

QUARTERLY REPORT

Contract #03-5-022-69

Research Unit #3/4

Reporting Period July 1, 1976-
Sept. 30, 1976

Pages - 27

Identification, Documentation and Delineation of Coastal Migratory Bird
Habitat in Alaska.

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Alaska Department of Fish and Game

September 30, 1976

I. Task Objectives

1. Summarize and evaluate existing literature and unpublished data on the distribution, abundance, behavior, and food dependencies of birds associated with littoral and estuarine habitat in the Gulf of Alaska, Bristol Bay, Beaufort Sea and Chukchi Sea, and on barrier islands in the Beaufort Sea.
2. Determine seasonal density distribution, critical habitats, migratory routes, and breeding locales for principal bird species in littoral and estuarine habitat in the Gulf of Alaska, Bristol Bay, Beaufort Sea and Chukchi Sea; and on barrier islands in the Beaufort Sea. Identify critical species particularly in regard to possible effects of oil and gas development.
3. Describe dynamics and trophic relationships of selected species at coastal study sites on the Beaufort Sea.

III. Field Activities

The report of activities in the Beaufort and Chukchi Seas will be completed by George Divoky, Alaska Department of Fish and Game, Fairbanks.

A. Schedule

1. Not reported in the June 30, 1976 Quarterly Report were bird surveys conducted from June 21-25, 1976 in Lower Cook Inlet. This included a complete shoreline count and a pelagic survey on eight transects. A DeHavilland Beaver and Travel Air were used for the shoreline survey and a State of Alaska Grumman Goose for the pelagic survey.
2. Bird colonies were mapped from June 26-July 8 in Kachemak Bay and the Iniskin Bay vicinity from a Boston Whaler and Avon raft.
3. From July 24-26 habitat mapping and a partial bird survey were conducted from Cape Fairweather to Valdez Arm using a Gulf Air Cessna 180 and a Chitina Air Cessna 185 and Beaver.
4. Pelagic bird observations were made on July 30-31 in southern Bristol Bay from the Office of Aircraft Services "Super Goose".
5. On August 24 and 31 habitat mapping flights were made from Montague Island to Gore Point in a PA-18 from Charlie Allen's Flying Service.
6. Habitat mapping was done from August 28-31 on Kodiak Island in a Flirite Bellanca Scout.

B. Scientific Party

1. Bird observers for the Lower Cook Inlet surveys from June 21-July 8 were David Erikson, ADFG, Homer and Paul Arneson, ADFG, Anchorage.
2. Habitat mapping in Lower Cook Inlet on June 21-25, in NEGOA and Prince William Sound on July 24-26 and in Kodiak on August 28-31 was done by David Kurhajec, ADFG, Anchorage. He also conducted a bird survey on July 24 in NEGOA.
3. Bird surveys in southern Bristol Bay on July 30-31 and habitat mapping on August 24 and 31 were conducted by Paul Arneson, ADFG, Anchorage.

C. Methods

As in past reports, the technique used for shoreline bird surveys was flying in single-engine, high wing aircraft at an altitude of approximately 30-45 meters and speed of 160 kilometers per hour. Observers were used on both sides of the aircraft with the shoreside observer covering the area to the high tide line and the oceanside observer enumerated all birds within 200 meters of the aircraft. In estuarine habitat and where upland vegetation was inundated by storm tides, a total count of birds was attempted. These methods were used in the June 21-25 Lower Cook Inlet survey.

On July 24, 1976 from Cape Fairweather to Cape Suckling on the outer beach only, a survey was conducted using one observer on the shoreside of the aircraft. The area being surveyed was variable, since the distance from the aircraft to which the observer enumerated birds was not fixed.

In southern Bristol Bay on July 30-31 the bird survey was conducted in conjunction with marine mammal surveys and only one bird observer was aboard. Transects were flown out to approximate outer limits of sea otter habitat and at higher altitudes (61 meters) and faster speeds (222 kilometers/hour) than normal bird surveys. Therefore, the distance out to which birds were enumerated was only 100 meters.

All observations were recorded on cassette-type tape recorders. Information recorded was: bird identification to lowest taxa possible (order, family, genus, species); bird numbers, habitat type in which the bird was found and other information including activities, sex, color phase, etc., as outlined in the data processing format. Weather observations were recorded at the start of each flight and a coded survey conditions number was noted as often as conditions change. Time was recorded each time a new station was started and ended.

During the colony survey of Kachemak Bay and the Iniskin Bay vicinity, all known colonies were visited by skiff or raft. Nests and/or burrows were either counted or sampled depending on the size of the colony. The coastline was searched by boat for colonies not previously

known and for nesting birds not associated with a colony. Bird use of the nearshore area other than for nesting was also noted at that time.

Habitat mapping was conducted from single-engine aircraft while flying at 90-120 meters along the coastline. Information was color-coded onto USGS 1:63,360 maps.

D. Localities

See attached maps (Figures 1-10).

E. Data Collected

During the June aerial survey of Lower Cook Inlet, approximately 1300 kilometers of shoreline were covered. In all, 182 stations were surveyed with 1270 parameters recorded. During the boat survey over 80 km of shoreline were searched for nesting birds. The pelagic bird surveys of Lower Cook Inlet totaled 464 kilometers with a breakdown as follows:

Transect	Length (km)
A	16
B	52
C	50
D	64
E	114
F	56
G	86
H	26

Figure 1. Trackline of aerial shoreline bird survey of Lower Cook Inlet, June 21-23, & 25, 1976, ADFG.

