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US FISH & WILDLIFE SERVICE--ALASKA

ANNUAL NARRATIVE REPORT
Calendar Year 1983

IZEMBEK NATIONAL WILDLIFE REFUGE
Cold Bay, Alaska

Pavlof Unit of the Alaska Peninsula NWR
Unimak & Amak Islands of the Alaska Maritime NWR



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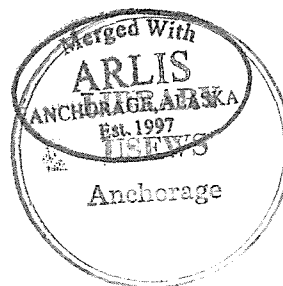
IZEMBEK NATIONAL WILDLIFE REFUGE
Cold Bay, Alaska

Including:

Pavlof Unit of the Alaska Peninsula National Wildlife Refuge
Unimak and Amak Islands of the Alaska Maritime National Wildlife Refuge

ANNUAL NARRATIVE REPORT
Calendar Year 1983

NATIONAL WILDLIFE REFUGE SYSTEM
Fish and Wildlife Service
U. S. DEPARTMENT OF THE INTERIOR



PERSONNEL

1.	John Sarvis, Refuge Manager, PFT, GS-485-12	6/23/74 - Present
2.	Michael L. Nunn, Assistant Refuge Manager, PFT, GS-486-11	7/13/80 - Present
3.	Christian P. Dau, Wildlife Biologist, PFT, GS-486-11	1/30/81 - Present
4.	Alan Rogers, Maintenance Worker, PFT, WG-4749-8	8/20/81 - 3/03/84
5.	Barbara M. Bull, Refuge Assistant (typing), PFT, GS-303-5	4/04/82 - 2/05/83
6.	Kim Schaff, Refuge Assistant (typing), PFT, GS-303-4	4/03/83 - 1/13/84
7.	Bonnie Taylor, Refuge Assistant (typing), PFT, GS-303-5	2/06/84 - Present
8.	Kevin Riske, YOC Enrollee	6/12/83 - 9/02/83
9.	Jason Nunn, YOC Enrollee	6/12/83 - 9/02/83

Review and Approvals

John Sarvis 3/30/84
Submitted By: Date

Alaska Reg. Office (R-7) Date

US FISH & WILDLIFE SERVICE--ALASKA



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1. Unimak and Amak Islands 1

INTRODUCTION

The Izembek National Wildlife Range was established in 1960 (Public Land Order 2216) with a boundary encompassing 415,300 acres dominated by wet and upland tundra. Within this area are approximately 95,000 acres of tide lands and lagoons owned by the State of Alaska. These areas have been identified as critical habitat by the State and are largely the basis for the identification and establishment of the refuge. Some of the largest eelgrass beds in the world occur in these shallow lagoons and this resource in addition to those in adjacent fresh water and terrestrial habitats support the large numbers of migratory waterfowl which characterizes the area in fall through spring. The brown bear and barren ground caribou, both impressive resident game species, occur commonly in the area as well.

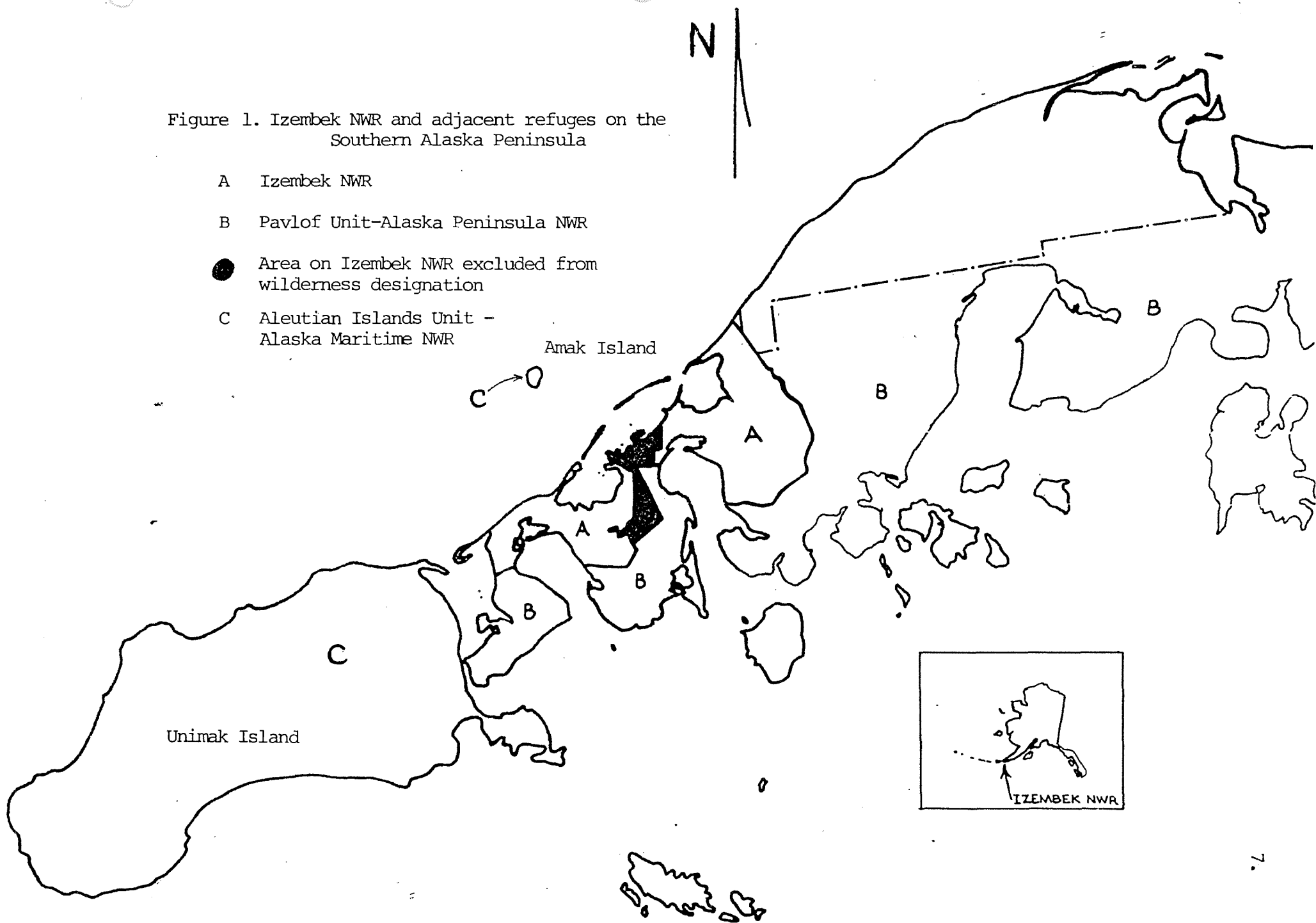
The Izembek National Wildlife Range became the Izembek National Wildlife Refuge on December 2, 1980 with the signing of the Alaska National Interest Lands Conservation Act (ANILCA - P.L. 96-487) by President Carter (Figure 1). Under ANILCA, sixteen refuges were either established, redesignated (such as our name change), or enlarged, adding 53,720,000 acres to the NWRS for a total of 76.1 million acres of refuges in Alaska. The purposes for which each of these 16 refuges are to be managed were also changed and/or defined. In addition, 13 refuge wilderness areas were established, totalling 18,560,000 acres. A wilderness area of 300,000 acres was designated for Izembek.

The Izembek NWR lies near the western terminus of the Alaskan Peninsula approximately 650 miles southwest of Anchorage. The refuge headquarters is in Cold Bay, Alaska, a largely Federal and State government town of approximately 200 people. The Cold Bay office also has responsibility for the administration of part of the Aleutian Islands Unit of the Alaska-Maritime NWR (lands east of Unimak Pass) and the Pavlof Unit of the Alaska Peninsula NWR. These areas support some of the largest seabird colonies in Alaska with a wide variety of species present. In addition, Unimak Island and the Pavlof Unit support important populations of brown bear, caribou, furbearers, and a resident population of Whistling Swans. Adjacent coastal areas support rich and diversified populations of migratory waterfowl, marine birds and mammals, and fin and shellfish. Several fishery stocks exist in commercial quantities and activities associated with these resources increase on a seasonal basis.

Maintenance of Refuge habitats in their present pristine condition is the goal of the Refuge staff. In view of land status changes resulting from ANILCA and the upcoming leasing and subsequent development of offshore petroleum rich basins in the Bering Sea, this chore will be no small one. The impacts of petroleum development on Cold Bay began on a small scale in 1982 when crews moved into the area to initiate the exploratory phase. Two to three large helicopters which supplied the crews on the offshore "rigs" were a common sight and sound in the area. Pending the location of sufficient deposits in the North Aleutian Shelf and St. George Basin

Figure 1. Izembek NWR and adjacent refuges on the
Southern Alaska Peninsula

- A Izembek NWR
- B Pavlof Unit-Alaska Peninsula NWR
- Area on Izembek NWR excluded from wilderness designation
- C Aleutian Islands Unit - Alaska Maritime NWR



lease areas, the Cold Bay area and Izembek NWR may have to deal with such requests as onshore pipelines, road building, and terminal and tanker port construction. Due to the likelihood that significant amounts of oil and gas will be located, the direction of field investigations undertaken by the Izembek NWR staff has been to quantify significant bird and mammal resources by habitat type on a seasonal basis. These data will give us our best chance of providing meaningful, conservation oriented stipulations for development on the refuge and in adjacent areas.



The Aghileen Pinnacles 'Cradle of the Storms'
(81) 33

Sarvis (11-77)



With Pavlof and Pavlof's sister in the background, the Aghileen
Pinnacles seem even more impressive.

(151) 11

Sarvis (12-78)

A. HIGHLIGHTS

1. Tundra swan production set a new record with 28 nests located, 19 hatched and 49 cygnets reaching flight stage. A total of 76 new swans were banded and neck collared of which 39 were cygnets. Fourteen swans marked in previous years were recaptured.
2. The bear study suffered because of the taking of marked bears IZ12 and 19 by hunters, and IZ18 illegally. IZ12 and IZ18 were well known bears from whom we obtained good movement and growth information.
3. A record 140 bears were observed on Izembek during one flight of 2 hours duration.
4. Productivity appraisals of the Black Brant and Emperor goose populations showed 1983 to be a near average year with 24.1% juveniles for Brant and 27.1% juveniles for Emperor.
5. A record number of caribou (10,203) was observed on an aerial survey from Bechevin Bay to Herendeen Bay.
6. A Cold Bay resident was mauled by a bear while beach combing on the refuge. He fortunately suffered no permanent damage (unless you count psychological damage from the resulting National Enquirer story).
7. Public hearings were held in all Alaska Peninsula and Unimak Villages on the draft Bristol Bay Plan, at which time, we also discussed refuge land exchange proposals regarding Izembek Lagoon, Black Hills caribou calving grounds, Mortensen's marsh, and others. It is hoped that at least one significant impact of the Bristol Bay Plan will be that these exchanges are accomplished.
8. Izembek continued to be encumbered administratively with the need to split-out lands and manpower for management of the Pavlof Unit of Alaska Peninsula NWR. Ultimately, it is planned to merge this unit with Izembek, an occurrence we anxiously await.

B. CLIMATIC CONDITIONS

Weather conditions influence refuge programs more at this station than any other single factor. Cold Bay is famous for inclement weather, usually in the form of high winds, rain and fog.

Temperatures in 1983 were slightly above normal and precipitation and average windspeed were less than normal (Table 1). Weather during the field season, April through August, was much better than last year and enabled us to accomplish much of our necessary field work (Table 2).

Table 1. Summary of Weather Data, Cold Bay, Alaska 1983^{/1}

Month	Avg. Temp. (F)	Departure from Normal	Precipitation (inches)	Departure from Normal	Wind Speed Average (MPH)	Peak ^{/2} (MPH)
January	24.6	-3.7	1.58	-1.12	16.2	41
February	31.5	4.0	.66	-1.61	14.5	49
March	33.5	4.9	.88	-1.43	15.2	44
April	36.8	3.8	3.53	1.58	17.4	55
May	41.7	2.2	1.59	-.88	15.3	36
June	48.4	3.0	1.31	-.85	11.6	25
July	51.6	1.3	2.71	.21	15.0	41
August	52.2	1.0	4.06	.36	14.7	37
September	47.3	.2	4.41	.64	15.8	72
October	39.7	.2	4.82	.53	16.4	46
November	34.6	.3	5.69	1.65	16.0	59
December	37.5	8.0	7.31	4.46	17.7	52
1983 Summary	40.0 Avg.	2.7	38.55 Total	3.54	15.5 Avg.	46 Avg.

^{/1} Data reported by the National Weather Service, Cold Bay, Alaska

^{/2} This figure is the fastest mile (i.e. it is the peak sustained wind for a one minute period). Peak gusts (less than one minute duration) are much higher.

Table 2. Spring and Summer Weather Conditions, Izembek MWR - 1983^{/1}

Month	Avg. Temp. (F)			Precipitation (inches)			Avg. Wind Speed (MPH)		Peak Gust ² (MPH)	
	1983	1982	Normal	1983	1982	Normal	1983	1982	1983	1982
April	36.8	32.1	33.1	3.53	1.33	1.54	17.4	20.7	55	52
May	41.7	38.0	39.5	1.59	4.13	2.19	15.3	17.8	36	44
June	48.4	45.0	45.4	1.31	2.93	1.84	11.6	17.1	25	49
July	51.6	46.8	50.1	2.71	6.13	2.22	15.0	16.9	41	48
August	52.2	50.2	51.3	4.06	2.17	3.89	14.7	16.5	37	39
Overall Average	46.14	42.4	43.9	2.6	3.3	2.3	14.8	17.8	38.8	46
	(+9.3% from 1982)			(-26.9% from 1982)			(-20.3% from 1982)		(-15.7% from 1982)	

^{/1} Data reported by the National Weather Service, Cold Bay, Alaska.

^{/2} This figure is the fastest mile (i.e. it is the peak sustained wind for a one minute period). Peak gusts (less than one minute duration) are much higher.

Waterfowl production, as measured by the resident tundra swan population, responded favorably to the early spring and excellent conditions through the period of brood rearing and a record number of young were raised. The ptarmigan population appeared to exhibit a similar response, as many broods that were nearly fully grown were observed when the hunting season opened on 10 August.

The fall season could be characterized as mild compared to most years, with little snow and few really bad storms. One storm on 29 September was particularly severe, however, with winds up to 104 m.p.h. Our 2,128 sq. foot wooden storage building at Grant Point was blown into the lagoon and several buildings and an airplane in town were damaged.

Lakes were still open at year's end and swans were still in the area.

D. PLANNING

1. Master Plan; 2. Management Plan

The Refuge Comprehensive Conservation Plan was scheduled for completion in 1983 in coordination with the Bristol Bay Cooperative Management Plan (BBCMP); however, this was not possible and the deadline was extended into 1984. Izembek NWR in relation to the Bristol Bay Study Area is shown in Figure 2.

3. Public Participation

Refuge staff attended BBCMP meetings in Cold Bay and False Pass in January and Nelson Lagoon, Cold Bay, King Cove, Sand Point and False Pass in August.

5. Research and Investigation

Refuge Personnel

Seasonal Movements and Population Structure of the Resident Whistling Swan Population

This project continued in 1983 during which 76 new birds were color marked. See Section G.3., Waterfowl, Whistling Swan for complete discussion.

Population, Size and Productivity of Black Brant

This continuing program receives a high degree of emphasis during the fall staging period to ensure accurate assessments for management of the species throughout the Pacific Flyway, per the Pacific Flyway Black Brant Management Plan. This work in 1983 is summarized in Section G.3., Waterfowl, Black Brant.

Population, Size and Productivity of Emperor Geese

Emperor geese winter in the Aleutian Islands and Alaska Peninsula and use the Izembek NWR extensively during the spring and fall migration. Fall productivity surveys and periodic inventories aid in the current drafting process of a Pacific Flyway Emperor Goose Management Plan. The 1983 project results are summarized in Section G.3., Waterfowl, Emperor Goose.

Seasonal Movements and Morphological Characteristics of the Gray-Crowned Rosy Finch, Snow Bunting and McKay's Bunting

This project is a low intensity effort performed primarily at the Cold Bay headquarters of the Izembek NWR. Birds are baited to a permanent trap site near the office, captured, banded and released. All birds are aged, sexed and weighed with other observations made on physical and plumage characteristics. Banding efforts performed at Cold Bay in 1983 are summarized in Table

Seasonal Movements and Distribution of Brown Bear on the Izembek NWR

This telemetry project, begun in 1977, was continued into 1983. Movements of radio collared bears were recorded using aerial and ground location techniques. See Section G.8., Game Mammals, Brown Bear.

Seasonal Movements, Distribution and Productivity of Caribou on the Izembek NWR

Census efforts, begun in 1979, were continued in 1983 with both ground and aerial productivity appraisals. See Section G.8., Game Mammals, Caribou.

Existing Wildlife Inventory Plans covering some of these projects were updated where applicable and new plans were drafted for other major projects.

Other Personnel

The Institute of Marine Science (IMS) from the University of Alaska has performed studies in Izembek Lagoon for some years under the direction of Dr. C.P. McRoy. These studies have concentrated on the dynamics of the eelgrass beds. Other aspects of the ecological relationships of the flora and fauna of this important estuarine system have also been investigated. A marine laboratory is maintained at the Grant Point Air Force facility by IMS for use by seasonal personnel.

E. ADMINISTRATION1. Personnel Shown in Table 3.

The Refuge Assistant (typing) position, vacated by Barbara Bull in January was filled on 4 April with the hiring of Kim Shaff. In December, we learned that Kim will resign in the middle of January to return to her home in Washington state.

In addition to the permanent staff, two YCC enrollees were hired from the local community. Recruitment was difficult because of the small population of approximately 200 people and the fact that most kids were gone for the summer or had higher paying jobs. (See Section H. 19 for details.)

Table 3. Staffing, Izembek NWR

	<u>Full-Time</u>	<u>Part-Time</u>	<u>Temporary</u>
FY 1977	3	1	
FY 1978	4	1	1
FY 1979	4	1	1
FY 1980 ^{/1}	3	3	1
FY 1981 ^{/2}	3	2	
FY 1982	5		
FY 1983	5.0 FTE-Permanent		
FY 1984	5.0 " "		

^{/1} Includes 1 PFT and 1 PPT ceiling and funding for Cape Sarichef field station, Eastern Aleutian NWR.

^{/2} One PFT ceiling and 1 PPT ceiling vacated due to closing of Cape Sarichef field station. One PFT ceiling filled at Izembek.

2. Funding

Table 4. Funding for Izembek NWR (in thousands of dollars)

	<u>1210</u>	<u>1220</u>	<u>1240</u>	<u>1260</u>	<u>1500</u>	<u>Total</u>
	<u>/1</u>					
FY 1977	93	17			5	115
	<u>/2</u>	<u>/3</u>	<u>/4</u>			
FY 1978	122	25	20			167
						<u>/5</u>
FY 1979	128	35	15			178
FY 1980	169	40	16			225
FY 1981	160	75	13			248
FY 1982	207	96	10			313
	<u>/6</u>	<u>/7</u>				
FY 1983	208	100	10			318
						<u>/8</u>
FY 1984				425		425

1. Includes \$3,000 for rehabilitation of Grant Point building.
2. Includes \$9,000 cyclic maintenance.
3. Includes \$10,000 ANCSA.
4. Includes \$15,000 cyclic maintenance.
5. Includes funding for 3 months' operation and salaries at Cape Sarichef, Unimak Island, Eastern Aleutian NWR.
6. Includes \$15,000 for management of Pavlof Unit of APNWR.
7. Includes \$5,000 for management of Pavlof Unit of APNWR.
8. Includes \$135,000 for ARMM projects.

3. Safety

R.M. Sarvis attended an O.A.S. pilot's ground school and had his annual flight physical and check ride in December.

W.B. Dau was the refuge representative on the Emergency Medical Service Council.

Fire extinguishers and smoke alarms were inspected and replaced or repaired as needed.

A defective breaker box in the shop was repaired.

Safety meetings were conducted with such topics as bear safety, handling of bear immobilization equipment, aircraft safety, hypothermia, rabies, aircraft and boat safety and emergency survival gear receiving emphasis.

A safety inspection was conducted by R.O. Safety Manager, Ginny Hyatt, on 29 and 30 August.

No lost time accidents occurred during the year.

On 7 August, a local employee of the National Weather Service was mauled by a brown bear while camping on the refuge. He had taken a kayak to one of the barrier islands separating Izembek Lagoon from the Bering Sea for a three day camping trip. He forgot to bring fresh water and tried to get some at a small hole on the island that caught ground and rain water. On the inner beach of the island was a carcass of a bull sealion which was being fed on (apparently for several days) by a moderate sized brown bear. The bear had numerous day beds around the waterhole, which was approximately 100 yards from the carcass. When the mauling victim approached for water, the bear was probably on one of his day beds and was startled. The bear was apparently acting defensively of its food and water. The mauling lasted only a few seconds after which the bear departed the area. The victim, with several broken ribs and a lacerated knee, made it back to his camp. He spent three days in his sleeping bag before he was overdue and a search began. He was first discovered by a local air-taxi pilot. He was hospitalized in Anchorage for care of breaks, lacerations and infection.

Traumatic as this mauling incident was, lessons applicable to bear safety were learned. An unfortunate by-product of the incident was the fact that the "National Enquirer" published an article that was almost totally inaccurate and fictitious (see Appendix). This article did nothing but perpetuate myths about brown bears.

4. Technical Assistance

Biological data pertinent to resident and migratory game was routinely supplied to biologists of the Alaska Department of Fish and Game.

Wildlife Biologist Dau was detailed to the Regional Office in June to assist Acting A.W.R. Skipp Ladd by drafting habitat strategies for cackling Canada geese and Pacific Flyway white-fronted geese, both National Species of Special Emphasis (NSSE).

W.B. Dau further assisted the R.O. by preparing a draft NSSE: Tundra Swan (Western Population) Management Plan which was submitted in early December.



The water hole on Newman Island where Jim Hunter was attacked by a bear is in the lower right hand portion of the brown area in the middle of the picture. Several bear trails leading from day beds can be seen converging on the water hole.
(388) 38 Sarvis (8-83)

5. Other Items

Special Use Permits

A total of 36 Special Use Permits were issued by the Cold Bay headquarters for Izembek, Unimak Island and the Pavlof Unit. Included were 23 trapping permits, 10 guiding permits, 1 for the installation of Navigation antennas, 1 for gravel removal and 1 for collecting fish.

Systems Status

The following advices were listed in the FY83 Annual Work Plan:

Annual Work Plan Advices - FY 83 - Izembek NWR (includes Pavlof Unit of Ak. Peninsula NWR and Unimak Island of Ak. Maritime NWR).

Migratory Birds (1210)

a. 100 Continuing Commitment

Manage the refuges and retain adequate support services to maintain existing natural ecosystems and preserve habitat for current populations of all migratory bird species using the refuge.

Responsible person:	Refuge Manager
Funds:	\$110,000 IZM/ 2,000 PAV
FTE:	1.2 perm./0 others
Report:	Annual Refuge Narrative Report
FY 84:	Continue

b. 700 Continuing Commitment

In accordance with Black Brant Pacific Flyway Management Plan, determine the size and age composition of the fall population of Black Brant staging on Izembek and adjacent lagoons. Continue to develop an accurate method of counting the Brant on refuge lagoons through aerial surveys, photography, etc.

Responsible person:	Refuge Manager
Funds:	\$20,000/0
FTE:	0.1 perm./0.1 other
Report:	Submit results to Wildlife Operations- Migratory birds specialist no later than October 21, 1982.
FY 84:	Continue

c. 750 Continuing Commitment

Continue study of resident whistling swan population on Izembek, Unimak Island, and Pavlof Unit to determine population size, productivity, limiting factors, diseases, movements, habitat preferences, and migration patterns.

Responsible person: Refuge Manager
 Funds: \$20,000/0
 FTE: 0.3 perm./0.1 other
 Report: Annual Refuge Narrative Report and publications as data are developed
 FY 84: Continue

d. 550 Continuing Commitment

Conduct high visibility enforcement efforts on refuges especially during periods of the most intensive public hunting pressure for migratory birds. Also conduct routine patrols to protect habitats from illegal encroachment.

Responsible person: Refuge Manager
 Funds: \$10,000/0
 FTE: 0.1 perm./0 other
 Report: N.A.
 FY 84: Continue

e. 700 Continuing Commitment

With cooperation from Yukon Delta, Togiak, Becharof, Alaska Peninsula NWRs, and Waterfowl Investigations, as needed, conduct an annual spring survey from Kuskokwim Delta to Unimak Is. to determine population and monitor status of emperor geese. Coordinate implementation of survey with each Refuge Manager.

Responsible person: Refuge Manager of Izembek NWR
 Funds: \$5,000 IZM/\$1,000 PAV
 FTE: .1 perm./0 other
 Report: Report at conclusion of survey and in Annual Refuge Narrative Report
 FY 84: Continue

f. 700 Continuing Commitment

Continue to conduct waterfowl surveys during fall, winter, and spring to monitor dabbling duck and seaduck populations using Izembek NWR, Unimak Is., and Pavlof Unit.

Responsible person: Refuge Manager
 Funds: \$6,000 IZM/\$1,000 PAV
 FTE: 0.1 perm./0.1 other
 Report: Annual Refuge Narrative Report
 FY 84: Continue

g. 700 Continuing Commitment

In accordance with the Pacific Flyway Emperor Goose Management Plan, determine the age composition of the fall population of emperor geese using the refuges.

Responsible person: Refuge Manager
 Funds: \$6,000/0
 FTE: 0.1 perm./0.1 other
 Report: Annual Refuge Narrative Report
 FY 84: Continue

h. 700 Continuing Commitment

Conduct surveys of bald eagles on Izembek, Unimak, and Pavlof Unit to determine breeding and wintering populations. Also census other raptors in conjunction with the eagle survey. Coordinate with W.O.P. Raptor Project Leader.

Responsible person: Refuge Manager
 Funds: \$3,000/0
 FTE: 0.1 perm./0 other
 Report: Annual Refuge Narrative Report
 FY 84: Continue

i. 140 Continuing Commitment

Maintain refuge buildings, vehicles, boats, motors, and equipment at FWS standards in order to meet refuge objectives in a safe and efficient manner. Perform rehabilitation of equipment and facilities as necessary.

Responsible person: Refuge Manager
 Funds: \$10,000/0
 FTE: 0.2 perm./0.2 other
 Report: Annual Refuge Narrative Report
 FY 84: Continue

j. 125 Continuing Commitment

Prepare papers for and attend annual, regional migratory bird conference.

Responsible person: Refuge Manager
 Funds: \$1,500/0
 FTE: 0.1 perm./0 other
 Report: N.A.
 FY 84: Continue

k. 120 Continuing Commitment

Write, edit and supply data for Bristol Bay Cooperative Management Plan and Refuge Comprehensive Plans.

Responsible person: Refuge Manager
 Funds: \$13,000 IZM/\$3,000 PAV
 FTE: 0.4 perm./0 other
 Report: Monthly activity reports and the plans themselves
 FY 84: Terminate

l. 150 New Commitment

Inventory and document existing cabins on Izembek and Pavlof Unit, issue permits, and monitor use in accordance with the Alaska cabin policy.

Responsible person: Refuge Manager
 Funds: \$500 IZM/\$4,000 PAV
 FTE: 0.3 perm./0 other
 Report: Annual Refuge Narrative Report
 FY 84: Continue

m. 150 New Commitment

Issue and monitor special use permits for refuges for guiding, oil exploration, special projects, rights-of-ways, etc.

Responsible person: Refuge Manager
 Funds: \$2,000 IZM/\$3,000 PAV
 FTE: 0.2 perm./0 other
 Report: Annual Refuge Narrative Report
 FY 84: Continue

MAMMALS AND NON MIGRATORY BIRDS (1220):a. 100 Continuing Commitment

Manage the refuges and retain adequate support services to maintain the existing natural ecosystems to preserve habitat for all indigenous mammals and non-migratory bird species. Compile and submit routine administrative reports, answer correspondence, participate in training courses to maintain professional currency, purchase supplies, respond to public and FWS requests and handle the details associated with the administering and managing of refuges. Monitor and issue special use permits for guiding, trapping, geologic exploration, etc.

Responsible person: Refuge Manager
 Funds: \$50,000 IZM/\$1,000 PAV
 FTE: 0.5 perm./0.1 other
 Report: Annual Refuge Narrative Report
 FY 84: Continue

b. 700 Continuing Commitment

Conduct annual brown bear census of Izembek and Unimak in August.
 Begin brown bear census on remainder of Pavlof Unit not already covered.

Responsible person: Refuge Manager
 Funds: \$11,000 IZM/\$2,000 PAV
 FTE: 0.2 perm./0 other
 Report: Annual Refuge Narrative Report
 FY 84: Continue

c. 550 Continuing Commitment

Conduct high visibility enforcement efforts during periods of the most intensive hunting pressure, such as season openings and week-ends, to minimize illegal kill, particularly of brown bears and caribou. Conduct level of enforcement and routine patrol throughout the year that will protect mammals and non-migratory bird habitats from encroachment or change, such as might occur from geologic exploration, off road vehicling, aircraft disturbance, etc. Continue to send personnel with enforcement authority for refresher law enforcement training and conduct firearms qualifications tests locally as necessary to maintain qualification.

Responsible person: Refuge Manager
 Funds: \$8,000 IZM/\$1,000 PAV
 FTE: 0.1 perm./0 other
 Report: Annual Refuge Narrative Report
 FY 84: Continue

d. 700 Continuing Commitment

Continue to monitor and census the Cold Bay and Unimak caribou herds, in cooperation with the ADF&G monitor harvest.

Responsible person: Refuge Manager
 Funds: \$5,000 IZM/\$2,000 PAV
 FTE: 0.2 perm./0.1 other
 Report: Annual Refuge Narrative Report
 FY 84: Continue

e. 750 Continuing Commitment

Continue work on the brown bear study including capturing, marking and collaring, and subsequent home range and movements follow-up through telemetry.

Responsible person: Refuge Manager
 Funds: \$13,000/0
 FTE: 0.3 perm./0.1 other
 Report: Annual Refuge Narrative Report
 FY 84: Continue

f. 650 Continuing Commitment

Continue cooperating with ADF&G in setting seasons, bag limits, and permit conditions for brown bear, caribou, furbearer, and other species. Using news releases, personal contact, public meetings, etc., continue public relations and awareness work with the public regarding co-existing with brown bears, causes underlying bear/human conflicts, etc.

Responsible person: Refuge Manager
 Funds: \$5,000/0
 FTE: 0.1 perm./0 other
 Report: Annual Refuge Narrative Report
 FY 84: Continue

g. 700 New Commitment

Conduct annual surveys of harbor seals and sea otters to monitor population trends.

