RESULTS OF BIRD AND MAMMAL SURVEYS OF THE WESTERN ALEUTIANS

94

~~2010~~

SUMMER 1979

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ALEUTIAN ISLANDS NATIONAL WILDLIFE REFUGE

FEBRUARY, 1980

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I. INTRODUCTION

This is the third consecutive season of what is part of a continuing effort to census and map all wildlife populations within the Aleutian Islands National Wildlife Refuge (AINWR). Part of this effort is directed towards establishing permanent plots to determine trends of specific wildlife populations since actual census information, at times, has minimal practical value.

Originally it was intended to survey the entire refuge within a four to five year span. This emphasis is placed on obtaining rough population estimates, locating and mapping breeding areas of birds and marine mammals, setting up permanent monitoring plots in each group of islands and to check for presence of arctic fox populations on all islands. Our original goals have not changed but the time frame will probably be increased to a total of 5 years for completion. This census information is critical from a management standpoint, even if exact population estimates cannot be obtained. With increased pressure on these remote and very environmentally sensitive islands by the general public, oil exploration and various research pressures this information is vital.

Only the results of this year's data is included in this report with brief references to past information. This data, as in the past, will be sent to interested parties and all is in the AINWR files. We hope to write and publish a summary report when the project is completed.

Jonathan Beall assisted a great deal with the report and drafted Section IV, Migratory Birds, and under Section VI, drafted information for part D, Permanent Plots. William Henry drafted part A, Beached Animal Surveys, part B, Terrestrial Transects and part C, Pelagic Bird Surveys under Section VI. Mary Taber drafted Section V, Mammals and Non-Migratory Birds. Tom Early drafted the remainder of the report and edited the entire thing. Lorraine Craw expertly typed the report.

Table 1.

TENTATIVE SUMMER WORK SCHEDULE
1979

15 April	- Tern Arr Adak
18 April	- Tern Lv Adak w/supplies for Amchitka (Reeves can not fly charter from 1 April until 15 May) and Agattu. May have Bio-Techs on board
20 April	- Off load at Amchitka and proceed to Near Islands.
27 April	- Pick up Martin, Lee and 2 Bio Techs w/gear at Shemya
28 April	- Set up Agattu release camp on Aga Cove
29 April-5 May	- Support Fox work
4 May	- Martin off at Shemya
6 May	- Lv for Amchitka w/l
9 May	- Arr Amchitka - Pick up geese for release- Lee disembark
10 May	- Lv Amchitka
12 May	- Arr Agattu - off load release geese
13 May-24 May	- Support Agattu work
25 May	- Pick up Early and Survey Crew w/supplies at Shemya
25 May	- Tern Lv Shemya f[illegible] Buldir
26 May	- Tern Arr Buldir and off load crew and supplies
27 May	- Tern depart Buldir for Agattu
28 May-10 June	- Tern support Agattu Crew
11 June	- Lv Agattu for Shemya
12 June	- Arr Shemya, pick up Martin, Garrett and supplies for Buldir Crew
12 June	- Lv Shemya for Buldir
13 June	- Arr Buldir and off load supplies

13 June	- Lv Buldir for Agattu
14-28 June	- Arr Agattu and support goose crew
29 June	- Lv Agattu for Buldir
30 June	- Arr Buldir and pick up field gear and crew
30 June-1 July	- Circumnavigate Buldir (?)
1 July	- Lv Buldir for Shemya
2-3 July	- Arr Shemya. Rest & relax, wash up, Martin, Early, Garrett disembark, pick Hall up
3 July	- Lv Shemya for Agattu. Off load camping equipment needed by Agattu crew. Work plots around Aga Cove
4-6July	- Circumnavigate Agattu (w/Survey Crew) (70 miles)
6 July	- Lv Agattu for Attu
7-11 July	- Arr Attu and circumnavigate (153 miles) dia.
12 July	- R & R Attu Island Loran Station
13 July	- Lv Attu Island for Shemya
13-14 July	- Arr Shemya. Drop off Hall & pick up Early. Circumnavigate Shemya 13 1/2 miles
15-16 July	- Arr Nizki/Aliad and circumnavigate (9 1/2 / 12 miles)
17 July	- Arr Shemya and pick up fresh food and supplies for Agattu. Depart Shemya.
18 July	- Arr Agattu. Drop off supplies for crew. Depart for Segula Island
19-20 July	- Travel to Segula Island
21-22 July	- Circumnavigate Segula (16 miles)
22-24 July	- Set up plots on Segula Is. for Auklets