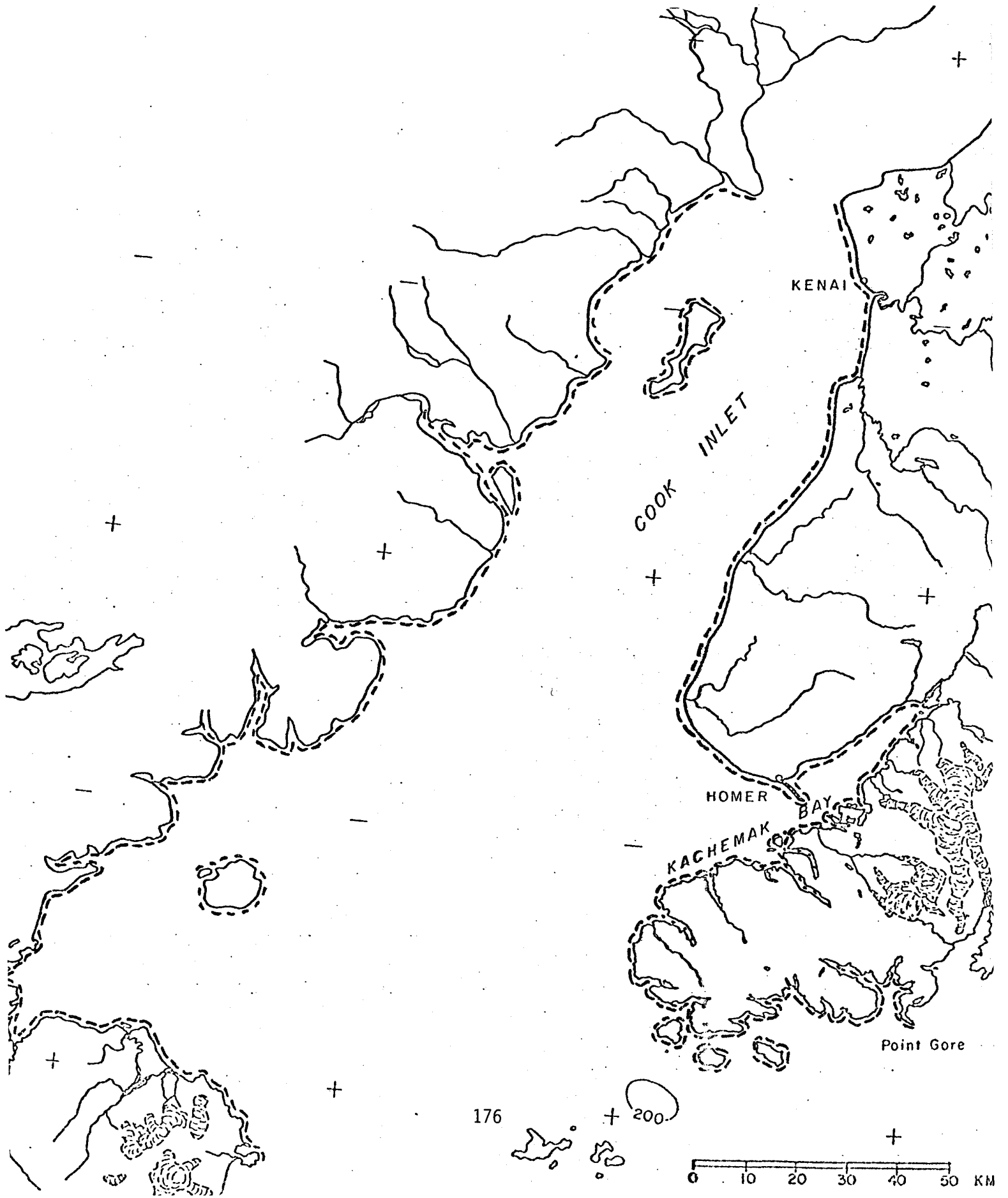


Figure 2. Aerial pelagic bird transects, June 24, 1976, Lower Cook Inlet, ADFG.

