and to determine the cause(s) of decline. The low rate of recruitment observed in the herd appears to be due to low survival in both pregnant cows and calves resulting from poor nutrition and to a lesser extent predation.

Refuge personnel conducted ten aerial radio tracking flights in 1996 to determine the distribution, habitat use and survival of collared cows and their calves. The timing of calf losses can be determined through the monitoring of collared cows. Eleven of fifteen marked cows with active radio transmitters survived from fall 1995 to fall 1996 (i.e., post-calving). Two of the eleven



produced calves. One of the calves was lost during summer; the fate of the remaining calf has not been determined.

ADF&G biologists were unable to perform post-calving productivity surveys in 1996. A helicopter is needed to perform the post-calving survey. This fall and early winter we had to rely on fixed-wing and ground transects to obtain an indication of population size and calf recruitment. A sample of 665 animals from 1,054 caribou observed from the Black Hills/Trader Mountain to Moffet Bay area indicated 7.2% were calves (n=48). Estimated production in 1996 was 54.4% below the average of  $15.8 \pm 11.4\%$  calves (n=17 years). The post-calving count of 1,403 animals was down 2.2% from the 1995 level of 1,434. All 11 of the cows with active radio collars were located during this survey.

## **9. Marine Mammals**

Gray whales are common spring and fall migrants in near-shore 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 sightings in Unimak Pass typically occur in late March. The first sightings in the Izembek area occur the week of April. Spring migration normally ends by mid-June. Fall migrants are more dispersed over a longer period extending into November.

Sea otters commonly occur in all salt water areas of the Izembek NWR. Harbor seals are also commonly observed, with small concentrations (usually less than 50 animals) hauled out in Izembek and Kinzarof lagoons. Alaska's Harbor seals as well as several other populations are under review as a potential listed species under the Endangered Species Act (ESA).

Steller sea lions occur in marine waters within and adjacent to the Refuge Complex. The species is listed as threatened under the ESA with some populations being proposed as endangered. Richard Merrick, a National Marine Fisheries Service biologist, and crew from the Seattle Marine Mammal Laboratory stayed in the bunkhouse in February and December while conducting a helicopter survey Steller sea lion rookeries in the vicinity of Cold Bay and Sand Point.

Orcas or killer whales are regular visitors to the area, especially during salmon runs. Although more common along open coasts, orcas are occasionally reported in Cold Bay.

Refuge staff responded to a call from King Cove concerning an injured elephant seal that was causing a commotion on the beach near the center of town. After discussing the issue with Marine Mammals Management (MMM) staff in Anchorage, Refuge personnel traveled to King Cove to try to remedy the situation. The seal had become beached in King Cove where local children harassed it by throwing rocks and poking it with sticks. The local police officer was unable to dissuade the children. By the time Refuge staff arrived, the seal was disoriented. Attempts to get the animal to leave the immediate vicinity failed. The seal would swim for short periods and then haul out on the beach of downtown King Cove. Refuge personnel had agreed to let the animal rest, hoping that it

would return to the ocean and leave the area. However, as Refuge staff prepared to board a flight back to Cold Bay, they were notified that the animal had been destroyed by the local police. Concern for public safety was cited as reason for destruction and was appropriate according to MMM-Anchorage. Measurements and samples were collected for the National Marine Fisheries Service.



*RM Siekaniec attempts to drag the elephant seal back to the water.*

*After attempts failed to encourage the seal to swim away and to disperse taunting children, the King Cove Sheriff shot the injured seal. BT Shafer and ST Eliason dissect the seal while RM Siekaniec takes notes.*





## 10. Other Resident Wildlife

Tundra hares are rare on the Refuge Complex with only 1 to 2 animals observed each year. At least one juvenile hare was seen several times near our MAPS banding station on Frosty Road. The first Arctic ground (parka) squirrel of the year appeared on March 10 nearly a month earlier than last year. They were not common until late in the month. Last sightings of the year normally occur in November.

*A rare tundra hare made frequent visits to the MAPS site on Frosty Road*



Willow ptarmigan numbers appeared to remain below normal in 1996. A comparison of 1995 and 1996 BBS data (June) suggests a 43.8% reduction in willow ptarmigan population in 1996 and a 55% reduction from the long-term average ( $n=4$  years). We assume this deficiency is due to the large number of red foxes. Rock ptarmigan are uncommon and occur only at higher elevations on the Refuge.



## **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 (rainbow trout) and chinook (king) salmon. A variety of marine species occur in Izembek Lagoon and Cold Bay. Although the anadromous fishery resources are not managed by Refuge staff, they are of particular interest. Productivity of Izembek Lagoon, of tributaries that enter the lagoon and of the numerous lakes affect the distribution and abundance of birds and mammals. Migratory waterfowl, bald eagles, furbearers, and brown bears are closely tied to fresh-water lakes because of abundant spawning red salmon.

KSFRO staff continued inventories of the Joshua Green River on Izembek Refuge in 1996. This was the third field season for the study designed to gather baseline fishery information. The Joshua Green River is a major watershed of Moffet Lagoon and the eastern third of the Izembek Unit. The three person field crew of Fishery Biologist Dewey Eaton, BTs Eric Stark and Brian Thomas, and Volunteers Eve Strothotte and Morris Bonesso arrived in Cold Bay on June 18 and worked at their field site from June 19 to October 11.

Two primary goals drove the 1996 field work. The first goal was to document and characterize the late run of coho (silver) salmon and identifying spawning locations. Secondly, continued sampling of other fish populations throughout the run are necessary to determine timing of run, spawning area, and demographics.

## **14. Scientific Collections**

No scientific bird or mammal collections occurred in 1996; however, several specimens were salvaged from beaches, obstacle strikes/electrocutions, and donations from hunters. A lapland longspur, yellow warbler, American dipper, three oldsquaws, and two spectacled eiders were prepared for display in the office/visitor center. Another 30 birds were prepared as study skins during the year. The refuge maintains a collection of local fauna for use during school programs and to respond to visitor/hunter inquiries as well as for scientific purposes.

Flora collections are maintained for all four units of the refuge. A new herbarium was purchased in 1995. The specimens are used in a fashion similar to the vertebrate collections. BT Schafer cataloged the collection at the Refuge and Steve Talbot, Regional Office botanist, maintains a data base file of vascular and nonvascular collections from the refuge.

## **16. Marking and Banding**

### **Steller's Eider**

An expanded 14 person USGS-BRD crew began capture operations on Izembek Lagoon with Refuge staff from August 28 to September 3. A total of 14,939 birds were handled. In Izembek Lagoon, 3,236 birds were banded for the first time, 5 eiders received replacements for worn bands,



and 2,487 were recaptured. At Nelson Lagoon, 7,608 previously unbanded birds were banded and 1,603 were recaptured. Adult survival rates and other population indices will be generated based on banding data.

### **Bald Eagle**

ROS Schulmeister, BT Schafer, ST Eliason, and Vol. Dochat banded two bald eaglets at the bald eagle boulder-top nest site off Frosty Road on July 24. This is the fifth consecutive year (seventh year since 1987) that eaglets from this nest site have been banded. Fred and Marlene Peterson, visitors to the Refuge, accompanied the staff on the banding expedition and observed from a safe distance.



*Eagle mother soars over eaglets in nest with watchful eye as BT Schafer reaches for one.*

### **Monitoring Avian Productivity and Survivorship Program**

The Izembek NWR Monitoring Avian Productivity and Survivorship (MAPS) Program station, established on the refuge between 1st and 2nd bridges along Frosty Road in 1995, was operated again in 1996. The new site is at approximately 500 feet in elevation in alder thicket and heath uplands. The objectives of the program are to provide long term data on population and demographic parameters for select target land-bird species; 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 provide estimates of adult population size through point counts in the vicinity of the MAPS station. A minimum of three years of data collection is required prior to analysis.

BT Schafer and ST Eliason conducted the program from June 13 to August 24; Vol. Dochat assisted BT Schafer while ST Eliason worked at South Slough in July and August. The nets were opened during 8 sessions for a total of 413.6 net hours. The crew averaged 54.6 birds per 100 net hours. A total of 226 birds of seven species were captured including 53 recaptures. Nine birds escaped or were released prior to banding; there were two mortalities. Of the recaptured birds, 19 were returns

from 1995 and 2 were returns from 1994. One band was recovered from a golden-crowned sparrow at Izembek that had been banded at a different banding location. Yellow warbler was the number one species handled (41), followed by fox sparrow (31), golden-crowned sparrow (28), Wilson's Warbler (21), hermit thrush (19), savannah sparrow (13) and common redpoll (9).

The results from 1996, show a 42.7% decrease in the number of birds captured (based on number of birds per 100 net hours). No significant difference in species composition or relative abundance was recorded. Until more data is collected, it is not possible to define "normal" bird activity for this site.

Point counts were conducted by BT Schafer following three banding sessions. Nineteen species were identified. An average of 143.7 individual birds were recorded during each count. Fox sparrow, golden-crowned sparrow, yellow warbler, and lapland longspur were the most common species observed or heard.

## **17. Disease Prevention and Control**

Two potentially rabid animals, a red fox from Cold Bay and a river otter from False Pass, were collected during 1996. Samples were sent to the State of Alaska-Virology Laboratory in Fairbanks for analysis. The analysis reports of both were negative. Red foxes were common and fortunately healthy on the refuge and near Cold Bay in 1996.