Responsible person: Refuge Manager
 Funds: \$2,000/0
 FTE: 0.1 perm./0 other
 Report: Annual Refuge Narrative Report
 FY 84: Continue

h. 700 Continuing Commitment

Continue beached marine mammal transects on deadhead return trips from other surveys.

Responsible person: Refuge Manager
 Funds: \$1,000/0
 FTE: 0.1 perm./0 other
 Report: Annual Refuge Narrative Report
 FY 84: Continue

INTERPRETATION AND RECREATION (1240):a. 100/140 Continuing Commitment

Rehabilitation of facilities and base level funding of refuge operations for visitor inquiries, hunting programs, public information, brochures, maps, occasional tours, etc.

Responsible person:	Refuge Manager
Funds:	\$10,000/0
FTE:	0.1/0 other
Report:	Annual Refuge Narrative Report
FY 84:	Continue

F. HABITAT MANAGEMENT1. General

Izembek National Wildlife Refuge totals 320,893 acres with 300,000 designated as Wilderness, giving additional protection to these important habitats. Also, within the refuge boundary are approximately 100,000 acres of lagoon systems which provide habitats essential to the wildlife of the area. These areas are tidelands owned by the State of Alaska. One, Izembek Lagoon, has been afforded protection by the State as a State Wildlife Refuge (114 SLA 1960, Chapter 20, Article 1) (Fig. 3.).

The conveyance of 17,800 acres of Izembek NWR lands to adjacent village corporations poses new management problems as the regulations relating to these 22g (Alaska Native Claims Settlement Act) lands may be more liberal than those presently in force. When ANILCA was first passed, it was assumed by us that refuge rules and regulations would remain in effect, as this was the direction that Native Corporations were given in ANCSA in an effort to discourage them from selecting lands from existing refuges. However, in 1983, the solicitor ruled that those regulations do not apply and that new regulations would have to be promulgated. This was certainly a bad decision and will probably result in further degradation of lands that were supposed to be protected, as well as greatly decrease the trading value of these lands. A regional task force has been assigned the task of developing new regulations. The intent of the village and regional corporations, with respect to the development of their lands, is unknown at present, but center on economic return for the shareholders. Such projects as roads and thermal and hydroelectric developments have been mentioned as potentials. The area promises to be a hub of activities associated with offshore petroleum exploration in the Bering Sea, as well as with an expanding fishing industry. These activities and changing land use

patterns will be closely monitored in an attempt to maintain the integrity of the refuge and its wildlife resources. The present status of land conveyances under ANILCA are summarized in Table 5.

Table 5. Native Selection of Land within the Izembek NWR per the Alaska Native Claims Settlement Act

Village	Refuge Lands Conveyed (acres)	Refuge Lands Remaining for Conveyance (acres)	Total (acres)	Remarks
King Cove	9,695	5,760	15,455	22 g land
False Pass	8,105	1,264	9,369	"
Pauloff Harbor	-	- approx.	320	"
Aleut. Corp.	-	-	96,030	14 (h) (8) ^{/1}
"	-	-	152	14 (h) (1)

^{/1}

In January, 1983, a verbal decision by the Regional Office was made that all 14 (h) (8) selections on Izembek are invalid.

2. Wetlands

Approximately 87 percent of the Izembek NWR is characterized as true wetlands. Nearly 200,00 acres of upland tundra (61%), 22,400 acres of wet sedge and grass marsh (7%) and 60,000 acres of pond, lake and river areas (19%) make up this total. Most of these areas are protected by wilderness designation and all are important to the continued stability of fish and wildlife populations on the refuge.

The nearly 100,000 acres of State owned lagoon within the Izembek NWR is essential wetland habitat for up to 250,000 migratory waterfowl in the fall. Eelgrass is the most important food item covering an estimated 68 percent of Izembek Lagoon. Goose species graze heavily on the leaves of this essential food item.



The fountain of youth? A glacial stream cascades down a rocky gorge near the Aghileen Pinnacles.

Nunn (6-82)



The spectacular Left Hand Valley provides some of the best brown bear habitat in the world.

Nunn (6082)

Puddle duck species inhabiting Izembek Lagoon in the fall are especially fond of eelgrass seeds. The seeds are very small (1 mm long) and crops of shot birds are often completely packed with them. Crops from a pair of mallards shot this fall were weighed and sampled to estimate the number of eelgrass seeds. The male carried an estimated 17,500 seeds while the female had 11,650! Considering the large numbers of waterfowl utilizing these seeds (twice a day in fall or once each tide flux) the quantities consumed are astronomical.

6. Other Habitat

No livestock grazing is permitted on Izembek NWR. The Refuge Staff, however, flew cattle surveys for the Alaska Maritime NWR on Caton and Simeonof Islands on which continuing negotiations are underway to eliminate grazing programs. On June 16, a total of 127 head of cattle, of which 21 were calves, was observed on Caton. On 25 August, 620 head of cattle and 4 horses were tallied on Simeonof.

12. Wilderness and Special Areas

On December 2, 1980, 300,000 acres of Izembek were officially designated as Wilderness by the Alaska National Interest Lands Conservation Act.

G. WILDLIFE

1. Wildlife Diversity

Approximately 142 species of birds and 23 species of mammals have been reported as residents and/or migrants on Izembek NWR. Four species of Pacific Salmon (chum, pink, red and silver), two varieties of trout (dolly varden and arctic char) and sticklebacks are the primary fish species in fresh-water habitats on the refuge. A minimum of 23 species of saltwater fishes have been reported for Izembek Lagoon.

2. Endangered Species

The endangered Aleutian Canada goose (Branta canadensis leucopareia) may occur on the Izembek NWR during spring or fall migration to and from their western Aleutian nesting areas, however, this use has not been documented by actual sightings. In addition, the Arctic and American races of the peregrine falcon (Falco peregrinus tundrius and F.p. anatum, respectively) may occur in the area during migration, however, use by these species has not been documented either. The non-endangered or threatened Peale's race of the peregrine falcon (F.p. pealei) is a fairly common resident of the area.

3. Waterfowl

Whistling Swan

The whistling swan study continued in 1983. Whistling swans are the key nesting waterfowl species here and utilize the entire refuge. Therefore, a knowledge of their habitat needs and population parameters is essential to managing and protecting refuge ecological units. In order to fulfill one of our mandates of protecting the essentially wilderness nature of the refuge, knowledge is necessary of species such as whistling swans which require wilderness conditions in order to reproduce. Swans are a key indicator species that show the health of refuge habitats and conditions.

The year began with the majority of the Izembek NWR and Unimak Island resident whistling swan population wintering, as usual, at Peterson Lagoon and Cape Lapin River in the Urilia Bay area of Unimak Island. The peak wintering population count was made on January 17. Of the 672 swans observed, 621 were on Peterson Lagoon, 23 on Cape Lapin River, 9 on Christianson Springs, and 19 on some small open freshwater leads on Izembek (Table 6). Of the 548 swans observed from the ground, 50 (9.1%) were cygnets and 42 neck collared birds were read. In addition, the legbands were read on a bird marked in 1978 that had lost its collar. Another marked bird was also observed with a short metal legband (used before 1978 when we changed to taller bands).

Periodically, throughout January and February, warming trends will open portions of the lake and pond systems on the refuge. At such times, whistling swans will disperse from the protection of springs in the Peterson Lagoon area and some will appear near Cold Bay. Another hard freeze quickly concentrates them again at Peterson Lagoon.

Timing of spring break-up was about normal this year. Swans began moving back to Izembek in mid-March. On March 18, a cursory survey of Izembek revealed 162 (17 with collars) birds scattered throughout the refuge. Most of the freshwater was still frozen at the time, but the birds had already spread out on their nesting territories. On April 1, only 3 swans were left on the Unimak Island wintering lagoon areas. The rest were spread throughout their summer range on Izembek, Pavlof Unit, and Unimak Island.

Nesting activities were about 7 to 10 days earlier than last year. Nest initiation began about April 19 (#22), peaked in early May and the last nest (#6) was begun about May 15. The first nests hatched on May 30 (nests #11, #17, #22), the peak of the hatch was the first 10 days of June, and the last nest (#6) hatched June 21 (Figure 4).

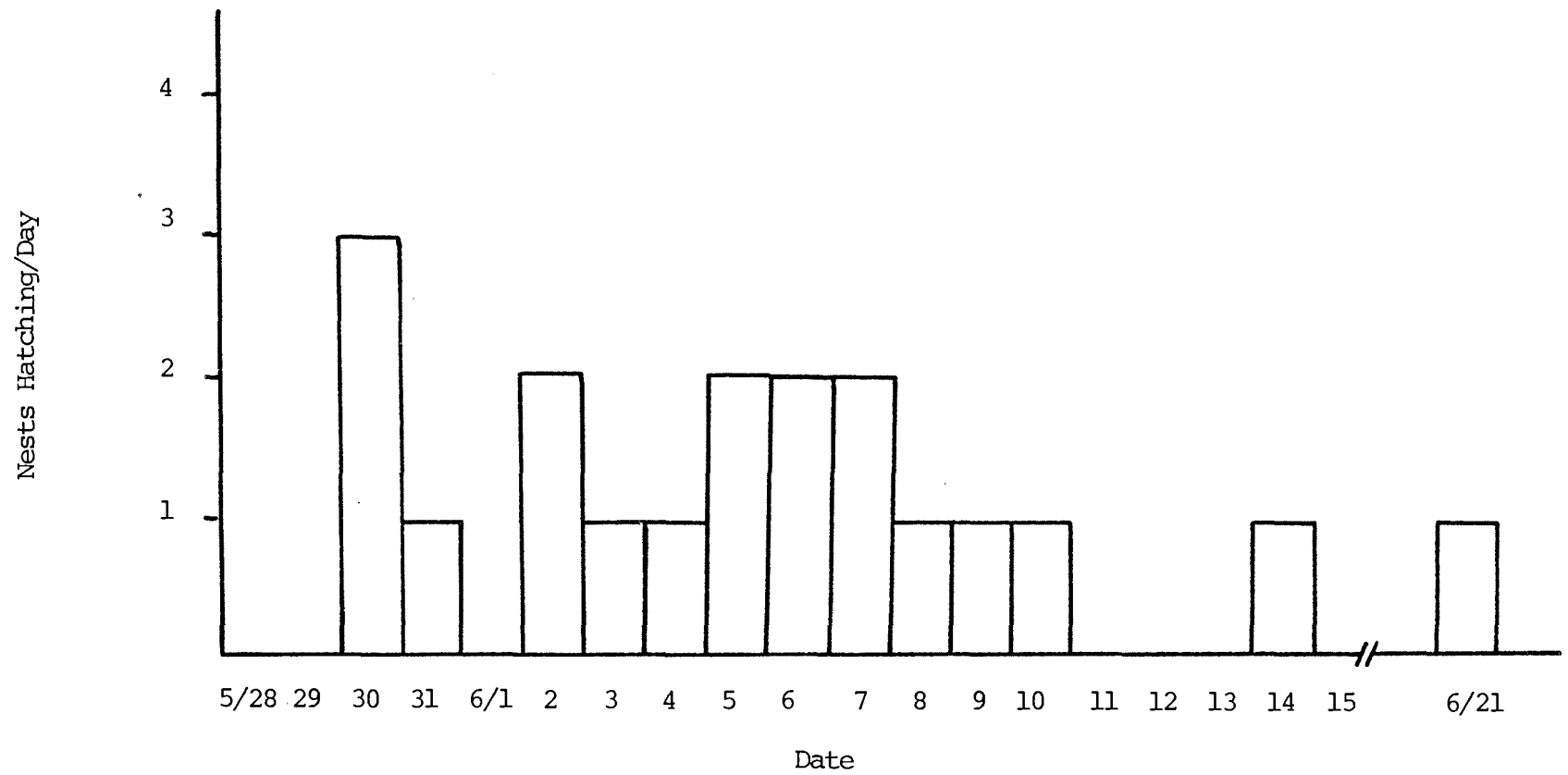


Figure 4. Hatching dates for 19 successful nests in 1983.

Table 6. Winter Whistling Swan Surveys of Unimak Island
and Izembek NWR

Date	Immature	Adult	Total Classified	Total Observed	^{/1} Neck Collars	^{/2} Swan Location	^{/2} Area Covered
01/06/78				294	na	I,P,C,S	I,U
02/08/78				309	na	P,C	U
11/13/78				400	1	I,S,P,C	I,U,
11/15/78	40 (17.6%)	187	227	235	14	P	P
11/29/78				286	?	P	P
12/05/78	7 (4.7%)	143	150	196	4	L,P,C	L,P,C
12/29/78	29 (8.0%)	332	361	361	9	P	P
01/05/79				136	1	P	P
01/12/79				264	1	I,S,L,C	I,U
01/24/79				300+	5+	P	P
02/24/79				229	?	I,S,P,C	I,U
03/05/79				241	8	I,S	I,S
03/07/79				236	7	I,S,O,P,C,Z	I,U,Z
11/06/79				266	9	I,S,P,C	I,U
12/12/79				390	?	P	P
12/21/79				493	6+	L,P,C	U
01/02/80				458	?	L,P,C	U
01/07/80				494	5	P,C,	L,P,C
01/09/80	48 (11.9%)	354	402	533	17	P,C	L,P,C
02/06/80				573	11	L,P,C	U
10/24/80	3 (4.3%)	70	73	92	0	I,P	I,P
10/28/80				247	9	I,S,O,L,P	I,U
11/02/80				148	?	L,P	L,P
01/20/81	26 (7.5%)	321	347	540	16+	S,O,L,P,C	U
01/27/81	43 (7.6%)	521	564	564	27	L,P,C	U
11/16/81				285	?	L,P	U
12/24/81				598	?	S,O,L,P	U
01/09/82	86 (14.7%)	499	585	673	44	L,P	S,O,L,P
02/10/82				270	?	P	P
02/20/82				150	?	S	S
02/24/82	80 (13.5%)	512	592	592	30	P,Z	I,U,Z
12/08/82				654	?	P,L	P,L
12/23/82				90	?	I	I
01/17/83	72 (12.0%)	527	599	672	44+	I,L,P,C	I,U
02/05/83				517	?	P,L,C	U
03/18/83				162	17	I	I
11/15/83				120	17	I	I
01/20/84				580	44	S,O,P,C	I,U
01/23/84				575	?	P,O	I,U
02/22/84	70 (15.8%)	374	444	444	44	P,L	I,U
6 Year Ave. 11.6 %				577 ^{/3}			

^{/1} Includes birds who have lost collars, but legband(s) were observed.

^{/2} I-Izembek NWR, U-N - Unimak, S-Swanson Lagoon, O-Otter Point, L-Cape Lapin R.,
P-Peterson Lagoon, C-Christianson Lagoon, Z-Lazaref R.

^{/3} From peak count each winter.

The annual nesting survey was done on May 31 and June 1 with 227 swans (37 neck collared) observed on Izembek, the Pavlof Unit (SW of the Black Hills only), and adjacent areas (Table 7). During this survey, 24 nesting pairs, 47 non-nesting pairs, 8 single birds, and 77 in flocks were observed. Total swans observed was comparable to the last four years, but the number of nesting pairs was down. This was more due to the survey being done a little late than an actual decrease in nesting. Three broods were observed while conducting the survey indicating it was late. Usually many of the nests are already destroyed by the time the first ones hatch.

Only 28 nests were found this year compared to 44 in 1982, but again this was probably due to missing many of the nests that were destroyed by the time nest searching began. Data from the past three years further confirms this (Table 8). From 1980 - 1982, the average number of nests found was 42 and the average number hatched, 19 (45% nest success). In 1983, 19 nests hatched, the same as the 3 year average, so the total nests this year was probably more than the 28 found.

Each year, over half the nests do not hatch. A majority of these are unsuccessful due to predation. Most of these nests can only be observed from the air making conclusions about their outcome more difficult. We have quite a few species here that could be taking swan eggs, but lately the brown bear has been the main suspect. Most of the destroyed nests are considerably torn up, eliminating avian and some smaller mammals as possibilities. This year brown bears were confirmed as destroying several nests. Nests #1, #2, #7, and #21 all had fresh bear tracks around them. A couple of the nests were on islands, but bear tracks (which were not present when the nest was active) were easily observed in the shallow, mud bottom around the islands. Nest #1, was on a small island 200 yards from the lakeshore and there was a common loon nesting only two feet from the swan nest. Both nests were being incubated on June 1. On June 5, both nests were destroyed and bear tracks were seen in the mud around the island.

Over the last three years, brown bear numbers in the Cold Bay Road System Area have been reduced considerably due primarily to hunting (see Brown Bear section). Though we are concerned with the reduction in bear numbers and have suggested steps to change this trend, it has provided an opportunity for further testing of the hypothesis that bears are the primary swan nest predator. As revealed in Table (9), swan nest success in the road system area containing low bear numbers has been over twice as high as the rest of the refuge.

Table 7. Spring Nesting Surveys of Whistling Swans

(Area of coverage: Izembek NWR, Cathedral Lakes, lakes south of Cold Bay to Thin Point and west side of Morzhovoi Bay)

Category	No. of Swans Observed (% of total)						Aver. Last 4 Years
	^{/1} 5/8/78	^{/2} 4/25,28/79	5/14,15/80	5/13,15/81	^{/3} 6/2,6/82	^{/3} 5/31-6/1/83	
Singles	6 (8%)	10 (5%)	9 (4%)	16 (8%)	11 (5%)	8 (4%)	11 (5%)
Swans (nesting pairs)	18 (23%)	24 (12%)	60 (26%)	58 (29%)	68 (30%)	48 (21%)	59 (27%)
Swans (other pairs)	26 (33%)	96 (47%)	84 (36%)	94 (48%)	92 (41%)	94 (41%)	91 (41%)
In groups	28 (36%)	75 (36%)	80 (34%)	29 (15%)	55 (24%)	77 (34%)	60 (27%)
Total	78	205	233	197	226	227	221
Area Covered (Sq. Mi.)	315.5	413.9	413.9	413.9	413.9	413.9	413.9
Density (Sq. Mi.)	.25	.50	.56	.48	.55	.55	.53
No. collared swans seen	N/A	12	1	21	23	37	

^{/1} Cathedral lakes, lakes south of Mortensen's Lagoon and west side of Morzhovoi Bay areas not covered.
Other areas not covered thoroughly

^{/2} Survey done too early to include peak of nesting.

^{/3} Survey a little late for peak of nesting.

Table 8. Whistling Swan Production
(Izembek NWR, Pavlof Unit of Ak. Peninsula NWR & Vicinity)

36.

Parameter	1977 ^{/1}	1978 ^{/2}	1979	1980	1981	1982	1983
Nests with known clutch				17	23	22	14
Number eggs				82	118	105	75
Mean clutch				4.82	5.13	4.77	5.36
Total nests	?	14+	17+	34	47	44	28
No. hatched (nest hatch success)	10+	9+	7+	17 (50%)	17 (36%)	22 (50%)	19 (68%)
1st Obs. - #broods (cygnets)				15 (51)	17 (64)	22 (74+) ^{/3}	19 (87+) ^{/4}
Average Brood Size (at hatch)				3.4	3.8	3.4	4.6
Last Obs. - before 9/1							
No. broods (cygnets)	10 (34)	9 (28)	7 (17)	10 (22)	13 (32)	9 (23)	17 (49)
Average Brood Size (at flight)	3.4	3.1	2.4	2.2	2.5	2.6	2.9
Dates of last observation	7/22	7/21, 8/8	7/18	Various	Various	8/28, 9/2	Various
Egg hatching success (successful nests only)				78%	65%	85%	90%
Success - (eggs to flight stage)				32%	33%	28%	46%
Success - (hatch to flight stage)				41%	50%	33%	51%

^{/1} Swan surveys not done before 1977 due to no aircraft at station.

^{/2} Total nests deduced in 1978 and 1979 from a combination of nest surveys done too early and later brood surveys

^{/3} In 1982, one brood was not discovered until it was about 50 days old; number of cygnets that hatched is unknown.

^{/4} In 1983, one brood was not discovered until it was about 35 days old; number of cygnets that hatched is unknown.

Table 9. Comparison of Whistling Swan Nest Success Between
the Cold Bay Road System Area and the Rest of the Refuge

Year	<u>/1</u> Nests in Road System Area			Non Road System Nests		
	Hatched	Rest	Total	Hatched	Rest	Total
1981	9 (64%)	5	14	8 (24%)	25	33
1982	8 (80%)	2	10	14 (41%)	20	34
1983	10 (100%)	0	10	9 (50%)	<u>9</u> ^{/2}	18
Total	27	7	34	31	54	85
%	79%			36%		

/1

The Cold Bay Road System Area is described in the ADF&G brown bear regulations and includes central Izembek NWR and lands south of Cold Bay.

/2

Undoubtedly low since numerous destroyed nests were not located in 1983 due to late survey.

Clutch size was obtained for 17 nests which contained 91 eggs for an average clutch of 4.8, the same as last year (Table 10). Of the 28 nests found, 19 (68%) hatched with 87 cygnets observed within a day or two of hatching. This year's average brood size of 4.6 was by far the most yet and well over the prior 3 years' average of 3.5. The weather in June and early July was excellent with considerably less wind and rain than normal. This was the main reason for the excellent hatch.

Of the 19 broods, 17 (89%) reached flight stage, the best success rate observed so far. Brood survival to flight stage has only averaged 59% the last three years. Forty-nine of the 89 cygnets reached flight stage for a survival rate of 56%, also considerably above the three year average survival rate of 41%.

As reported in past years, cygnet survival here is very low. We have been attempting to determine the cause (s) for this and have considered disease, parasites, predators and weather. So far, nothing significant has been found relating to any disease or parasites. Several dead cygnets sent to the National Wildlife Health Lab have been necropsied, but nothing has been found indicating exact cause of death. Blood smears and blood samples were taken for several years but no blood parasites or unusual blood parameters were found. Enough dead cygnets are found each year to indicate predation is not the major cause of mortality. The unusual summer weather of 1983 seems to have provided more information than anything else we have checked. June and early July were unusually warm and dry for this area and this appears to be the main reason for the exceptional hatching success and cygnet survival. Every year before 1983, the majority of the cygnets that perished, died within 10 days of hatching (Figure 5). But this year, the cygnet mortality rate was nearly constant for the first 30 days after hatching when they would be most fragile. If disease or parasitism were the problem, it would seem that these would take more than the first few days to have an effect.

Neck collars still appear to have no adverse behavioral impacts on whistling swan production. Of the seven nests that were made by marked swans, the female had a neck collar in all seven, and the male in four of the seven was also collared (Table 11). Five (71%) of the seven nests hatched successfully and all five broods reached flight stage. For the seven nests combined, the females were observed incubating 25 times and the males were incubating five times. Although occasionally the male is on the nest more than the female, normally the female does the majority of the incubating.

As in previous years, brood movements were monitored to identify the extent of brood rearing habitat with special emphasis on the

Table 10. Summary of 1983 Successful Whistling Swan Nests.

Nest No.	Clutch ^{/1}	Hatching Date	First	No. cygnets in brood (age in days) Intermediate Observations	Last Obs. ^{/2}
5	6	6/10	4 (1)	4 (14), 3 (18), 2 (26)	2 (82)
6	(4)	6/21	4 (2)	3 (7)	0 (15)
8	(5)	6/3	5 (2)	4 (5)	4 (89)
9	7	6/8	5 (1)	4 (2), 3 (7-9), 2 (11-33), 1 (42)	1 (74)
10	5	6/4	4 (1)	3 (2-11), 2 (13-20), 1 (24)	1 (80)
11	(5)	5/30	5 (1)	4 (2-4), 3 (6)	3 (142)
12	(5)	6/2	5 (1)	5 (4), 4 (6-15), 3 (21-22), 2 (26-50), 1 (54)	1 (91)
13	5	6/14	5 (1)	5 (3), 4 (5)	4 (72)
^{/3} 14	7	6/2	7 (1)	7 (8), 6 (13-34), 5 (39-50), 4 (54-57)	3 (64) 3 (82)
15	7	6/7	6 (1)		6 (137)
^{/4} 16	(5)	6/5	5 (1)	5 (5), 4 (10)	4 (109)
17	(4)	5/30	4 (1)	4 (7), 3 (8)	3 (85)
^{/4} 18	5	6/5	4 (1)	4 (5), 3 (10)	3 (109)
^{/4} 19	(5)	6/7	4 (1)	4 (16), 3 (17-21), 1 (34)	1 (52)
20	(5)	5/31	5 (3)	5 (8), 4 (10), 3 (15-59)	2 (98)
22	(7)	5/30	6 (2)		6 (169)
^{/3} 24	4	6/9	4 (1)	4 (19), 3 (27), 2 (32), 1 (41)	1 (61)
26	?	6/6	1 (4)	1 (18)	0 (22)
28	?	6/6	4 (35)		4 (86)
19	91		87		49
Mean or %	4.8		96% of eggs hatched	^{/5} 54% - eggs to flight 56% - survived from hatch to flight	

^{/1} Eggs in () were derived from first brood observation and eggs remaining in nest.

^{/2} Cygnets first fly at 65-75 days of age.

^{/3} One adult, female, with neck collar before nesting.

^{/4} Both adults with neck collar before nesting.

^{/5} Minimum egg hatching success since more eggs may have hatched, but the cygnets died before the first brood observation.

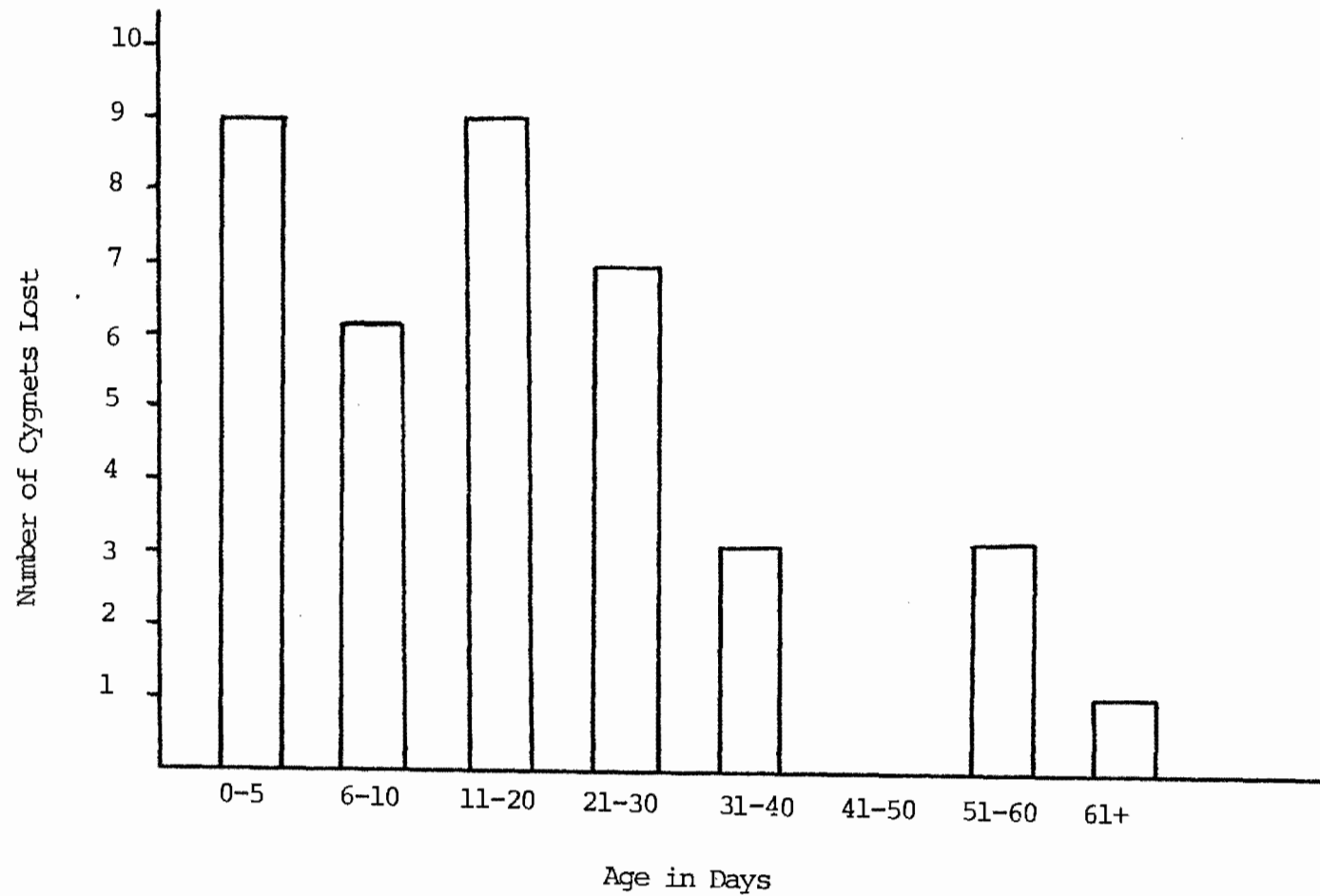


Figure 5. Chronology of Cygnet Loss.^{/1}

^{/1} From data in Table 10.

Table 11. Summary of Seven Nests Made by Neck Collared Swan Pairs in 1983

Nest No.	Collar Number (Male Listed First)	Bird Incubating Nest		Clutch	Outcome ^{/1} (date)	Number of Cygnets	
		Male	Female			At Hatch	Flight
7	Uncoll. / TO	0	6 (100%)	5	DB (6/15)	-	-
^{/2} 14	(C9) / 74	1 (50%)	1 (50%)	7	H (6/2)	7	3
16	45 / 48	0	3 (100%)	(5)	H (6/5)	5	4
18	F5 / J6	0	3 (100%)	5	H (6/5)	4	3
19	K9 / Y4	1 (17%)	5 (83%)	(5)	H (6/7)	4	1
21	M5 / K4	1 (20%)	4 (80%)	5	DB (6/8)	-	-
^{/2} 24	(Y7) / A7	2	3	4	H (6/9)	4	1
		5	25	36		24	12

^{/1} DB - Destroyed by bears; H - Hatched

^{/2} Male had lost collar before nesting; collar replaced in late July, 1983.

location of preferred areas. Lakes with outlets large enough to support even a small run of salmon were fertile and had good stands of aquatic vegetation (primarily Potamogeton perfoliatus, P. filiformis and Sparganium hyperboreum). Ponds with similar vegetation stands are present in wet marshes and these, in addition to the somewhat deeper lakes with salmon runs, were used preferentially by swans during the nesting, molting and brood rearing periods. Data on lake type and use on a seasonal basis is essential to providing the protection necessary to maintain the whistling swan population and protect refuge wilderness habitats.

In 1983, 76 new swans were captured and neck collared plus 14 previously marked ones were recaptured (Table 12). The greater number of cygnets this year plus the excellent help of our two YCC's made this our most successful year yet for banding. In the last five years, we have managed to band 46 cygnets and this year 39 more were banded further attesting to the good production this year.

In addition to putting a standard FWS metal band, neck collar and color leg band on each bird, we recorded age, sex, plumage characteristics, eye color, size of bill and yellow spot on lores, wing and leg measurements. Weight and presence or absence of external parasites was also determined. We also took photos of facial pattern.