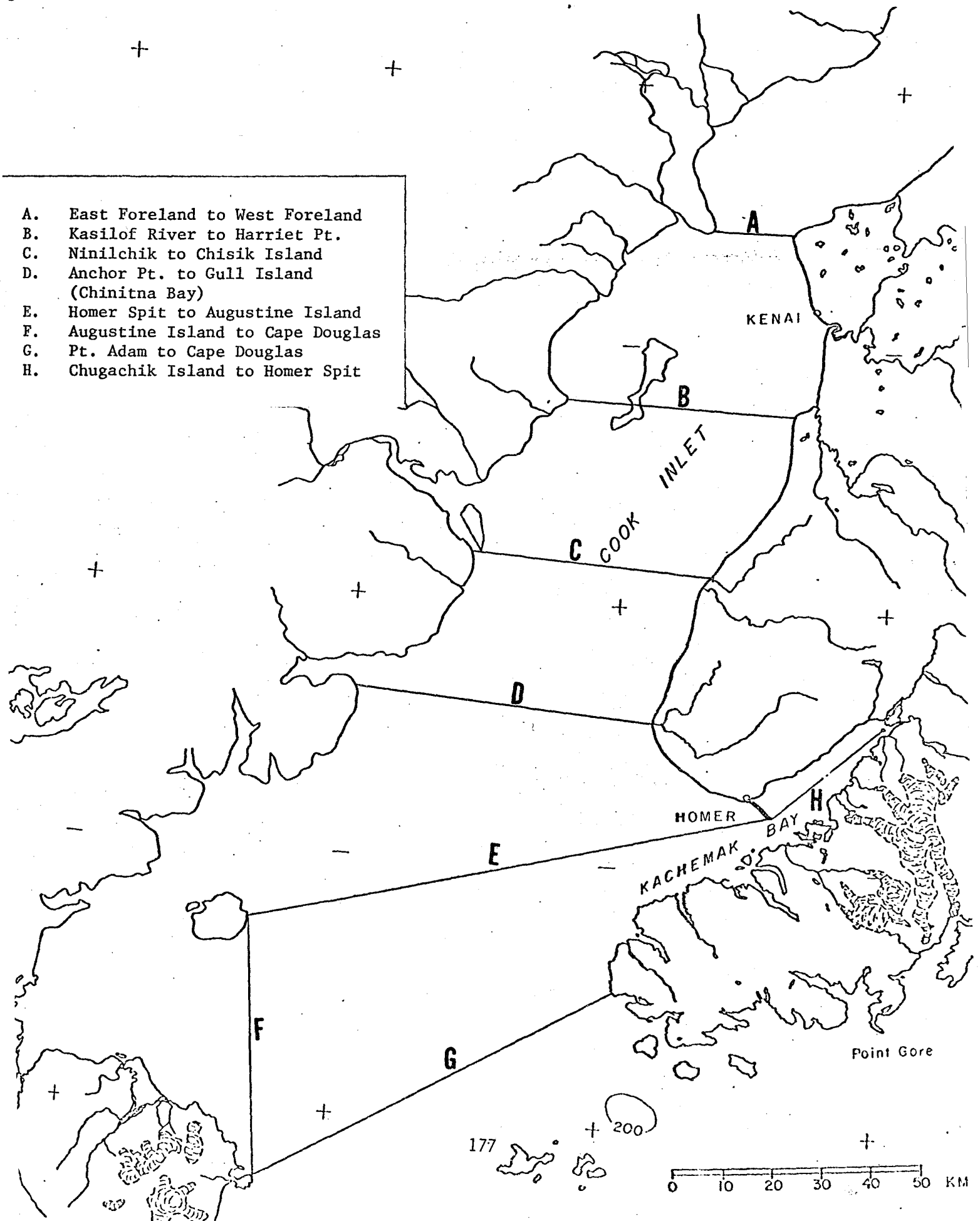
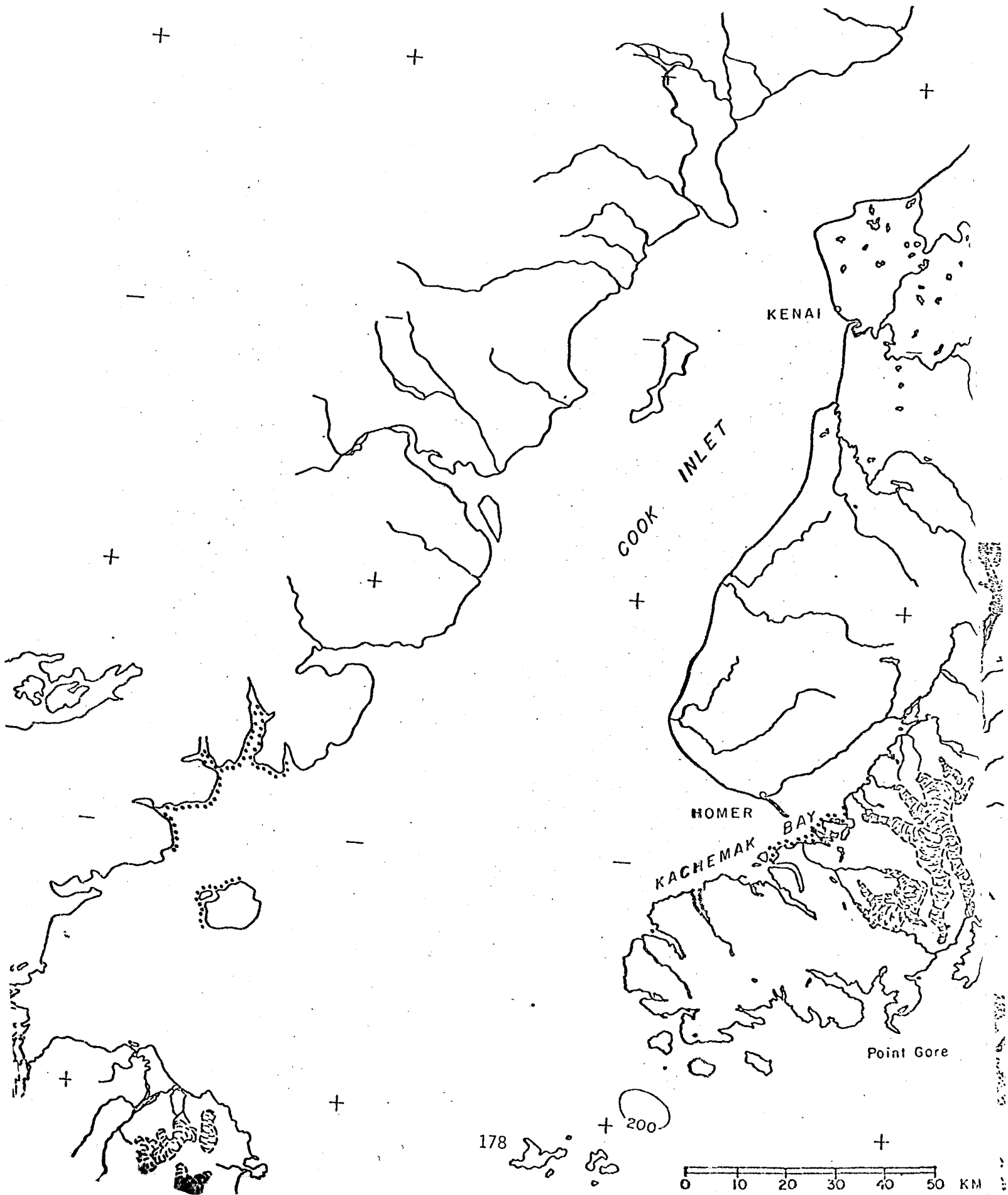