# **H. PUBLIC USE**

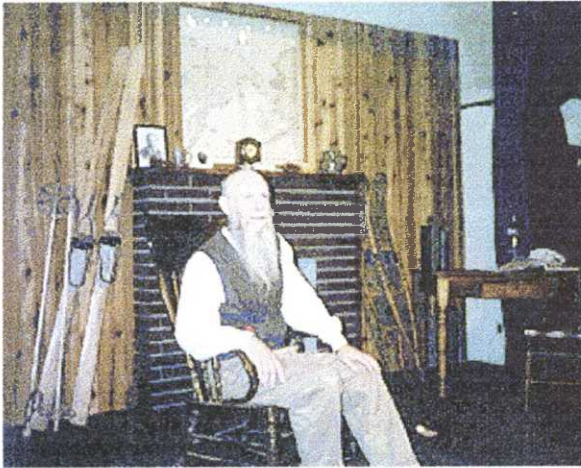
## **1. General**

The majority of Izembek NWR public use is by the residents of Cold Bay, King Cove, False Pass, and, to a lesser extent, Nelson Lagoon and Sand Point, Alaska. Consequently, our public use and interpretive programs are geared primarily for that audience. Non-local public use is almost exclusively by those hunting and/or fishing; consequently, September and October are the high-use months. The refuge also hosts a few hardy birders each year.

Refuge staff along with the King Salmon Fishery Resource Office staff hosted the annual Silver Salmon Derby from August 31 to September 2. The derby was quite a success with about 115 children and adults participating. Visitors (mostly family and friends) came from Arizona, Washington, Michigan, and Minnesota. One man had heard of the derby and saved for several years to come from Japan to participate! Unfortunately the weather was not the most cooperative and limited the number of people actually catching the 5 fish per day limit. In spite of the weather, fun was had by all.



## National Wildlife Refuge Week



Entertainer Lee Stetson performed as John Muir at the Cold Bay School during National Wildlife Refuge Week. Stories told in a Yosemite Valley, CA, setting bore a strong conservation theme. The event was sponsored by Reeve Aleutian Airways, Pavlof Services, the Cold Bay School, and Izembek NWR. An open house was held during which visitors were able to talk to Lee Stetson and the Refuge staff. A drawing was held for a framed Duck Stamp poster. Bob Berceli of Alaska Department of Fish and Game won the poster.

*Entertainer Lee Stetson performs as story-telling naturalist John Muir during National Wildlife Refuge Week.*



*ROS Schulmeister presents Bob Berceli with a Duck Stamp poster.*



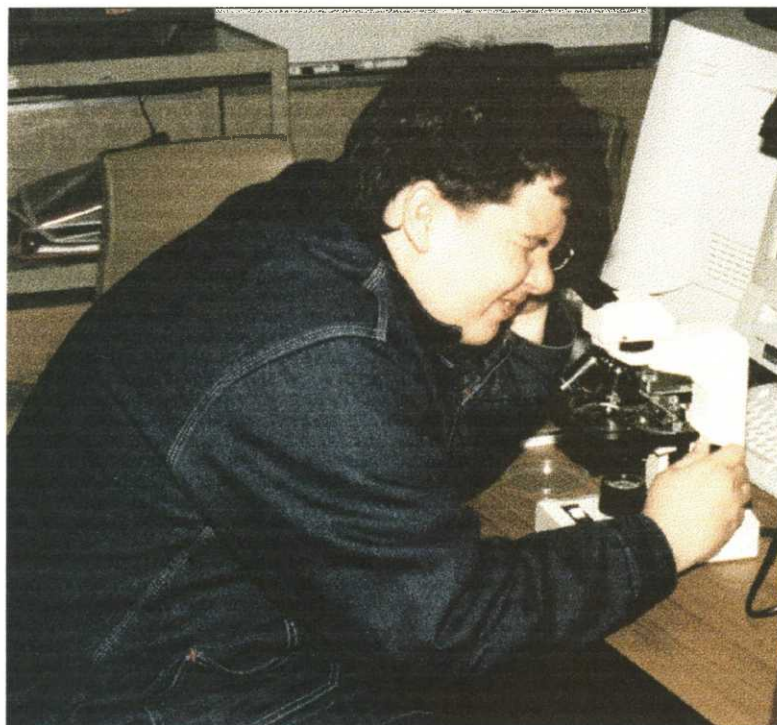
## 6. Interpretive Exhibits/Demonstrations

Refuge staff maintains year-round interpretive displays at two locations within the Cold Bay community. Large plexiglass map panels with accompanying wildlife/habitat panels describing the Izembek NWR cover an entire wall at the Reeve Aleutian Airways terminal. Smaller 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

In 1995, Izembek Refuge was contacted by Nina Garfield of the national Oceanic and Atmospheric Administration (NOAA) National Estuarine Reserve Program regarding a project to develop a partnership between schools along the Pacific flyway to monitor black brant migration and to use the Internet as the medium for communication. Partners included Izembek Refuge in Alaska, Qualicum Beach in British Columbia, Padilla Bay in Washington, South Slough in Oregon and Pro Esteros in Baja California. This year marked the real start of the project in Cold Bay with ST Eliason organizing activities for students here.

Funding was acquired by Izembek Refuge through two U.S. Fish & Wildlife Service challenge cost share (ccs) agreements. The first, totaling \$31,734.00 of in-kind contributions, bought computer and optical equipment for Cold Bay and Qualicum Beach schools and provided salaries for project coordinators in Coos Bay, Oregon, and Cold Bay, Alaska. The second ccs agreement totaling \$9,105.00 of in-kind contributions provided funds to enable South Slough National Estuarine Research Reserve (NERR) to develop the curriculum and traveling brant migration kit.



ST Eliason traveled to South Slough NERR in August to coordinate with other participants and to assist in developing the curriculum and brant kit.

*Cold Bay student Robert Nielsen examines a specimen under the microscope.*



*Cold Bay students work with Refuge bird specimens.*

## 8. Hunting

### Waterfowl

Duck and goose hunting accounts for the majority of public use occurring on the Refuge. As it does every year, the 1996 waterfowl season opened on September 1 and continued through December 16. For all practical purposes, the season is "over" when the brant and Canada geese initiate their migration out of the area in late October or early November.

Table 13a. HUNTER INFORMATION

Month	# of Hunters	# of Hours Hunted	Hours/Hunter	# of Ducks (cripples)	# of Brant (cripples)	# of Canada (cripples)
Sept.	Actual 139 Est. 195	Actual 703 Est. 975	5.1	19 (2)	38 (5)	211 (11)
Oct.	Actual 163 Est. 228	Actual 876 Est. 1226	5.4	59 (7)	12 (1)	121 (18)
Nov.	Actual 12 Est. 17	Actual 53 Est. 74	4.4	0	0	7 (2)
Dec.	No data for December					
TOTAL	Actual 314 Est. 440	Actual 1632 Est. 2275	5.3	77 (9)	50 (6)	339 (31)

Table 13b. SPECIES HARVEST BY AGE AND SEX

Species	Adult			Juvenile			Unknown			Cripple	Total
	M	F	U	M	F	U	M	F	U		
Black Brant	8	9	2		2				28	6	55
Canada Goose	52	37	24	18	20	18			178	28	385
Cackler	1	3	1		2						7
Goose Total	61	49	37	18	24	18			206	34	447
Gadwall									1	2	3
Greater Scaup	1	1							7	4	13
Green Teal	2	1		1			3		14	3	26
Mallard	16	5							12	1	38
Pintail	6	12		8					26	8	71
Widgeon	8								10	1	21
C. Goldeneye		1								1	2
W.W. Scoter											
Eura. Widgeon	1								2		4
N. Shoveler									2		2
Bufflehead	2								1		3
Duck Total	36	20		9			3		75	20	183

## **Brown Bear**

The Spring permit hunt for brown bear on Izembek Refuge and on Unimak Island was open from May 10 to 25. A total of 31 bears was sealed by Refuge staff including 27 taken in GMU 9D (Peninsula west of Port Moller), 3 in GMU 9E (Port Moller east to Egegik), and 1 taken in GMU 10 (Unimak Island). An additional 43 bears were reported taken in GMU 9D and an additional 2 in GMU 10.

The fall Unimak Island drawing permit brown bear hunt opened on October 1. The season ended December 31, but no hunting occurred on the island past the end of October. The island is an unforgiving place after winter weather begins in November.

## **Caribou**

Due to the continued small population of the caribou herd, there was no caribou season again in 1996. The season has been closed annually since 1993 by Emergency Order issued by Alaska Department of Fish and Game.

Sustained poor calf recruitment for the past several years, and high adult mortality continue to cause the herd to remain at about 2,000 animals. Through the management plan signed by the RM and ADF&G Area Biologist, hunting will not resume until the herd exceeds 2,500 animals.

## **9. Fishing**

Sport fishing within the Refuge is somewhat limited due to access difficulties related to roadless areas, rough terrain, and great distances. Although on-refuge access is basically limited to Frosty Creek, upper Russell Creek, and a few larger lakes, considerable opportunity exists off-refuge at lower Russell Creek and, to a lesser extent, lower Trout Creek (both of streams originate within the Refuge).

The Refuge hosted the sixth annual "Youth Fishing Derby" on June 3 as part of National Fishing Week activities. The derby was held at the Grant Point pond. Eleven young people and four adults participated. Each youth participant received a Certificate of accomplishment, a National Fishing Week poster, a hat, and polarized sun shades. Fishing gear prizes were given for the three largest fish caught. The Youth Fishing Derby provides an excellent opportunity to teach proper and safe catch and release techniques.