Seventeen separate operations were necessary to obtain the 90 swans captured. As in previous years, the refuge Super Cub aircraft and collapsible rubber boat were essential to many of our efforts. Although the actual captures were usually attempted with a dipnet from the 12' Avon boat, many were made by foot when the birds escaped the boat and went ashore. The refuge aircraft was used to locate molting swans and for shuttles of banding equipment and personnel. The aircraft was also used occasionally to spot hiding birds and guide banders when swans did not cooperate with "Plan A". While banding this year, we again reached several new areas of the refuge we had not visited before and further added to our knowledge of refuge habitats and wildlife.

After several years of near super-human efforts to reach swan molting areas, we are now looking forward to reaching some heretofore impossible areas when the refuge aircraft is equipped with floats. A float plane will provide access to more of the Pavlof Unit, especially, which we are especially anxious to cover. Somewhere north of here on the Alaska Peninsula, the whistling swans all migrate to the Lower 48 in winter. Most of the swans here do not migrate. We are interested in delineating where the "dividing line" is between the resident and migratory populations. Most of the Pavlof Unit contains swans, but we have been unable to reach them because we have not had a float plane.

Table 12. Summary of Whistling Swans Banded and Neck Collared in 1983
Izenbek NWR

Date	Location	ASY M	ASY F	SY M	SY F	L-M	L-F	Neck Collar Numbers
7/19/83	Lake #143 (Frosty)	1	1					2T, 3C
7/21/83	Salmonberry Lake	1	1					4T, 5C
7/22/83	Lake #136 (Trout Crk.)		1					6T
7/22/83	Lamprey Lake	1				2		8T, 7C, 9C
7/26/83	Hatchery Lake	1	1				3	0T, 1P, 2C, 4C, 6C
7/28/83	Bering Inlet	1	1			1	5	3P, 8C, 0C, 2P, 4P, 5P, 6P, 8P
7/28/83	Lake #34 (Bering Inlet)	1	2					0P, 7P, 2U
7/29/83	Thin Point Lake	1	1			1	2	9P, 4U, 1U, 6U, 8U
7/29/83	Bluebill Lake					3	1	3U, 5U, 7U, 0U
7/29/83	Y Lakes	1	1			1	5	9U, 2F, 1F, 4F, 6F, 8F, 0F, 2J
7/30/83	Swan Lake	1	1			3	1	3F, 4J, 5F, 7F, 9F, 6J
7/30/83	Lake #90		1				3	8J, 2Y, 4Y, 0J
8/02/83	Buglake (#113)	6	7	2	1			1J, 3J, 5J, 7J, 9J, 1Y, 3Y, 5Y, 6Y, 8Y, 0Y, 1A, 2A, 3A, 4A, 5A
8/03/83	Mortensen's (Lake #					1	3	7Y, 6A, 7A, 8A
8/05/83	Mortensen's South					1	2	9Y, 9A, 0A
8/08/83	VOR Lake		1					2K
8/09/83	Hook Bay						1	4K
TOTALS - 1983.		15	19	2	1	13	26	76
TOTALS FOR 1978 - 1983		68	85	16	20	42	43	274

In addition, 23, 45, 48, 74, C9, P8, F5, J6, Y3, Y5, Y7, K1, K5, and 7T were recaptured in 1983.

This year, 23 (26%) of the 90 swans captured had leeches (Theromyzon rude) in their eyes with one bird having them in both eyes (Table 13). Over the six years that we have checked swans for leeches, an average of 21% have had them in their eyes. They do not appear to be causing significant mortality, but one wonders how much the swan's forward vision is affected, with the large bulge a leech causes under the nictitating membrane. The leeches this year were all mailed in 35mm film containers to the National Wildlife Health Lab in Wisconsin and they were all alive upon arrival. They must be hardy to survive swans, banders and the U. S. Post Office so well!

A brood of six cygnets had never reached flight stage until this year when two broods actually hatched six cygnets and all six survived (Table 10). Their histories so far have been interesting especially in comparison. The Bering Inlet Brood (3P,8C,0C,2P,4P,5P,6P,8P) was neck collared on July 28 and contained one male cygnet and five females. With the larger broods, it is especially tricky to capture them all and for them to all stay together upon release since the adults invariably move to a new location after banding. But the Bering Inlet brood stayed together and was observed throughout the remainder of the year and wintered on Unimak Island.

The Y brood (9U,2F,1F,4F,6F,8F,0F,2J) was neck collared on July 29 and also contained one male and five female cygnets. And that is where the similarities ended. After we released them, they did not stay together. The adults and three young ended up on a lake two miles away and the other three cygnets were on a lake next to the banding lake. If the young remain on their own, their survival rate is low and those that do survive are on the absolute bottom of the pecking order when they attempt to join flocks in the fall. Yet if the young remain with the parents, the brood is dominant in fall flocks. It became obvious they were not going to get together, so seven days after banding we recaptured the three separated cygnets and carried them over to the lake the rest of the brood was using. After sneaking up to the lake, we released them and hoped they would find their parents and siblings. When we checked with the refuge aircraft the next day, five cygnets were with the parents. So the operation was partially successful, but we could not find the sixth cygnet. Thirteen days later, we discovered the missing cygnet still alone and on a different lake from the brood. Then to our surprise, four days later, all six cygnets were with the adults!

But this was not the end of surprises for the Y brood. The swan population here is essentially resident all year. Only five swans banded by us have ever been reported in the Lower 48 and as we stated last year, all five were non-breeders and possibly not resident birds of this area. So no sooner had we come to this conclusion,

Table 13. Occurrence of Leeches in Whistling Swan Eyes, 1978-1983

Year	ASY-M	ASY-F	SY-M	SY-F	L-M	L-F	Total Swans W/Leeches	Swans W/O Leeches
1978	1	2			1	2	6 (22%)	21
1979		1					1 (6%)	17
1980	3	3					6 (14%)	38
1981	7	6		4	3	2	22 (29%)	54
1982	4	3			1		8 (12%)	58
1983	6	4	3		4	6	23 (26%)	67
Totals	21	19	3	4	9	10	66 (21%) ^{/1}	255

^{/1} 60 swans had leeches in one eye and 6 had leeches in both eyes.

than the Y brood proved us wrong. They were last seen here on October 24, and then, to our surprise, were observed on November 24 near Burlington, Washington, and still all six cygnets were present! They have been observed numerous times all winter in Washington in the same general area feeding in winter wheat fields and roosting near the mouth of the North Fork of the Skagit River. We now have a dairy farmer there observing them on a daily basis. He will let us know as soon as they are gone and we will attempt to pinpoint their arrival time at Izembek.

Black Brant

Brant productivity has been measured at Izembek NWR for 21 consecutive years. Production of young was near average in 1983 (Table 14) with a total of 8,096 brant classified to age and 1,947 (24.1%) of this total being hatching year birds. The 21 year average for brant productivity measured at Izembek NWR is 24.4 percent. In only two years in the past six has average or better production been achieved. Productivity and family group counting efforts on Izembek Lagoon were begun on 15 September and continued until 22 October. Although an adequate sample of family groups was obtained (i.e., $N=173 \times 3.0$ young/family) considerably more effort was necessary this year to achieve this goal (Table 15).

Productivity appraisals of brant on the Yukon-Kuskokwim Delta (YKD) as reported by Ron Garrett, refuge biologist, suggested 52 percent nesting success for a sample of nearly 4,000 nests. Clutch size averaged 3.6 eggs per nest ($N=900$) and Class I brood size was 2.8 young per family ($N=1500$) suggesting 78 percent of eggs laid survived to be Class I young. Interestingly, the average number of young per family observed at Izembek slightly exceeded the Class I brood size on the Yukon Delta NWR (i.e. 3.0 young/family group; $N=173$ at Izembek NWR). This suggests that hatching success and brood survival elsewhere in the population (i.e. Canadian arctic or USSR) may have exceeded that observed on the YKD. As all the various breeding populations of brant mix during the fall at Izembek, annual estimates of population size and productivity at each breeding location become increasingly valuable.

The bulk of our family group counts are normally obtained in the Grant Point area, however little use of this area by brant was observed in 1983. It is often difficult to distinguish individual families when scanning large flocks for productivity appraisals. It was necessary to do this in 1983 to achieve an adequate sample and this may have correspondingly resulted in a reduction in our productivity sample.

The fall of 1983 was very mild and it wasn't until 20 October that we got our first snow squall. The majority of the brant population departed on 21 October for the earliest departure yet observed. Storm systems through mid-October, although few in number, were severe. Habitat and feeding conditions were excellent. Aerial surveys of the refuge and adjacent areas were performed by the refuge staff on 22 September and by Wildlife Assistance personnel Rod King and Dirk Derksen on 12 October. Totals for black brant were 147,933 and 210,865, respectively. It is felt the peak fall population may be approximately 150,000 brants. Estimated composition of the fall population is shown in Table 16.

Table 14. Annual Black Brant Production Counts, Izembek NWR

<u>Year</u>	<u>Adults</u>	<u>Juveniles</u>	<u>Total</u>	<u>% Juveniles</u>
1963	3,968	1,243	5,211	23.9
1964	13,324	4,577	17,901	25.8
1965	21,210	5,050	26,260	19.4
1966	9,927	7,134	17,061	42.0
1967	15,219	3,081	18,300	16.8
1968	15,110	3,117	18,227	17.1
1969	12,829	3,577	16,406	22.1
1970	12,104	6,256	18,360	34.3
1971	4,820	1,953	6,773	29.0
1972	6,599	3,698	10,197	36.3
1973	12,025	4,999	17,024	29.4
1974	13,118	632	13,750	4.6
1975	9,396	5,452	14,848	36.7
1976	7,962	4,340	12,302	35.3
1977	8,856	4,092	12,948	31.6
1978	10,696	1,842	12,538	14.7
1979	13,674	2,349	16,023	14.7
1980	9,618	3,341	12,949	25.8
1981	4,109	936	5,045	18.6
1982	11,509	1,213	12,722	9.5
1983	6,149	1,947	8,096	24.1
(21 yr. \bar{x} 24.4)				

Table 15. Black Brant Family Group Counts at Izembek NWR, 1972 - 1983

No. of Juveniles	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1966 - 1983	
													\bar{x} No.	\bar{x} %
1	30	45	26	22	36	49	13	22	26	34	18	25	28.8	16.5
2	39	95	44	66	59	77	31	64	47	38	22	40	51.8	29.6
3	45	87	19	48	78	71	29	37	57	36	25	55	48.9	27.9
4	25	70	13	31	40	29	24	17	39	27	20	26	30.1	17.2
5	11	22	2	14	19	13	10	5	7	10	4	21	11.5	6.6
6	3	5	1	5	4	1	3	0	0	8	0	6	3.0	1.7
7	0	2	0	3	1	0	0	1	1	1	0	0	0.8	0.5
8	0	1	0	0	0	0	0	0	0	0	0	0	0.1	0.1
Total Families	153	327	105	189	237	240	110	146	177	154	89	173	175 \pm 67	
Total Juveniles	416	938	239	543	674	603	326	361	489	431	237	515	481 \pm 198	
Mean Family Size	2.72	2.87	2.28	2.87	2.84	2.51	2.96	2.47	2.76	2.80	2.66	2.98	2.73 \pm 0.21	

Table 16. Composition of the Black Brant Population
Izembek Lagoon

	<u>Number of Birds</u>	
	<u>1982</u>	<u>1983</u>
Peak Count	146,945	147,933
Est. number of hatching - year birds (Percent young x total)	14,004	35,652
Est. number of families (Number of HY - Avg. family group size)	5,265	11,964
Est. maximum number of breeding adults with young (number of families x 2)	10,530	23,927
Est. total number of sub-adults and non-and/or failed breeding adults	122,411 (83.3%)	88,354 (59.7%)

Wildlife Assistance (RO) and Waterfowl Investigations personnel from Juneau were assisted again this fall by the refuge staff in an attempt to enumerate the fall population of black brant through the use of aerial photography. This is the second fall a nine inch format camera has been tested to attempt to develop an appropriate total count or sampling scheme to achieve this goal.

Six and twelve inch lens configurations and black/white and color film were exposed at various altitudes in this experimental effort. Products in a scale of 1:10,000 and 1:5000 were obtained in 1982, however, altitudes were not sufficient to keep from arousing the birds and hence, counting was not possible. We feel significant over or under counting may occur if birds are put in the air. Although the 1983 products have not yet been fully analyzed, the planned scale of 1:2000 was obtained from the operating altitudes in the 1000 to 5000 foot ASL range and the products appear promising. At this point individual birds can be counted on the photos, but species identification is not possible. This project is a continuing cooperative effort which will be pursued until we can develop an accurate photographic censusing program or it is determined unfeasible.

Photographic products obtained to date will be valuable in mapping and monitoring the beds of eelgrass which characterize Izembek Lagoon and adjacent bays and lagoons.

The fall exodus of the brant population for their Mexican wintering areas occurred on 21 October, the earliest departure date recorded so far. Approximately 20,000 to 30,000 brant remained in the lagoon after the main departure. The U.S. Air Force and their civilian contractor (RCA Alascom) at the Grant Point facility gave us permission to monitor this departure via radar. However, our clearance did not come until the day most of the brant left. The birds failed to give their usual pre-departure clues so we missed our opportunity to view the departure on radar. As usual the birds did select a favorable storm system and departed at a ground speed of approximately 90 mph. A second departure of brant occurred on 2 November. We were able to notify selected individuals at key locations along the Pacific coast of these departures in the hopes of better understanding migration speed and routes.

The first brant was observed at Yaquina Bay, Oregon on 24 October and Humboldt Bay on 23 October, and at their destination in Baja, California (Bahia de San Quintin) on 24 October. These sightings provided good supportive data relative to the migration analysis made by the Izembek NWR staff.

Since 1959, the refuge has documented the brant departure from Izembek Lagoon. Normally the bulk of the birds depart over several hours just after dark on a given date, but in some years a more sporadic pattern appears to take place. Additionally, a variable number of brant (up to 10,000 in 1982) remain to winter in the area. The highest winter count

for 1983 was approximately 3,400 birds on 27 February. An analysis of departure weather systems for the 25 years of observation was begun this fall in an attempt to characterize the 'normal' system (Figure 6). Quite wide variability in a variety of climatic parameters was found in addition to differences in the configurations of circulation patterns exhibited at the surface and 5,000 ft. ASL (850 MB) elevations (Figure 7).

The brant departure from Izembek Lagoon routinely follows the passage of a low pressure system, when northwesterly winds occur. No other climatic parameters were found to be obviously correlated with the departure during the initial stage of the analysis. It appears that the average fall flight from Izembek to coastal Mexican lagoons covers over 3,300 miles in approximately 55 hours. Although ground speeds may approach 100 mph at departure, the average for the entire route is approximately 60 mph (Table 17). Although few birds stop in the fall along the coasts of Washington, Oregon or California, we are hopeful that even a modest influx of birds at key locations may be indicative of the passage of the main flight further offshore.

The annual mid-winter inventory of black brant along the Pacific coast of the U.S. and Mexico was completed in January. A total count of 133,430 brant was obtained, bringing the three-year moving average to 121,262 (Table 18). The Pacific Flyway Black Brant Management Plan calls for a complete cessation of hunting when the three-year average falls below 120,000 birds.

Canada Goose

The Izembek NWR is an important annual fall staging stronghold for up to 80,000 Taverner's Canada geese. The population builds to its peak in late September and early October fattening on eelgrass from Izembek Lagoon and other adjacent bays and lagoons, and on crowberries found abundantly in associated areas of upland tundra. This population undertakes a primarily diurnal migration departure from Izembek NWR with northwesterly tail winds to complete its fall flight to wintering areas in Oregon and California.

The Taverner's Canada goose is a dispersed nester in its primary habitats on the Yukon-Kuskokwin Delta (YKD) and thus does not lend itself to approaches used to assess productivity of other YKD geese. Banding activities and hunter bag checks (Tables 19 and 20) on the Izembek NWR provide our only index of the age composition of the fall flight. Juvenile birds comprised 51 percent of the observed harvest of 104 Canada geese and 52 percent of 61 birds captured for banding. Usually the percentage of juveniles in the bag is higher than the actual percentage in the population, and we assume this is probably true for the birds using the Izembek.

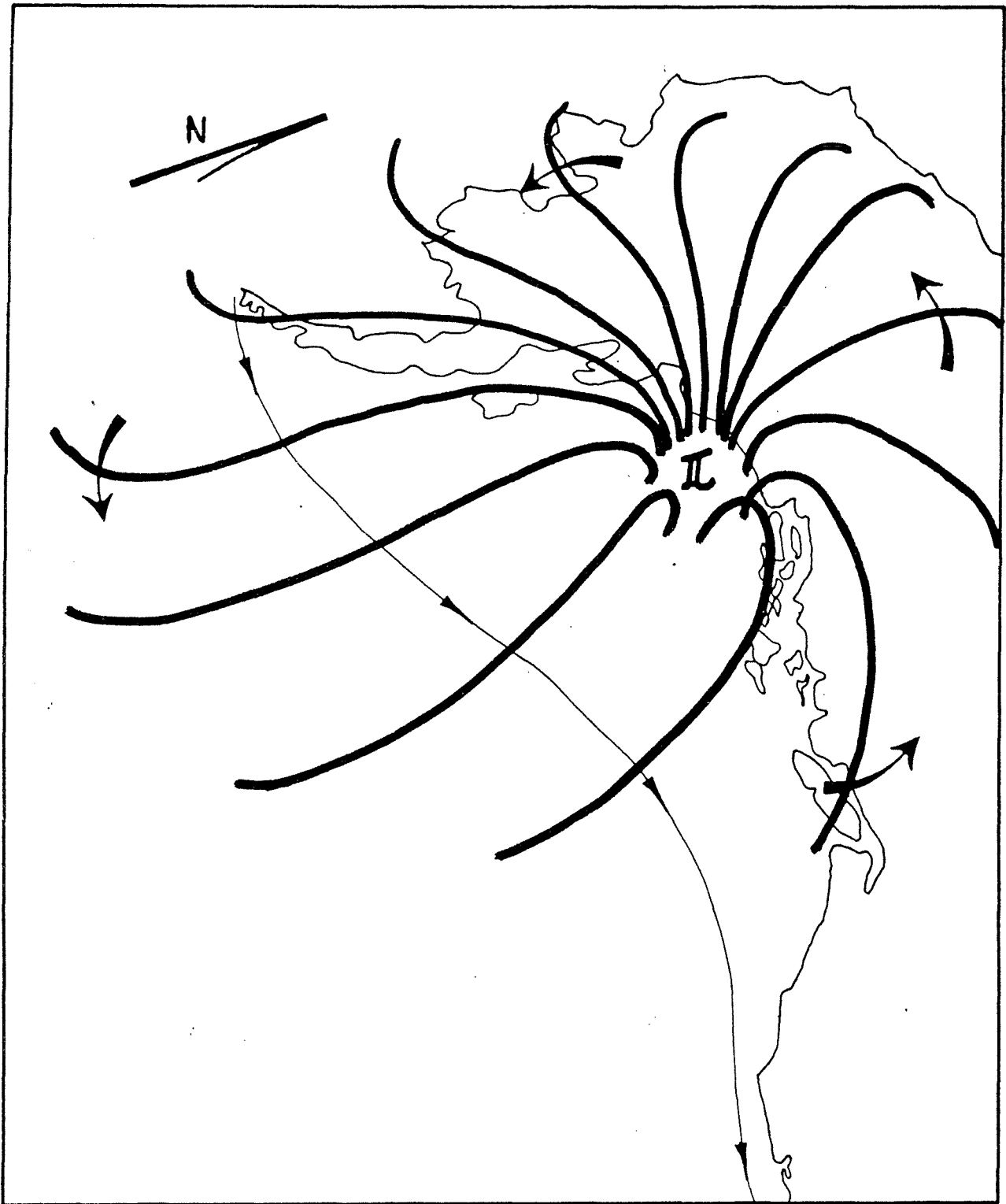


Figure 6. Three dimensional view of the 24 year average low pressure system centered 900 miles N.E. of Izembek Lagoon along the 067° TN radial and its relationship to the probable black brant flight route.

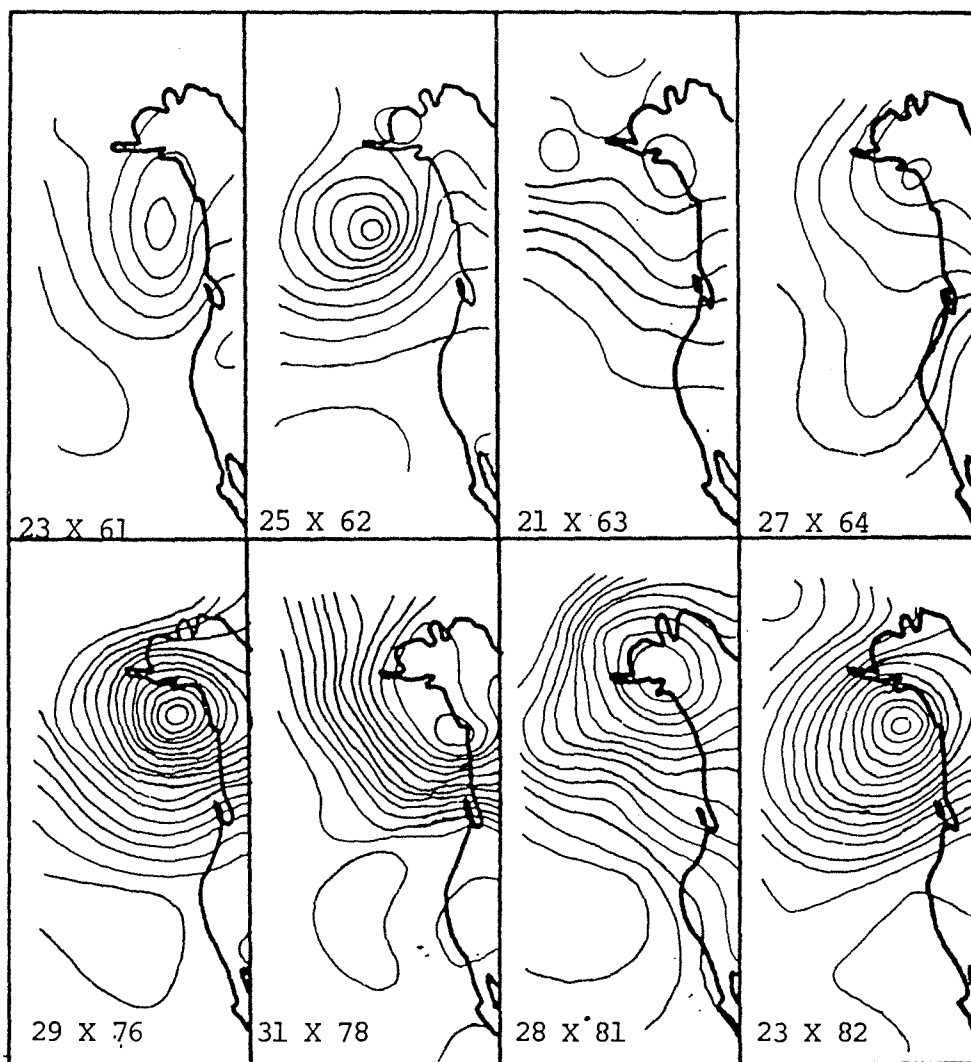


Figure 7. 850 MB weather system patterns showing low pressure center on dates of early departures of black brant from Izenbek Lagoon (21 to 31 October).

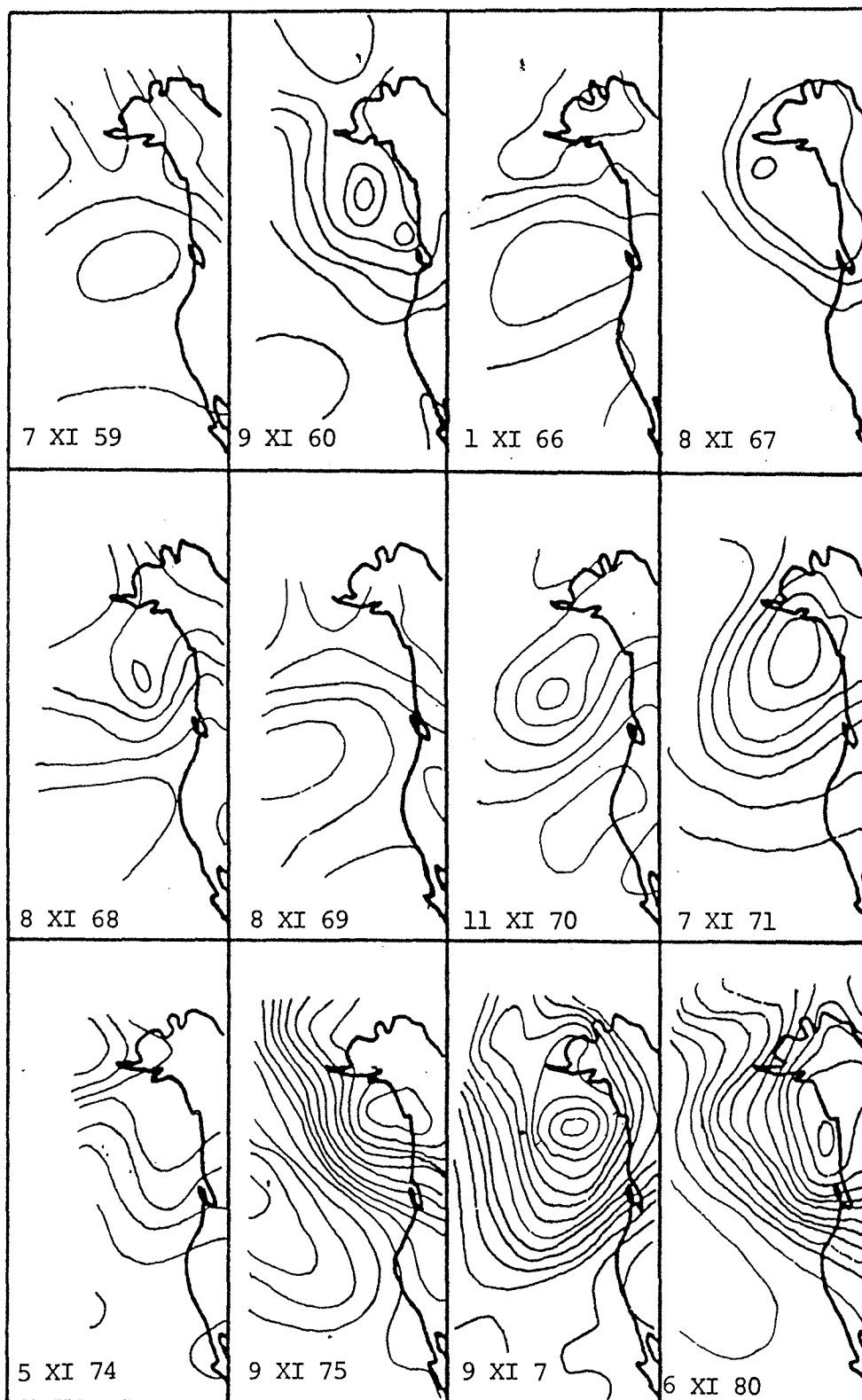


Figure 7. 850 MB weather system patterns showing low pressure centers on dates of median departures of black brant from Izembek Lagoon (1 to 11 November)

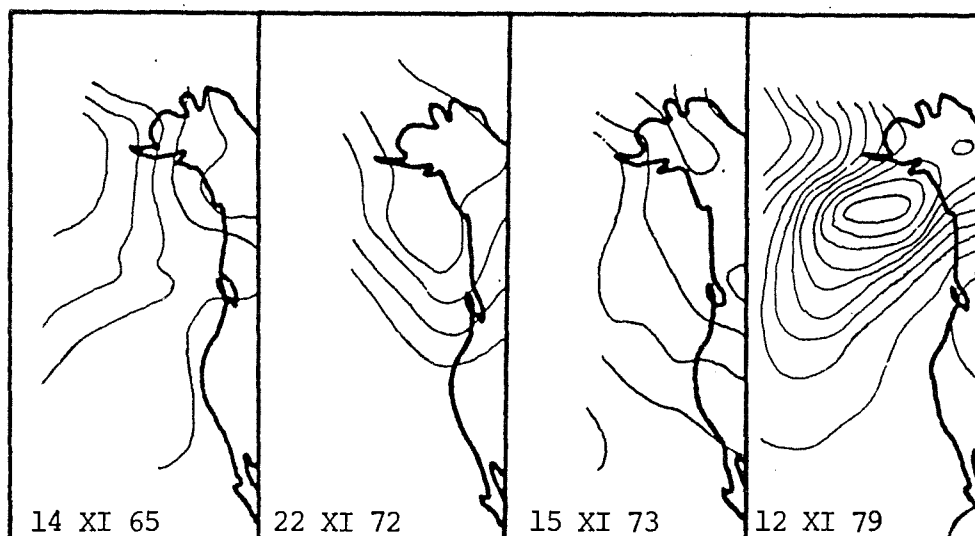


Figure 7. 850 MB weather system patterns showing low pressure center on dates of late departures of black brant from Izembek Lagoon (12 to 22 November).

Table 17. Flight Distances and Ground Speeds of Black Brant during Fall Migration (Estimated).

Year	EST. GROUND SPEED AND DISTANCE ^{1/2}								
	Departure to Mid-Route			Mid-Route to Arrival ³			Departure to Arrival		
	Distance	Time	Speed	Distance	Time	Speed	Distance	Time	Speed
1959	1612 Mi.	26.9	60	1656	33.1	50	3268	60.0	54.5
60	1673	20.9	80				3329	54.0	61.7
1	1739	29.0	60				3395	62.1	54.7
2	2070	29.6	70				3726	62.7	59.4
3	1725	26.5	65				3381	59.6	56.7
4	1553	18.3	85				3209	51.4	62.4
5	1612	20.2	80				3268	53.3	61.3
6	1581	22.6	70				3237	55.7	58.1
7	1696	22.6	75				3352	55.7	60.2
8	1696	21.2	80				3352	54.3	61.7
9	1610	32.2	50				3266	65.3	50.0
70	1898	23.7	80				3554	56.8	62.6
1	1668	19.6	85				3324	52.7	63.1
2	1617	23.1	70				3273	56.2	58.2
3	1848	24.6	75				3504	57.7	60.7
4		20.0	80				3504	53.1	69.1
5	1502	16.7	90				3158	49.8	63.4
6	1540	17.1	90				3196	50.2	63.7
7	1694	26.1	65				3350	59.2	56.6
8	1662	20.8	80				3196	53.9	58.1
9	1694	22.6	75				3350	55.7	60.1
80	1771	21.5	80				3427	54.6	62.8
1	1656	17.4	95				3312	50.5	65.6
2	1955	21.7	90				3543	54.8	65.5
<hr/>									
Avg.	1697+	22.6+4.1	76.9+	1656	33.1	50	3353+	55.7+4.1	60.4+
	136		12.5				136		4.1
$\bar{X} \pm 1SD$									
(RANGE)									
	(1502-2007)	(16.7-32.2)	(50-95)				(3158-3726)	(49.8-65.3)	(50-69)

^{1/1} Routes estimated from 850 MB circulation patterns

^{2/2} Migration speed (est. 50MPH) + wind aid

^{3/3} Assume migration speed maintained due to predominately light and variable winds. Also assume constant distance and time in route.