25-26 July	- Circumnavigate Davidof and Kvostof
27-28 July	- Circumnavigate Little Sitkin (22 miles) Lv Little Sitkin for Rat Island
29 July	- Arr Rat Island
29-31 July	- Circumnavigate Rat Island(20 miles) Lv Rat for Amchitka
1 August	- Arr Amchitka (West end)
1-5 August	- Circumnavigate Amchitka (106 1/2 miles)
6 August	- Lv Amchitka for Tanaga
7-13 August	- Circumnavigate Tanaga Island (130 1/2 miles)
14 August	- Lv Tanaga for Adak
17 August	- Arr Adak, load supplies
17 August	- Lv Adak for Amchitka
19 August	- Pick up Lee and release geese
22 August	- Release geese at Agattu
24 August	- Lee off at Shemya
24 Aug-13 Sep	- Support release and subsequent fox work
14 September	- Pick up Lee at Shemya
15 September	- Break up Agattu Camp - return east with Bio Techs
17 September	- Drop Lee off at Amchitka
19 September	- Arr at Adak with Agattu Bio Techs
25 September	- Putney to Anchorage to confer on vessel contract
27 September	- Putney return from Anchorage
28 September	- Tern leave Adak for Ketchikan

Table 2. Itinerary of Events for the 1979 Field Season.

DATE	PERSONNEL AND PLACES	ACTIVITY
31 May	Beall, Early, Henry, Taber aboard R/V Aleutian Tern at Adak	-
1 June	Tern to Amchitka	pelagic transects
2-3 June	Tern at Kiska	storm
4 June	Beall, Early, Henry, Taber ashore on Buldir	set up field camp
5-22 June	same ashore on Buldir	permanent plots beached animal survey goose plot work
23-24 June	same at Buldir	coastline survey
25-30 June	same ashore on Buldir	permanent plots inland transects
1 July	Tern to Shemya	pelagic transects
2 July	Beall, Hall, Henry, Taber to Attu	-
3 July	same ashore on Agattu	permanent plots
4 July	Tern at Agattu	storm
5-7 July	Beall, Hall, Henry, Taber at Agattu	coastline survey
8 July	same at Attu	coastline survey
9 July	Hall, Taber ashore on Attu Beall, Henry to Shemya	inland survey pelagic transects
10-11 July	Beall, Garrett, Hall, Henry, Taber at Attu	coastline survey
12 July	Tern to Shemya	pelagic transects
13-14 July	Beall, Early, Garrett, Henry, Meyer, Taber at Nizki, Alaid, Shemya Pass	coastline survey inland transects beached animal surveys

Table 2. Itinerary of Events for the 1979 Field Season. (con't)