Figure 3. Trackline of colony mapping in Lower Cook Inlet by boat, June 26-July 8, 1976, ADFG.





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Figure 4. Trackline of aerial bird surveys in NEOGA, July 24, 1976, ADFG.



Figure 5. Trackline of habitat mapping flight on July 24-25, 1976 in NEGOA, ADFG.

Figure 6. Trackline of habitat mapping flight in Prince William Sound on July 26, 1976, ADFG.

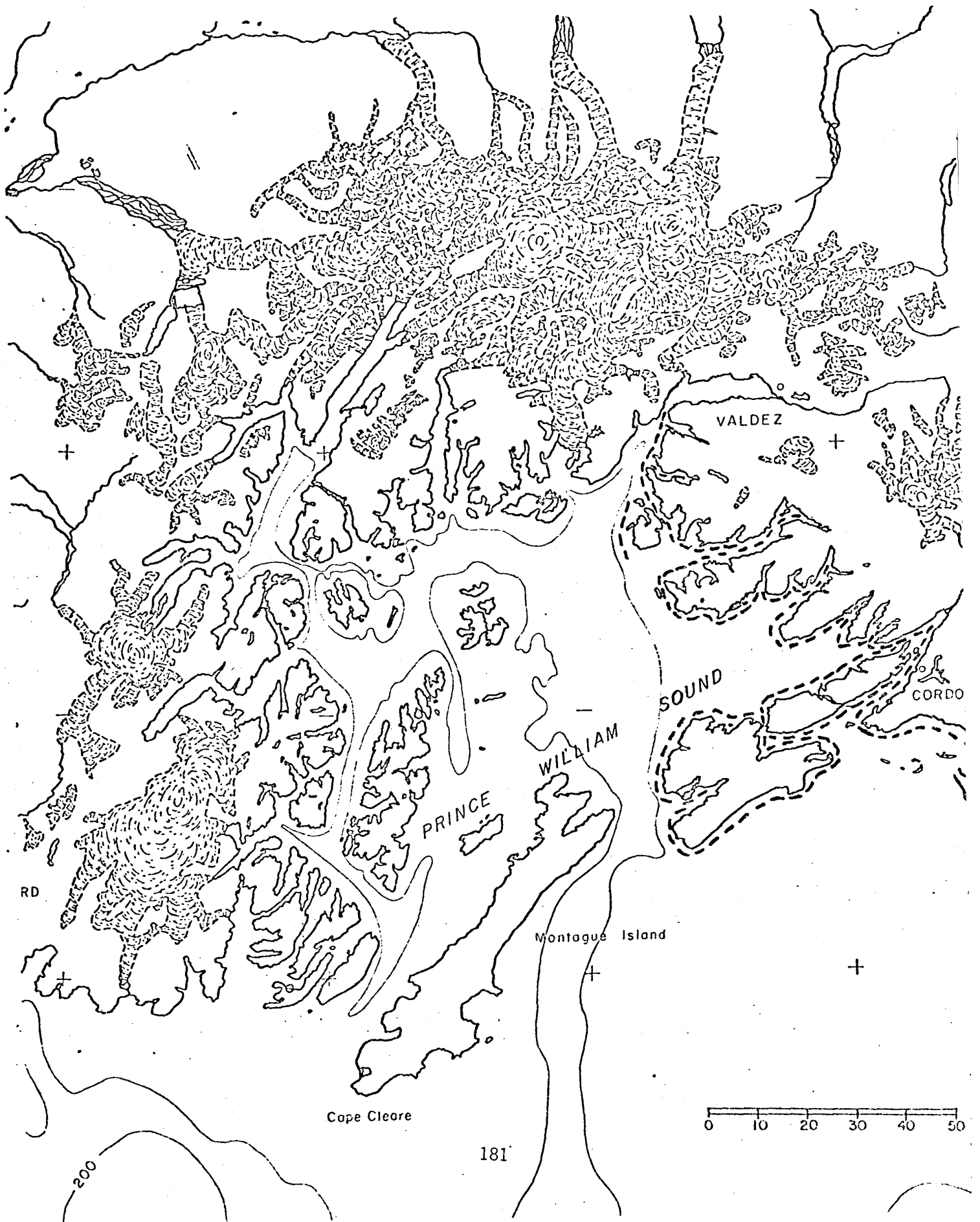


Figure 7. Aerial transects for marine mammal/bird survey, southern Bristol Bay, July 30-31, 1976, ADFG.