## **10. Trapping**

Trapping permits are required for two of the four Izembek NWR units (Izembek and Unimak) per 50 CFR Part 36. One permit was issued for the Unimak Unit for the 1996/97 trapping season. The trapper and a partner took 69 red fox. Two late 1995/96 season permits were issued in February

1996. Neither permittee was successful in trapping efforts. Three permits were issued for the Izembek Unit during the 1996/97 trapping season. The permittees and one partner trapped a total of 6 red fox, 14 mink, and 3 land otters. One magpie was inadvertently trapped. Trapping on the Refuge is considered "recreational".

## **11. Wildlife Observation**

Wildlife observation is a common past-time for Cold Bay residents. With access provided by the Refuge road system, many people drive the area year-round to view and photograph wildlife. Bears, fox, caribou, and a variety of birds are the primary attraction for this activity. Although this use is difficult to measure, it has increased, especially at the Grant Point wildlife observation facility during the spectacular fall waterfowl migration.

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.

## **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 a short distance to gain access to the beach, and most incidents occur during waterfowl season. Use of any wheeled vehicle on the beach within the Izembek State Game Refuge (SGR) 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.

Vehicular 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 provides for refuge maintenance of the existing road system without any further road construction within the Refuge. The current road system was so designated at a public meeting in the 1970s. Portions of the roads still useable by passenger vehicle are remnants of military roads constructed during the 1940s and 1950s. At that time, Cold Bay vehicular traffic was mainly military four-wheel drive vehicles.

## **16. Other Non-Wildlife Oriented Recreation**

Beach-combing is a popular past-time among local residents. The beaches of the Pacific Ocean and Bering Sea in the local area are littered with "treasures" from nature and human sources, past and present. Much of the beach-combing is accomplished during the summer and fall. There are a few very serious beach-combers who concentrate their efforts on the outer beaches in the late spring. The primary trophies of interest are walrus tusks and the larger (12"-16" diameter) glass fishing floats.



Most animal parts collected on the beaches must be registered pursuant to the Marine Mammal Protection Act of 1972. The Izembek NWR office is a designated sealing agent for beach-found marine mammal parts.

## **17. Law Enforcement**

Izembek NWR staff continued to support the Region 7 policy on enforcement of migratory bird hunting during the closed season (spring waterfowl hunting).

## 19. Concessions

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*Who issued his permit?*

### **Guide-Outfitters**

The only "concession" activity on the Refuge is game guiding. Guides are required to receive special-use permits to guide on Alaska National Wildlife Refuges. In addition to the standing 5-year special use permits, two individual guides were awarded permits for waterfowl hunting for the areas under our jurisdiction in 1996.



## Gravel Extraction

Ten special-use permits were issued for gravel extraction on the refuge in 1996. Two permits were granted to the city of False Pass. Weather Operations and Alaska Department of Transportation each receive a permit for gravel. The remaining six permits were issued to contractors.

# I. EQUIPMENT AND FACILITIES

## 1. New Construction

Efforts continued to get the new shop fully functional. A heating system was installed as well as interior walls for an office, a boiler room, parts rooms.

## 2. Rehabilitation

The kitchen in Quarters 2 was remodelled. MW Schulmeister painted the bunkhouse interior and installed new carpet.

A new refuge sign was installed at the identifying the Refuge headquarters. The new sign, made by MW Schulmeister sports a black brant. Cold Bay resident Eric Iverson painted the brant. Additional signs are planned to replace the existing signs that mark the road entrance to the Refuge.



*Refuge staff poses under the new Refuge sign (l-r): WB/P Dau, MW Schulmeister, ROS Schulmeister, RM Siekaniec, AT Hermann.*







# King Cove Road Briefing Report

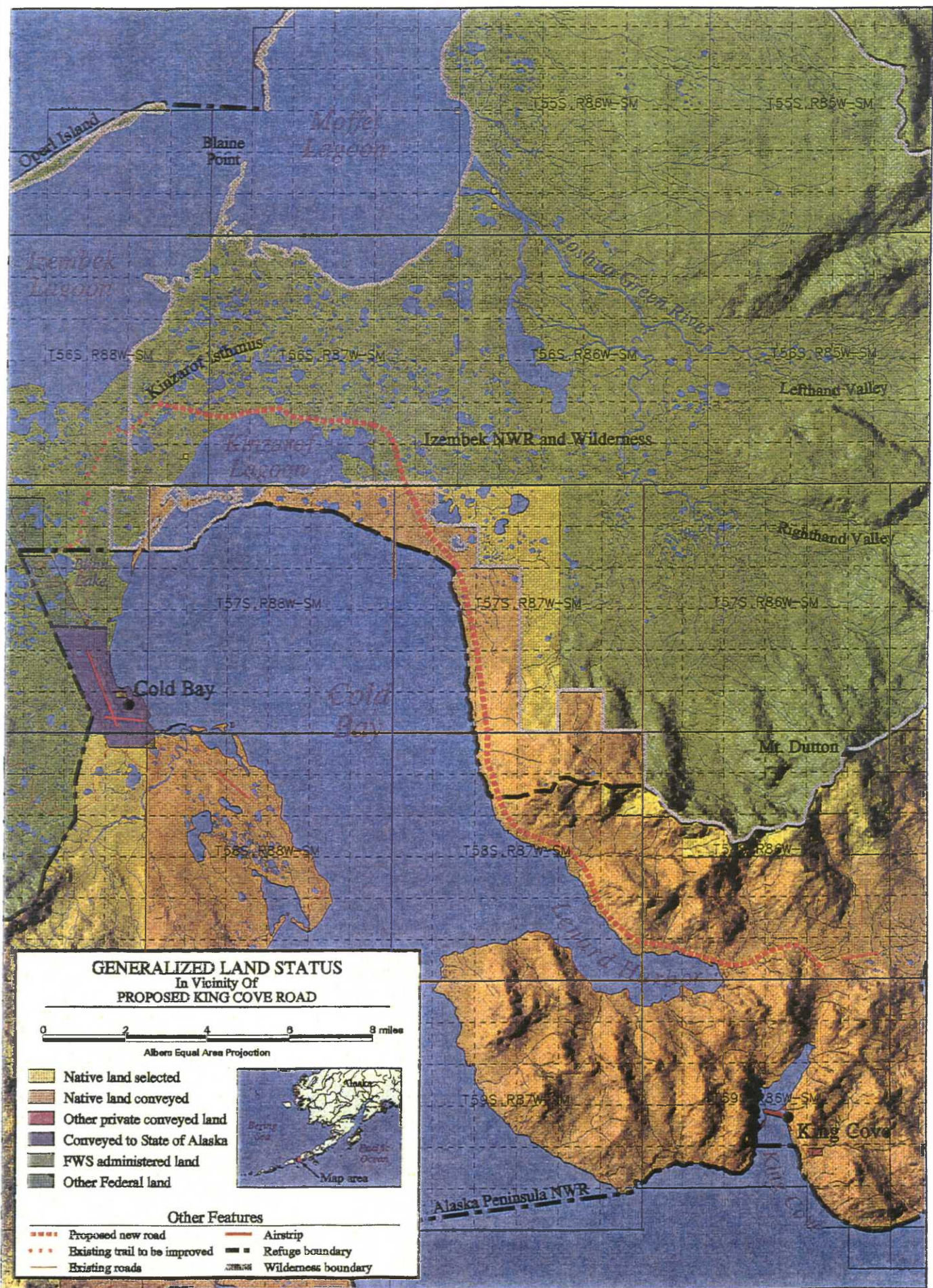
March 1996

Izembek

National Wildlife Refuge

U.S. Fish and Wildlife Service







## **Proposed King Cove-Cold Bay Road Project on the Izembek National Wildlife Refuge**

**ISSUE:** The Aleutians East Borough and the village of King Cove wish to improve access between the communities of Cold Bay and King Cove, Alaska. Presently, the transportation link is by commuter air service or marine access. Their preferred alternative is a 30-mile road corridor which would cross 11 miles of Izembek Refuge lands, including eight miles of the Izembek Wilderness.

**Point:** The proposed road would have little or no effect upon the surrounding environment.

**COUNTERPOINT:** S. 1092 WOULD CREATE AN UNPRECEDENTED PERPETUAL RIGHT-OF-WAY THROUGH PORTIONS OF THE IZEMBEK NATIONAL WILDLIFE REFUGE AND CONGRESSIONALLY-DESIGNATED WILDERNESS AREA. THIS LEGISLATION UNDERMINES THE MISSION OF THE RECENTLY ENACTED BIPARTISAN "NATIONAL WILDLIFE REFUGE SYSTEM IMPROVEMENT ACT OF 1997." THE SECRETARY OF THE INTERIOR HAS RECOMMENDED THAT THE PRESIDENT VETO S. 1092 IF ENACTED BY CONGRESS.