DATE	PERSONNEL AND PLACES	ACTIVITY
15 July	same at Alaid	storm
16 July	Tern at Shemya	-
17 July	Tern at Agattu	pelagic transects
18 July	Beall, Early, Henry, Taber at Shemya	coastline survey
19 July	Tern at Agattu	storm
20 July	Tern to Kiska	pelagic transects
21 July	Tern to [illegible]	pelagic transects
22 July	Tern at [illegible]	-
23 July	Beall, Early, [illegible], Taber at Segula same onshore at Segula	pelagic transects auklet census
24 July	same at Segula, Khrostof, Pyramid, Davidof same onshore at Segula	coastline survey auklet census
25 July	Tern to Buldir	pelagic transects
26 July	Beall, Early, Henry, Taber onshore at Buldir	capture geese for Agattu release
27 July	Tern to Agattu Beall, Early, Taber ashore on Buldir	pelagic transects capture geese for Agattu release
28-29 July	same on Buldir	capture geese for Agattu release
30 July	Tern to Agattu	pelagic transects
31 July	Tern to Shemya Beall, Early, Henry ashore	pelagic transects
1-2 Aug	same on Shemya	-
3 Aug	Beall, Early, Henry on Adak Taber aboard Tern	-
4-12 Aug	Tern to Agattu-Amchitka-Agattu	pelagic transects
14 Aug	Taber on [illegible]	end of field season

II. MATERIALS AND METHODS

All too often, information has been gathered giving wildlife population data without giving details of how the information was obtained. This has been a severe handicap in the Aleutians when trying to compare historical data with recent information gathered. Hopefully the following methods described will aid in comparing future work with ours and provide a more standardized census technique.

In general, similar procedures were used in 1979 as was used in 1977 (first year of survey). Minor variations are mentioned in the species by species account.

The following is a description of techniques used to count and estimate the total number of each species encountered. Because we feel its important to separate actual counts from estimates (as our tables do) we separate methods for counting and estimating in the description also.

Migratory Birds

1) Northern Fulmar

Count: # nests observed = # of breeding pair.

Methods were modified since 1977. The number of fulmar nests/scrapes seen are assumed to equal the number of breeding pair. In areas surveyed this season we believe most scrapes can be seen through binoculars from the ship. In most cases, the colonies were inaccessible for detailed observations.

Estimate: Direct information from counts and doubled to equal total number of individual breeders (and non-breeding nest holders).

2) Leach's and Fork-tailed Storm Petrel

Count: Not realistically possible.

Estimate: This is very difficult due to the nesting habits of the species and low nesting density on most islands. The estimate for Buldir Island was based on Byrd's (1978) data. Both of these species probably nest on most islands in relatively low numbers as evidenced by the fact a few came aboard ship after dark virtually everywhere we anchored. No number estimate was made on any island except Buldir.

3) Pelagic and Red-faced Cormorants

Counts: # nests counted = # breeding pair.

Total # Cormorants counted = # nests counted + # birds not associated w/nests

Estimate: Total # estimated = Total # cormorants counted

Breeding birds present at time of survey = 0.67 X (# total breeders)

Nonbreeding birds present = total birds counted - # breeders present.

All colonies were located on maps. Counts were made of all occupied nests and birds seen (excluding chicks). All techniques are similar to 1977 except when estimating the number of breeding birds present we assumed 2/3 of the breeders were present at the colony instead of all breeders at the time of census. The number of breeders present was subtracted from the total number of cormorants counted to get number of nonbreeders.

4) Black Oystercatcher

Count and Estimate: $\#\text{ Breeding pair} = \frac{\#\text{ Birds Counted}}{2}$

This is the same procedure as 1977. The exception to the above formula occurred on Agattu and Davidof Island where only one bird was seen, we then assumed a pair was on the island.

5) Glaucous-winged gull

Count and Estimate: $\#\text{ Breeding Pair} = \frac{\#\text{ Adults Counted}}{2}$

Immatures = # Immatures Counted

Fledglings = # Fledglings counted

Procedure similar to 1977.

6) Black-legged and Red-legged Kittiwake

Count and Estimate: # Nests Counted = # Breeding pair

Procedure similar to 1977. No count was attempted of individual birds at breeding colonies.

7) Arctic and Aleutian Tern

Count and Estimate: # Birds counted = population estimate

The only breeding colony encountered was on Attu Island where Byrd's 1973 estimate was used.