Figure 8. Trackline of habitat mapping flight, Prince William Sound, August 24, 1976, ADFG.

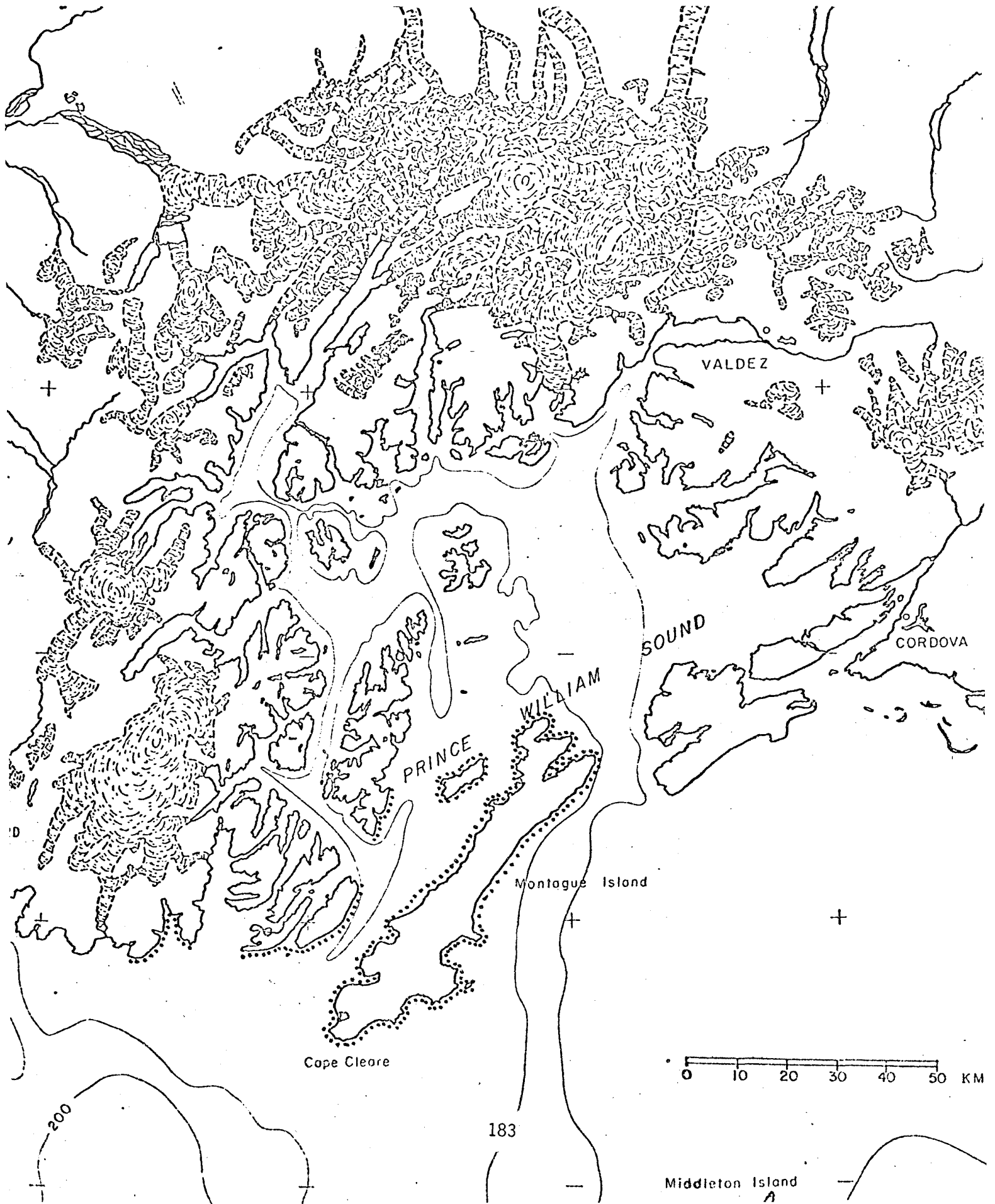


Figure 9. Trackline of habitat mapping flight, Blying Sound, August 24 & 31, 1976, ADFG.