Table 18. Black Brant Mid-winter Survey Data

^{/1} Year	Washington	Oregon	California	Mexico (W. Coast)	Total	3 Year Running Av
1974	6,163	1,507	480	115,340	123,490	126,483
1975	7,540	1,769	680	112,056	122,045	126,055
1976	14,111	2,100	0	130,756	146,967	125,068
1977	18,100	1,110	560	143,117	162,887	130,834
1978	8,078	1,255	10	120,070	129,413	146,422
1979	6,618	1,015	135	137,550	145,318	145,873
1980	10,107	1,790	540	181,760	194,197	156,309
1981	6,451	706	485	113,402	121,044	153,520
1982	3,113	718	565	104,918	109,314	141,518
1983	7,097	930	700	124,703	133,430	121,263

^{/1} Calendar year prior to January mid-winter survey (i.e. 1983 data represents survey done in January 1984).

Table 19. Results of Taverner's Canada goose banding activities,
Izembek NWR, 1983

Date	New Bands				Recaptures				Remarks
	HY		ASY		HY		ASY		
	M	F	M	F	M	F	M	F	
20 September	6	3	5	7	-	-	-	-	Three adult Cackling Canada geese (i.e.1M, 2F):
26 September	5	1	2	4	-	-	1	-	-
4 October	13	2	3	4	1	1	1	2	Two (2) birds fatally injured (i.e. (1)HYM, (1)HYF).
Totals	24	6	10	15	1	1	2	2	

Table 20. Age Ratio of Canada Geese in Hunters' Bags,
Izembek NWR

Year	Canada Geese Harvested		Total	Adult: Immature Ratio In Harvest
	Adults (%)	Immatures (%)		
1976	78 (38.6)	124 (61.4)	202	1:00:1.6
1977	32 (43.2)	42 (56.8)	74	1.00:1.3
1978	29 (37.7)	48 (62.3)	77	1.00:1.7
1979	98 (53.3)	86 (46.7)	184	1.10:1.0
1980	30 (43.5)	39 (56.5)	69	1.00:1.3
1981	113 (57.1)	85 (42.9)	198	1.30:1.0
1982	74 (50.7)	72 (49.3)	146	1.03:1.0
1983	51 (49.1)	53 (50.9)	104	1.00:1.04
TOTAL	505 (47.9)	549 (52.1)	1054	1.00:1.09

Fall banding activities began on 2 September in 1983 with the preparation of our capture site and the installation of a new 66 x 114 foot rocket net. The site was baited on 7 September and after six days a few geese began using it on a regular basis. Three firings of the rocket propelled net resulted in captures of 21 birds on 20 September, 13 birds on 26 September and 29 birds on 4 October (Table 19). Three of the 21 geese captured on 20 September were reported as cackling Canada geese (adults) based on culmen length and body size. A total of six recaptures were recorded, three from birds previously handled in 1983 on the Izembek NWR. Three indirect recaptures were obtained of Izembek banded birds captured in 1977, 1978, and 1981.

As of this writing, no 1982-83 or 1983-84 hunting season recoveries of Izembek NWR banded birds have been received. The spatial distribution of wintering ground recoveries of our banded birds by age and sex is unchanged from that presented in the 1981 Izembek NWR Annual Narrative Report.

Emperor Goose

The emperor goose population recovered from a nearly complete re-productive failure in 1982 to produce an above average cohort of young in 1983. Production in 1982 was the poorest yet observed in the emperor goose. A total of 1451 individuals were classified to age from September through December in 1983 on the Izembek NWR, with 393 (27.1%) of these being hatching-year birds (Table 21).

On 6 September, our largest sample of 1052 birds was obtained by performing an aerial survey from Unimak Island east to Izembek Lagoon including bays and lagoons along the Pacific side of the Alaska Peninsula. Both ocular and photographic techniques were employed to insure adequate sampling of both small and large flocks. This effort put our first appraisal of production of young at 26.1 percent. Birds observed through September and October were believed to be primarily in passage while counts from November through the end of the year may include birds wintering in this area. A total of four neck-collared birds seen in October were, with two exceptions, seen only once possibly supporting this hypothesis that a fairly continuous movement of birds was occurring. All collared birds observed were from this summer's bandings at Kokechik Bay, Yukon Delta NWR. One family group including a lone-collared juvenile and a single-collared adult was observed four times near Grant Point from 6 October to 3 December.

A total of 192 families of emperor geese were observed during September and October with the average being 3.2 young per family. Although above the 17 year average of 2.9 young/family, counting efforts this

Table 21. Emperor Goose Productivity Counts

Izembek NWR, 1966 - 1983

Year	Adults	Juveniles	Total	% Juveniles	No. of Families	Family Group Size
1966	699	265	964	27.0	132	2.5
1967	1457	585	2042	28.0	66	3.3
1968	1195	585	1780	33.0	40	2.8
1969	4149	2980	7129	41.8	161	3.3
1970	9722	4933	14655	33.5	383	2.9
1971	8142	3458	11600	29.8	480	2.7
1972	4680	2270	6950	32.7	210	3.1
1973	--	--	--	--	--	--
1974	2025	377	2402	15.7	50	2.6
1975	744	405	1149	35.2	51	2.9
1976	1023	324	2247	14.4	207	2.7
1977	996	683	1679	40.7	108	2.8
1978	1395	495	1890	26.2	62	3.0
1979	841	113	954	11.8	53	3.3
1980	1777	586	2363	24.8	40	2.3
1981	1067	495	1562	31.7	181	3.2
1982	1653	140	1793	7.8	32	2.7
1983	1058	393	1451	27.1	192	3.2
17 Year Average				27.1		2.9



Emperor geese loaf on a gravel bar after having gorged themselves on eelgrass in Izembek Lagoon.

Dau (7-83)



Rock sandpipers too, find abundant food resources in eelgrass beds.

(126) 16

Sarvis (10-78)

year further pointed out the relatively stable survival rate for young birds as measured by fall indexes at Izembek NWR (Table 21). Average clutch size of 5.7 eggs and an average Class I brood size of 3.7 young were reported by Yukon Delta NWR. A comparison with our average brood (family group) size at Izembek suggests good survival of young through the fledging period.

Two aerial assessments of the emperor goose population in Izembek Lagoon and adjacent bays and lagoons were conducted in 1983. The refuge staff counted 5,583 birds on 22 September and Rod King, Migratory Bird Management - North, and Dirk Derksen, Migratory Bird Specialist, R.O., counted 9,824 on 12 October.

The third annual spring emperor goose survey in southwestern Alaska was completed by two aerial survey crews from 25 to 28 April, 1983. A total of 79,155 emperor geese were observed. Favorable weather conditions allowed coverage of the coastline and estuarine areas from Kuskokwim Bay to Izembek Lagoon from 25 to 26 April. The area from Izembek Lagoon west to Unimak Island was surveyed on 28 April after a one day delay due to weather. The survey results suggest an overall population decline of 21 percent (21,488 geese) from the 1982 spring population of 100,643, probably due to the poor production which occurred in 1982.

The 1983 survey was accomplished by two teams of pilot/observers and observers flying in Cessna 180 and 185 Service aircraft. Survey altitude was often dictated by weather conditions, however, from 250 to 300 feet AGL was maintained when possible to facilitate species identification. The coastline, bays, lagoons and estuaries along the survey route were included in the coverage, and all birds and marine mammals observed were recorded. Sea ice forecast charts issued by the National Weather Service were consulted and these data were compared to actual field conditions observed to document the ice conditions encountered in 1983.

This survey was initiated simultaneously from Bethel, Alaska and King Salmon, Alaska on 25 April. Numbers of Emperor geese by survey segment are presented in Table 22, and a mapped distribution of observations is shown in Figure 8.

Vern Berns (pilot observer) and John Solberg (observer), Alaska Peninsula NWR, surveyed most of the south side of the Alaska Peninsula on 25 April, completing the remaining areas along the south side west to Cold Bay on 26 April. A total of 2,072 emperor geese (2.6% of the total) were observed in these segments, suggesting that spring migration was well advanced and most birds had probably moved to more northerly areas.

Rod King (pilot/observer), Migratory Bird Management - North, and Chris Dau (observer), Izembek NWR, completed survey segments from Bethel to

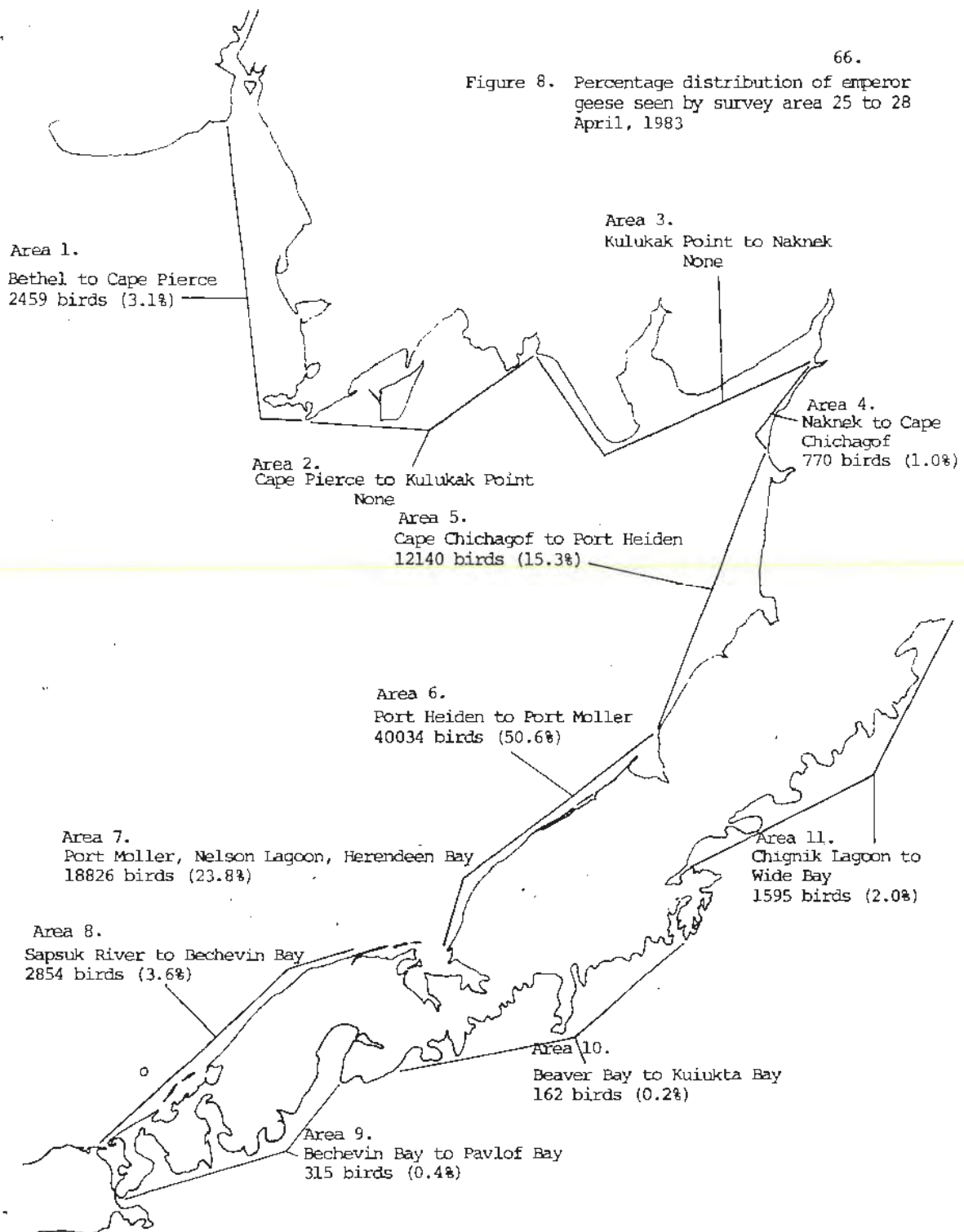
Table 22. Summary of emperor goose sightings by area,
25-28 April 1983

Area	Date	Location	Number of emperor geese	Observers
1	25 April	Bethel to Kwigillingok (mouth of Kuskokwim R.)	0	R. King/Dau
"	"	Eek Island to Quinhagak	0	"
"	"	Quinhagak to Jacksmith Bay	0	"
"	"	Jacksmith Bay to Carter Bay	256	"
"	"	Carter Bay	60	"
"	"	Carter Bay to Platinum	27	"
"	"	Platinum to Security Cove (incl. Chagvan Bay)	1,806	"
"	"	Security Cove to Cape Pierce (incl. Nanvak Bay)	310	"
2	"	Cape Pierce to Asigyugpak Spit	0	"
"	"	Asigyugpak Spit to Tongue Point	0	"
"	"	Tongue Point to Kulukak Point	0	"
3	"	Kulukak Point to Dillingham	0	"
"	"	Dillingham to Nakeen	0	"
4	"	Nakeen to Cape Chickagof	0	"
5	"	Cape Chichagof to Goose Point (incl. Egegik Bay)	770	"
"	"	Goose Point to Cape Menshikof (incl. Ugashik Bay)	1,034	"
"	"	Cape Menshikof to Port Heiden (incl. Cinder River estuary and Hook Lagoon)	11,106	"
"	"	Port Heiden to Base of Stroganof Point (incl. Port Heiden)	25,992	"
6	"	Base of Stroganof Point to Ilnik (incl. Seal Islands Lagoon)	14,042	"
"	"	Ilnik to Port Moller (village)	0	"
7	"	Port Moller (village) to Point Divide	300	"
"	"	Herendeen Bay	0	"
"	"	Point Divide to Sapsuk River mouth (incl. Nelson Lagoon, Mud Bay and Kudobin, Deer and unnamed sand islands)	18,526	"
8	"	Sapsuk River mouth to Moffett Point	0	"
"	28 April	Moffett Point to Strawberry Point (incl. Moffett Bay)	1,734	"
"	"	Strawberry Point to Cape Krenitzin (incl. Izembek Lagoon and Applegate Cove)	1,120	"
"	"	Cape Krenitzin to Chunak Point (incl. Hook Bay, St. Catherines Cove and Hot Springs Bay)	0	"
9	"	Boiler Point to Big Lagoon (incl. Little, Middle, and Big Lagoons)	0	"
"	"	Big Lagoon to Delta Point (incl. Littlejohn, Old Mans and Mortensens Lagoons)	0	"
"	26 April	Cold Bay (village) to Lenard Harbor (incl. Kinzarof Lagoon)	0	Berns/Solberg
"	"	Lenard Harbor	0	"
"	"	Lenard Harbor to Indian Head	25	"
"	"	Indian Head to Volcano Bay	17	"
"	"	Volcano Bay	0	"
"	"	Arch Point to Jackson Lagoon	273	"
"	"	Jackson Lagoon to Canoe Bay	0	"
"	"	Canoe Bay	0	"
10	25 April	Beaver Bay to Balboa Bay	85	"
"	"	Dorenai Bay to Mitrofanina	77	"
11	"	Mitrofanina to Chignik Lagoon	0	"
"	"	Chignik Lagoon to Base of Cape Kumlium	448	"
"	"	Base of Cape Kumlium to Cape Kilokak	322	"
"	"	Cape Kilokak to Hartman Island	825	"
"	"	Hartman Island to Coal Point (incl. Wide Bay)	0	"

79,155

Note: Fewer than 200 emperor geese were observed during incidental surveys of the Sanak and Shumagin Island groups on 26 April by Bruce Conant, Jack Hodges and Mike Nunn (N754.)

Figure 8. Percentage distribution of emperor geese seen by survey area 25 to 28 April, 1983



Naknek on 25 April observing a total of 2,459 emperor geese (3.1% of the total). On 26 April, the north side of the Alaska Peninsula from Naknek to Moffett Point was surveyed with most birds being in the Port Heiden and Seal Island lagoon areas. The total for the 26 April survey along the north side of the Alaska Peninsula was 71,770 emperor geese (90.7% of the total observed). Izembek Lagoon and coastline and estuarine areas west to Unimak Island were surveyed on 28 April after a one day delay due to weather with a total of 2,854 emperor geese observed (3.6% of the total). It appeared the one day delay in completion of the survey had little effect on the numbers of birds observed, as comparative data for this area on 26 April was available.

Climatic conditions in April of 1983 were in all respects milder than those encountered in April and May of 1982. Ice conditions in mid-April of 1983 were comparable to those encountered in the first week of May, 1982. Late, heavy ice conditions in 1982 retarded spring migration as evidenced by the greater numbers of emperor geese observed south of the Alaska Peninsula and from Izembek Lagoon west to Unimak Island. Few emperor geese were observed in these areas in 1983 when ice conditions farther north were very light.

A population decline of from 100,643 to 79,155 emperor geese (down 21%) based on a comparison of the spring aerial surveys of 1982 and 1983 is alarming and points out the need for a quantitative analysis of mortality factors affecting emperor geese. Also of value would be a more complete appraisal of migratory behavior in late April and early May to support our subjective opinions that essentially the entire population is included in the survey area during this time period.

Steller's Eider

The refuge staff performed an aerial survey of waterfowl populations on Izembek Lagoon on 22 September. A total of 38,835 Steller's eiders were observed, down from the average September population of nearly 42,000 birds.

Plans were made to conduct our annual banding effort in a new segment of the lagoon to determine if there was any partitioning of the fall population. Banding drives in the same location each year often result in up to 10 percent recoveries of our own banded birds. In an effort to determine if individual birds or sub-populations are site specific in their molting, we planned to handle several hundred birds, hopefully at the regular, as well as a new site. Inspections by W.D.C. and R.O. staff, inclement weather, and finally a recalcitrant outboard motor on the last day, caused cancellation of this effort until next fall.

We are pleased to report that 16 recoveries of Steller's eiders banded on the Izembek NWR have been relayed to us during 1983 by the Bird Banding Laboratory. These are the first Soviet recoveries received since 1981. We have worked hard via correspondence and personal contacts the past two years to establish good contacts with Soviet biologists

and our efforts have been fruitful. These recoveries, all received in one batch from the B.B.L., were of birds recovered from 1979 through 1983.

4. Marsh and Water Birds

Lesser sandhill cranes are uncommon nesters in wet lowland areas of the refuge. These areas are characterized by sedge-grass marshes and numerous small to moderate sized shallow waterbodies. Cranes often select shorelines or small islands associated with these waterbodies for nesting. One nest monitored by periodic overflights in 1983 hatched between 10 June to 15 June.

The first red-necked grebe nest observed on Izembek NWR was found in 1982. This species nests in emergent beds of Hippurus spp. from which it also builds its nest platform. Knowing where to look has raised this species from a suspected to common breeder. Numerous active and inactive nest sites were observed in 1983.

5. Shorebirds, Gulls, Terns and Allied Species

Mew gulls, glaucous-winged gulls and arctic terns are the most common larids on the Izembek NWR. Nesting activities of mew gulls were first observed on 11 May. The Aleutian tern is a suspected nester on one island in Izembek Lagoon and is seen occasionally on the refuge in spring and summer. Rock sandpipers are common nesters in upland and drier meadow areas of the refuge. Although rock sandpipers sometimes occur as winter residents associated with beaches, their appearance in preferred nesting areas does not occur until late March or early April. Nuptial activities occur in April and May with nest initiation in mid to late May.

Semipalmated plovers nest commonly on and along gravel surfaced roads on the refuge. The first sighting in 1982, was on 9 May when the first courting flights were also observed. Hatching dates were determined to be around 13 June with the first downy young seen on 14 June.

6. Raptors

Bald eagles are common year-round residents of Izembek NWR. However, no evidence exists that this species has ever successfully nested here. Several nests are located on sea stacks above the shore of Unimak Island. Gyrfalcons, Peale's peregrine falcons, rough-legged hawks and marsh hawks are common fall migrants. Short-eared owls are uncommon summer residents, probably breeding on the refuge.

7. Other Migratory Birds

Two passerine species were banded by the refuge staff in 1982. All banding was accomplished at a baited trap adjacent to the refuge office.

The gray-crowned rosyfinch was the most common species handled with 26 banded during the year. A total of 24 recaptures of previously banded gray-crowned rosyfinches was tallied in 1983. A summary of all passerine bandings is shown in Table 23.

The annual Christmas Bird Count was conducted on 27 December by R.M. Sarvis and A.R.M. Nunn. A total of 7,617 individual birds of 32 species were observed (Table 24).

8. Game Mammals

Brown Bear

Brown bears in the Cold Bay area were a definite rarity in 1983, down even from the low 1982 population. We attribute the depressed population in the immediate vicinity of Cold Bay to hunting mortality and associated harrassment. The road system permit area (Figure 9), is open to bear hunting each spring and fall with each respective season being closed upon the taking of two bear. Two bears were taken in the spring of 1983, a sow and her independent 2½ year old cub. Both of these bears were marked members of a group of local bears being investigated by the refuge (i.e. IZ12 and IZ19). IZ12 was collared, however the transmitter was not functioning. A single unmarked bear was taken during the fall season.

Permits for each seven week spring and three week fall hunt are limited to ten per week. Hunter activity was high during each period, however few bears other than those taken were seen. A proposal (which Alaska Department of Fish and Game agrees with) to limit openings of the Cold Bay road system area to hunting every other regulatory year while maintaining the same bag limit, is under consideration by the Alaska Board of Game. If adopted, half as many bears could be taken in the local area.

The remainder of the Alaska Peninsula was open to brown bear hunting this fall from 7 to 21 October. The refuge staff, Alaska Department of Fish and Game personnel and Regional Office Law Enforcement personnel were busy sealing bears, checking guide camps and investigating violations. Guide activity was heavier than normal in more remote areas of the refuge, especially the Right and Left Hand Valley area northeast of Cold Bay.

There were seven bears taken in the Right or Left Hand Valley during the fall season, six by hunters using commercial guides and one by a non-resident guided by his son.

For years, Mike Uttecht has been the only guide operating in Left Hand Valley. In the spring of 1982 the Guide Board, who has responsibility

Table 23. Passerine Banding, Izembek NWR, 1983

Species	AHY			HY			U			Total
	M	F	U	M	F	U	M	F	U	
Grey-crowned Rosy Finch	18	8	-	-	-	-	-	-	-	26
Snow Bunting	32	6	-	-	-	-	-	-	-	38
Totals	50	14	-	-	-	-	-	-	-	64

Table 24 . Results of Christmas Bird Count, Cold Bay, December 27, 1983

Species ¹	No. Seen	Over 18 yr. Period ² (no. years seen)	% Change 1982 Versus 18 yr. Average
Red-necked Grebe	3	11 (5)	-73
Horned Grebe	5	11 (7)	-55
Pelagic Cormorant	10	20 (16)	-50
Black Brant	3337	1460 (11)	+128
Emperor Goose	886	1278 (18)	-31
Mallard	7	38 (10)	-82
Pintail	25	26 (5)	-4
Green-winged Teal	11	8 (6)	+38
Greater Scaup	1	36 (5)	-97
Common Goldeneye	47	126 (17)	-63
Bufflehead	2	7 (11)	-71
Oldsquaw	57	287 (18)	-80
Harlequin Duck	30	21 (17)	+43
Steller's Eider	2751	1190 (18)	+131
Common Eider	11	57 (14)	-81
King Eider	1	3 (6)	-67
White-winged Scoter	6	19 (14)	-68
Black Scoter	30	193 (15)	-85
Common Merganser	5	6 (6)	-17
Red-breasted Merganser	38	149 (16)	-75
Gyr Falcon	1	1 (8)	0
Bald Eagle	18	8 (18)	+125
Willow Ptarmigan	10	9 (11)	+11
Glaucous-winged Gull	159	191 (18)	-17
Murre Sp.	3	3 (7)	0
Pigeon Guillemot	2	7 (9)	-71
Black-billed Magpie	1	2 (10)	-50
Common Raven	126	89 (18)	+42
Dipper	2	3 (9)	-33
Northern Shrike	2	1 (12)	+100
Gray-crowned Rosy Finch	22	71 (18)	-69
Snow Bunting	8	41 (18)	-81

Total Species 32
Total Individuals 7,617

No. Observers 2 (J. Sarvis, M. Nunn)
Observation Time 8 hrs. (1 hr. on foot; 7 hrs. by car)
Distance Covered 63 Miles (2 miles on foot; 61 miles by car)

¹ A total of 54 species have been seen on the counts over the 18-year period and four (4) additional species have been seen during the count period but not on the count day.

² Mean for years during which species were observed.

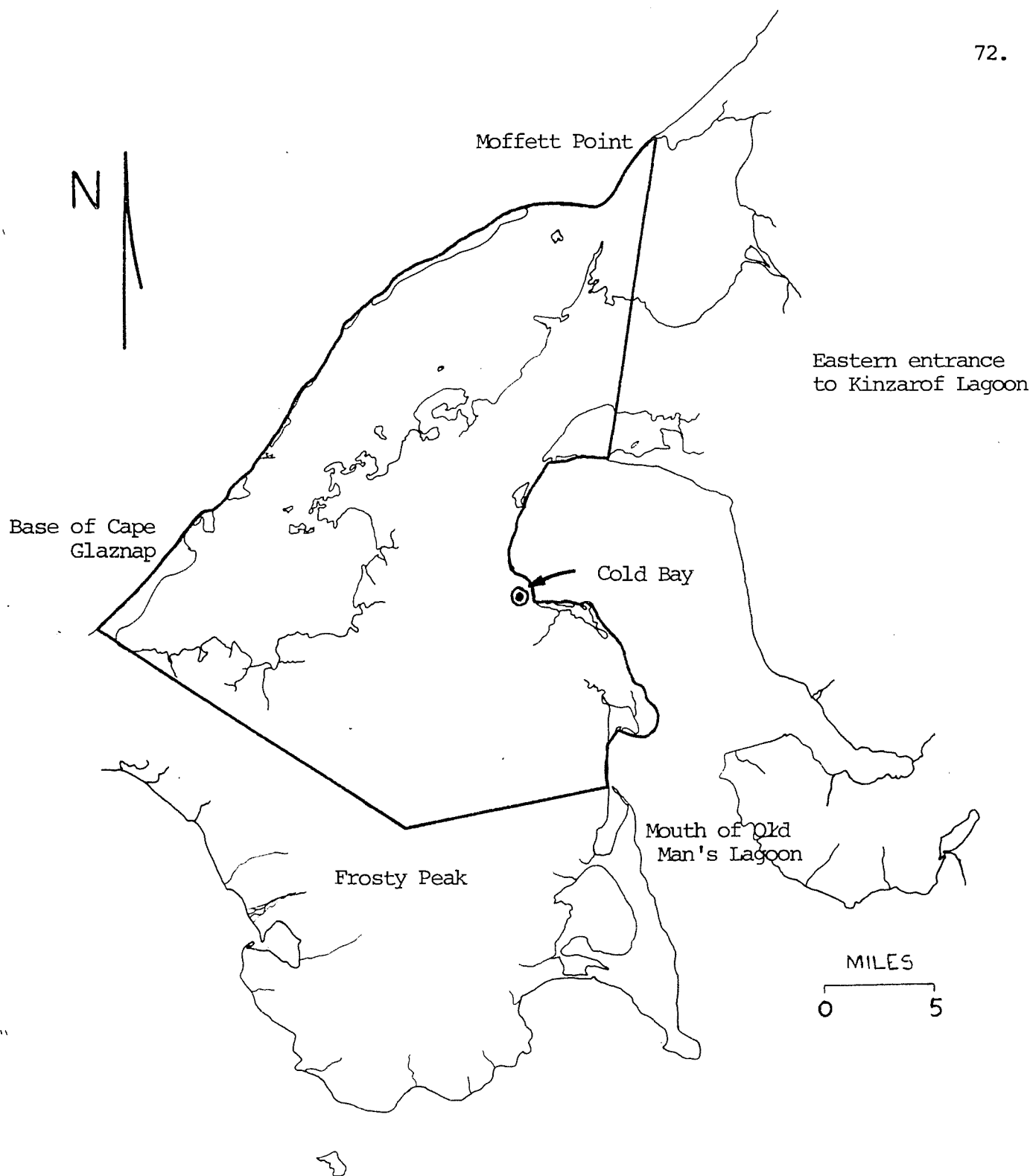


Figure 9. Boundary of Cold Bay Road System Bear Hunt.

for assigning exclusive guide areas, revoked his exclusive right to the area for "non-use" and declared it an open area. So much interest was shown in the area that we decided to hold a drawing to select one guide who would receive a permit to use the area for the Spring season only. The Guide Board sent us an irate letter on this matter, advising us we had no authority to limit guiding on the refuge. The Guide Board met shortly after the season and assigned Uttecht's area to two guides: Dick Carlson and Richard Guthrie of Anchorage. Both guides filed protests over the boundaries established. Steve Black, another guide who was assigned most of the remaining refuge in 1977, has had Right Hand Valley since then, but did not use it until the fall of 1983. He felt compelled to use it because he was afraid that he might lose it on the basis of non-use. The end result of all this was that we had three guides operating in the Right and Left Hand Valley. We felt that this was too many people in a small area that has terrific wilderness values. In December, R.M. Sarvis attended a hearing and guide board meeting and testified to that effect. The guide board, however, chose not to take his recommendation, and left three guides in the area. We are exploring means to limit the number of hunters in the area. There will either be a limit to how many clients each guide can take in or a limit to the number of bears that can be taken.

The annual fall brown bear survey was modified this year due to poor flying weather and several Bristol Bay Plan public hearings occurring during the survey time period. Only the eastern portion of the refuge (Moffett Bay, and Right and Left Hand Valley) was surveyed. One early morning flight of two hours duration resulted in 138 bears observed (Table 25).

There were no bear problems in the town of Cold Bay this year as we have often had in the past due to the reduced number of bears in the immediate area and a concerted effort to keep the town free of food accessible to bears.

The brown bear management study continued into 1983, with limited success. The essence of the study is to identify procedures to reduce the conflicts with brown bears in areas of human habitation without needless destruction of the bear. Conflicts normally result in dead bears, hence age related behavioral changes are difficult to quantify. Marked bears that are not involved in conflicts with humans are subjected to heavy hunting pressure in the registration permit hunt areas around town. These two factors make it extremely difficult to follow marked bears over a significant period of time. By the end of 1983, to our knowledge there was only one marked bear and her cubs left in the road system area.

Behavior of Individually Marked Bears

Bear IZ05: Female bear IZ05 is the only remaining marked bear. She was marked in 1977, the first year of the study. She is 14 years old and



One of two former bear guide cabins in Left Hand Valley.
(389) 16

Sarvis (7-83)



The first step is to remove the sheet metal, as A.R.M. Nunn
is doing.
(389) 14

Sarvis (7-83)



Once the sheet metal was removed, the dry wooden frame burned beautifully.