8) Common and Thick-billed Murre

Count: Direct (# birds actually observed = # birds counted)

Estimate: # Breeding pair = # nests counted

Procedure similar to 1977.

9) Pigeon Guillemot

Count: Direct.

Estimate: # Breeding pair = # birds counted X (1.10)

Procedure differs from 1977 in that we estimate 90% of those present were counted.

10) All Murrelet Species

Count: Direct.

Estimate: Same as count but this figure is undoubtedly unreliable. Byrd's (1978) figures for this species population on Buldir Island [illegible].

11) Crested, Whiskered, Least Auklets

Count: The number actually observed around islands without auklet colonies were recorded. Auklets seen near auklet colonies were ignored and included in the estimate for the colony.

Estimate: All colony populations were estimated either by past references or by inland surveys of each colony. (See Auklet Census)

12) Parakeet Auklet

Count: Direct.

Estimate: Direct.

The exception was on Buldir Island where Byrd's (1978) data was used for a population estimate.

13) Horned and Tufted Puffin

Count: Direct.

Estimate: $\frac{\text{\# birds counted X 5}}{2}$ = # breeding pair

Procedure similar to 1977 in that an estimated 80% of the puffins present are not counted. This figure then divided by 2 to determine # of breeding pair.

14) Parasitic Jaeger

Count: Direct.

Estimate: Direct.

The exception was on Buldir Island where Byrd's (1978) data was used for a population estimate.

15) Waterfowl

Count: Direct.

Estimate: Procedure similar to 1977.

Exceptions: Aleutian Canada goose population on Buldir Island is estimated based on 1979 fall flight estimate (from 1979 Goose Report). Common Teal: On Buldir Island, the estimate is based on the number seen on shore during goose work.

All other waterfowl were counted then an additional figure estimated based on habitat types, notes and observing conditions on each island.

16) Raptors

Count: # Aeries counted = # breeding pair. Direct for individuals with the exception of Buldir Island where the number is based on inland surveys during June's goose work. In many cases aeries were assumed to exist when a pair of territorial adults were encountered during circumnavigation. or a single adult exhibiting territorial behavior

Estimate: Total Population = # aeries X 3 + other immature sightings.

The total population estimate was made by multiplying the number of aeries seen by 3 to account for the pair and an average of 1 young per aerie. Additional immature [illegible], not in the aeries, were then added.

Exceptions for Migrator[illegible]

Shemya Island - because the southern shore of Shemya was not surveyed (1/3 total [illegible] presence) and based on habitat and ground observations, the following species were inflated slightly:
Glaucous-winged Gull
Cormorant (individuals)
Harlequin (non-breeders)
Common Eider
Common Raven

Hammerhead Island - because of dense puffin use and accessibility the entire island was [illegible] and the total number of tufted puffin burrows were [illegible] counted.

Buldir Island - the [illegible] gull population was increased due to dense inland [illegible] of the island during the goose work.

Mammals and Non-Migrator[illegible]

1) Arctic Fox

Because no systematic [illegible] method was used, no population estimates nor counts were made. A general, description of fox abundance is included under "Land Mammals and Non-Migratory Birds."

2) Rock Ptarmigan

Similar to arctic fox.

Marine Mammals

Procedure similar to 1977. Although the figures are undoubtedly minimal, population estimates are the same as the number of individuals counted during the circumnavigation. Counts were broken down into adults and pups for sea otters and harbor seals and into bulls, cows and/or yearlings and pups for sea lions.

III. ISLAND DESCRIPTIONS

Attu Island is the westernmost island of the Aleutian chain and the largest of the Near Island group. It is about 15 miles wide by 42 miles long and very mountainous with peaks rising to elevations of 3,000 to 3,500 feet. There are very few flat areas on the island and the largest, in Massacre Bay, is the present site of the U.S. Coast Guard Loran Station. This station has about 35 to 40 permanent U.S. Coast Guard Personnel stationed there.