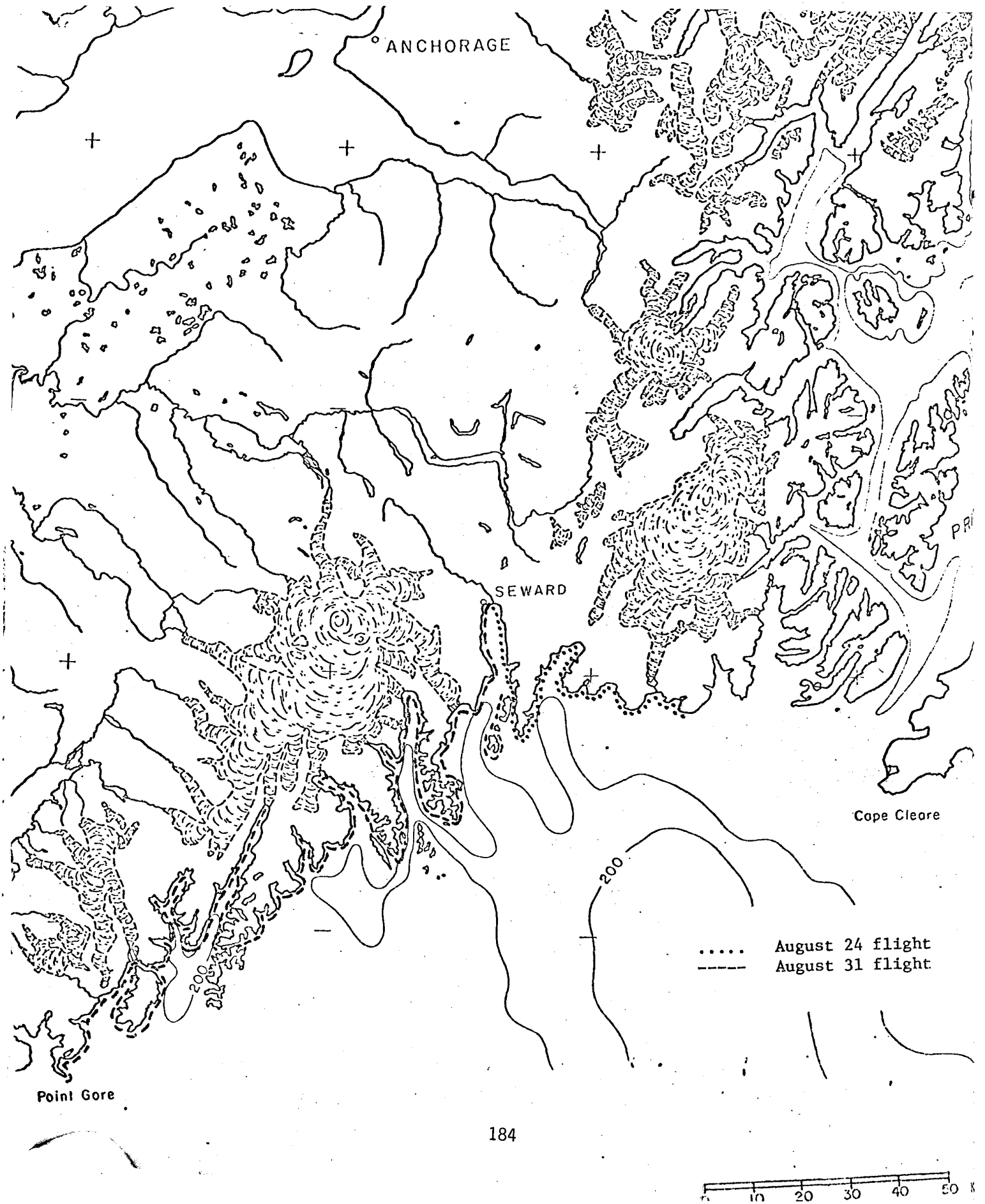


Figure 10. Trackline of habitat mapping flight, Kodiak Island, August 28-31, 1976, ADFG.



Aerial bird surveys in NEGOA on July 24, 1976 covered 324 kilometers with 26 stations surveyed and 308 parameters recorded. During the same period 912 kilometers of shoreline were mapped for the various habitat types. Also, approximately 470 kilometers of eastern Prince William Sound were mapped.

A total of 1401 km were surveyed in the 39 transects from Cape Sarichef to Port Moller. Seventeen species of birds were observed and 313 parameters recorded.

On August 24, 1976 375 kilometers of shoreline were mapped from Montague Island to Seward and on August 31 approximately 415 kilometers were mapped from Seward to Gore Point.

From August 28-31, 1976 about 1130 kilometers of shoreline were mapped on the mainland of Kodiak Island.

III. Results

The final format for data processing was accepted by NOOC/EDS during this report period. A transcribing form was designed to facilitate transcribing directly from cassette tapes to a key-punchable format. Nine of ten surveys were transcribed and submitted for keypunching. A backlog of data turned in simultaneously for keypunching caused a delay in verification of the data. All data should be keypunched, verified and finalized in October and analysis begun.

An ADFG programmer has been contacted and a computer program is being written for data analysis. The analysis will stress bird distribution and densities by habitat type but will include distribution in relation to tide height, activity, age, sex and weather where possible.

A preliminary analysis of the pelagic survey in southern Bristol Bay has been completed. Table 1 lists the number of transects, area of transects, approximate area covered by the survey and mean number of birds per transect. The Unimak-Izembek region was sufficiently different from the Port Moller region to be analyzed separately. Table 2 shows the total number of birds observed and their percent occurrence in the transects by region. Shearwaters made up almost 95 percent of the total with murre (2.5%) and kittiwakes (1.3%) a distant second and third, respectively. Together with the three previously mentioned species, glaucous-winged gulls were the most ubiquitous being observed in 87 percent or more of the transects. Fifteen species or groups were observed in the Unimak-Izembek region and eight species in the Port Moller region. Two species of scoters (white-winged and surf) were seen in Port Moller but were combined for the analysis. Scoters were not seen in the Unimak-Izembek area.