Dau (7-83)



Nothing left but ashes. Sheet metal was stored in the alders to be removed later.

Dau (7-83)

Table 25. Izembek NWR Brown Bear Survey Results, August 1977 - 1983

Year	Singles	Sows w/cubs of year				Sows with yearlings				Sows w/2 -1/2 yr. olds			Totals	
		w/1	w/2	w/3	w/4	w/1	w/2	w/3	w/4	w/1	w/2	w/3	Area A/ <u>1</u>	Overall
1977	39	0	9	1	1	3	6	4	0	0	0	0	87	115 ^{/2}
1978	40	2	2	1	0	4	4	1	0	0	0	0	37	78
1979	43	0	4	7	0	6	3	0	0	0	0	1	86	108
1980	34	0	4	4	2	4	4	3	0	0	0	0	78	104
1981	73	0	4	1	1	6	6	4	1	0	0	0	92	133
1982	81	1	5	6	0	2	3	3	1	0	0	0	123	152
1983	70	2	2	4	0	4	2	7	0	0	0	0	138	138 ^{/3}

/1

Includes Moffet Bay area and Right and Left Hand Valleys

/2

Thinpoint area and area south of Morzhovoi Bay not surveyed.

/3

Only Moffet Bay area and Right and Left Hand Valleys surveyed in 1983.



IZ05 just before darting. R.M. Sarvis is hidden on top of the big rock in the background.

Dau (7-83)



IZ05 getting a new collar. She had lost so much weight since the last capture (Nov. '82) that it didn't seem like the same bear.

Dau (7-83)

Though her home range comes close to Cold Bay, she has amazingly eluded hunters for years. In November, 1982, her transmitter was replaced at the den site located at the 900' elevation level of the east side of Frosty Peak. On 25 April, 1983, the signal was still coming from the den but there were tracks in the snow around the den. We were unable to fly again until 11 May when the signal was located in Russell Creek drainage, but the bear was not seen. For the next several weeks, the signal remained stationary in a rocky snow-field at the head of Russell Creek. On 14 June, R.M. Sarvis and W. B. Dau climbed to the 2400' level on the south side of Russell Creek and located the collar in a snow den (Figure 10). IZ05 was not located again until 19 July when she was observed with two cubs approximately three miles south of the refuge sign on Frosty Road. We were preparing to capture two molting swans on a lake in the area when she was first spotted. We managed to catch the swans and the bear. Ten (10)mg. of sernylan and lcc of sparine were administered and she was immobilized within three minutes. The cubs ran into the alders and we were unable to capture them. This time we shortened the collar by two inches in hopes that it wouldn't come off again.

IZ05 was not visually located again. In early September the signal again seemed to be immobile, on a creek with a heavy fish run approximately three miles from Old Man's Lagoon. On 7 November, R.M. Sarvis, A.R.M. Nunn and W. B. Dau took three-wheelers across Russell Creek to investigate. The shed collar was located with the use of a hand-held antenna. We will try to catch her again, but believe now that there is not a suitable "year around" collar setting from some bears. The distribution pattern of IZ05 in 1983 is shown in Figure 11.

BEAR IZ-12

The last sighting of IZ12 was 2 June, 1982, at which time she was accompanied by both her 2½ year old cubs. Her radio collar was non-functional during 1983. She was taken by a young hunter on 17 May near the headwaters of Russell Creek. W. B. Dau and A.R.M. Nunn hiked to the carcass to weigh and examine it. The reproductive tract was removed for analysis, which showed the confusing occurrence of many ovarian follicles and no corpora lutea but what may be four placental scars remaining from the birth of four cubs in 1980. She was 11.5 years old, as determined by tooth sectioning performed by the Alaska Department of Fish and Game, and weighed 567 pounds.

While examining the carcass of IZ-12, several #2 shot pellets were found on the rump between the fat and the meat and two were located internally along the uterus. The hunter reported numerous pellets under the hide as he was skinning the animal, suggesting that she had come in contact with at least one waterfowl hunter sometime during her wanderings.

The radio transmitter collar was still around her neck and had caused considerable wear to hair and skin. There were two sores on the neck

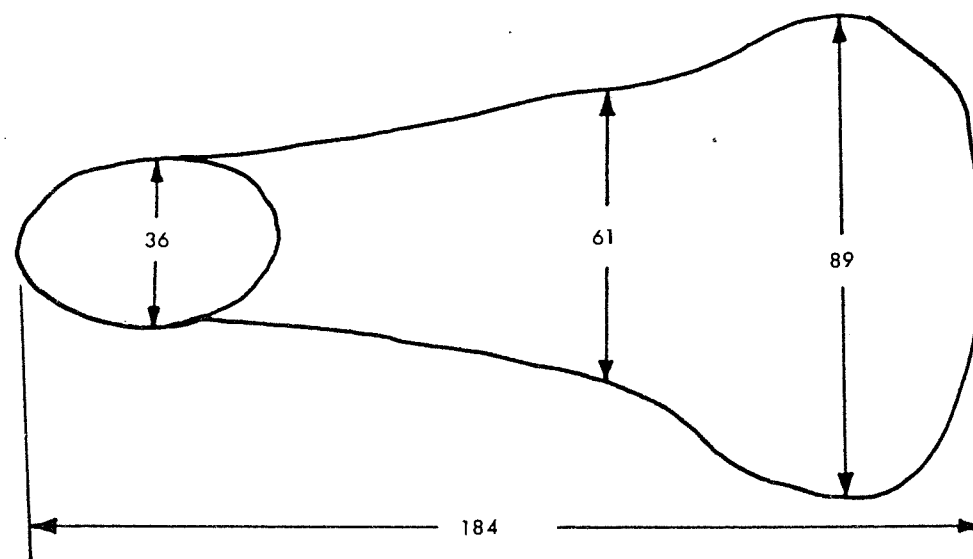
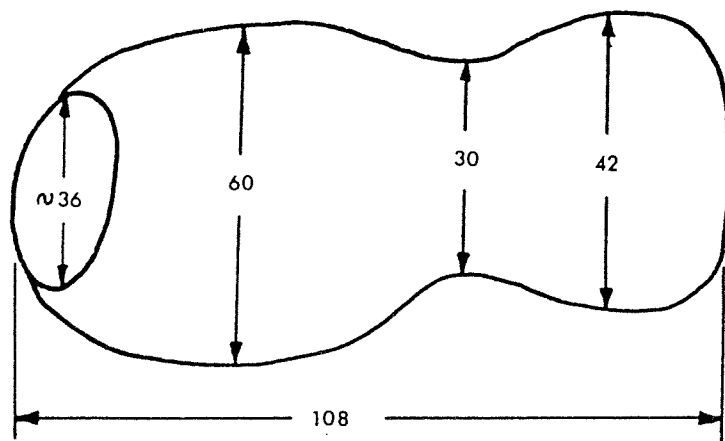
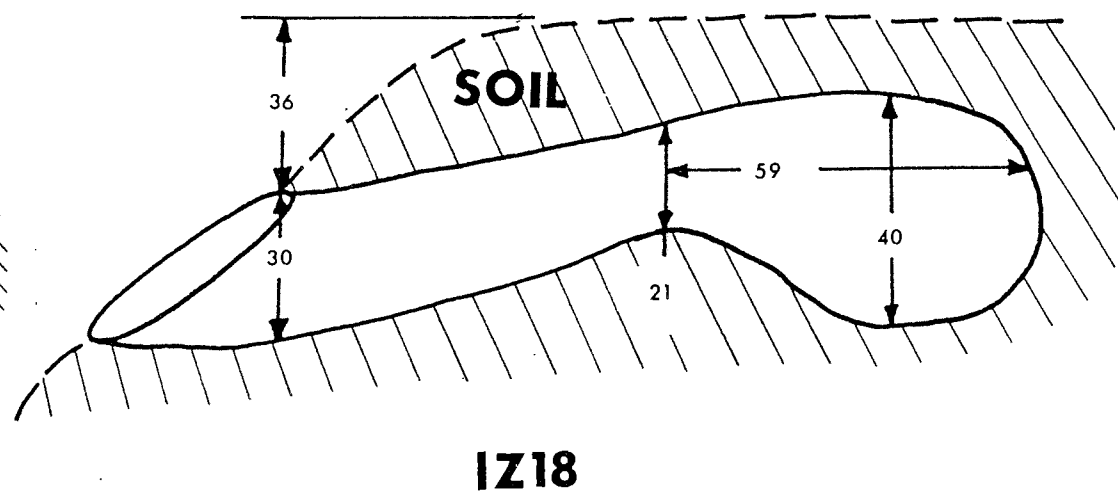
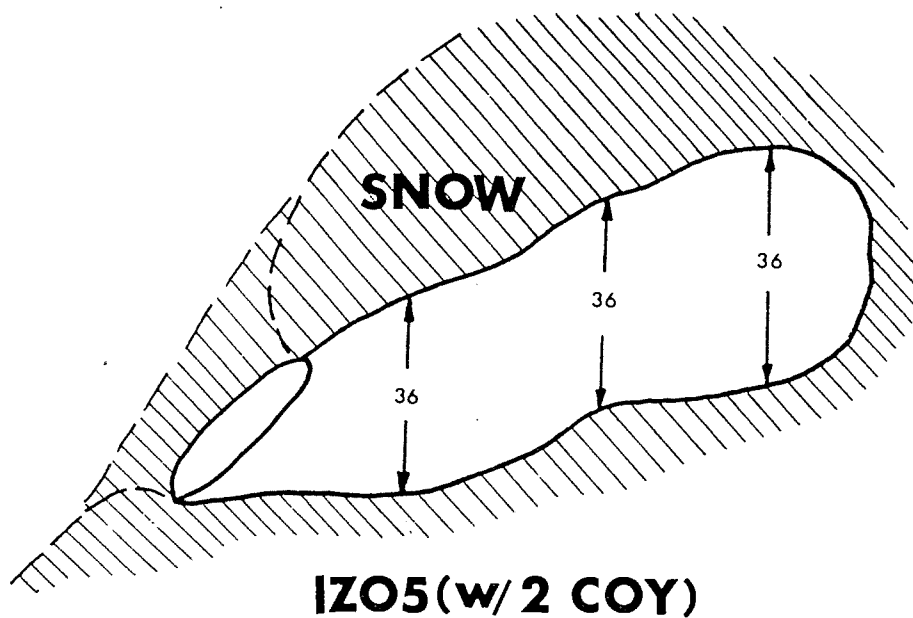


Figure 10. Den configurations and measurements (inches) for IZ18 (2.5 yr. male) and IZO5 (13.5 yr. female with two cubs of the year). NOTE: IZO5 den is a temporary structure constructed after emergence from the winter den.



IZ-05 lost her collar in this temporary snow den that she occupied after leaving her winter den.

Dau (6-83)



This shot was taken from inside the den - very cozy!

Dau (6-83)

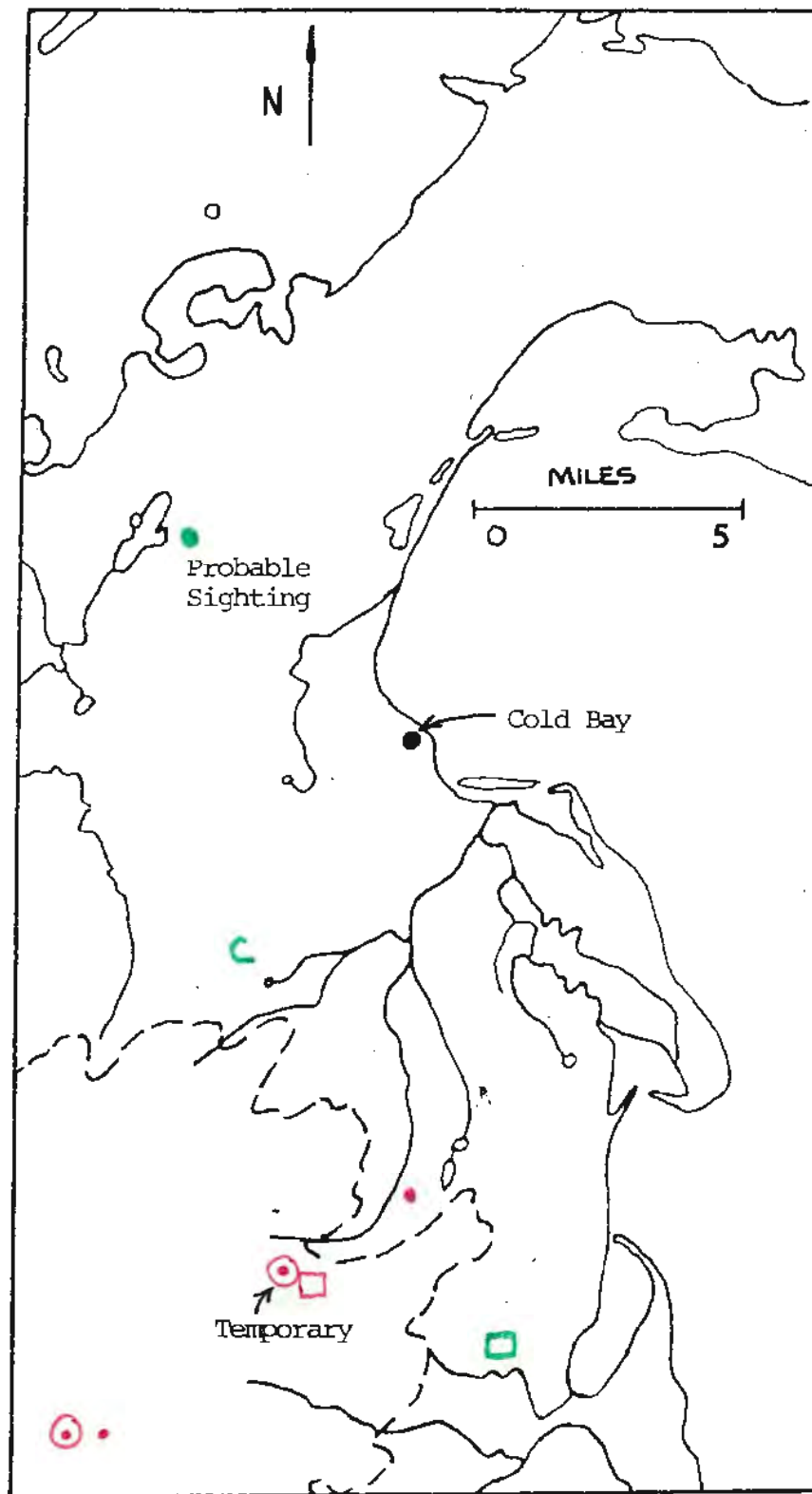


Figure 11. Sightings of bear IZ05 during 1983. March - June (red), July - October (green), \odot = den site, "c" = capture site, \square = location of shed collar.



IZ18, the 1982/3 'dump bear', was finally located on the shore of Unimak Island. Unfortunately, he had been shot.

Dau (6-83)



The remains of IZ12 prior to necropsy.

Nunn (6-83)

behind each ear. It would be nice if we could design a collar that would allow for some expansion.

Bear IZ-18

Bear IZ-18 was for the second year, the most commonly observed bear in the vicinity of Cold Bay. He was located 26 times in 1983. He denned in an atypical location approximately 10 feet above sea level on the shore of Izembek Lagoon near Grant Point (Figure 10). On 18 March, he was located on an old caribou carcass approximately two miles from his den site. He had apparently just emerged from his den as there were fresh signs of digging at the entrance. R. M. Sarvis and W. B. Dau captured him that day using 8 cc. sernylan and 2cc of sparine. The bear weighed 575 pounds. He had lost only 22 pounds or .26 lbs./day during his relatively short denning period of 86 days. During the late summer and early fall of 1982, he gained approximately 2.8 lbs./day.

IZ18 was located several times from 18 March through 3 April between the Outer Marker and Grant Point, but was not seen at the dump until 8 April. He remained in the area of the dump until 20 April and during that time made a couple of trips from the dump to Russell Creek, passing through Cold Bay. On 15 April, he broke a basement window in FWS Quarters No. 4 and got into some trash at a nearby mobile home. This was the only trouble he caused in town.

On 20 April, the last time he was seen in the Cold Bay area, he was sleeping in the sand dunes approximately 350 yards from the dump. On the 23rd and 24th of April, we searched the Cold Bay area by vehicle utilizing a hand-held antenna, but were unable to locate him. On 26 April, he was located by aircraft near Little John Lagoon, a straight line distance of 17 miles from the dump which greatly expanded his identified range. He had probably travelled much farther than this, since a straight line would have taken him over Frosty Peak. He was observed south of Little John Lagoon on 28 April and was travelling the beach in an easterly direction. We were unable to locate the bear in several other attempts by aircraft until 3 June 1983, when we found him dead on the shore of Unimak Island, halfway between False Pass and Rocky Point. The carcass was inspected on 6 June and what appeared to be a bullet hole was located behind the left shoulder approximately 4" from the spine, suggesting that he was shot from above, possibly from a boat while he was swimming to Unimak. We were excited by his dramatic departure from his identified home range and were saddened by the premature halt in our data collection. Our 1983 sightings of IZ18 are shown in Figure 12.

IZ19

Bear IZ19, a female sibling of IZ18, tagged as a yearling, was never radio collared and last seen with her mother, IZ12, on 2 June 1982.



W. B. Dau examines IZ18's den, unusual in that it was just above sea level. (Photo by IZ18)
(377) 8

Sarvis (4-83)



An outside view of IZ18's den. The gravel at the bottom of the picture is the shore of Izenbek Lagoon.
(377) 6

Sarvis (4-83)

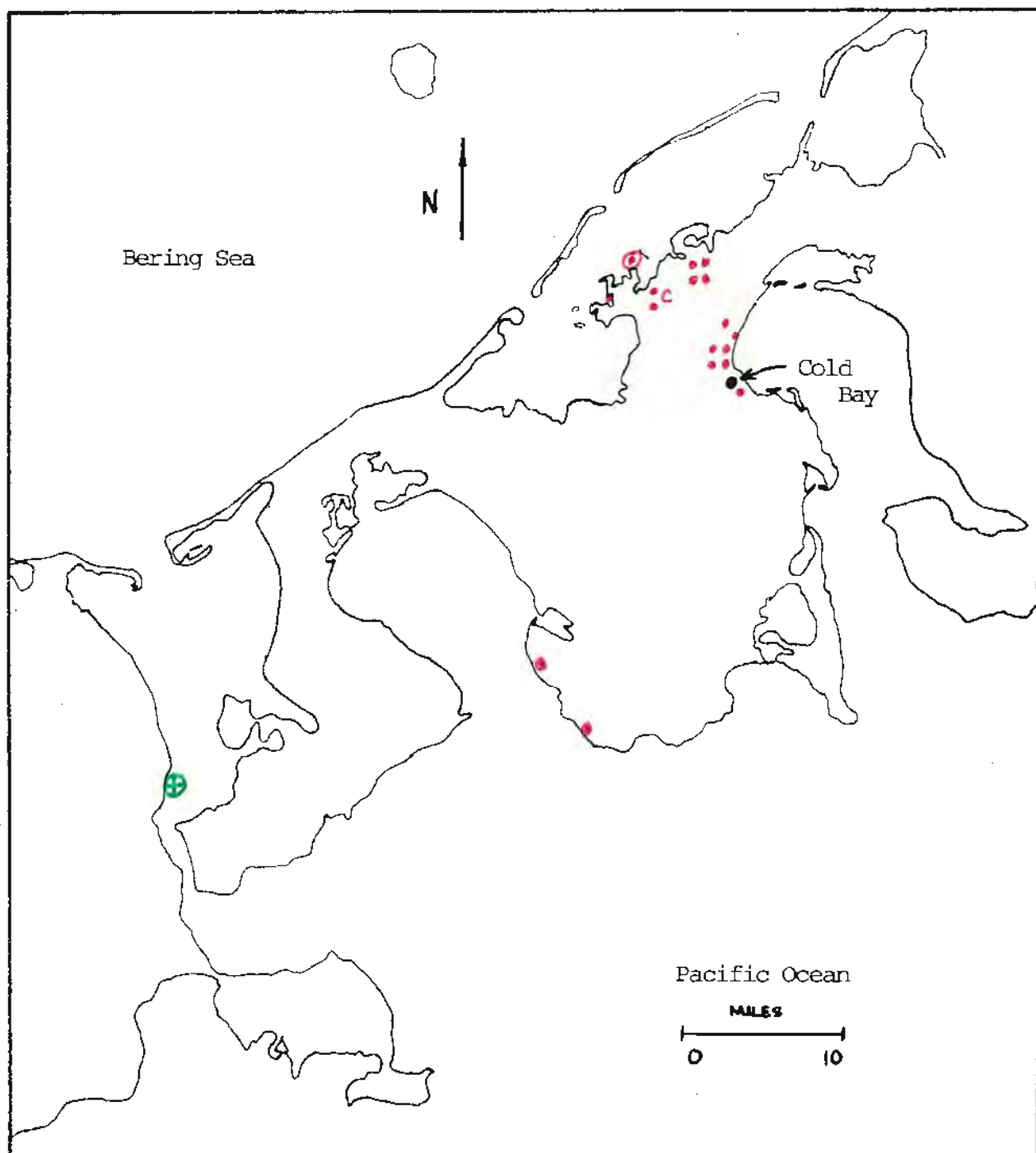


Figure 12. Sightings of bear 1Z18 during 1983. February - April (red), May - June (green), \odot = den site, c = capture site, \oplus = carcass location.

On 6 June 1983, she was taken by a hunter near Old Man's Lagoon, well within IZ12's former home range.

The observed behavioral differences between IZ19 and 18 are striking and based on observations of other marked bears, cannot wholly be attributed to difference in sex. Again, the elimination of our study bears is adversely affecting our analysis of the behavior of bears in association with an area of human habitation. The management implications seem fairly apparent: increased hunting results in decreased human interactions with bears. A depressed bear population offers few opportunities for other forms of public appreciation which have a definite place in our bear management goals and the public opinion of Cold Bay residents.

IZ21

Bear IZ21, a large male, was first observed on 15 June in the Outer Marker Marsh. A capture attempt followed with the first dart containing 7cc of sernylan and 3cc of sparine. We had underestimated the bear's size and this dosage had little effect. The bear ran across the marsh and waded approximately one mile into Izembek Lagoon to Round Island, a total distance of approximately 2.5 miles. Two and one half hours later, it was again darted with 7cc of sernylan and 3 cc of sparine, and in approximately 10 minutes, immobilization was complete. The bear's neck girth was so large (43 inches) that a collar could not be fitted. If we had a collar of sufficient size, it would not have stayed on anyway since his head was $38\frac{1}{2}$ inches in circumference. He was tattooed and an ear flag was attached, but we have not seen him since. This is the largest bear captured during the study; unfortunately, probably the only other data we will get from him will be the location he is when he is taken by a hunter. We are hoping to try some new methods of radio tagging large bears that cannot keep a collar on, such as possibly surgically implanting a transmitter.

Immobilization data for bears captured by the refuge staff during 1983 are presented in Table 26.

Caribou

Overview

The Lower Alaska Peninsula caribou herd is one of the smallest populations in Alaska occupying probably the smallest geographic range (Figure 13). The refuge has collected population data since 1979 by aerial ocular and photographic means and productivity data since 1981 utilizing ground counts. Considerable faith has been placed in our population estimates by ourselves and the Alaska Department of Fish and Game. In 1983, it became apparent why this most studied of the arctic big game fauna continues to baffle, even befuddle, we learned and often opinionated wildlife biologists.



IZ-21, the largest bear ever handled during our bear study, had impressive $8\frac{1}{2}$ inch wide front paws.

Dau (6-83)



IZ-21's neck was too large (43") for a radio collar.

Dau (6-83)

Table 26. Immobilization of Brown Bears, Izembek NWR, 1983

Bear	Date	Sex	Age	Wt.	Drug	Dosage	Induction Time	Remarks
IZ18	03/18	M	3	575	Sernylan	7 mg.	6 min.	2 cc. Sparine in dart & 10 cc. more by hand after short period of convulsions.
IZ21	06/15	M	~15	1000 est.	Sernylan	7 mg. & 7 mg.	Little effect 1.6 hrs. 10 min.	First dart had little effect until 1.6 hours after injection. Second dart was administered 1750 and bear was down in 10 min. 3cc Sparine in each dart, plus 10cc given by hand. Total time 2.5 hours.
IZ205	07/19	F	14	500 est.	Sernylan	10 mg.	3 min.	1 cc. Sparine in dart, 14 cc. Sparine given by hand. 5 strong convulsions, one every 3 minutes after induction.

Our 1982 data collection program emphasized population size, survival of calves and hunting mortality. The product of our melting pot of data suggested that harvest was exceeding production and regulatory caution was called for. On 15 and 16 November, with ideal survey conditions (i.e. complete snow cover and light winds), our aerial survey of the population suggested there were 10,203 animals. This exceeded the identical survey of the previous winter by 80.9 percent (i.e. 5,641 animals on 14-15 January 1983)!! Our ominous prediction of a decline and corresponding bubble burst. We now fall in with that worthy lot of 'tuktu' biologists who often shake their head in wonderment. We find it hard to believe that:

- 1) We missed up to 3,000 animals in the 1982-83 winter survey as aerial photographs were utilized for enumeration both years. This, however, is the most likely source of error.
- 2) Productivity could have been 4 to 5 times higher than we observed and hence accounted for the 1983-84 winter estimate increase, as we sample approximately 20% of the herd.
- 3) We could have had significant influx of animals from the Upper Alaska Peninsula herd or from Unimak Island.
(NOTE: Port Moller and the narrow mountainous strip of land that divides the Upper and Lower Alaska Peninsula appears to provide an effective geographic barrier to all but incidental movements of caribou. In addition, few animals have been reported in recent years swimming between Unimak Island and the Alaska Peninsula. In addition, the total population on Unimak would not yield this much increase anyway.)
- 4) Several thousand animals were outside the survey area when the census was taken. Unsurveyed areas include high snow fields, mountains and volcanic structures above 1,000' ASL and unvegetated ash fields (in other words, unsuitable caribou wintering habitat).

Hence, we believe that our observed population increases may be the result of some combination of the above factors and that the following should be attempted:

- 1) Attempt a photographic survey of the population on the calving grounds for comparison with our continuing winter aerial survey.
- 2) Enhance fall composition surveys (approximately 27 and 16% of the estimated total population was sampled in 1982 and 1983, respectively).

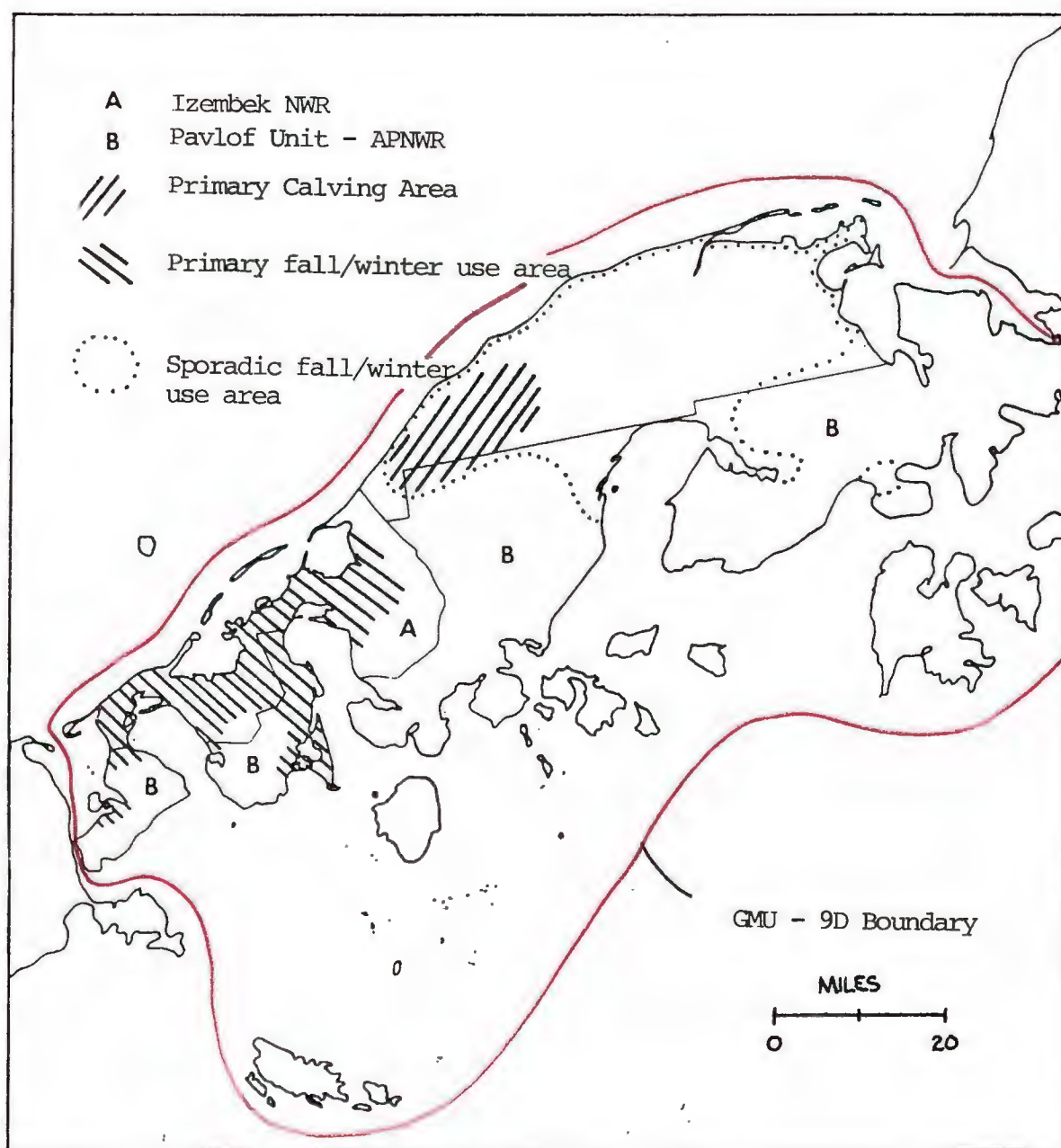


Figure 13. Seasonal distribution of the southern Alaska Peninsula caribou herd, Game Management Unit (GMU) - 9D.

- 3) Attempt to reinitiate post-calving ground counts in June to determine productivity and better assess annual survival rates.
- 4) Continue to monitor seasonal distribution patterns as an index of habitat preference and quality. This should be done in relation to similar comparisons in the area from Port Heiden to Port Moller to identify any emigrations from that area.