Attu has drawn flora and fauna from both Asia and Alaska and represents an interesting combination of both continents. It is believed, but not confirmed, that arctic fox were indigenous to the island; movement supposedly came from Asia. Aleut natives had several sites on the island and were present and captured when the Japanese took over the island in 1942. The Attu WWII battlefield site was renominated in the spring of 1979 to be placed on the Registered National Historic Landmark status. To date, no decision has been made.

The island has many streams flowing from the snow fields and glacier areas in the mountains. The Temnac River and its associated broad, flat valley is one of the largest in the Aleutian chain. Offshore islands and rocks are uncommon around Attu, especially on the western two-thirds. All of the larger islands support nesting populations of puffins and nesting or roosting areas for cormorants. Kennon, Gibson and Cooper Islands are located at the mouth of Chichacof Harbor and on the grassy slopes of Cooper and Gibson there is very dense Tufted Puffin nesting. It is possible Canada Goose droppings were found on Gibson Island by Jim Estes' crew during July, 1979. The sample was submitted for analysis.

Agattu Island is located about 20 miles southeast of Attu. The northeastern third of Agattu is mountainous with several peaks just over 2,000 feet. The southern two-thirds is made up of hills and plateaus with numerous valleys and shallow lakes. Unlike most of the Western Aleutians, Agattu is composed primarily of sedimentary deposits.

Most beaches consist of boulders or pebbles except for the sand beaches found at McDonald Cove and Sandy Beach, immediately south. The southeast coastline seacliffs support many nesting murres. There are only two islands of any size associated with Agattu: Kohl and Lion. Kohl is a grassy island about 100 feet in elevation and Lion is also grassy reaching about 50 - 75 feet elevation. Aga Cove is the present release site for the endangered Aleutian Canada goose. A holding pen constructed in 1978 for the geese, is in place in the valley of the cove. An old fox trapper's cabin in Aga Cove is used

as summer camp for personnel working with the geese.

Alaid Island is the westernmost island of the Semichi Island subgroup and measures about three miles in length and one mile wide. The eastern portion is rolling tundra interspersed with many lakes, several are quite large. The western portion is gently sloping to the west to a series of four hills, two of which are over 600 feet in elevation. There are few streams on the island. A long stretch of sand beach occurs on the south side of the island and the north shoreline is composed of seacliffs culminating in Alaid Head, a spectacular sea cliff. The many offshore rocks, especially on the southeast side, support dense populations of puffins and nest or roosting cormorants. The grassy sea slopes west of Nina, on the north side, also have dense concentrations of puffins. Alaid Head is mostly rock face sea cliffs up to about 100 feet elevation and give way to grassy vegetation and less abrupt vertical relief.

Nizki Island is usually connected to Alaid Island by a low-lying sandspit that is occasionally disrupted by the ocean altogether. Nizki is similar in size to Alaid and also shares many topographic features with Alaid's flatter east end. Nizki is interspersed with many lakes, several being quite large. The island's highest point is 110 feet. Most of the offshore rocks provide puffin nesting and cormorant roosting or nesting habitat. Practically all the beaches are composed of gravel, cobble or boulders.

Juan, Lotus and Lie Islands are relatively small, low, unvegetated rocks located in Shemya Pass. They serve primarily as seal haul-out areas as well as cormorant and gull roosting locations. The numerous rips in the pass provide abundant food supplies and also make island access, at times, very difficult.

Hammerhead Island is a unique island in Shemya Pass rising to an elevation of 55 feet. Lying about one-half mile west of Shemya, it supports a dense nesting population of gulls and Tufted Puffins. These birds have appeared to greatly impede vegetative growth on the flat island top either by their nesting and burrows activities or merely walking on the surface. The soil on the island's top is very suitable for puffin burrows. The island is most readily accessible from the northwest side.