Transects either began or ended on shore so different species occurred in nearshore waters versus the pelagic areas some distance from shore. No attempt has yet been made to analyze the birds' distribution in relation to distance from shore but, in general, terns, most gulls, cormorants and seaducks occurred closest to shore. Shearwaters did not

Table 1. Transect number and area, approximate area covered, and mean number of birds observed on a pelagic bird survey in the Unimak-Izembek and Port Moller regions of Bristol Bay, July 30-31, 1976.

	No. of Transects	Area of Transects-Km ²	Approx. area Surveyed-Km ²	\bar{x} No. Birds per Transect
U-I	34	126.2	10,045	2160
PM	5	13.9	1,555	148
Total	39	140.1	11,600	1903

Table 2. Total number of birds by species and percent occurrence in transects in pelagic bird surveys of the Unimak-Izembek and Port Moller regions of Birstol Bay, July 30-31, 1976.

Species	Part A Total No. of Birds Observed			Percent of Total Birds	Part B % Occurrence in Transects		
	U-I	PM	Total		U-I	PM	Total
ShWa	70,000	341	70,341	94.8	94	40	87
Murr	1,697	178	1,875	2.5	94	80	92
Kitt	926	70	996	1.3	88	100	90
GWGu	460	73	533	0.7	91	80	90
SmAl	193	3	196	0.3	44	20	41
Scot	0	70	70	0.1	0	40	5
Corm	63	0	63	0.1	9	0	8
TuPu	34	0	34	Tr	44	0	38
Phal	28	0	28	Tr	15	0	13
Tern	19	7	26	Tr	38	40	38
SaGu	8	0	8	Tr	15	0	13
Jaeg	6	0	6	Tr	4	0	10
GlGu	3	0	3	Tr	2	0	5
Petr	3	0	3	Tr	2	0	5
RTLo	2	0	2	Tr	2	0	5
PaEi	1	0	1	Tr	1	0	3
Total	73,443	742	74,185	99.8			

show up in transects until some distance from shore and were still abundant when transects ended. Murres and kittiwakes could be found in most parts of a transect. The shortest transect was 13 kilometers and the longest 57.4 kilometers.

Shearwaters were about 40 times more dense than the next most abundant species (murres) and only five species had more than one bird per square kilometer (Table 3). After expanding the population by multiplying the density of bird species in each region by the approximate area in the region (found in Table 1), the importance of southern Bristol Bay to summering populations of shearwaters and other seabirds is strongly indicated. Over 6 million birds were estimated for the 11,600 km² surveyed and only a small portion of the Bering Sea was covered in the survey.

Habitat types mapped in Prince William Sound/Blying Sound, east side of Lower Cook Inlet, and west side of Lower Cook Inlet are summarized in Tables 4, 5 and 6 respectively. An atlas of all habitat information collected this past fiscal year has been completed on 1:63,360 USGS maps in color-coded form and is on file in the Anchorage ADFG office. Arrangements are being made to transfer the information onto a black and white format of 1:250,000 maps for distribution.

Table 3. Densities and expanded population size of sixteen species of birds observed on pelagic bird surveys in the Unimak-Izembek and Port Moller regions of Bristol Bay July 30-31, 1976.

Species	Part A Density: Birds/Km ² *			Part B Expanded Population Size: Est. No. Birds**		
	U-I	PM	Total	U-I	PM	Total
ShWa	554.6	24.6	502.1	5,570,957	38,253	5,824,360
Murr	13.4	12.8	13.4	134,603	19,904	155,440
Kitt	7.3	5.0	7.1	73,329	7,775	82,360
GWGu	3.6	5.3	3.8	36,162	8,242	44,080
SmAl	1.5	0.2	1.4	15,068	311	16,240
Scot	0	5.0	0.5	0	7,775	5,800
Corm	0.5	0	0.4	5,023	0	4,640
TuPu	0.3	0	0.2	3,014	0	2,320
Phal	0.2	0	0.2	2,009	0	2,320
Tern	0.2	0.5	0.2	2,009	778	2,320
SaGu	0.1	0	0.1	1,005	0	1,160
Jaeg	Tr	0	Tr	1,193	0	1,379
GlGu	Tr	0	Tr	1,193	0	1,379
Petr	Tr	0	Tr	1,193	0	1,379
RTLo	Tr	0	Tr	1,193	0	1,379
PaEi	Tr	0	Tr	1,193	0	1,379
Combined	581.9	53.4	529.5	5,845,185	83,037	6,142,200

* Based on actual area and bird numbers observed.

** Based on approximate area covered by survey and the calculated densities of Part A.

Table 4. Substitute of shoreline in Prince William Sound and Blying Sound from Cordova to Entrance Point and Montague Island to Gore Point, Summer 1976.

	Shoreline in Kilometers						
	<u>Mud</u>	<u>Sand</u>	<u>Gravel</u>	<u>Rock</u>	<u>Sand & Gravel</u>	<u>Sand & Rock</u>	<u>Rock & Gravel</u>
Cordova to Entrance Point	6.8	2.1	94.0	326.4	0	0	78.4
Hawkins Island	4.0	0	27.5	52.0	0	0	18.0
Hinchinbrook Is.	18.0	13.7	80.3	70.8	1.4	3.2	20.9
Montague Island	0	62.4	109.0	51.8	23.2	0	65.0
Green Island	0	2.4	37.8	4.3	0	0	3.7
Cape Puget to Seward	0	20.4	28.3	149.7	15.4	0	13.7
Seward to Gore Point	0	10.9	149.7	571.3	32.5	0.3	26.4

Table 5. Quantity of various habitat types on the shoreline from Gore Point to East Foreland in Lower Cook Inlet, summer 1976.