1983 Data

Two aerial photographic surveys of the southern Alaskan Peninsula caribou herd were accomplished by the refuge staff during 1983. A 14 - 15 January survey set the 1982-83 winter population at 5,641 while our 15 - 16 November index of the 1983-84 winter population skyrocketed the estimated total to 10,203 individuals, an increase of 80.9 percent (Table 27, Figure 14)! Table 28 also summarizes results of a 24 June aerial population/productivity survey covering the herds primary calving area. As discussed previously in the overview section, we are still pondering the potential causative factors affecting the observed population fluctuations. Observed population trends in the southern Alaskan Peninsula herd are shown in Figure 15.

Our annual productivity appraisals, presented as the percentage of calves in the population, was accomplished on 24 June and 23-24 October (Table 28). Percent calves in the samples observed ranged from 17.9 in June to 15.2 in October, however, the June concentrations did not include the bulk of the mature bull cohort (Figure 16). Hence it appears however, that the Southern Alaska Peninsula herd continues to exhibit productivity rates below those observed in the Upper Peninsula herd (averaging approximately 25%, R. Sellers, ADF&G, King Salmon personal communication). We have not determined the cause of the observed lower productivity but hypothesize that (selectively) higher hunting mortality, being directed toward large males may be an important factor. No comprehensive survey of seasonal habitat availability and quality has been undertaken and such an analysis may also help clarify the question of lower productivity rates. The fact that our evaluations of population size, productivity and harvest pressure last year induced us to warn of a decline when, in fact, the opposite appeared to occur, suggests that other population or habitat parameters require further study.

Our third annual caribou harvest survey was performed after the 1982-83 hunting season. This is a telephone survey of ten (10) residences (23% of those occupied during the survey period in Cold Bay). Data obtained were compared to our previous surveys and the reports of harvest collected by the Alaska Department of Fish

Table 27. Caribou Survey Data, Southern Alaska Peninsula Herd, 1983

Data	Area	No. of Groups	Total Caribou Seen
14 January	Pavlof South ^{/1}	139	4,795
15 January	Pavlof North ^{/2}	88	846
14 - 15 January	Total	227	5,641
15 November	Pavlof South	91	7,997
16 November	Pavlof North	126	2,206
15 - 16 November	Total	217	10,203

^{/1} Area from the Cathedral River/Pavlof Volcano region south to the tip of the Alaska Peninsula.

^{/2} Area from the Cathedral River/Pavlof Volcano region north to Herendeen Bay.

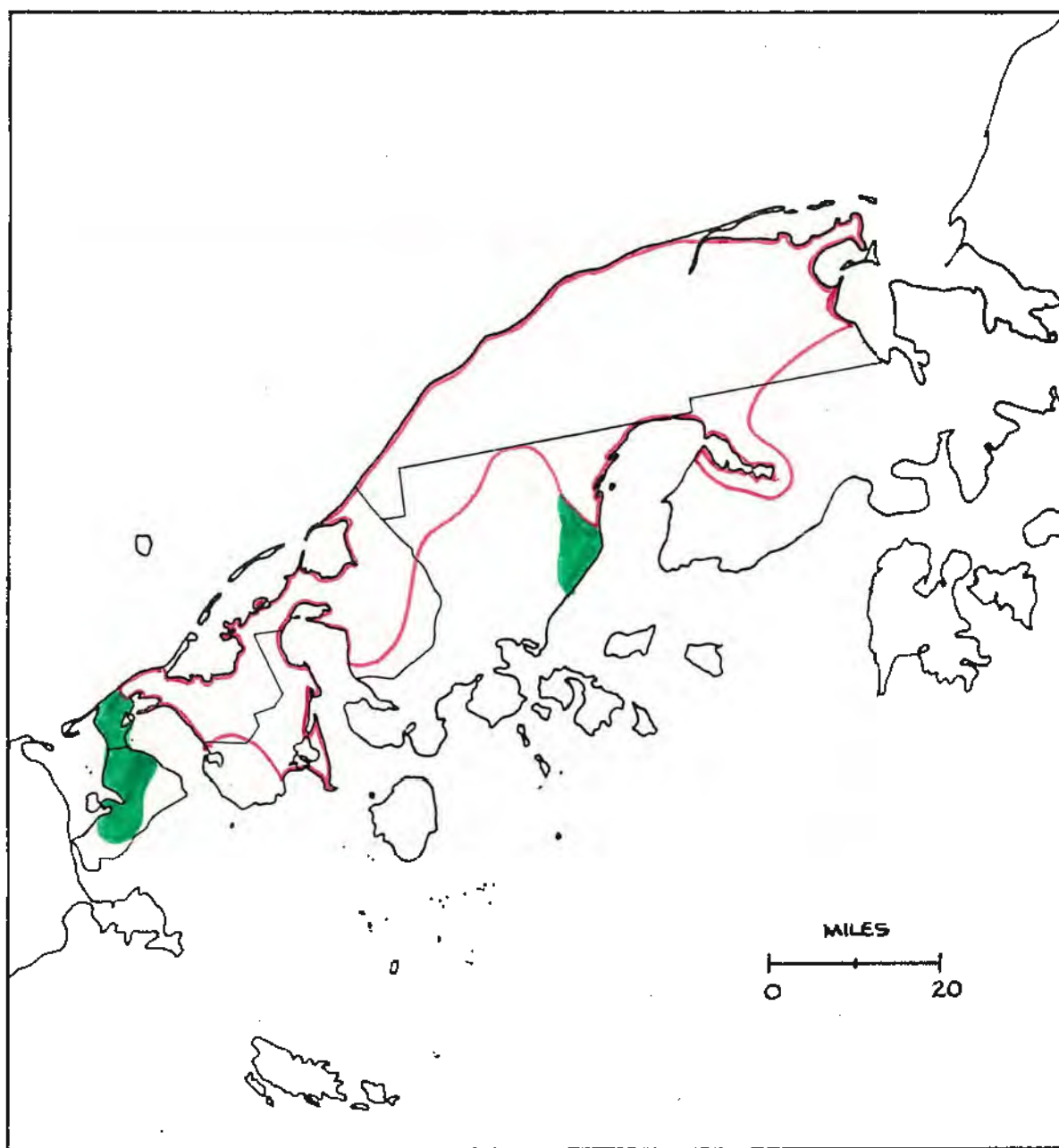



Figure 14. Caribou survey area, 15-16 November, 1983 ().
Additional area covered on 14-15 January, 1983,
survey shown in green.

Table 28. Caribou Productivity Data, Southern Alaska Peninsula Herd, 1983

Date	Survey Type	Total Animals Observed	No. Sampled	No. Calves (%)	No. Large Bulls (%)
24 June	Aerial/Photographic	5,264	2,342	942 (17.9)	-
23-24 October	Ground	3,000	1,596	242 (15.2)	-
"	"	"	754	-	34 (4.5)

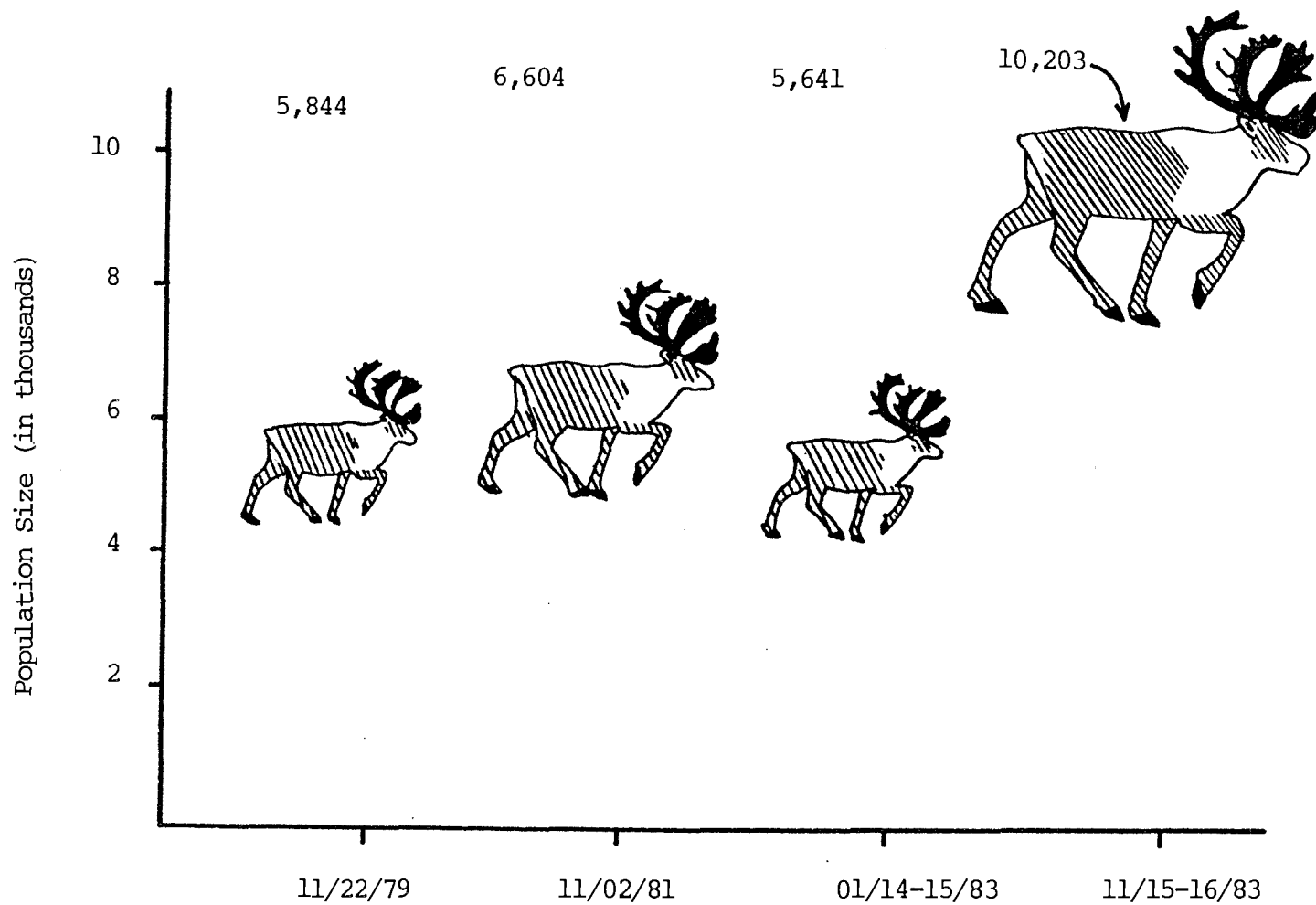


Figure 15. Wintering population trends, Southern Alaska Peninsula Caribou Herd.

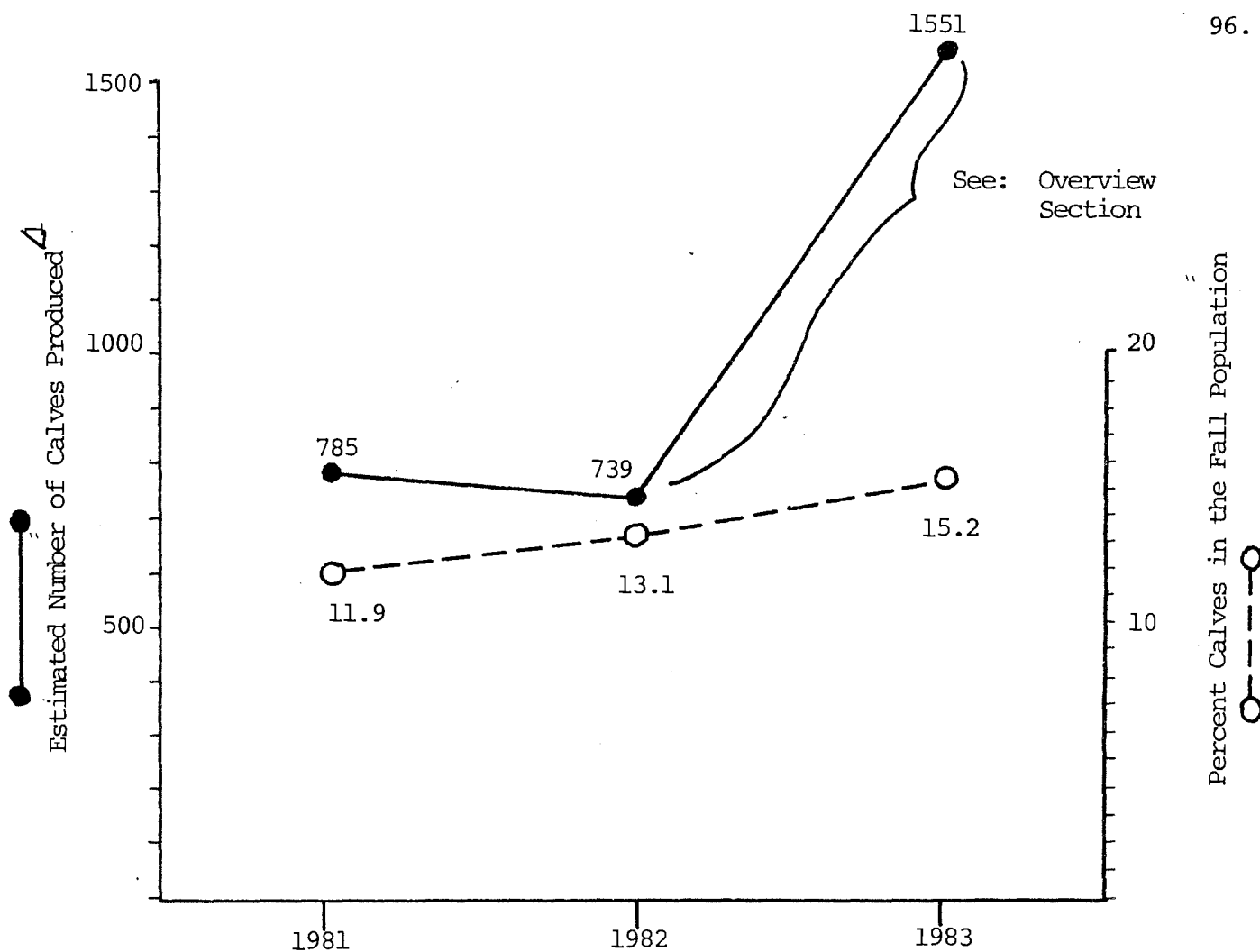


Figure 16. Estimated Calf Production, Southern Alaska Peninsula herd.

Δ Fall productivity index applied to the following winter population census.

and Game (ADF&G) to show trends in hunting pressure (Table 29). Hunter activity and harvest in the Cold Bay area has stabilized over the past two hunting seasons according to hunter questionnaires received and analyzed by ADF&G (Figure 17), while our survey data suggest overall slight declines in both categories. These comparative evaluations remain valid and singly or in aggregate are of increasing importance to the management of the herd. By the end of 1983, the refuge staff had recorded the taking of 214 caribou by local and non-local hunters in the Cold Bay area. Harvest in November amounted to 76 percent of this total.

9. Marine Mammals

R. M. Sarvis and A.R.M. Nunn performed two aerial surveys of harbor seals in Izembek Lagoon in 1983. Both surveys were performed at low tide when the majority of the animals were hauled out on exposed sand bars. On 10 June, 995 seals were observed with the largest group being 500 individuals. Young seal pups were numerous and due to their size, the population may have been underestimated. Groups ranging up to 1,000 animals were observed on 11 July survey on which a total of 1,974 seals were recorded. Similar surveys in 1975 set the population at 4,000 to 5,000 seals.

The chronology of events relative to the traditional haul-out of bull walrus at Cape Seniavin (120 miles northwest of Cold Bay) follows:

<u>31 March</u>	Vern Berns (Alaska Peninsula NWR) reported 2,500 animals hauled-out.
<u>9 April</u>	R. M. Sarvis reported approximately 1,000 animals.
<u>26 April</u>	W. B. Dau and Rod King (Migratory Bird Management - North) reported 3,500 animals.
<u>7 May</u>	Local charter pilots reported 75 walrus including 3 freshly killed headless adults.
<u>19 June</u>	R. M. Sarvis reported 250 animals with 23 headless carcasses scattered 10 miles north and south of Cape Seniavin.

On 26 April, Dau and King observed an additional 3,250 walrus between Port Moller and Herendeen Bay. Including those observed on that date at Cape Seniavin a total of 6,750 animals were recorded. This is the most walrus that have been reported this far south on the Alaska Peninsula in recent years.

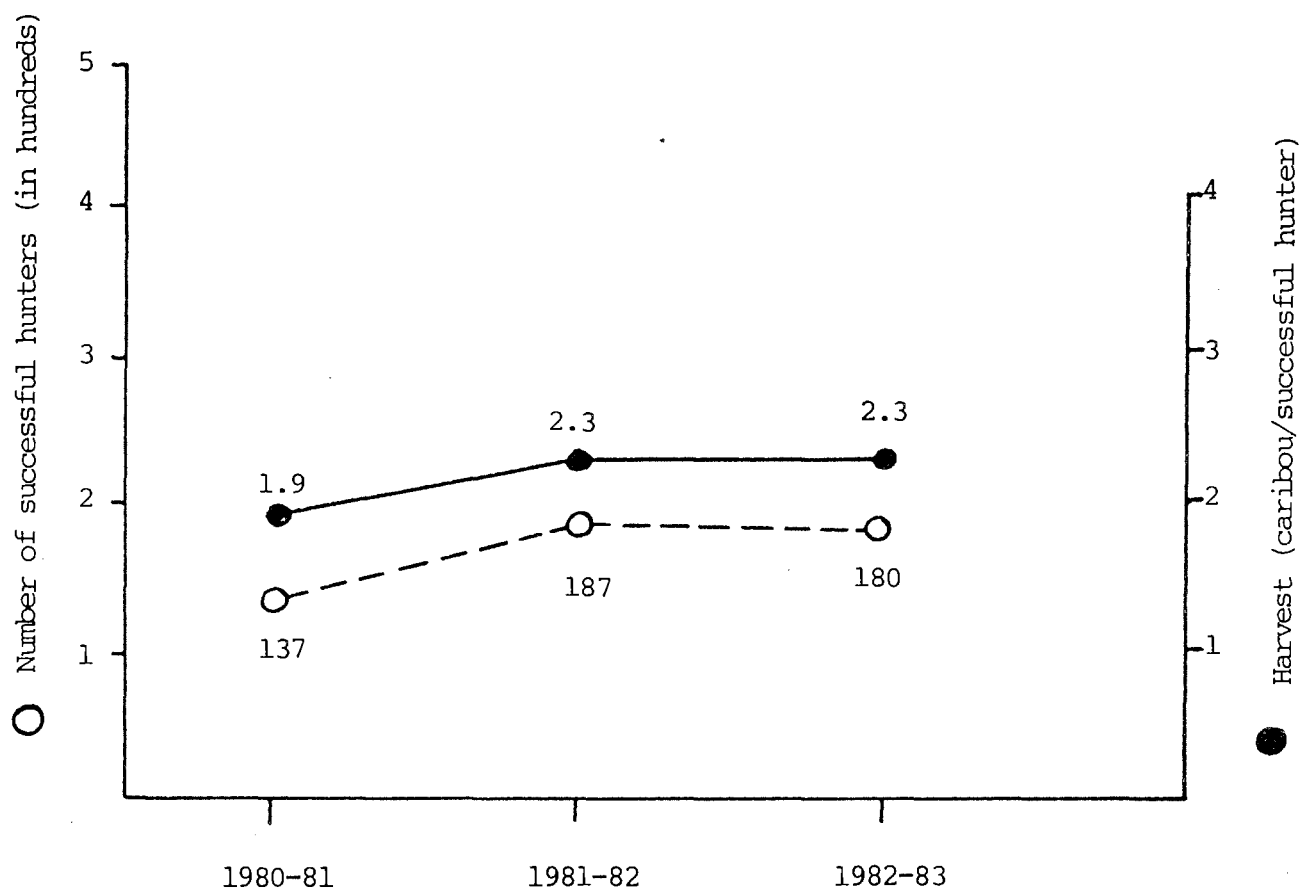


Figure 17. Numbers of Successful Hunters and Take/Hunter in Game Management Unit 9D (i.e. Southern Alaska Peninsula Caribou Herd).

Table 29. Caribou Harvest Statistics, Southern Alaska Peninsula Herd

	<u>/1</u> Local Hunters					<u>/2</u> Non-local Assists (hunters)				
	<u>Animals Taken</u>					<u>Animals Taken</u>				
	No.	♂	♀	Unk.	Take/Pers.	No.	♂	♀	Unk.	Take/Pers.
1980-81	15	17	4	8	1.9	13	7	8	4	1.5
1981-82	20	28	13	0	2.1	9	9	0	8	1.9
1982-83	15	24	10	0	2.3	9	-	-	22	2.4
% change 1982-83 (versus 1981-82)	-33		-17		+10	0		+29		+26

Data Reported on ADF&G Harvest Survey

	Local Hunters			<u>/3</u> Non-local Hunters		
	No.	<u>Animals Taken</u>		No.	<u>Animals Taken</u>	
		Total	Take/Pers.		Total	Take/Pers.
1980-81	39	80	2.1	98	176	1.8
1981-82	35	92	2.6	152	332	2.2
1982-83	31	74	2.4	149	350	2.4
% change 1982-83 (versus 1981-82)	-11	-20	-8	-2	+5	-9

/1

Based on a sampling of ten (10) households in Cold Bay in 1980-81 and 1981-82 and nine (9) households in 1982-83 (i.e. approximately 20% of total households sampled each year).

/2

Hunters assisted by sample households (normally hunters from out of town who stayed in the household in Cold Bay).

/3

Includes resident and non-resident hunters.

A beached dolphin, of undetermined species, was reported near Cold Bay in September. W. B. Dau took measurements, photos and the skull for the Smithsonian Institution. It is probably Delphinus delphis or Stenella coeruleoalba either one of which would be a new range extension. When we get the skull cleaned, it will be shipped to the Smithsonian for positive identification.

10. Other Resident Wildlife

No cases of rabies were encountered in 1983, after the numerous occurrences in red foxes and the single land otter observed in 1982. The red fox population seemed to respond, occurring at near normal levels. Trapping activity on the refuge picked up in response to the lack of rabid animals.

The most abundant form of resident wildlife, the arctic ground (or "parky") squirrel, is an ever present component of the Izembek fauna. Several females examined in the first week of May were not lactating. The first young (4-5 inches long) were observed venturing out of their burrows during the first week of June.

11. Fishing Resources

Salmon runs in various streams on Izembek NWR, and the Pavlof Unit of the Alaska Peninsula NWR are annually monitored by ADF&G biologists of the Commercial Fish Division. Commercial catch and escapement data for these areas are presented in Tables 30 and 31.

Russell Creek Hatchery

The State of Alaska (ADF&G - Fisheries Rehabilitation, enhancement and Development (FRED) Division) constructed this 4 million dollar facility near Cold Bay in 1979. At full capacity, the facility will be able to rear up to 50 million salmon annually. The ADF&G (FRED Division) has been plagued by recent legislative uncertainties with respect to funding which has left the future for personnel and facilities in doubt.

In 1980 and 1981, most mechanical problems were worked out of the system. Pink and chum salmon were reared in 1980. In 1981, 1982 and 1983 chum salmon only were produced with the 1983 effort resulting in a take of approximately 11.8 million eggs (estimated) from approximately 7,200 adults (C. Brown, Russell Creek Hatchery, pers. comm.) (Table 32). Chum salmon are reared until approximately one gram in weight, as release at this stage considerably increases their survival.

Returning runs of salmon in 1983 should have included fish reared and released from the hatchery's initial effort. The expected increases were not realized and the explanation expressed by some was



The red fox population has not recovered completely from the rabies epidemic of 1982. Here a healthy animal beachcombs for food.

(123) 27

Sarvis (10-78)



Bald eagles are common throughout the year on Izembek.

Nunn (4-83)

Table 30. Salmon Catch and Escapement, Vicinity of Izembek NWR, 1969-1983

(Data supplied by Alaska Department of Fish and Game, Division of Commercial Fisheries, Kodiak)

Pink (Humpy) Salmon (in thousands)

Chum (Dog) Salmon (in thousands)

Pink (Humpy) Salmon (in thousands)					Chum (Dog) Salmon (in thousands)				
Cold Bay & Morzhovoi*		Izembek & Moffett			Cold Bay & Morzhovoi		Izembek & Moffett		
<u>Year</u>	<u>Catch</u>	<u>Escape</u>	<u>Catch</u>	<u>Escape</u>	<u>Year</u>	<u>Catch</u>	<u>Escape</u>	<u>Catch</u>	<u>Escape</u>
1969	0.2	20.3	0	2.3	1969	0	24.6	4.5	94.4
1970	1.5	43.9	0	0	1970	1.8	43.5	10.0	53.4
1971	3.6	4.5	0	0.1	1971	0.5	54.3	36.3	54.8
1972	0	5.7	0	0	1972	0	51.0	57.9	72.7
1973	0	4.6	0	0	1973	0.7	30.4	96.6	70.3
1974	0	9.9	0	0	1974	0	30.9	11.2	70.6
1975	0	8.3	0	0.1	1975	0	17.7	3.4	77.6
1976	0.8	55.8	0.1	0	1976	2.9	38.7	40.8	123.3
1977	0	21.7	0	0.2	1977	0	139.1	20.3	368.3
1978	6.0	157.7	2.2	0	1978	5.9	102.2	81.4	119.0
1979	0.03	19.2	0.01	0	1979	4.6	27.4	17.8	178.0
1980	126.1	127.1	0	0	1980	43.3	64.4	282.6	365.2
1981	8.5	17.5	0	0	1981	27.0	48.5	296.4	235.0
1982 ¹	136.9	319.7	0	0.2	1982 ¹	103.6	103.6	57.5	166.4
1983	13.8	31.2	0	0	1983	58.9	62.5	154.8	173.3

*Much of the Cold Bay - Morzhovoi runs occur off-refuge

¹ Includes Inner Cold Bay, Lenard Harbor, Sandy Cove - Mortensen's Lagoon, Morzhovoi Bay - Isanotski Strait.

Table 30. Commercial Salmon Catch and Escapement, Vicinity of Izembek NWR, 1969-1983 (Cont'd.)

Red (Sockeye) Salmon (in thousands)					King (Chinook) Salmon (in thousands)				
Cold Bay & Morzhovoi		Izembek & Moffett			Cold Bay & Morzhovoi		Izembek & Moffett		
<u>Year</u>	<u>Catch</u>	<u>Escape</u>	<u>Catch</u>	<u>Escape</u>	<u>Year</u>	<u>Catch</u>	<u>Escape</u>	<u>Catch</u>	<u>Escape</u>
1969	2.2	7.5	6.1	14.0	1969	0	0	0	6.9
1970	1.0	3.3	3.1	7.5	1970	0	0	0	2.1
1971	1.1	2.3	6.9	3.5	1971	0	0	0	0.2
1972	0	2.5	0.8	4.8	1972	0	0	0	0.2
1973	0.2	3.3	1.2	2.0	1973	0	0	0	0.7
1974	0	27.3	4.7	3.7	1974	0	0	0	0
1975	0.5	15.6	1.5	13.6	1975	0	0	0	0
1976	1.4	27.3	20.4	15.3	1976	0	0	0	0
1977	12.5	28.7	3.1	26.1	1977	0	0	0	0
1978	1.0	24.7	15.5	23.0	1978	0	0	0	0
1979	0	8.5	10.8	8.4	1979	.002	0	0	0
1980	15.7	6.1	34.2	11.2	1980	0	0	0	0
1981	8.9	7.0	30.9	12.0	1981	0	0	0	0
1982 ^{/1}	19.8	17.0	24.5	21.2	1982 ^{/1}	0	0	0	0
1983	13.8	18.2	15.2	18.5	1983	0	0	0	0

*Much of the Cold Bay-Morzhovoi run occurs off-refuge

^{/1}Includes Inner Cold Bay, Lenard Harbor, Sandy Cove - Mortensen's Lagoon

Table 30. Salmon Catch and Escapement, Vicinity of Izembek NWR, 1969-1983 (Cont'd)

Coho (Silver) Salmon ** (in thousands)		
	Cold Bay & Morzhovoi *	Izembek & Moffett
<u>Year</u>	<u>Catch</u>	<u>Catch</u>
1969	0	0
1970	0	0
1971	0	0
1972	0	0
1973	0	0.2
1974	0	0
1975	0	0
1976	0	0
1977	0	0
1978	1.3	0
1979	7.0	0
1980	16.4	0
1981	13.1	0
1982 ^{/1}	1.4	0
1983	0.7	0

*Much of the Cold Bay-Morzhovoi runs occur off-refuge

**Coho escapement data is incomplete. Some suveys are done but they are rarely peak counts. Fishing effort is usually very light on Alaska Peninsula coho. (per comm. Arnold R. Shaul, A.D.F. & G., Comm. Fish Div. Kodiak)

^{/1}Includes Inner Cold Bay, Lenard Harbor, Sandy Cove-Mortensen's Lagoon.

Table 31. Chum and Pink Salmon Escapement, Russell Creek 1978 - 1983⁴

<u>Year</u>	<u>Chum Salmon</u>	<u>Pink Salmon</u>
1978	50,000	50,000
1979	15,100	3,000
1980	36,240	39,680
1981	30,263	1,500
1982	40,800	60,000 (est.)
1983	10,000	Trace ³
<hr/>		
Avg. Even Year ²	22,500	29,600
Avg. Odd Year ²	15,800	1,200

⁴ Data supplied by Marlin Bricker, Fisheries Biologist, Fisheries Rehabilitation and Enhancement Division, Alaska Department of Fish and Game, Cold Bay, Alaska through 1982. Hatchery staff 1983.

² Pre-hatchery average for 1962 - 1978

³ No fish seen. Stream conditions "murky."

Table 32. Management Data, Russell Creek Hatchery, 1980 - 1983¹

	<u>SPECIES</u>							
	Chum Salmon				Pink Salmon			
	1980	1981	1982	1983	1980	1981	1982	1983
No. adults taken for eggng	7,840	7,160	5,502	7,200	3,977	-	-	-
Aerial assessment of stream pop. (i.e. escapement)	28,400	30,263	40,800	17,200 ²	35,700	1,500	60,000 est	Trace ³
Estimated commercial harvest	30,047	15,891	25,000	1,700	39,375	4,929	5,000	100
No. fish fin clipped	67,145	100,000	-	-	-	-	-	-
Total run (approx.)	66,200	53,300	71,300	18,900	79,100	6,400	65,000 est	100+

¹ Data for 1983 supplied by Arnold Shaul, Fisheries Biologist, Commercial Fisheries Division, Alaska Department of Fish and Game, Kodiak, Alaska

² Included hatchery take.

³ No fish seen, however, stream condition was "murky".

that "a herring purse seiner testing his gear in Cold Bay took a majority of the smolts as they departed the creek." The mystery remains unsolved and the hatchery, after four years of operation, has not yet begun to fulfill its production goals.