### **BACKGROUND and STATUS:**

- 1985 - King Cove Road project identified in Bristol Bay Management Plan. Refuge concerns were addressed in Comprehensive Conservation Plan.
- October 1994 - Alaska Department of Transportation and Public Facilities (ADOT&PF) released *Reconnaissance Study Report for King Cove-Cold Bay Access* identifying and ranking four alternatives for improved access. The proposed road project was favored by a slight margin.
- March/April 1995 - The King Cove Corporation requested a land exchange for road right-of-way across Izembek Refuge and wilderness. The Service's Regional Office declined, stating an exchange would not be in the public interest because of the high value wildlife lands in the road corridor.
- October 1995 - Study released by private consultants identifying legal, financial, and land-use issues relating to project.
- In late 1995, the Aleutians East Borough and City of King Cove requested assistance from Congressman Don Young and Senator Frank Murkowski for special legislation authorizing a road across Izembek Refuge.
- March 1996 - Proponents postponed pursuing special legislation and agreed to work with all interested parties to identify and evaluate alternatives. The U.S. Fish and Wildlife Service (FWS) agreed to work with the Borough and King Cove on further evaluation of alternatives, likely to result in fewer impacts to less critical lands.
- March 1997 - Proponents have indicated they are not pleased with the ADOT&PF evaluation process and have decided to seek special legislation authorizing a road through Izembek Refuge and Wilderness.
- April 1997 - The King Cove Corporation offered to exchange Corporation lands at the mouth of Kinzarof Lagoon for a road right-of-way across Izembek Refuge and wilderness. The FWS declined, stating an exchange would not be in the public interest because of the high value wildlife lands in the road corridor.
- May 1997 - ADOT&PF retained consultants who initiated an evaluation process to complete a King Cove-Cold Bay Transportation Improvement Assessment. Health and Safety were identified as Moderate concern by residents of King Cove. Final due in April.

## Background

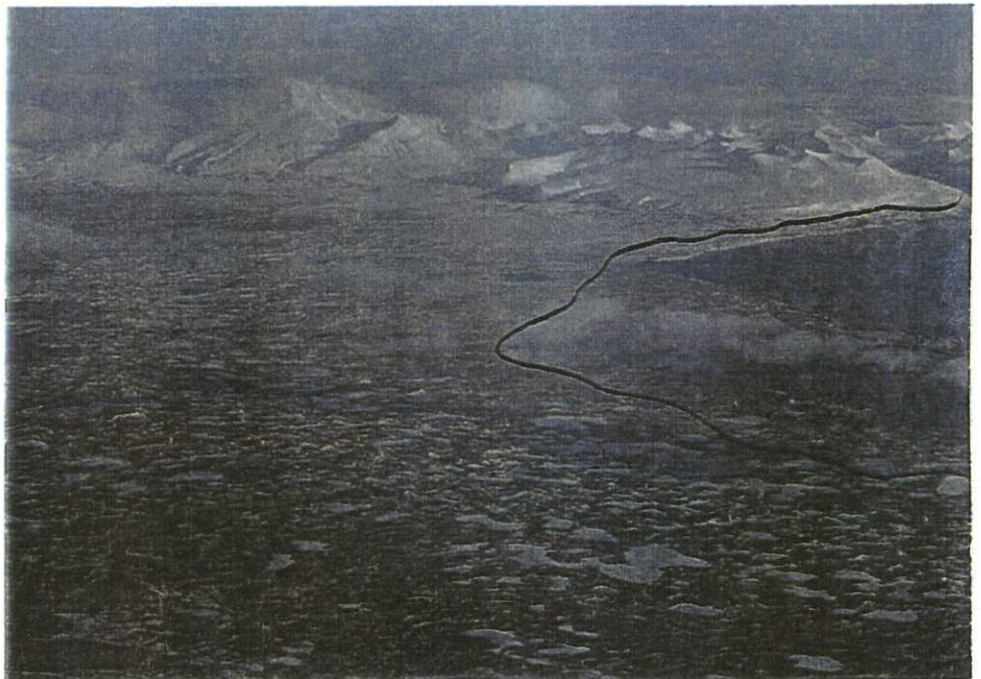
A road connecting the communities of King Cove and Cold Bay was recommended in the preferred alternative of the 1985 Bristol Bay Regional Management Plan. Although the plan was never formally adopted, The U.S. Fish and Wildlife Service (Service), in concurrent Izembek National Wildlife Refuge comprehensive conservation planning documents, recognized that significant wildlife and wilderness resources could be adversely affected by construction of this road.

The recent resurgence of the road project was initiated when the Alaska Department of Transportation and Public Facilities (ADOT/PF) introduced a planning effort for Intermodal Transportation Projects on the Alaska Peninsula. The King Cove - Cold Bay Road was identified in the plan which was followed with a *King Cove - Cold Bay Access Reconnaissance Study Report (1994)* case study.

During the summer of 1995 the new Governor's Administration announced that the transportation plan, including the King Cove - Cold Bay Road, was a high priority for improving the economic infrastructure of the Lower Alaska Peninsula area. This was followed with the *King Cove/Cold Bay Highway Feasibility Study, Phase I* (final draft report, October 4, 1995). This report provided a focal point for State and local policy makers to begin assessing the proposed transportation link.

*The community of King Cove lies behind Lenard Harbor, shown in the upper right hand corner of the photograph.*

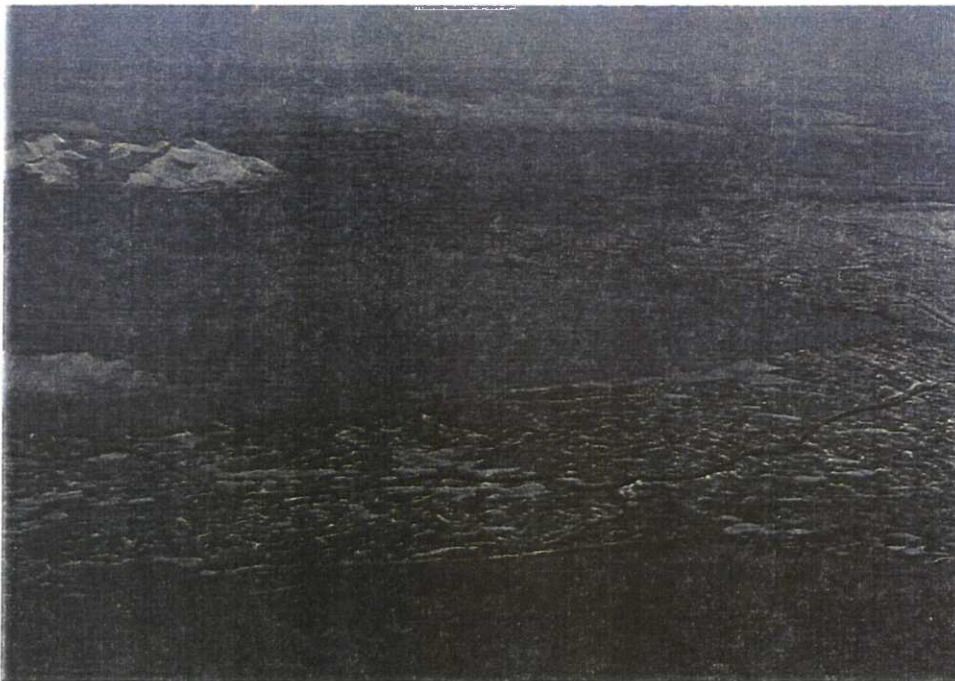
*The proposed road would follow the approximate route shown in the photographs on pages two and three.*



Project proponents have expressed concerns over timely processing of Departmental regulations for evaluating and granting transportation systems across Alaska Conservation System Units. In an effort to expedite the entire planning process the Aleutians East Borough focused on preparing draft legislation that would: 1) provide Congressional relief from environmental provisions in the Alaska National Interest Lands Conservation Act (ANILCA), Alaska Native Claims Settlement Act (ANCSA), and Federal Department of Transportation regulations; and 2) authorize the construction of a road corridor through Izembek National Wildlife Refuge and Wilderness.

Discussions with Alaska's Special Assistant to the Secretary of Interior, the current State administration, Alaska DOT/PF, and a consortium of environmental organizations prompted the deferral of a Federal legislative solution pending analysis of transportation alternatives. In March 1997 proponents expressed concern that the DOT/PF process was not expedient; therefore, special legislation would again be sought.

The Service recognizes the need for an improved transportation link between the communities of King Cove and Cold Bay; however, we have grave concerns for any proposal to construct a road through the Kinzarof Isthmus and Izembek Wilderness. We remain supportive of developing an alternative that would satisfy the health and safety concerns and provide opportunity for economic development in the region, while minimizing impacts to fish, wildlife and habitat. We believe such an alternative exists.



*The road would bisect a narrow isthmus separating Kinzarof and Izembek lagoons.*



# Environmental Considerations

The Izembek Refuge was established in 1960, and in 1980, ANILCA Section 303(3) defined the following management purposes:

*Purposes of the Izembek National Wildlife Refuge*

"...**(i) to conserve fish and wildlife populations and habitats in their natural diversity including, but not limited to, waterfowl, shorebirds, and other migratory birds, brown bears, and salmonids;**

**(ii) to fulfill the international treaty obligations of the United States with respect to fish and wildlife and their habitats;**

**(iii) to provide, in a manner consistent with purposes set forth in subparagraphs (i) and (ii), the opportunity for continued subsistence uses by local residents; and**

**(iv) to ensure, to the maximum extent practicable and in a manner consistent with the purposes set forth in subparagraph (i), water quality and necessary water quantity within the refuge.**

*Izembek Lagoon is managed as a game refuge by the State of Alaska.*

Izembek Lagoon, which lies entirely within the boundary of the Izembek National Wildlife Refuge, is owned and managed by the State of Alaska. Acknowledging the value of the wildlife resources associated with Izembek Lagoon, the Alaska State Legislature established the Izembek State Game Refuge (Izembek Lagoon) in 1960 for the purpose of **protecting natural habitat and game populations (especially waterfowl),**

*The 304,000 acre Izembek Refuge is 95% Wilderness.*

Izembek Lagoon and the surrounding watershed have been noted internationally for having some of the most striking wildlife diversity and wilderness values of the northern hemisphere. In the late 1970's the Carter Administration recommended that Izembek Refuge be designated a wilderness area. ANILCA established Izembek Wilderness in 1980.