Shemya Island's habitat is greatly influenced by the Air Force Base present on the island. On this four mile by two mile island, approximately 1000 military and civilian personnel are stationed at any one time. The island's topography slopes southward to sea level from about 250 feet elevation on the north side. The north shoreline has the most varied coast with cliffs dropping off to a near sea-level plateau about 100 meters wide before meeting the ocean. The moderate-sized lagoon on the west side of Alcan Harbor is subject

to occasional oil contamination from the base. Most offshore rocks are on the northeast side with the highest being 56 feet in elevation. Most islets are rocky with little or no vegetation and support roosting and nesting cormorants, harbor seal and sea lion haul-out sites. There are numerous inland lakes.

Buldir Island is the westernmost of the Rat Island group and the most isloated in the western Aleutians. The island is characterized by sugarloaf peaks, one of which rises to 2,150 feet. The island is extremely rich in flora and fauna. There is a relatively flat valley on the island's northwest side which constitutes the island's principle level topography. Nearly verticle sea cliffs culminating in narrow rock or boulder beaches characterize most of the coastline. There is only one freshwater lake of mentionable size shich is located in the north central portion of the island. There are numerous permanent streams flowing off the island. Many vertical rock and dirt sea cliffs are weathering rapidly but nonetheless create excellent nesting sites for thousands of seabirds.

Segula Island is about four miles in diameter and is composed of one volcanic peak rising to 3,784 feet. Most of the shoreline is rocks and reefs with high sea cliffs only on the west central portion. The unnamed bay between Gula Point and Zapad Head is clogged with a dense bed of kelp at the mouth making entry, even by Zodiac, very difficult. A gently sloping plateau is at Zapad Head. Lava flows exist from the volcano to sea level just south of Gula Point and is the site of a large auklet colony.

Khvostof Island is a relatively small island located one mile west of Davidof Island. The interior is moderately high with a peak on the west end reaching 870 feet elevation. The beaches are rocky and boulder lined with the west end having higher sea cliffs. Most sea slopes and cliffs are grass covered and provide excellent puffin nesting habitat.

Pyramid Island lies between Khvostof and Davidof Islands and reaches a maximum elevation of 333 feet. The slopes are grassy as is the top. The north end is rocky and lower and provides some haul-out sites for seals.

Davidof Island is a high, irregularly shaped island, two miles long and about one-half mile wide. The highest point is on the south end and reaches an elevation of 1076 feet. Grassy sea slopes provide excellent nesting areas for puffins.

IV MIGRATORY BIRDS

Attu Island

A total of three days was spent circumnavigating Attu Island. Excellent sea conditions allowed the survey crew to complete the island in brief time. Arctic fox are present on Attu, which probably restricts the habitat for nesting sea birds.

The most numerous seabird observed were cormorants (both pelagic and red-faced), which numbered over 40,000 individuals. Sekora estimated approximately 70,000 cormorants on Attu in 1972. The occurrence of large scale movement of cormorant use areas is exemplified by the contrasting counts surrounding the McCloud Head Area. The 1979 survey counted just over 2,000 individuals but Sekora's figure in 1972 was over 14,000 cormorants. The highest concentration of nesting birds were observed near Cape Wrangell and on the broken-up docks extending out into Massacre Bay. [illegible] roosting site was just northeast of Cape Wrangell with [illegible]0 cormorants. Sekora (1972) observed similar numbers.

Common eider males outnumbered females about four to one, although occassional eider broods [illegible] observed. The Abraham Bay area held the largest concentration of [illegible] eiders.

Common and thick-billed murres were present in 5 nesting colonies on Attu. The largest single colony was on Etienne Head, while smaller concentrations occurred at Cape Wrangell, Krasni Pt. area, and northeast of Cape Wrangell. Large differences occurred between the 1979 survey counts and Sekora's work in 1972. Sekora estimated 15,000 murres at Cape Wrangell while the 1979 survey revealed only 650 murres in the same area. The reason such a difference is not clear. It may be that Sekora's [illegible] abnormally high or a major decrease or shift in murre populations occurred. Habitat evaluation made during the 1979 census did show enough unused cliff-nesting habitat to support 15,000 murres on Etienne Head and the area northeast of Cape Wrangell show moderate [illegible] over the earlier survey.