Legislative alterations by the incoming State administration resulted in a directive from ADF&G to cut-off funding for the Russell Creek Hatchery and to "mothball" the facility leaving one employee to act in a caretaker roll. Further negotiation resulted in a personnel cut from five to three and 75 percent of the normal operating budget. This restricted operational budget was maintained throughout the fiscal year. Meetings are currently underway on next year's budget with plans to add an additional maintenanceman and obtain full funding for peak hatchery production. Also, being discussed is the possibility of obtaining approximately 2.5 million dollars resulting from legal settlement involving initial construction of the hatchery.

14. Scientific Collections

Several bird strikes occurred in or near Cold Bay in 1983. Lighted towers and their support wiring near the airport and at the USAF facility at Grant Point resulted in mortalities to three red phalaropes and two black scoters in early June and three king eiders in December (1982) and January (1983). Stellers eiders were fairly common winter casualties at the Cold Bay airport and at the U.S. Air Force facility, and at least ten individuals were examined. Birds in good condition were either prepared as scientific specimens for the refuge collection or frozen to fill requests from universities and museums, etc. Paul Springer, Research, Arcata, CA., maintains an ongoing listing of bird strikes and has prepared a bibliography on the subject so our observations were also forwarded to him.

16. Marking and Banding

Mammals

See Section 6.8 WILDLIFE, Game Mammals, Brown Bear, for a discussion of marking activities in 1983.

Birds

Birds banded under the Refuge Master Banding Permit 20826 are summarized in Table 33. Refer to the appropriate section in G. WILDLIFE, for further discussions of specific projects.

Table 33. Birds Banded at Izembek NWR, 1976 - 1983

Species	Year								Total
	1976	1977	1978	1979	1980	1981	1982	1983	
Gyr Falcon	-	-	-	-	-	2	1	-	3
Pelagic Cormorant	-	-	-	1	-	-	-	-	1
Tundra Swan	-	4	27	16	38	66	52	115 ^Δ	318
Canada Goose	-	109	143	-	66	45	-	55	418
Black Brant	26	-	-	-	-	-	-	-	26
Emperor Goose	2	-	-	-	-	-	-	-	2
Mallard	1	-	-	-	-	-	-	-	1
Pintail	-	-	98	-	5	-	-	-	103
Greater Scaup	-	-	-	-	5	-	-	-	5
Steller's Eider	457	1045	502	516	941	869	-	-	4330
Rock Sandpiper	-	-	-	12	-	-	-	-	12
Dunlin	-	-	-	2	-	-	-	-	2
Lapland Longspur	9	4	-	-	-	7	-	-	20
Snow Bunting	162	15	33	105	19	33	6	38	411
McKay's Bunting	1	-	7	8	1	-	-	-	17
Common Raven	-	-	-	1	-	1	-	-	1
Gray-crowned Rosy Finch	128	50	40	113	147	67	58	26	629
Savannah Sparrow	1	-	2	-	2	4	-	-	9
Song Sparrow	-	-	-	-	3	-	-	-	3
TOTALS	787	1227	852	774	1227	1093	117	234	6311

^Δ Includes 39 tundra swan banded on Izembek banding permit by the Alaska Peninsula NWR.

A. Public Use

1. General

The community of Cold Bay continues to hover at or near a population level of approximately 200 people. Little offshore oil related activities, other than the normal array of temporary navigational towers, occurred on or near the refuge this year. ARCO did not maintain a camp in Cold Bay in 1983 giving us a misplaced feeling of inactivity prior to the onslaught of leasing and exploratory activities in the St. George Basin next year. Public use in the form of hunting and fishing was actively pursued by petroleum related transients in 1982 and to a lesser extent in 1983.

In September the last U. S. Air Force personnel stationed at the Grant Point Dew Line site departed leaving the facility to be totally run via a contract with RCA ALASCOM. Permanent military personnel at the site made little use of the refuge. There will continue to be regular C-130 supply flights from Elmendorf AFB (Anchorage) and these brought the normal fall onslaught of caribou hunters in November and December.

Although the refuge has no formal interpretive program, we do maintain a 'homemade' visitor center in the refuge office displaying some of the objects of our research programs and a variety of the game species on the refuge. Most visitors and many members of the local community come by the office or are contacted in the field by refuge staff. This personal contact has resulted in keeping the user public relatively well informed on refuge programs as well as game laws.

6. Interpretive Exhibits/Demonstrations

Office exhibits of local wildlife, and informative maps of the area were maintained. In addition, a large 4' by 8' blackboard was installed in the office to display data on swan productivity which is kept chronologically until September when goose census, productivity, banding and neck collar resighting information replaces it. Refuge visitors, especially waterfowl hunters, were especially interested in seeing our population estimates and learning about goose production.

R. M. Sarvis presented a workshop on trapping techniques, care of fur animals and regulations. Many local trappers turned out and an informative interchange of ideas resulted.

7. Other Interpretive Programs

Bulletin boards were maintained at the local hotel, airport terminal and at the Air Force Site. Tide tables, shooting hours, a map of the designated road system and information about bear safety and current refuge research activities were displayed.

8. Hunting

Waterfowl hunting is one of the most popular forms of outdoor recreation on the refuge. Large concentrations of black brant, Canada geese, emperor geese and a variety of ducks are available to the hunter within walking distance of the road system. The wilderness setting, lack of competition (except on 'goose' charter weekends) and availability of birds make this a (high quality) hunting experience. The quality deteriorates a little on one weekend a year when an organized "charter" hunt takes place. This year a group of about 75 hunters came out from Anchorage. This group chartered a Lockheed Electra from Reeve Aleutian Airways and brought guns, dogs, inflatable boats, decoys and other equipment for a three day hunt. Overcrowding, by Alaskan standards, existed in a few choice hunting areas, however, most everyone seemed satisfied. The refuge prepares an annual letter which is distributed to each hunter through the charter organizer, which outlines regulations, shooting hours, tides, camping tips and advice on coping with Cold Bay's notorious weather and bears. Refuge personnel spent all three days in the field, meeting hunters, answering questions and doing bag (Table 34) and license checks.

Waterfowl of all species appeared in more abundance this year as compared to 1982 levels. Unseasonably mild weather persisted until 21 October providing good hunting opportunities for local as well as visiting refuge users. The bulk of the staging black brant and Canada goose populations departed in the third week of October. This coincided with the annual fall arrival of the southern Alaska Peninsula caribou herd. Most hunters on the refuge quickly shifted their emphasis leaving the remaining waterfowl to the few local die-hard enthusiasts.

Caribou were heavily hunted in the Cold Bay area from their arrival in the third week of October through the end of the year. They were readily accessible from the road system and local as well as non-local use appeared to increase over the level observed last year. As has been observed in recent years, military personnel and people affiliated with airlines or local agencies who can get to Cold Bay at reduced rates are making up an increasing component of the hunter population. Approximately 40 percent of 217 animals checked by the refuge staff, were taken by hunters with subsidized travel. (See: Wildlife, Big Game, Caribou).

This year the Alaska Peninsula brown bear season was open in the fall from 7 to 21 October. There was no spring season in 1983. State law requires that bear hides and skulls be sealed by a representative of the State. Since ADF&G has no wildlife biologist in Cold Bay, we cooperate with them by sealing bears taken in this area. Fifteen

Table 34 . Summary of Waterfowl Bag Check Data
Izembek NWR, 1983

111

Species	Harvest by Age/Sex								Total ^{/1}	% of Harvest
	Adult			Immature			Unk.	Crippled		
	M	F	U	M	F	U	U			
Emperor Goose	6	2	15	2	8	6	13	3	52	19.5
Black Brant	1	5	6	4	9	5	30	7	60	22.5
Tav. Canada	18	12	21	20	14	19	48	13	152	56.9
Cackling Canada	-	-	-	-	-	1	-	-	1	0.4
Wh.-frt. Goose	-	-	-	1	1	-	-	-	2	0.8
Goose Total								34 ^{/2}	267	
Pintail	1	3	-	2	6	6	25	1	43	42.6
Mallard	13	2	-	5	-	-	6	-	26	25.7
G-W Teal	3	1	-	1	-	-	15	-	20	19.8
E. Wigeon	-	-	-	1	-	-	-	-	1	1.0
Gadwall	1	1	-	1	1	-	-	-	4	4.0
G. Scaup	1	-	-	1	-	-	-	-	2	2.0
Harlequin	1	1	-	-	-	-	-	-	2	2.0
R-b. Merganser	-	-	-	-	-	-	2	-	2	2.0
C. Merganser	1	-	-	-	-	-	-	1	1	1.0
Duck Total								11 ^{/3}	101	
Total Birds	45	26	42	39	39	37	141	45	368	

	Hunters Checked	Ducks	Emperors	Canadas	Brant
Charter Weekend	129	35	41	90	22
Non-Charter Days	34	74	11	62	38

* Estimate 90% of Charter hunters checked and 10% of all others

	Est. Charter Weekend Bag	Est. Other Bag	Est. Cripples	Est. Total
Ducks	35/.9 = 39	74/.1 = 740	85 (10.9%)	779
Emperor	41/.9 = 46	11/.1 = 110	9 (5.8%)	156
Canada	90/.9 = 100	62/.1 = 620	62 (8.6%)	720
Brant	22/.9 = 24	38/.1 = 380	47 (11.7%)	404

^{/1} Total excluding cripples

^{/2} Eleven geese of unknown species were reported crippled

^{/3} Ten ducks of unknown species were reported crippled



Caribou hunting is on the increase. Often, caribou can be dragged in one piece to a road.

Nunn (2-83)



Waterfowl hunting is the most popular recreational activity on the refuge. Retrievers save many birds that would be lost to winds and tides.

(109) 39

Bromley (10-75)

bears were sealed during the fall in 1983. Only six of these were taken on Izembek, however eight were taken on the Alaska Peninsula NWR (Pavlof Unit). Additionally, two bears taken in the fall on Unimak Island, were sealed along with one bear taken during the fall road system hunt in Cold Bay.

In addition to the Alaska Peninsula brown bear season which is open every other year, there is a registration permit hunt for the Cold Bay road system which is presently open both spring and fall every year. Up to ten permits per week are issued by the refuge on a first come, first served basis. The season is closed by emergency order when two bears are taken. The spring season was closed on 2 June after having been open 24 days. Two bears, both females, were taken with nine different hunters participating during the hunt period. The fall season was open for 25 days and one medium sized male bear was taken six days before the end of the season. Ten permits were in effect during the majority of the hunt period, but no bears were observed until the one individual showed up just before the season closed. No other bears moved into the area and the season ended without having to institute the emergency closure.

9. Fishing

Sport fishing is very popular during the summer and early fall. Primary species sought are silver, chum and pink salmon and Dolly Varden trout. Salt water fishing is also popular with Pacific cod, starry flounder and halibut making up the majority of the harvest.

10. Trapping

Trapping is permitted under State regulations; however, a trapping permit issued by the refuge is also required. Izembek was one of the refuges specifically mentioned in ANILCA for which trapping permits are required. Fourteen trappers received permits in the 1983-84 season. Several other local residents trapped in areas of the adjacent Pavlof Unit of the Alaska Peninsula NWR where trapping permits are not required. Harvest are above the 1982-83 level for most species as rabies probably reduced some populations, primarily red fox, last year which resulted in less trapper activity. This year's harvest data are not yet available and will be reported next year. The reported catches for the last three seasons are shown in Table 35.

11. Wildlife Observation

Most wildlife observation on the refuge is incidental to other activities. There are rare days when the weather is good and most of the town turns out to drive refuge roads and view wildlife.

13. Camping

Camping is not an important activity on the refuge. Excluding guided hunters, probably less than 20 campers use the area a year and all of them are involved in hunting or fishing activities.



Ptarmigan hunters were very successful in 1983, thanks to a fox population reduced by a rabies outbreak.

Nunn (1-83)



Happiness is a limit of silvers and chums!

Nunn (6-83)

Table 35. Results of Permit Trapping Program, Izembek NWR

Species	1980-81 (15 Trappers)	1981-82 (15 Trappers)	1982-83 (21 Trappers)	1983-84 (17 Trappers)
Red Fox	90	94	74	82
Land Otter	7	8	18	25
Mink	7	3	6	32
Wolverine	2	4	1	1
Wolf	3	0	0	0

17. Law Enforcement

The law enforcement effort in 1983 consisted of highly visible patrols during peak hunting periods, investigation of complaints received from the public, and routine surveillance of hunters in the field. The period of peak use occurred this year in October when the bear season on Unimak Island and the Alaska Peninsula coincided with the waterfowl season. S.A.C. Jim Hogue and S.A. Wally Soroka were here for three days to assist in patrols during this period. Soroka cooperated with refuge staff on three of the waterfowl cases (Table 36).

Their assistance was deeply appreciated since it allowed us to free two staff members to collect biological data via bag checks on the roads while simultaneously conducting law enforcement patrols.

For the first time we were able to patrol Unimak Island during the bear season. The case involving the illegal transportation of a bear hide occurred on Unimak and was the result of a three day investigation. The refuge staff was certain that the bear was taken the same day the hunters were airborne, but unfortunately, we were unable to prove it. Two of the individuals were cited a day after the bear was taken for taking caribou the same day airborne on Izembek NWR.

18. Youth Programs

Izembek's Y.C.C. program consisted of two enrollees from 20 June through 2 September. They were a real asset, particularly during swan banding. Projects completed consisted of the following:

1. Quonset hut removal.
2. Vehicle maintenance and painting.
3. Sign painting and rehab.
4. Radio antenna installation.
5. Headquarters maintenance.
6. Insulate and stain Grant Point building
7. Helped capture and mark 90 tundra swans.
8. Helped with bear capture and monitoring.

I. EQUIPMENT AND FACILITIES

3. Major Maintenance

The \$89,000 contract awarded in August, 1982, to Latta Construction Company for metal roofs, siding, and exterior doors for Qtrs. 1, 2, and 3 was completed on 25 March. The metal siding underneath the eaves blew off on all three residences and was later replaced by the contractor. At years' end, siding was coming off on the eaves

TABLE 36: LAW ENFORCEMENT CASES, 1983

Violation	Date	State Court	Federal Court	Residency		Source	Disposition
				Local	Non-Local		
1. Unplugged Gun	9/27/83		x		x	Patrol-foot	\$50 Fine
2. Overbag - caribou	10/4/83	x			x	Patrol-air - craft	\$750 w/\$250 suspended 1 yr. probation, forfeit caribou.
3. Same day airborne-caribou	10/4/83	x			x	Patrol-air-craft	\$750 w/\$250 suspended 1 yr. probation, forfeit caribou.
4. Same day airborne-caribou	10/4/83	x			x	Patrol air-craft	\$750 w/\$250. suspended 1 yr. probation, forfeit caribou
5. Illegal transportation brown bear hide	10/4/83	x			x	Investigation local	\$250 w/\$150 suspended 1 yr. probation.
6. Wanton Waste - Caribou	10/11/83	x			x	Investigation local	\$500 w/\$250 suspended 1 yr. probation, forfeit antlers and cape.
7. Overbag - Black Brant	10/15/83		x		x	Patrol - foot	\$100 fine, forfeit 5 Brant
8. Overbag - Canada Goose *	10/14/83		x		x	Patrol - vehicle	\$125 fine, forfeit 2 geese
9. Unplugged Gun*	10/14/83			x		Patrol air-craft	Forfeit 3 Emperor Geese
10. Unplugged Gun*	10/14/83			x		Patrol air-craft	Forfeit 3 Emperor Geese and 1 Teal
11. Rallying Waterfowl	10/15/83		x		x	Patrol-foot	\$100 fine w/\$50 suspended
12. Rallying Waterfowl	10/15/83		x		x	Patrol-Foot	\$100 fine w/\$ 50 suspended

* S. A. Saroka assisted



Alan Rogers' philosophy is "If it don't move, paint it".

(65) 34

Jean Sarvis (7-83)

once again and will probably be replaced with wood. Siding was also installed, for account, on the arctic entryway to Quarters No. 4.

A new powerline to Quarters No. 4 was installed and buried.

The GMC 3/4 pickup received a paint job and the Grant Point building a coat of sealant.

On 29 September, the Cold Bay Area was buffeted by winds with gusts clocked at up to 104 mph. We thought we had weathered the blow until we received a call from the U. S. Air Force site that our Grant Point storage building had blown down. Although anchored by deadmen under the concrete floor, the wind apparently lifted the 30' x 74' building off its foundation and blew it into Izembek Lagoon. Plans are underway to replace the facility with hopefully a stronger structure.

4. Equipment Utilization and Replacement

The 1952 Dodge winch truck, the 'Desert Rat' ATV, an old utility trailer, several outboard motors and other equipment were excessed and sold to local citizens.

5. Communications System

An HF radio antenna consisting of two 45' towers and a network of wires was installed behind the bunkhouse. This antenna ties us in with the U. S. Fish and Wildlife Service HF network developing statewide.

An FM radio system consisting of a base station, four portables and three mobile units was purchased near the end of FY 83 but not all the equipment had arrived by the end of the reporting period.

6. Energy Conservation

Eleven inches of additional insulation was added in the attic of Quarters 1, 2, and 3, bringing the R value to 32. Considerable heating fuel savings has since been noted.

Approximately 34,000 gallons of fuel oil was salvaged from the abandoned Coast Guard Station at Cape Sarichef. We have been trying to get this fuel delivered by Cool Barge for three years. The mission was finally accomplished on 25 August. This is an estimated six year supply for the Cold Bay headquarters, obtained at a cost of about \$.38 cents per gallon and a savings of about \$41,000. for the government.

A 250 gallon fuel trailer with pump was constructed by M.M. Rogers to deliver the fuel from storage tanks to the headquarters.



The Grant Point building as it looked during construction.
(79) 15

Sarvis (9-77)



Winds of over 100 MPH lifted the building from its foundation
and —

Dau (9-83)



—blew most of it into Izembek Lagoon, leaving only a few boards
on land.

Dau (9-83)

J. OTHER ITEMS2. Items of Interest

The 'city' and the 'power' are regular items of interest to residents of Cold Bay, including personnel of the Izembek NWR. The 'city' refers to the city government and council which meets monthly to deal with local affairs. Our local clinic is essentially completed; however, the city is still dealing with the contractor via lawyers. The clinic has yet to see its first patient.

Of greater concern to locals is the city's unstable power supply. Northern Power and Engineering (NP&E) supplies power to the city. Power outages, surges and occasional plant fires are normal occurrences. Many thousands of dollars worth of equipment and manpower have been expended by the various agencies in town. The Alaska Power Commission has dealt severely with NP&E; however, the quantity and quality of our power has changed little. Hence, most agencies have reinforced their standby power capabilities.

3. Credits

John Sarvis wrote Section G., Whistling Swan, and added significantly to other sections. John also edited the report.

Mike Nunn wrote Sections A, B, D, E, F, G.8, Brown Bear, H, 17-18, I and K. Mike also edited the report.

Chris Dau wrote Sections G. 1, 2, 3, Black Brant, Canada Goose, Emperor Goose, Steller's Eider, 4-8, Caribou, 9-11, 14-17, H. 1, 6 - 10. Chris added significantly to other portions and edited the report.

Bonnie Taylor edited and typed the report.

FEEDBACK

We feel like we've worked harder this year and accomplished less than in any of the past several years. The primary reason for this lack of real accomplishment is that staff time is required to accomplish administrative tasks that seem to grow at an exponential rate. We realize that it is necessary for refuge managers to manage the refuge program in total; including purely administrative tasks, and we, for the most part, support that. However, the primary reason we are here is to manage and protect refuge resources, not just keep the paper work moving.

Table 37 illustrates the deadlines we were required to meet in 1983 which were in excess of AWP responsibilities. Often these brush fires have little to do with management of resources on the Izembek NWR. In addition to these, of course, are the myriad of routine reports and obligations that must be accomplished, such as:

1. Ordering Supplies
2. Paying Bills
3. Time keeping
4. Budgeting
5. Energy Reports
6. Fuel Forecasts
7. Activities Reports
8. Inventories
9. Personnel Matters
10. Output Reports
11. Annual Work Plans
12. Youth Programs
13. Planning

The sad part about all this is that we are not getting as much resource work done as we should and that refuge staffs are only growing because of the administrative work load, not because we are doing more for the critters or the public.

This problem has originated at levels far higher than the field station and if a solution is to be found, it must also come from or at least be supported by these levels. We need some level above the field to try to screen a lot of these unnecessary requests or the biological and public use and information programs will continue to decline.

Refuge managers are no longer really held accountable for the biological or resource oriented part of the program, but are held strictly accountable for the purely administrative program and deadlines. We suggest that this situation should be reversed simultaneously with the elimination of all paperwork exercises that are not essential to the accomplishment of our mission. Sounds like a task for a W.O. task force with considerable field representation.

Table 37. Non-Annual Work Plan Reporting Responsibilities Assigned to Izenbek NWR During 1983.

Requesting Office	No. Received (%)	\bar{x} Reporting Period (days \pm 1SD)	\bar{x} Izenbek NWR Turnover Time (days \pm 1SD)	\bar{x} Days Ahead of Deadline	Type of Report	
					Resource (%)	Non-Resource (%)
Refuges (RO)	15 (23)	24.6 \pm 16.8	9.6 \pm 16.8	15.0 \pm 10.2	17 (26)	49 (74)
Regional Office (Other)	45 (68)					
Central Office	4 (6)					
Other Agency	2 (3)					
TOTAL	66					

41

Reporting with a deadline. Many written and verbal requests are also received by the refuge staff with an estimated 75 percent of these also being non-resource oriented.

APPENDIX

Camper Tells How His Peaceful Weekend Trip Turned Into a Hellish Nightmare

Mauled by an Angry Bear

By JAMES HUNTER

I knew I was going to die. A huge brown bear roared like thunder — then sent a lightning bolt of pain tearing through me with his razor-sharp claws.

Slicing right through my flesh like a monstrous mad slasher, the 500-pound killer dug his claws into my back and hurled me to the ground. This was the end.

"Please, let me die quickly!" I prayed. "Bring a merciful end to this terrible pain!"

Lying helpless on my back, I watched in horror as the beast stepped onto my chest, crushing the air out of my lungs. I could feel my ribs snapping like toothpicks under his tremendous force. It was like being run over by a Mack truck.

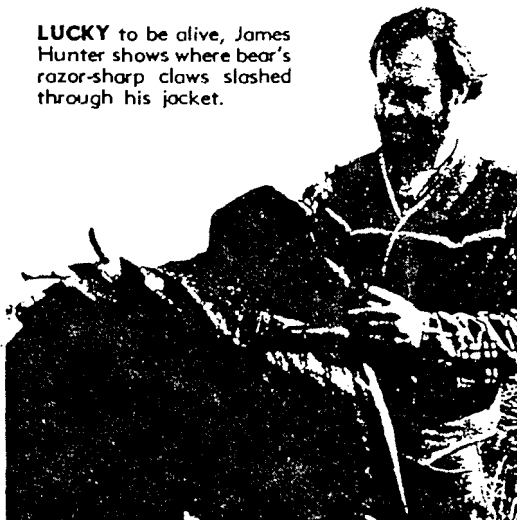
"Let me pass out, God — let me escape from this terrible pain and die in peace!" I begged.

But the stomach-churning smell of the bear's breath cleared my brain, and kept me from falling into unconsciousness.

I thought of my wife Pat and my daughters Kristina, 5, and Krystal, 2, at home just 10 miles away in Cold Bay, Alaska. That morning, last August 7, I'd paddled in my kayak to a deserted, treeless island in the Bering Sea for a peaceful weekend camping trip alone.

I didn't even know why this bear had attacked me. I was simply filling my can-

LUCKY to be alive, James Hunter shows where bear's razor-sharp claws slashed through his jacket.



'... I Could Feel My Ribs Snapping Like Toothpicks'

teen at a spring when suddenly, from out of nowhere, he pounced like some monster out of hell.

Now I was going to die at age 33 — a meal for an angry bear!

Then, with a terrifying growl, the bear stepped off my chest and grabbed my knee in his powerful jaws. I screamed with pain. He

picked me up and tossed me five feet as if I were weightless.

Lying facedown, I could see the bear coming again. Then suddenly, a desperate thought entered my mind. "Play dead!"

The bear struck at me with his paw. I wanted to writhe in agony, but I forced myself to stay still. The bear

took his paw away. The stench of his breath began to fade. But still I was afraid to move a muscle. After the longest, most terrifying 20 minutes of my life, I finally lifted my head and looked around.

The bear was nowhere in sight! It took me an hour to stumble the half-mile back to my campsite.

There was no way I could leave the island. I was far too weak to paddle back to town. I'd die at sea. This was Sunday — I knew if I wasn't back at 2 p.m. Tuesday, Pat would worry and send someone to look for me.

I had plenty of food but no water. I'd lost my canteen when the bear attacked. I had one can of fruit juice to ration.

That first night was sleepless. Every rush of air sounded like the snorting of

the killer bear's breath. Monday the hours passed slowly.

Tuesday morning I was weak from blood loss. My cuts and gashes were puffed with infection.

Finally, 2 p.m. passed. Would Pat send someone to find me? Hours crawled by. As the sun began to set, I heard the whine of a plane engine — and saw a plane heading straight for my island. My wife had sent it looking for me!

Ignoring the pain that stabbed through my body, I frantically waved my arms. The plane tipped its wings. The pilot saw me!

I was hospitalized for a week with broken ribs and painful gashes.

"Thank You, God!" I prayed. "All I wanted was to see my family again — and You answered my prayers!"

PAVLOF UNIT - ALASKA PENINSULA N.W.R.

A. Introduction

The Alaska Peninsula N.W.R. was created with the passage of the Alaska National Interest Lands Conservation Act (ANILCA) on 2 December 1980. In 1982, management responsibilities for the Pavlof Unit of the APNWR was assigned to the staff of the Izembek N.W.R. The Cold Bay office of I.N.W.R. is more centrally located and, hence, logistically able to adequately perform the required management functions.

The unit encompasses approximately 1.5 million acres of which well over half is native-selected or conveyed. This patchwork of land ownership will cause major problems with management of the refuge, in particular, since the native corporations have selected the coastal areas which are also the most important lands to wildlife.

The Aleutian Range runs the length of the unit and provides some of the most spectacular scenery on the Alaska Peninsula. Pavlof Volcano, the highest peak at 8,261 feet, is an active volcano that has erupted several times since 1980. The northern portion of the unit is characterized by lowland meadows interspersed with numerous ponds and lakes and areas of upland tundra. The southern portion is mountainous with steep-sided valleys drained by alder lined streams supporting good salmon runs.

Staffing and Funding

No personnel are assigned to the Pavlof Unit of the Alaska Peninsula NWR, it is managed by the Izembek N.W.R. staff. Funds in the amount of \$20,000 total were allocated; \$15,000 in 1220 and \$5,000 in 1210 for FY '83.

Planning

The Pavlof Unit is being master planned with the APNWR Refuge Comprehensive Conservation Plan, due for completion in 1984. It is also within the area being considered in the Bristol Bay Cooperative Management Plan. The Bristol Bay Plan could have a dramatic effect on the future management if it is implemented. Several land trades identified in the plan would consolidate refuge lands, and bring valuable wildlife areas into the system and eliminate the management headaches involved with lands near Cold Bay. The lands near the community are littered with WWII development (now debris) and are of little use to wildlife. Two especially important

areas identified for acquisition through land trades are the Mortensen's Lowlands, a wetland complex important to waterfowl, caribou and brown bears and the Black Hills area which is the calving area of the southern Alaska Peninsula caribou herd. This herd winters on Izembek and the Pavlof Unit. (Figure 1).

II. EQUIPMENT AND FACILITIES

Equipment and facilities necessary for management of the Pavlof Unit - APNWR were made available from those existing at the Izembek NWR. Although some funding (see Section I. GENERAL, B. Staffing and Funding) was made available, this covered only some of the staff time performed by personnel of the Izembek NWR.

III. HABITAT MANAGEMENT

The boundary of the Pavlof Unit - APNWR encompasses an array of Native, State and private inholdings with the occasional area of 'free and clear' refuge land. Our management philosophy is to attempt to hold-our-own with respect to fish and wildlife populations and their habitats. We recognize the need to work closely with adjacent landowners and keep them aware of the status of fish and wildlife populations on their lands. This will be an essential element in the joint management that will be necessary on these lands.

Regulations pertaining to access and use of ANILCA refuges, one of which is the Alaska Peninsula NWR, can be more liberal than those occurring on other Alaskan refuges. When the status of all lands within the refuge boundary is determined, negotiation on management direction can be undertaken. Various management options are presently being analyzed as part of the Master Plan and Bristol Bay Cooperative Management Planning process.

IV. WILDLIFE

A. Threatened or Endangered Species

No threatened or endangered species are known to use the Pavlof Unit - APNWR. The area is along a possible route of spring and fall migration of Aleutian Canada geese, however, their presence has not been documented.

B. Migratory Birds

The composition of bird species occurring on the Pavlof Unit - APNWR is similar to that reported for the Izembek NWR (See Section G.1. WILDLIFE, Wildlife Diversity, of the Izembek NWR 1983 Annual Narrative Report). The Pacific side of the Alaska Peninsula is characterized by areas of steep vegetated hillsides and cliff faces broken



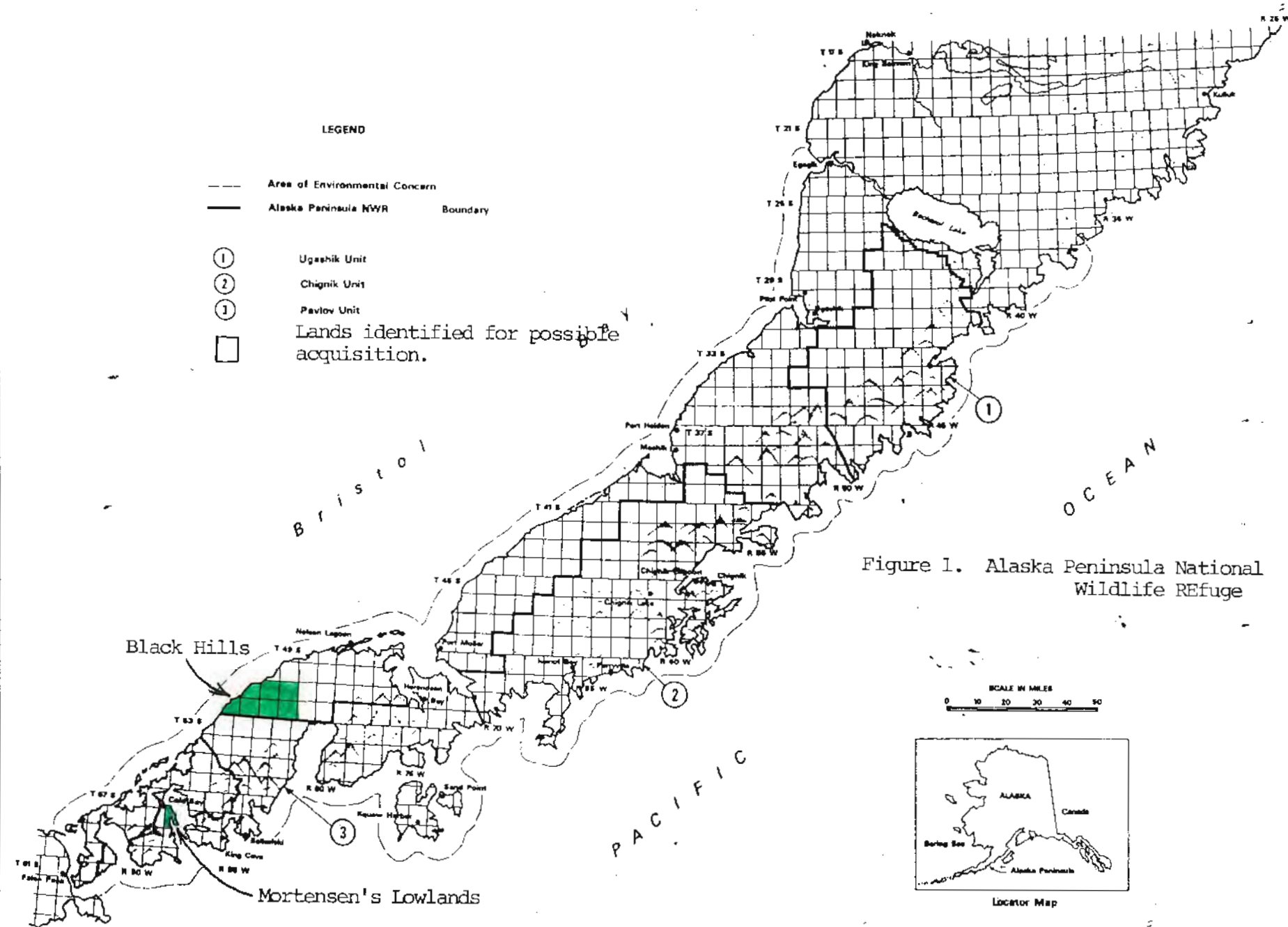
The Black Hills caribou calving grounds located just outside the boundary of the Pavlof Unit has been identified for acquisition by the Refuge through a land trade.