*Izembek was the first U.S.  
Wetland of International  
Importance*

In 1986 the United States became member to the Convention on Wetlands of International Importance (commonly known as the Ramsar Convention). Due to the vast array of wildlife and habitats it was no surprise that Izembek Refuge and Lagoon became the first wetland site in the United States recognized for its global resources. Being placed on the *List of Wetlands of International Importance* serves to heighten public recognition and awareness to the significance of conserving these areas. Ramsar treaty obligations include wise use or maintenance of the ecological characters which define the site's natural values.

In recognition of the value to migratory shorebirds, Izembek Refuge and Lagoon are again being considered for international recognition as a *Reserve of International Importance* by the Western Hemispheric Shorebird Reserve Network.

*Russia's Kronotskiy State  
Biosphere Reserve and  
Izembek are Sister Refuges.*

The significance of international resource values continues to be recognized by the governments of Russia and the United States through nomination of Izembek Refuge and Kronotskiy State Biosphere Reserve as *Sister Refuges*. The U.S. - Russia Agreement on Cooperation in Environmental Protection, Area V, Protection of Nature and the Organization of Reserves will promote the continued study of ecological relationships of these critical habitats by scientists from both countries.

Given the mandates set forth in ANILCA, the Service has many concerns about the proposed road and ecological impacts to the fish, wildlife, and habitats in and around the road corridor.



*Izembek Lagoon*

The proposed road would traverse seven miles of the Izembek Wilderness and four miles of non-wilderness refuge lands. Presence of a road and accompanying increased human disturbance would degrade wilderness values along the road corridor and adjacent refuge habitats. Vehicle traffic noise, visual presence, and increased off-road trespass problems would degrade the wildland experience of refuge users throughout much of the northern portion of the Izembek Wilderness.

Road construction through fragile tundra environments would probably result in increased silt loads or decreased fresh-water flowing into Kinzarof Lagoon, which in turn could affect eelgrass growth and production. Protecting the ecological integrity and resources of Kinzarof Lagoon is extremely important to the annual life cycle of a wide variety of fresh water and marine species. Eelgrass beds provide food for brant, emperor geese, Canada geese, and several species of ducks. Anadromous and marine fish rely on these habitats for security and production. Kinzarof Lagoon is of critical importance due to its proximity to Izembek Lagoon and exposure to warmer waters of the Pacific Ocean. If the eelgrass beds in Izembek Lagoon were impacted by waterborne agents, such as from shipping accidents or potential offshore oil development, Kinzarof Lagoon would provide the only significant alternative eelgrass foraging area on the Pacific side of the Alaska Peninsula.

*Kinzarof Lagoon provides the only significant eelgrass beds on the Pacific side of the Alaska Peninsula.*

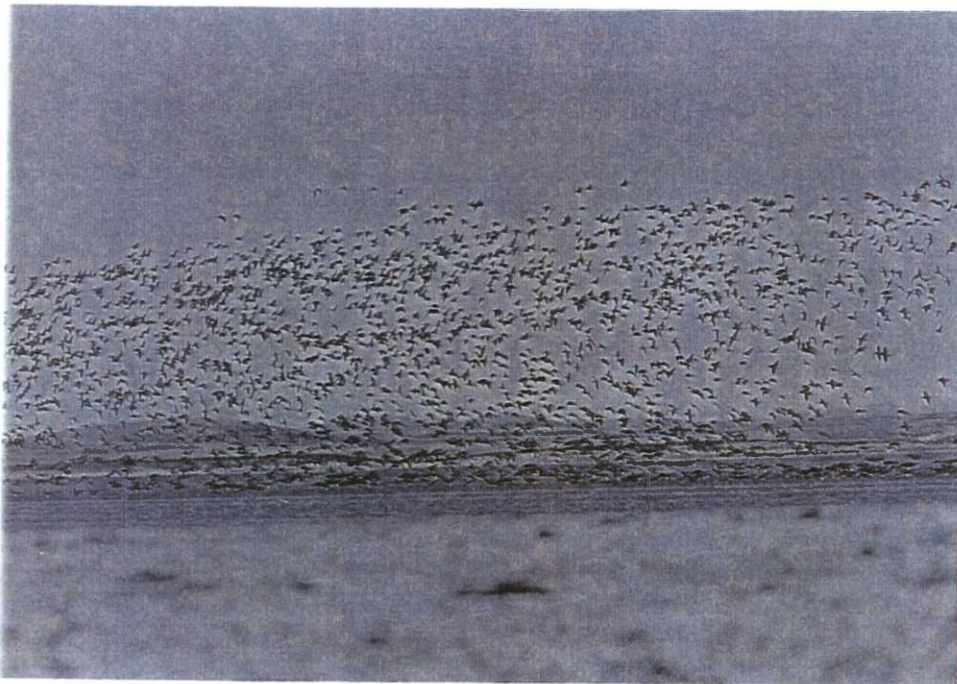
The proposed road corridor would bisect a three mile wide isthmus separating Izembek and Kinzarof lagoons. Increased human use would add to disturbance levels of waterfowl populations at critical times throughout the year. Landscape changes would impact essential habitat for a diversity of species, including: a resident, non-migratory tundra swan population; declining Steller's eiders and emperor geese; the entire Pacific brant population; harlequin ducks; caribou; sea otters; and declining harbor seals.





## Pacific Brant

The entire Pacific brant population, approximately 150,000 birds from Russia, Canada and Alaska is found in the Izembek area each fall. First arrivals occur in late August with peak influxes in mid to late September. Brant spend 30 to 50 days at Izembek and Kinzarof lagoons recovering from the physiological stresses of breeding and molting, and build fat reserves for their strenuous migration to wintering grounds. Eelgrass (*Zostera marina*), their primary food, is abundant in both lagoons. In late October or early November, most of the brant depart enmasse for primary wintering areas in Mexico, however a portion of the population remains at Izembek Lagoon throughout the winter (over 15% of the population in recent years).