	<u>Shoreline in Kilometers</u>								<u>Area in Square Kilometers</u>			
	<u>Mud</u>	<u>Mud & Sand</u>	<u>Sand</u>	<u>Gravel</u>	<u>Rock</u>	<u>Sand & Rock</u>	<u>Gravel & Rock</u>	<u>Sand & Gravel</u>	<u>Mud Flats</u>	<u>Sand Flats</u>	<u>Mixed Forbs</u>	<u>Eelgrass</u>
Gore Point to Chugach Bay	0	0	1.8	25.3	28.3	0	20.4	0	0	0	4.4	0
Elizabeth, Perl & E. Chugach Is.	0	2.7	1.1	3.2	35.4	0.3	3.1	3.4	0	0	0	0
Chugach Bay to Point Adam	0	0	0.3	22.0	23.0	0	18.0	0.8	0	0	0.5	2.3
Point Adam to Sadie Cove	0	0	0.6	66.9	87.1	0	24.1	2.4	5.4	0	1.0	0
Sadie Cove to Homer Spit	16.6	1.6	1.9	57.9	70.2	0	7.2	25.3	62.9	0	29.0	0
Homer Spit to Ninilchik	0	0	0.5	33.6	0.6	3.1	12.2	10.5	0	2.8	1.0	0
Ninilchik to East Foreland	21.6	0	2.7	27.5	0	0	1.0	50.9	0	6.2	11.9	0

Table 6. Quantity of various habitat types on the shoreline from West Foreland to Cape Douglas, Lower Cook Inlet, summer 1976.

	<u>Shoreline in Kilometers</u>									<u>Area in Square Kilometers</u>				
	<u>Mud</u>	<u>Mud & Sand</u>	<u>Sand</u>	<u>Gravel</u>	<u>Rock</u>	<u>Sand & Rock</u>	<u>Gravel & Rock</u>	<u>Sand & Gravel</u>	<u>Sand & Gravel & Rock</u>	<u>Mud Flats</u>	<u>Sand Flats</u>	<u>Mud & Sand Flats</u>	<u>Mixed Forbs</u>	<u>Elymus</u>
West Foreland to S. end Chisik Is.	28.5	36.7	21.6	13.7	49.9	0.6	23.3	29.3	7.9	28.0	10.4	112.9	99.2	0
S. end Chisid Is. to Ursus Head	10.9	0	7.2	46.5	104.9	1.4	20.3	24.0	1.0	63.2	7.0	0	27.5	0
Ursus Head to Contact Point	0	0	0	38.6	32.5	0	19.2	2.4	0	0	0	0	4.4	0
Contact Point to Kamishak River	10.0	0	0.2	29.3	17.5	0	22.4	0	0	21.8	0	0	4.9	6.5
Kamishak River to Cape Douglas	3.2	0	27.4	26.7	23.2	0	5.6	0	0	2.8	49.7	0	7.3	5.7
Kalgin Island	0	0	0	4.2	8.5	0	19.0	20.3	7.7	0	3.9	0	6.7	0
Augustine Island	0	0	6.4	0	5.8	18.0	0	0.6	1.6	0	0	0	0	0

IV. Interpretation of Results

Quite obviously, southern Bristol Bay is a very important summering area for birds. The regions surveyed containing an estimated 6 million birds represent only a small portion of the southern Bering Sea area. With large colonies in the Pribilofs, the Cape Newenham/Cape Peirce vicinity, the Walrus Islands, and Aleutian Islands, densities of birds are likely quite large in a much more extensive area. It is extremely productive in both birds and their food organisms. Past surveys have also indicated heavy use of this area for migrating birds both in spring and fall. For these reasons oil development (in particular an oil spill) in this region could be quite damaging to large populations of birds directly, or indirectly by affecting their food source.

Interpretation of data from other surveys awaits final development of a computer program for data retrieval. General observations indicate that the nearshore waters and beaches of the portions of the Gulf of Alaska surveyed during this report period do not support large densities of summering birds except in the vicinity of colonies. Larids and non-breeding and molting scoters were likely the most abundant species (not associated with breeding colonies) that were encountered during the summer's surveys. Final analysis of bird densities and distribution will be available when the computer program is completed.

V. Problems - nothing noteworthy.

VI. Estimate of funds expended

Salaries	14,588
Per diem/travel	475
Logistics (air charter, etc.)	6,170
Commodities	260
Equipment	<u>0</u>
Total	\$21,493

Environmental Assessment of the Alaskan Continental Shelf

July - Sept 1976 quarterly reports from Principal Investigators participating in a multi-year program of environmental assessment related to petroleum development on the Alaskan Continental Shelf. The program is directed by the National Oceanic and Atmospheric Administration under the sponsorship of the Bureau of Land Management.

ENVIRONMENTAL RESEARCH LABORATORIES

Boulder, Colorado

November 1976