Dau (6-81)



Mortensen's Lowlands, a very important area to both bears and waterfowl has also been identified for possible acquisition through trade with King Cove Native Corporation.

Nunn (7-81)



by small valleys and associated drainages. The cliff areas provide a small amount of habitat for pelagic cormorants and possibly black-legged kittiwakes and they, along with associated rocks, small islets or sea stacks are used as nesting areas by bald eagles.

The whistling swan is the primary nesting species in wet marsh habitats of the PU-APNWR. The segments of this resident population nesting adjacent to the Izembek NWR are discussed in detail as one unit in the Izembek NWR Annual Narrative Report. The large wetland area north of Pavlof Bay, some of which is part of the PU-APNWR, supports nesting swans but their numbers have not been determined.

Bays and lagoons along the Pacific shoreline of the PU-APNWR are important to migrant and wintering waterfowl. Seaducks, primarily harlequin ducks, scoters, oldsquaw and Steller's eider predominate. Black brant use most bays for short periods during spring migration. Emperor geese use essentially the entire coastline in moderate numbers during fall, winter and spring. Areas of special importance are the Jackson and Chinaman Lagoon areas along the west side of Pavlof Bay, and Mortensen, Thinpoint, and Old Man's Lagoons in Cold Bay. The coastline of the PU-APNWR, including these key areas, is flown each spring as part of a comprehensive survey of emperor geese in southwestern Alaska (See the Izembek NWR Annual Narrative Report for further information).

C. Mammals and Non-Migratory Birds

Brown Bear

Brown bears are common on the Pavlof Unit, particularly in the area of Pavlof Bay. The Izembek NWR staff performs annual fall aerial brown bear surveys on both INWR and the Pavlof Unit - APNWR. Due to poor flying conditions and conflicting Bristol Bay Plan public hearings, the Pavlof Unit portion of the survey was not flown until 1 September, approximately a week later than is desirable.

One early morning flight of approximately four hours was performed sampling a portion (i.e. Unit 2, Figure 2) of the survey area covered in 1982. A total of 21 bears were observed in that survey unit as compared to 39 last year (Fig 2). The other three survey units were not flown this year. We do not feel that the sighting of fewer bears means that the population has declined. Several areas along streams with salmon runs exhibited moderate to heavy use by bears; however, no sightings were made during the survey. Ideally, this survey should be flown during the second to third week of August when bears are concentrated on the streams. Flights should be no longer than 2 to 2.5 hours and should commence as early in the morning as possible, or should be performed during the two hours before dusk.



W. B. Dau tracking one of our study bears on the Pavlof Unit -
APNWR

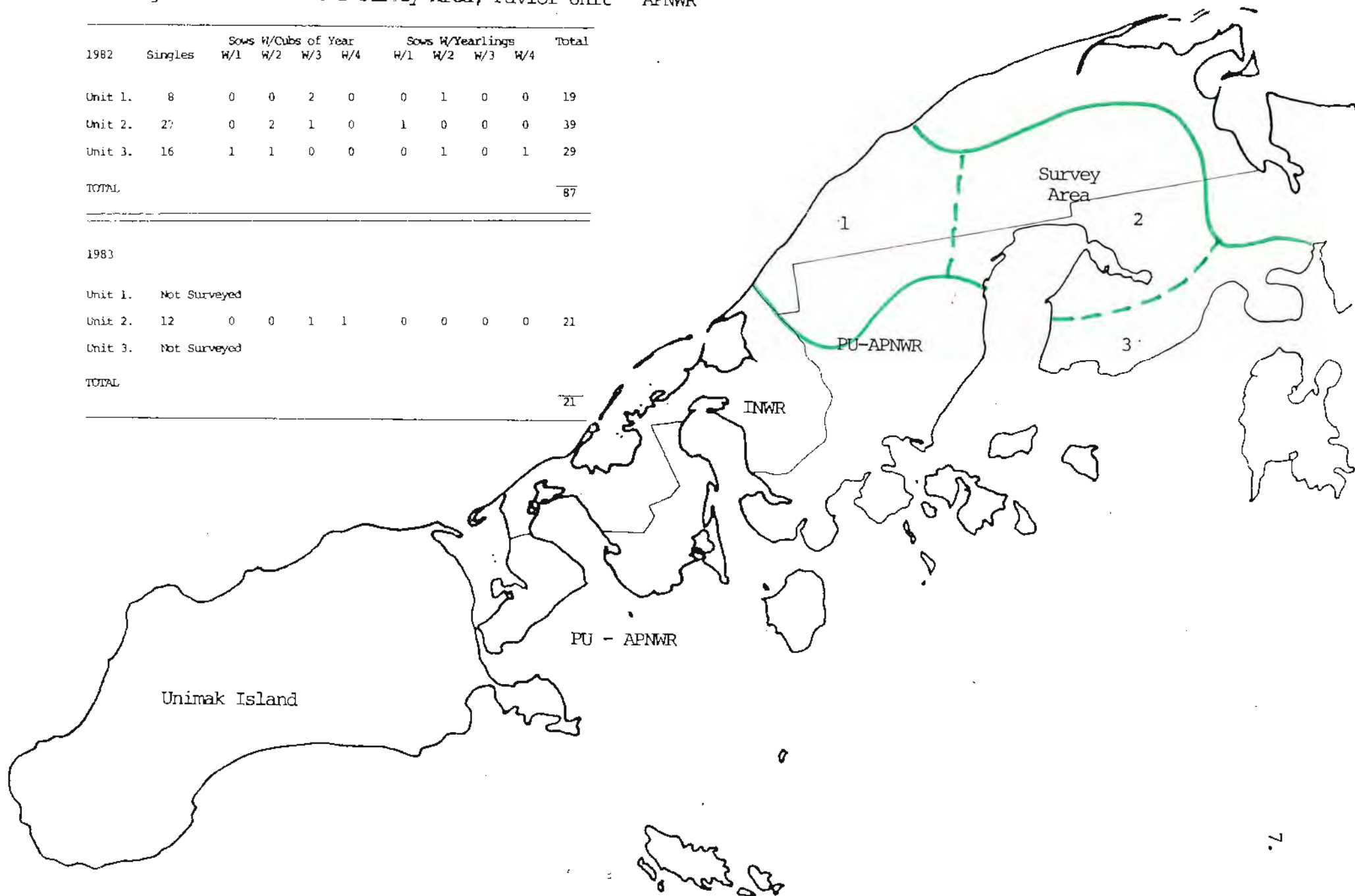
Nunn (6-83)

Figure 2. Brown Bear Survey Area, Pavlof Unit - APNWR

1982	Singles	Sows W/Cubs of Year				Sows W/Yearlings				Total
		W/1	W/2	W/3	W/4	W/1	W/2	W/3	W/4	
Unit 1.	8	0	0	2	0	0	1	0	0	19
Unit 2.	27	0	2	1	0	1	0	0	0	39
Unit 3.	16	1	1	0	0	0	1	0	1	29
TOTAL										87

1983

Unit 1.	Not Surveyed									
Unit 2.	12	0	0	1	1	0	0	0	0	21
Unit 3.	Not Surveyed									
TOTAL										21





The rocky plain of upper Russell Creek, Pavlof Unit - APNWR

Nunn (6-83)



Crowberries, very abundant in some locations, were extensively used by Canada geese.

(102-3)

Sarvis (10-78)



Willow ptarmigan responded well to an early Spring and depressed fox population.

(102-3)

Sarvis (9-78)

This may necessitate camping in the survey area to avoid the 45 minute delay of flying to the area from Cold Bay. Alder is much more abundant in this area than on Izembek, which also increases the difficulty of completing these survey portions in the necessary time frame before the bears have 'holed up' in the alders for the day.

Caribou

Portions of the calving and wintering areas of the southern Alaska Peninsula caribou herd occur on the Pavlof Unit APNWR. These areas are depicted in a figure in the caribou section of the Izembek NWR Annual Narrative Report. Also discussed in that report is productivity, harvest and status of this herd.

The distribution and abundance of marine mammals along the Pacific side of the Alaska Peninsula NWR is little known, however, it is likely that sealions and harbor seal haul-out in suitable locations. Sea otter occur throughout the area in moderate to low numbers.

D. Other Wildlife

Fisheries Resources

Salmon resources of the Pavlof Unit - APNWR are important and of commercial proportions. Four species of the salmon spawn in the area with pink and chum salmon predominating along the Pacific side.

Hoodoo (Sapsuk) Lake is a primary spawning area draining north from the PU-APNWR to the Bering Sea. The Caribou River, another component of this system combines with the Sapsuk River and flows into Nelson Lagoon. Catch and escapement data for this system in 1983 amounted to approximately 283,000 and 168,300 fish, respectively. (Table 1).

The Commercial Fisheries Division of the Alaska Department of Fish and Game monitors catch and escapement on the primary drainages within the PU-APNWR and has identified systems of important fishery value within the area (Fig. 3).

V. INTERPRETATION AND RECREATION

A. Hunting

Caribou and brown bear are the primary species hunted on the Pavlof Unit - APNWR (see Izembek Narrative Report for more on caribou hunting). Four permits for commercial guiding of bear and caribou hunters were issued to guides in 1983. The season was open in the fall from 7 to 21 October. Three of the guides reported taking



Calf production for the Southern Alaska Peninsula caribou herd was 17.9% in 1983 (measured in late June). Dau

Table 1. Catch and Escapement Data for Salmon in the Hoodoo(Sapsuk) Lake/Caribou River Drainage.⁴¹

Year		Species					Total
		Red	Silver	Chum	King	Pink	
1982	Catch	229,100	170,700	21,300	13,500	100	434,700
	Escapement	180,000	-	29,000	7,000	-	216,000
1983	Catch	192,900	64,000	14,000	12,100	0	283,000
	Escapement	128,800	13,000 ⁴²	14,000	12,500	0	168,300

⁴¹ Data supplied by Arnold Shaul, Commercial Fisheries Division, Alaska Department of Fish and Game, Kodiak, Alaska

⁴² Sapsuk River only.

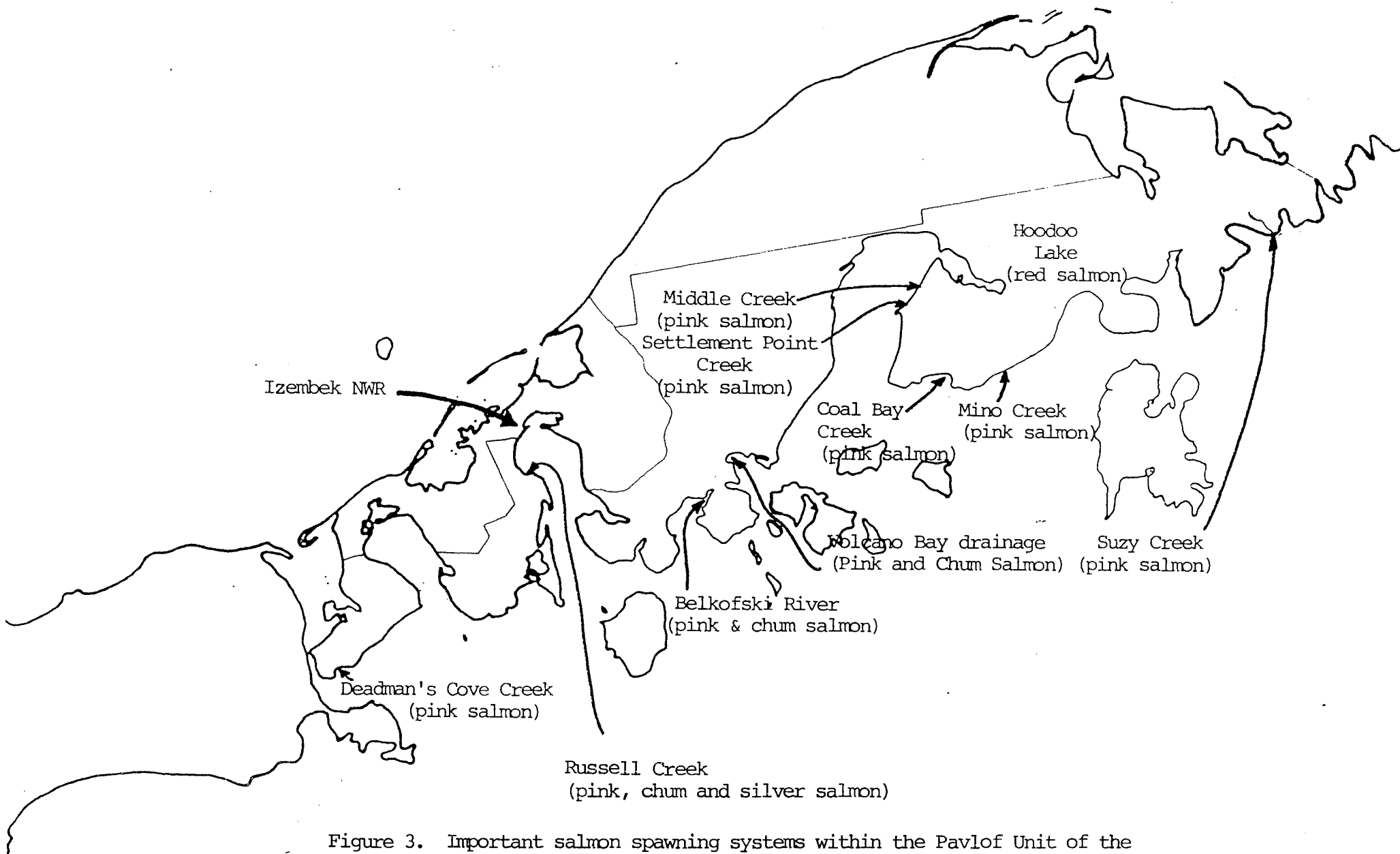


Figure 3. Important salmon spawning systems within the Pavlof Unit of the Alaska Peninsula NWR

14 hunters onto the refuge and harvesting 7 bears and 11 caribou. One guide failed to report. This particular guide has continually failed to report his harvest and hesitated to sign his permit each season since the area became a refuge. As was discussed last year, he has considerable political influence and does not hesitate to use it. Plans are in the mill to deny him a permit for the Spring 1984 season, so we suspect this section of the narrative will be quite lengthy next year.

B. Sport Fishing

Sport fishing is a popular summer activity on refuge streams which support good runs of chum, pink, red and silver salmon, as well as Dolly Varden. The most popular fishing area, lower Russell Creek, while inside the refuge boundary, has been conveyed to the King Cove Corporation. Access is guaranteed by an easement for the Russell Creek Road and a State easement corridor for recreation on both sides of the stream.

Trout Creek is also an important sport fishing stream. The refuge boundary crosses the stream a couple hundred yards up from the mouth, with the lower portion being in the refuge, except the mouth, where the boundary again crosses.

VI. OTHER

Credits

This report was written by Mike Nunn and Chris Dau, edited by John Sarvis and typed by Bonnie Taylor.

UNIMAK AND AMAK ISLANDS

I. GENERAL

The Aleutian Islands National Wildlife Refuge was created from public lands in 1913 by Executive Order 1733. The refuge is administratively divided at Unimak Pass, Unimak (989,000 acres) and Amak (2,600 acres) Islands are managed out of the Cold Bay office for logistical and biological reasons. The split also conforms to natural boundaries, Unimak Pass forming a distinct and extremely important biological 'divide' before the unique Aleutian flora and fauna of the central and western islands. On December 2, 1980, the Alaska National Interest Lands Conservation Act was passed. Section 303(1)III established the Alaska Maritime NWR with an Aleutian Islands Unit, which included the islands that formerly comprised the Aleutian Islands NWR.

Unimak is the only island reachable by our single-engine Super Cub; multi-engine aircraft or boats are required to reach the others. Amak is not accessible by aircraft at all, since it is too steep and the beach is too rocky for landing.

Unimak's habitat closely resembles that of the Alaska Peninsula, although it is somewhat impoverished. Cover, such as alder and willow shrubs, are quite restricted in distribution, and there are fairly extensive bare, or nearly bare ash and lava flows of varying ages. Especially in the western portion, salmon runs are small or non-existent, due partly to steep terrain and bluffs which make upstream negotiation impossible.

The weather on Unimak is very similar to that of Cold Bay. Since the field station was closed in 1980, there was no weather station on the island during 1983.

Eastern Aleutian habitat falls into two categories: wetlands and other. Wetlands include both salt and freshwater areas and support seasonally abundant waterfowl, notably whistling swans, Canada, emperor and black brant geese, sea ducks, mallards, pintails, gadwalls, green-winged and common teal, widgeons, buffleheads, common goldeneyes and greater scaup.

Other habitat includes beaches, cliffs, tundra, bare rock, lava flows, and perpetual snow and ice. Species using these types are red foxes, bears, wolverine, caribou, wolves, bald eagles, short-eared owls, geese, sea birds, marine mammals, passerines and shorebirds.

Wetlands are extensive on Unimak. Four large bay/lagoons (Swanson, St. Catherine's, Peterson and Christianson), provide nesting, feeding and resting habitat for waterfowl and shorebirds in summer. Other wetlands important to waterfowl include Lazaref River, Cape Lapin River and Otter Point. During winter, these lagoons are especially important for feeding and resting when freshwater freezes. We know from the swan collaring

study that Izembek whistling swans winter for the most part on Unimak, flocking up in these lagoons (primarily Peterson) during freezes, then spreading out to lakes and rivers for part of the day during thaws. Wet spongy areas occupy most low areas adjacent to the coast and lake systems. The glint of water is obvious for hundreds of acres from the air even though no open water is present.

Game trails - largely caribou and brown bear - cut these areas in every direction, often converging like spokes toward the hub of a small rise or other anomaly in these essentially flat expanses.

Volcanoes form the backbone of the island, from Roundtop in the east to Faris-Westdahl in the west. Perpetual snow fields and glaciers surround the five most prominent peaks; Roundtop, Isanotski, Shishaldin, Pogromni, and Faris-Westdahl. At 9,372 feet, Shishaldin is the highest peak on the island, and also the most spectacular, being a perfect volcanic cone. This mountain is a National Historic Landmark because it has served as a navigational aid for seamen at least since the days of Russian exploration and was undoubtedly used by the Aleuts as well. Active volcanoes include Shishaldin, Pogromni, and Faris-Westdahl. No known eruptions of any Unimak volcanoes occurred in 1983. However, steam and/or smoke rising from the vent of Mount Shishaldin was quite common. A huge lake - Fisher Caldera - lies in west-central Unimak in the crater of a volcano.

Extensive lava flows of varying ages are found below Shishaldin, Isanotski, Roundtop and Faris-Westdahl. Some of those on the north side of Shishaldin have revegetated, although so sparsely that the nature of the substrate is obvious from the air. Several rivers, among them North Creek, Coal Oil Creek and others unnamed, flow partly through wide ash flats. To the southeast of Roundtop, Isanotski and Shishaldin, are areas several thousand acres in size overlain with virtually bare lava and ash. These are also drained by sizeable streams.

Cliffs ranging from steep bluffs to spectacular wave-cut promontories and sea stacks occur along the coast, except at Unimak Bight and the north side from St. Catherine's Cove to Urilia Bay, where more gentle beaches and dunes are found. The more inaccessible bluffs and cliffs support some seabird nests, but are most important for bald eagles.

Because of its large size and unique features, Unimak was proposed as a separate unit for wilderness in 1972 but was held up pending resolution of the D-2 lands issued by Congress resulting from passage of the Alaska Native Claims Settlement Act. Finally, a wilderness area of 910,000 acres was established on December 2, 1980 with passage of the Alaska National Interest Lands Conservation Act. Management of Unimak will still be the same since it has been managed as a wilderness area all along.

Anak Island, about 2,600 acres in size, is a geologically new formation

only some 5,000 years old, lying about 12 miles offshore from Izembek Lagoon. The island rises to 1,760 feet and is generally tundra-covered with sheer cliffs dropping to the sea or extremely rough cobblestone beaches. Murres and kittiwakes nest on the cliffs. Large sea lion rookeries are found on the island and at nearby Sea Lion Rock. Amak was not visited during 1983.

II. EQUIPMENT AND FACILITIES

The field station (a former Coast Guard Station) at Cape Sarichef was closed in 1980 and the effort to salvage equipment and fuel left behind by the Coast Guard continued through 1983. Arrangements were made for the Cool Barge to pick up equipment and fuel each year since the station was closed; however, due to weather and other circumstances, the fuel wasn't picked up until 1983. Finally, after much effort, 34,000 gallons of diesel fuel was delivered to Cold Bay from Cape Sarichef. This is an estimated six years supply for the Cold Bay Headquarters obtained at a cost of about 38 cents per gallon; a savings of about \$41,000.00 to the government.

IV. WILDLIFE

A. Migratory Birds

Whistling Swans

See Section G.3., WILDLIFE, Whistling Swan, of Izembek NWR Narrative for discussion.

B. Mammals

Brown Bear

The aerial brown bear survey on Unimak Island was conducted during one flight of 2 hours duration on 27 August. In the past, the entire island below 800 feet in elevation was surveyed, requiring four or five flights of approximately two hours each. Most of the bears have historically been observed along salmon streams on the north side of the area. In 1983, only the streams on the north side of the island were surveyed to allow sufficient time to survey the newly acquired Pavlof Unit of the Alaska Peninsula NWR. A total of 55 bears (Tables 1 & 2) and 24 wolves were tallied.

Unimak Island is open to bear hunting each spring and fall with a total of 15 permits issued per year. This hunt is administered by the Alaska Department of Fish and Game which conducts a drawing to issue seven spring permits and eight fall permits (Table 3). Six of seven hunters during the spring season have reported to ADF&G.



Shishaldin Volcano, as seen from Fisher Caldera, is one of the most perfect volcanic cones in the world.

(139) 32

Sarvis (11-78)



The landing craft from the "Cool Barge" coming ashore at Cape Sarichef. After three years of trying, they were finally able to pick up over 30,000 gallons of fuel left by the Coast Guard.

(389) 36

Sarvis (9-83)



The beaches on Unimak provide excellent habitat for shore birds.
 (148) 25

Sarvis (12-78)



Peterson Lagoon provides abundant food and loafing area for over
 600 swans during the winter.

(368) 15

Sarvis (1-83)

Table 1. Unimak Brown Bear Survey Results, 1977 - 1983

Year	Singles	Sows w/cubs of Year			Sows with Yearlings			Sows w/ 2-1/2 Yr. Olds			Total
		W/1	W/2	W/3	W/1	W/2	W/3	W/1	W/2	W/3	
1977	36	3	4	0	1	4	2	0	0	0	76
1978	19	0	3	1	2	1	0	0	0	0	39
1979	39	1	0	1	5	4	2	0	0	0	75
1980	41	0	2	7	0	2	2	0	1	0	92
1981	44	0	5	2	0	2	1	0	0	0	77
1982	38	1	5	1	3	4	2	0	0	0	85
1983	29	2	1	2	2	1	1	0	0	0	55

Table 2. Comparison of Bear Locations, 1977 - 1982

	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>
Urilia Bay (North Creek to Shishkof Pond)	27	17	28	38	33	48	42
North Creek to St. Catherine Cove	24	19	21	13	32	37	13
False Pass/Ikatan Peninsula	2	0	2	17	5	*	*
Lazaref River Area	6	3	8	15	3	*	*
South Side to Scotch Cap	11	*	12**	7	4	*	*
West Urilia Bay to Sarichef	6	*	4	2	0	*	*

* Not Surveyed

**Area Cape Lutke to Scotch Cap not Surveyed

Table 3. Brown Bear Hunter Numbers and Success
Unimak Island, 1970 - 1983

	<u>Permits Issued</u>	<u>Hunters Active</u>	<u># Bears Known Taken</u>
Fall 1970 - Spring 1971	15	8	4
Fall 1971 - Spring 1972	15	10	4
Fall 1972 - Spring 1973	16	8	5
Fall 1973 - Spring 1974	20	10	3
Fall 1974	10	3-9 ^{/1}	3
CY 1975	20	9	6
CY 1976	18	10 ^{/2}	4
CY 1977	15	10 ^{/2}	7
CY 1978	15	3 ^{/2}	1
CY 1979	15	8 ^{/3}	7
CY 1980	15	6	3
CY 1981	15	5	3
CY 1982	15	7 ^{/2}	4
CY 1983	15	10 ^{/2}	6

^{/1}

It is not clear whether a 'no' answer in fall of 1974 records means 'did not hunt' or 'hunted but was not successful'.

^{/2}

One permittee failed to return questionnaire, unknown if active.

^{/3}

Three permittees failed to return questionnaire. Unknown if active. One additional hunter was lost at sea on his return flight to Anchorage. Not known if he took a bear.



Wolf "sign" is often seen on Unimak.

Nunn (1-83)



R. M. Sarvis is holding all that remains of a small caribou killed by wolves.

Nunn (1-83)

Two were successful, each taking four year old males while seeing a total of 38 bears. Two hunters were unsuccessful and saw only 12 bears and the remaining two hunters did not participate in the hunt.

Four of eight hunters during the fall season were successful in taking bears. Three females (aged 3 to 15 years) and one male (6 years) were taken with the successful hunters seeing a total of 40 bears. The two unsuccessful hunters saw a total of 16 bears during this hunt. The remaining two hunters did not participate in the hunt. The size of bears taken and location of take is shown in Table 4 .

V. INTERPRETATION AND RECREATION

There is no formal Interpretation and Recreation Program for Unimak Island. Poor weather, great traveling distances and expensive logistics combine to discourage most forms of public use. Recreation consists of hunting, with occasional trapping, fishing, hiking and photography. Aircraft use is restricted to the airstrip at False Pass and Cape Sarichef, lakes and lagoons and beaches below the mean high tide line.

Four trapping permits were issued for the 1982-83 season. Only two of these actually trapped, and they reported taking 35 red fox.

VI. OTHER

Special Use Permits

Two permits were issued for the installation of temporary navigation antennas for use by companies involved in offshore oil exploration in the Bering Sea. One permit was issued to the U. S. Coast Guard for the installation of permanent aids to navigation.

Credits

This report was written by Mike Nunn, edited by John Sarvis and Chris Dau and typed by Bonnie Taylor.

Table 4. Data on Bears Taken on Unimak Island, Fall 1971 to end of CY 1983

<u>Year</u>	<u>Sex</u>	<u>Size</u>	<u>Kill Date</u>	<u>Location</u>
Fall 1971-Spring 1972	U	7'	10/04/71	Scotch Cap
	F	8'	10/04/71	Sennett Point
	M	8'	10/06/71	4 mi. north of Sennett Point
	U	7'6"	10/12/71	Sennett Point
Fall 1972-Spring 1973	U	7'	10/02/72	Scotch Cap
	U	7'	10/02/72	Sennett Point
	M	9'	10/13/72	Urilia Bay
	U	7'6"	10/16/72	Urilia Bay
	U	7'9"	05/21/73	Urilia Bay
Fall 1973-Spring 1974	F	7'6"	10/02/73	Cape Sarichef
	U	6'11"	10/23/73	Sennett Point
	M	9'4"	05/21/74	Lazaref River
Fall 1974-End CY 1975	9U Other data not available			
CY 1976	4F Other data not available			
CY 1977	F	6'	05/12/77	Brown Peak
	M	7'	05/12/77	Shishkof Pond
	M	8'11"	05/13/77	Winding Creek at Oksenof Beach
	F	—	05/21/77	Urilia Bay
	F	8'1"	10/01/77	Urilia Bay
	F	6'4"	10/02/77	4 mi. south of Christianson Lagoon
	F	8'4"	10/02/77	3.5 mi. upstream Swanson Lagoon
CY 1978	F	7'8"	10/05/78	On coast, 3 mi. south of Cape Sarichef
CY 1979	M	9'11"	05/10/79	5 mi. south of Christianson Lagoon
	M	9'8"	05/11/79	Near Conical Red Hill
	M	9'7"	05/13/79	Cape Rukavitsie
	M	9'10"	05/14/79	West side of Brown Peak
	F	8'6"	05/22/79	4 mi. south of Cape Sarichef
	F	7'10"	10/02/79	Springs 5 mi. south of Christianson Lagoon
	F	7'1"	10/03/79	3 mi. south of Christianson Lagoon
CY 1980	M	8'6"	05/12/80	5 mi. east of Cape Lopin
	M	8'2"	10/06/80	Swanson Lagoon
	M	7'	10/06/80	Swanson Lagoon
CY 1981	M	9'3"	05/17/81	Christianson Lagoon
	F	7'10"	10/12/81	Swanson Lagoon
	M	8'4"	10/28/84	Cape Lapin River
CY 1982	M	7'10"	10/04/82	Swanson Lagoon
	M	8'2"	10/13/82	Urilia Bay
	F	8'8"	10/15/82	Otter Cove
	M	6'8"	10/19/82	Urilia Bay
CY 1983	M	—	—	Unimak Island
	M	—	—	Unimak Island
	F	6'10"	10/04/83	Swanson Lagoon
	F	6'10"	10/07/83	Urilia Bay
	F	—	—	Unimak Island
	M	—	—	Unimak Island

Our size information until 1980 is usually size of hide as measured fresh in the field by the hunter, and not the official state sealing records. 1980 through 1983 data is from the official sealing records.