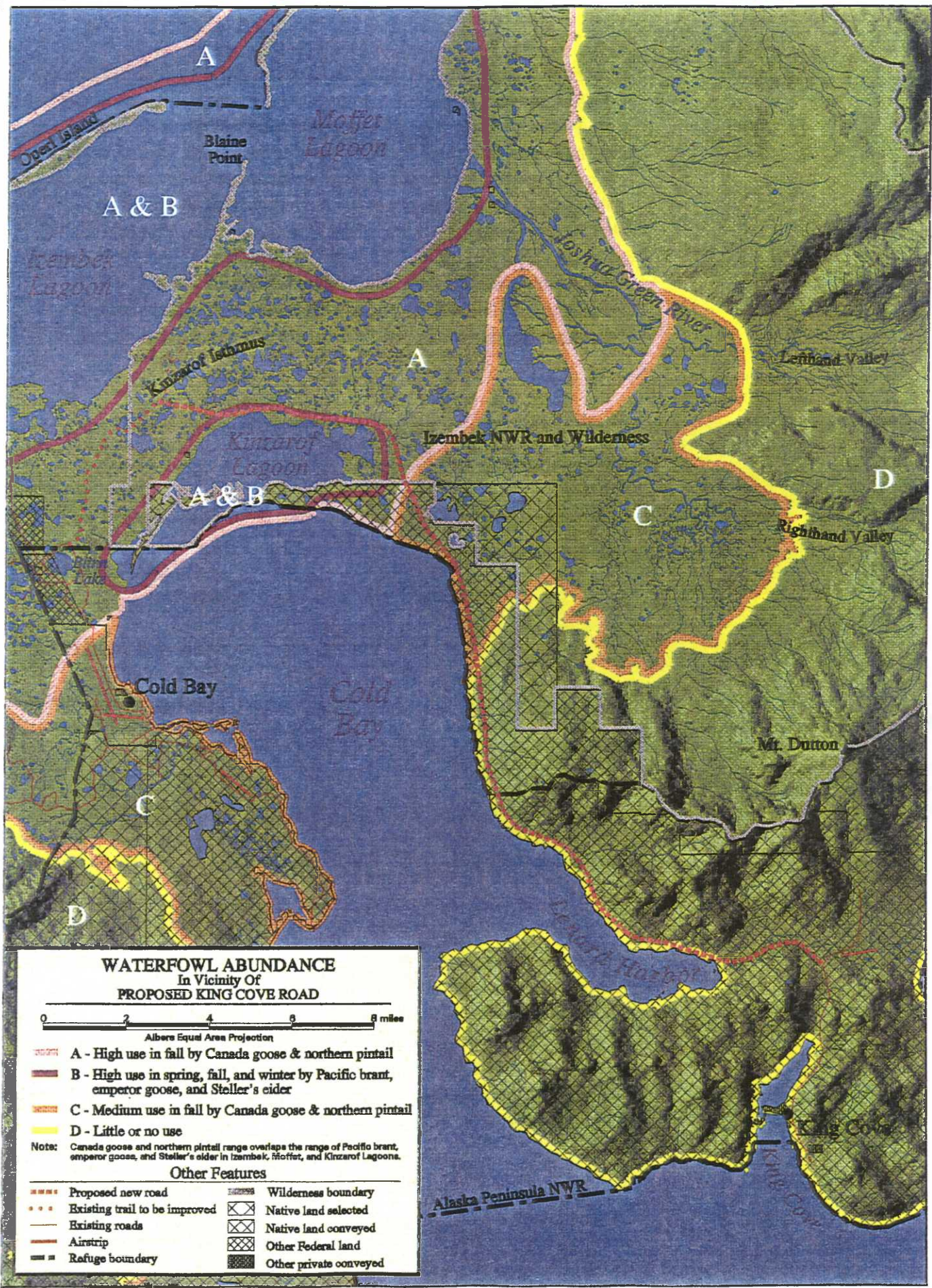


*Most of the world's Pacific brant stage in the Izembek area each fall.*

*Up to 50% of the overwintering population of brant use Kinzarof Lagoon.*

Over-wintering brant use three small, discrete areas of the refuge, two of which are adjacent to the proposed road corridor — Kinzarof Lagoon and central Izembek Lagoon. Brant are very sensitive to disturbance levels which would be elevated if the proposed road was constructed. An increase in hunting pressure in remote, seldom visited habitats would occur which could affect distribution and habitat use.







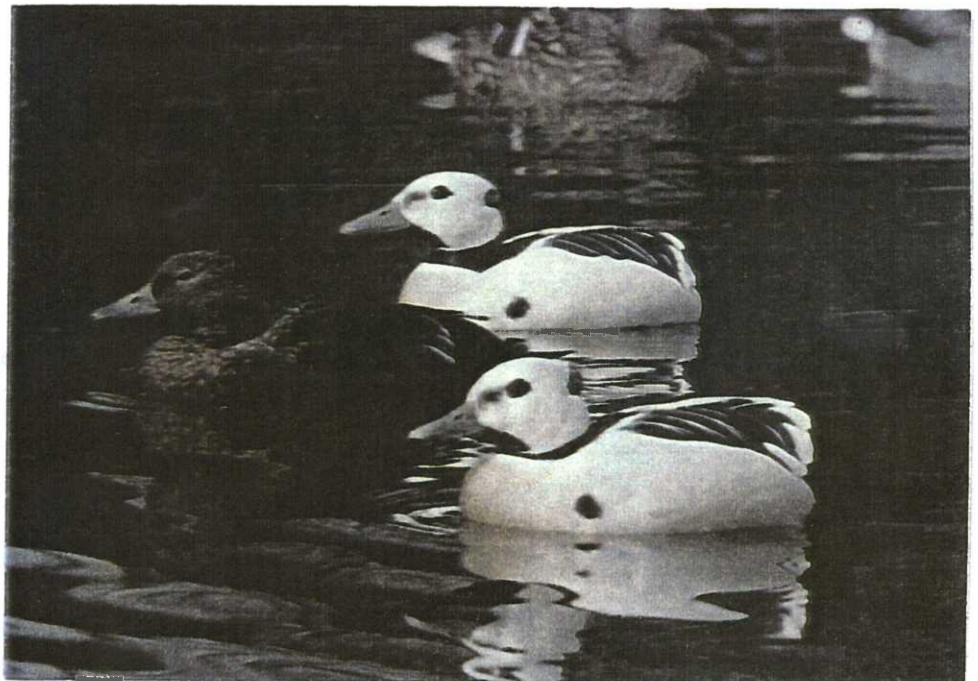
## Emperor Geese



The world's population of emperor geese (est. ~55,000 in 1995), which breed in Russia and southwestern Alaska, pass through the Izembek Refuge each spring and fall with many ( $\geq 10\%$ ) gathering in Izembek and Kinzarof lagoons during the winter.

## Steller's Eider

*Up to half of the world's Steller's eiders molt in Izembek and Kinzarof lagoons, and 70% overwinter.*



Arctic nesting Steller's eiders currently number about 150,000 birds. The Alaska breeding population has declined significantly and is being proposed as a threatened species. These eiders traverse the frigid waters of the Bering Sea to molt and winter in Izembek and Kinzarof lagoons, spending 10 months of the year in the area. Marine habitats and the invertebrates they support are essential to Steller's eiders and numerous other species of seaducks found in these areas.



## Tundra Swan

Izembek tundra swans are the only essentially nonmigratory breeding population in North America. Annual productivity of this small population is low due to high rates of egg predation and cygnet mortality.

*Swans are highly territorial, nesting in small wetlands.*

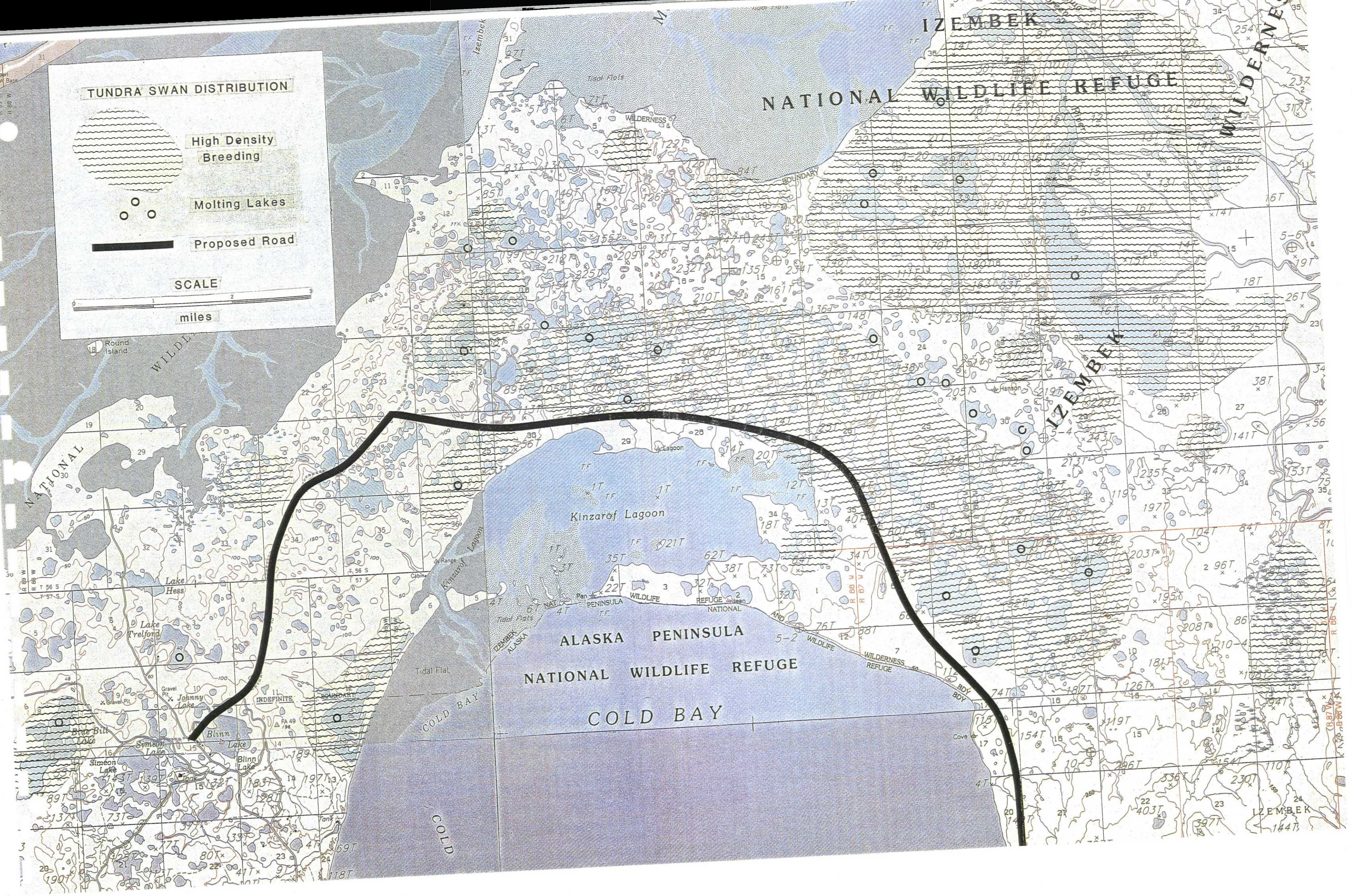
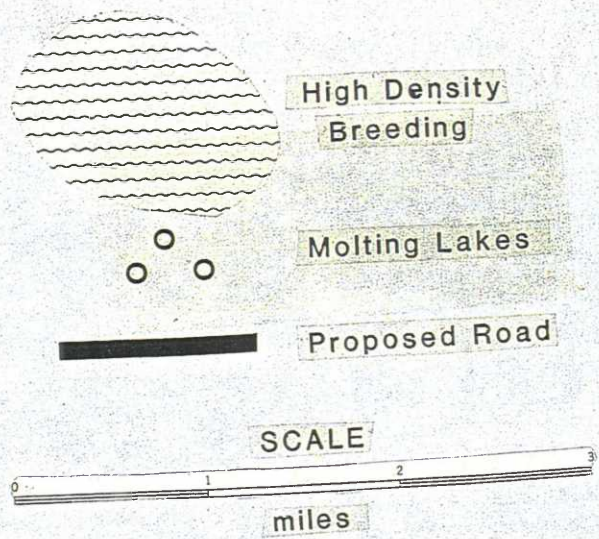


Swans are highly selective in their breeding and molting habitat requirements, and at Izembek, swans are extremely intolerant of human activity, especially during nesting and molting periods. The proposed road could adversely affect the unique Izembek Refuge tundra swan population. With daily traffic through these sensitive habitats, swans would be displaced to less desirable and less protected areas, thus increasing mortality and lowering overall productivity and population size.

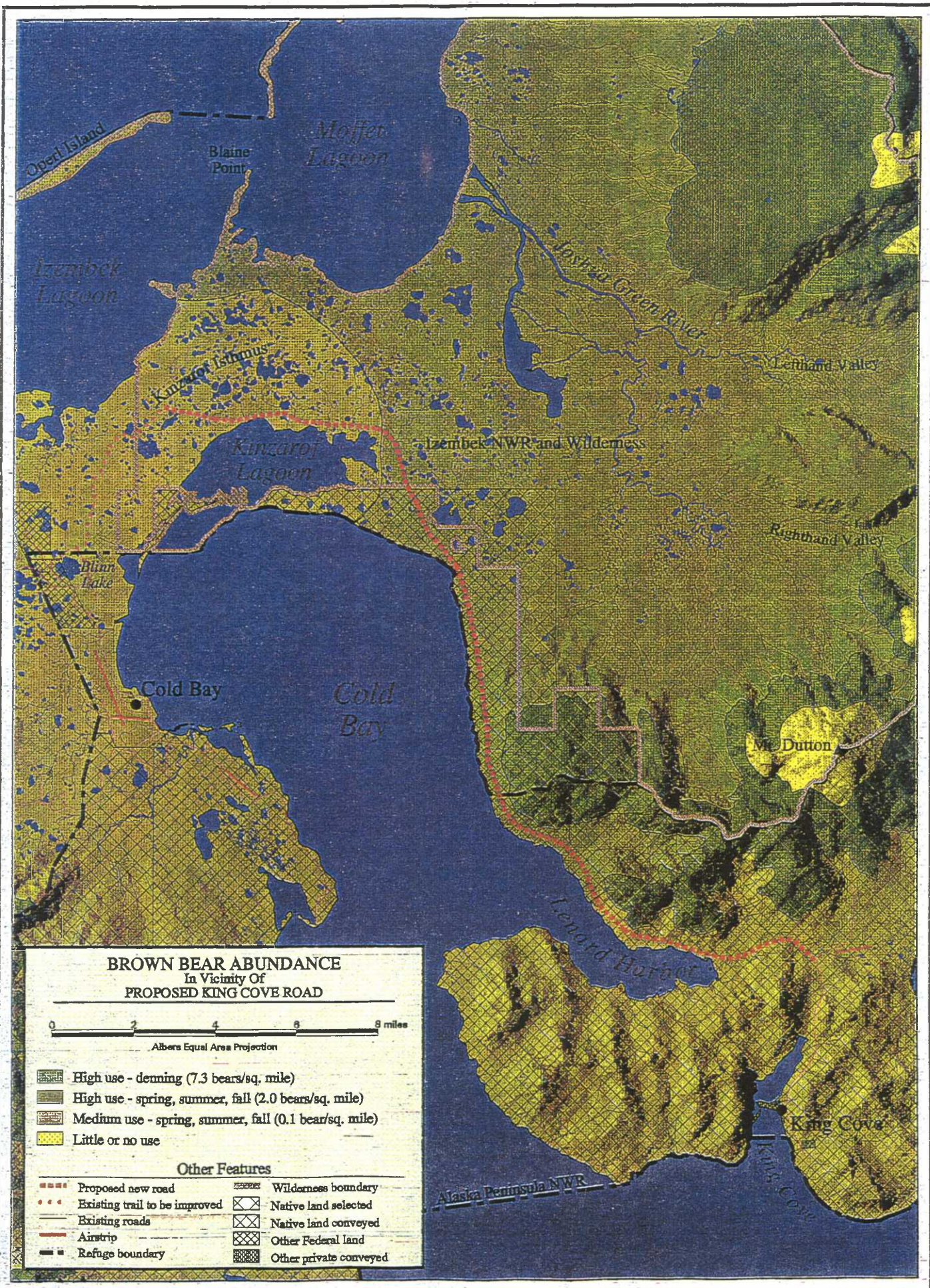
*Swan molting habitat consists of large secluded lakes with emergent vegetation, such as these between Izembek and Kinzarof lagoons.*













## Brown Bear

*Bears produced in the Joshua Green watershed are distributed over half of the southern Alaska Peninsula.*



*The Joshua Green watershed, adjacent to the proposed road, supports the highest densities of bears on the lower Alaska Peninsula.*

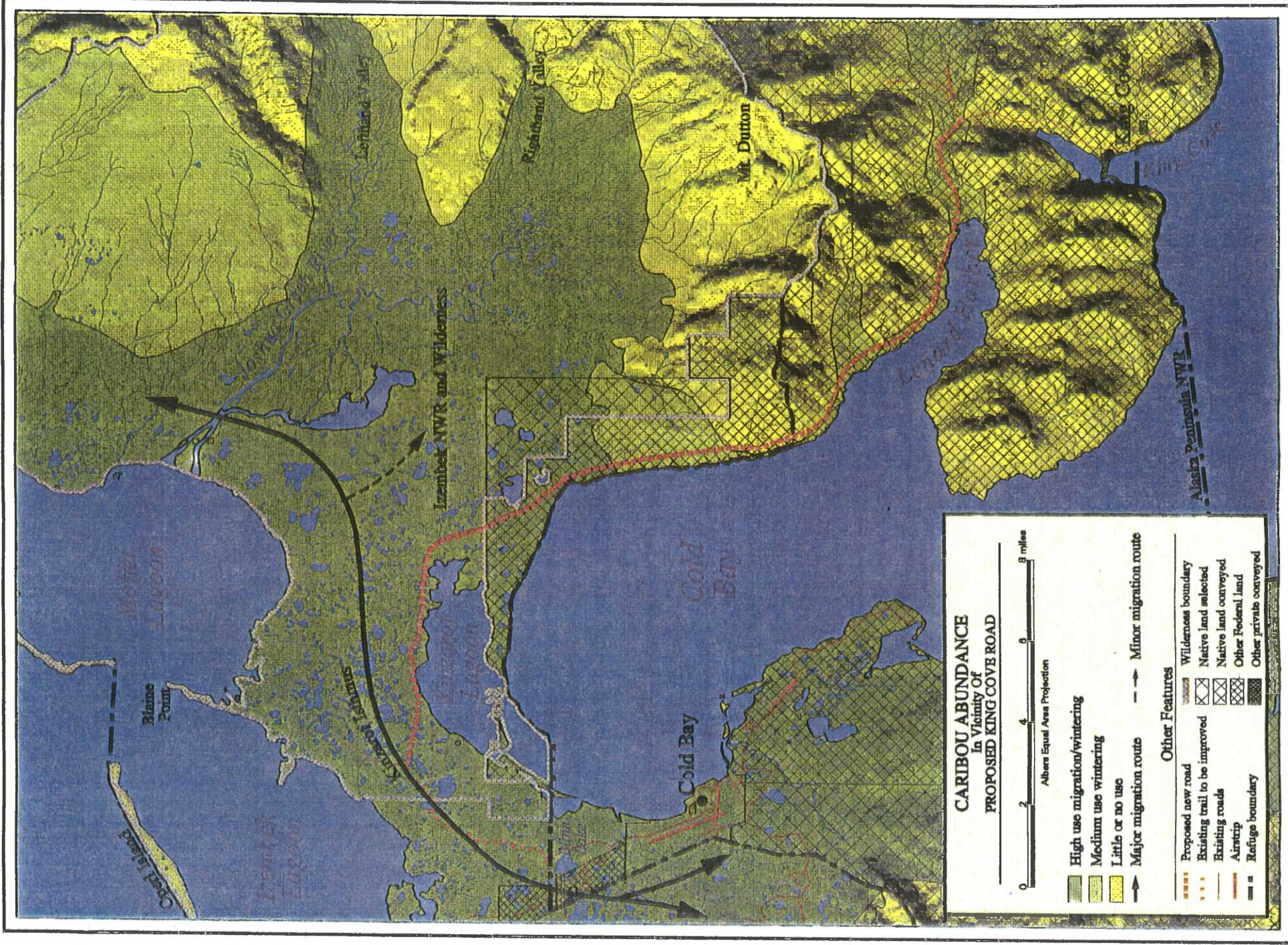
The Joshua Green watershed, including Right-hand and Left-hand valleys, is recognized as a key brown bear natal area for much of the lower Alaska Peninsula. Extensive anadromous fish runs using the watershed, just three miles northeast of the proposed road corridor, attract the highest densities of bears on the lower Alaska Peninsula.

Fall aerial population trend surveys from 1976-1995 have averaged 96.7 bears ( $0.6/\text{mi}^2$ ) with 30% of these being maternal sows. In 1995 the highest count ever, 168 bears (31% maternal sows), was made suggesting the population is healthy and possibly increasing. Up to 70% of the bears present in the area are observed during the daylight surveys. Due to their nocturnal/crepuscular behavior, the area population may exceed 320 bears ( $2.0/\text{mi}^2$ ). Small home ranges and high productivity in this area are a result of high habitat values in a relatively small geographic area with low levels of human disturbance. Road access would significantly increase human disturbance by consumptive and nonconsumptive users.

*Road access would significantly increase human disturbance and alter use by bears.*

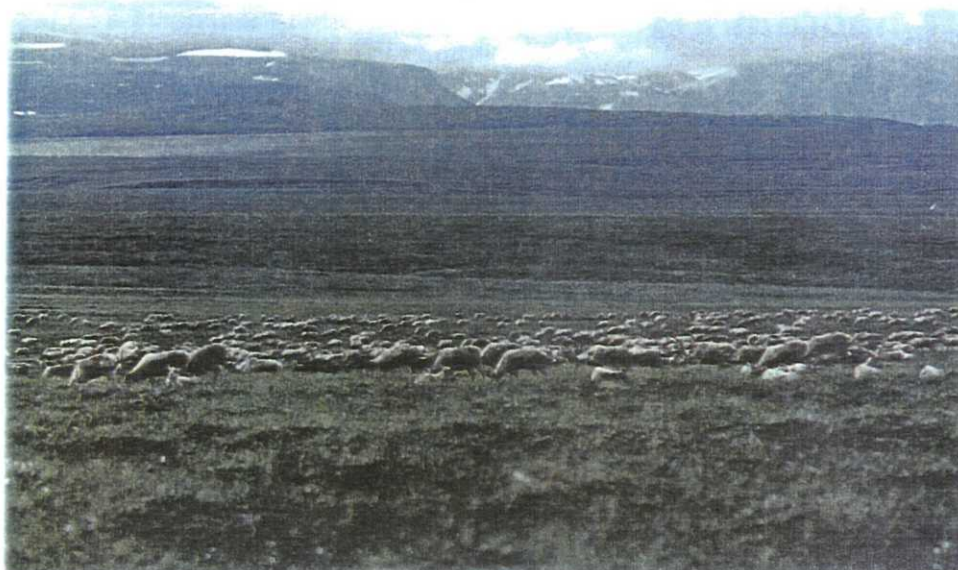
The proposed road would alter bears' normal behavior in this remote and pristine area primarily by affecting seasonal habitat use. Bears would likely abandon some traditional summer and fall foraging areas and denning sites, especially during road construction and possibly permanently. With increased human access into this remote area, brown bear hunting would undoubtedly increase. User conflicts between commercial big game guides, recreational hunters and wilderness enthusiasts would increase possibly requiring additional hunting and other public use restrictions to maintain the historic distribution and abundance of this bear population.







## Caribou



*The narrow isthmus between Izembek and Kinzarof lagoons is the primary migration route and wintering area of the southern Alaska Peninsula caribou herd.*

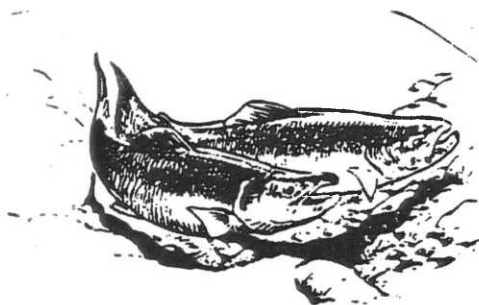
The proposed road would have a significant impact on the habitat use, seasonal distribution, and survival of the southern Alaska Peninsula caribou herd. The 10 mile portion of the road corridor around the north side of Kinzarof Lagoon is important wintering habitat and is the primary route used by caribou migrating to and from their calving grounds in the Black Hills-Trader Mountain area. In most years, nearly the entire herd (now  $\leq 3,900$  down from 10,000 animals in the early 1980's) passes through and often winters in the narrow three to six mile-wide corridor between Kinzarof and Izembek lagoons. Generally, this migration occurs in September and October, and again in March and April.

The presence of a road, vehicle traffic and increased public use could alter caribou migratory patterns in the Kinzarof Lagoon and Izembek Lagoon area. Under utilization of this important foraging area and over-utilization of other areas could occur. The reluctance of a significant number of animals to move through the area could fragment the herd, delaying migration to winter and calving grounds. Studies conducted along the Dempster Highway in the central Yukon suggest that increasing vehicular traffic and human presence pose a serious barrier to caribou movements.

With improved access into high concentration habitats, harvest levels could increase should caribou hunting seasons, closed since 1991, be reopened. Consequently, additional hunting and other public use restrictions would be needed to prevent displacement of caribou from important habitats and from overharvesting.

## Anadromous Fish

Conservation of salmonids is a purpose of the Izembek Refuge, therefore, potential impacts of any activity on fish habitats and populations must be carefully weighed. The proposed transportation corridor would cross numerous small streams and coastal wetlands along the northern shore of Kinzarof Lagoon. These small streams originate from lakes and springs and provide access routes for returning sockeye salmon. Salmon spawn in gravel-bottomed streams, outlet rivers, and lake beaches. These returning salmon are a key component of the annual nutrient cycle that maintains the productivity of freshwater and marine systems. Increased sediment loads and habitat destruction from road construction could disrupt productivity of returning salmon having significant ecological impacts to Kinzarof Lagoon.



## Wolf and Wolverine

The proposed road would provide easy access to wilderness habitats important to large furbearers such as wolves and wolverines. Wolves utilize caribou as an important prey item, along with Arctic ground squirrels and birds. Adverse effects on the numbers and distribution of caribou and large ground nesting birds such as tundra swans would affect wolves.

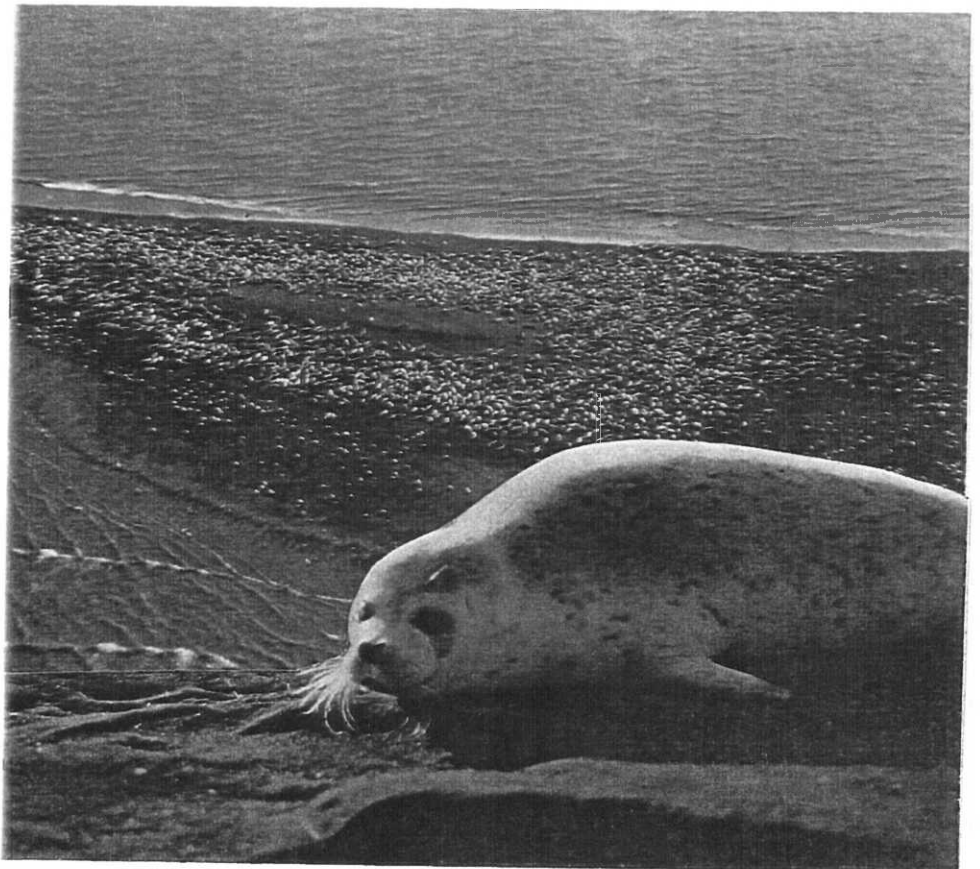
Wolverines are also opportunistic predators using habitats and prey species similar to wolves but also exhibit scavenging behavior. Beaches and streams are favored foraging habitats for wolverines which are primarily nocturnal.

These two secretive species exhibit a low tolerance for human activity. In addition to potential negative effects of a road corridor on their prey species, the pressures resulting from the use of this road could cause significant reductions in the wolf and wolverine populations in the eastern portion of Izembek Refuge.

## Harbor Seal and Sea Otter

Kinzarof Lagoon provides important foraging and haul-out sites for harbor seals and sea otters. Critical areas are sand and gravel islands and spits at the mouth of the lagoon. Both species also use exposed shoreline habitats along Cold Bay but in lower numbers. Harbor seal numbers are declining at significant rates in the Gulf of Alaska and along the Alaska Peninsula, including the Izembek area. Increasing human disturbance in the Kinzarof Lagoon area would adversely affect the use of foraging and haul-out sites by these two regionally important species.

*Sand and gravel islands at lagoon mouths are critical for sea otters and declining populations of harbor seals.*



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