Black-legged kittiwakes [illegible] breeding only in a small colony on Cape Wrangell. Several [illegible] flocks of kittiwakes were observed but no nests were present.

Glaucous-winged gulls were present along the entire shoreline. Most nests were observed on steep vegetated seaslopes.

Three major concentrations of tufted puffins were observed. The largest occurred on fox-free Saw[illegible] Island in Temnac Bay. The estimate from

our survey count was 7,500 individuals while Sekora's (1972) estimate was 5,000. Tufted puffins were also observed nesting in high numbers on Cooper and Gibson Island, at the mouth of Chichagof Harbor. Cape Wrangell and an area west of Etienne Bay had moderate numbers of tufted puffins.

A colony of arctic and Aleutian terns was present off Massacre Bay near the Coast Guard Loran Station runway. The population was estimated at 70 Aleutian terns and 25 arctic terns by Byrd (1973). Sixty-six individuals were observed flying in the area during the 1979 census. All birds positively identified were Aleutian terns. The area was not surveyed this year but nests were present at the site in 1978.

Red-breasted mergansers were observed at several locations on Attu. This species was not seen on any other island during the 1979 survey. Common loons, red-throated loons, and [illegible] ducks were seen occasionally along the shoreline. All three species are possible breeders.

Two separate individual peregrine falcons were recorded on Attu. Although no direct evidence of an aerie was found we estimated the presence of an aerie where falcon observations were made. No white-tailed eagles were observed during observation or ground searches around Temnac Bay. They have been observed in this same area during the past three springs and it may be possible a pair is nesting on the island.

Table 3. Population Counts for Attu Island, July 8, 10 & 11, 1979.

SPECIES		# COUNTED
Cormorant sp.		39,600i
Cormorant sp.		1,410n
Glaucous-winged gull	Adult	7,080i
	Juv	530i
	Fledgling	370i
Black-legged kittiwake		230n
	Adult	2,560i
Aleutian tern		70i
Murre sp.		8,120i
Pigeon guillemot		240i
Murrelet sp.		5i
Auklet sp.		1i
Crested auklet		9i
Horned puffin		220i
Tufted puffin		3,660i
Murrelet sp. (not ancient)		5i
Harlequin duck		850i
Common eider	Male	5,760i
	Female	1,810i
	Duckling	230i
Peregrine falcon		2i
Common raven		24i
Mallard		11i
Red-breasted mergansers		46i
Loon sp.		4i
Common loon		3i
Red-throated loon		2i

i = individual
n = nests

Table 4. Population Estimates for Attu Island, July 8, 10 & 11, 1979.

SPECIES		ESTIMATE
Cormorant p.	(non-breeders)	37,700i 2780i
Cormorant sp.		1,410pr 715
Glaucous-winged gull		3,540pr
Glaucous-winged gull	(non-breeders)	530i
Black-legged kittiwake		~~230~~pr
Black-legged kittiwake	(non-breeders)	2,560i
Aleutian tern		35pr 46
Arctic tern*		~~12pr~~
Murre sp.		8,130pr 410
Pigeon Guillemot		125pr
Kittlitz Murrelet	(probable breeders)	10i
Crested auklet	(non-breeders)	10i
Horned puffin		550pr
Tufted puffin		9,150pr
Harlequin duck	(non-breeders)	1,000i
Common eider	(partial breeders)	11,000i 3960
Peregrine falcon		2a
Peregrine falcon (total)		6i
Common raven		24i
Mallard		11i
Red-breasted mergansers		50i
Common loon	(probable breeders)	3i
Red-throated loon	(probable breeders)	2i

* Byrd's estimate 1973

a = aerie
i = individual
pr = breeding pair

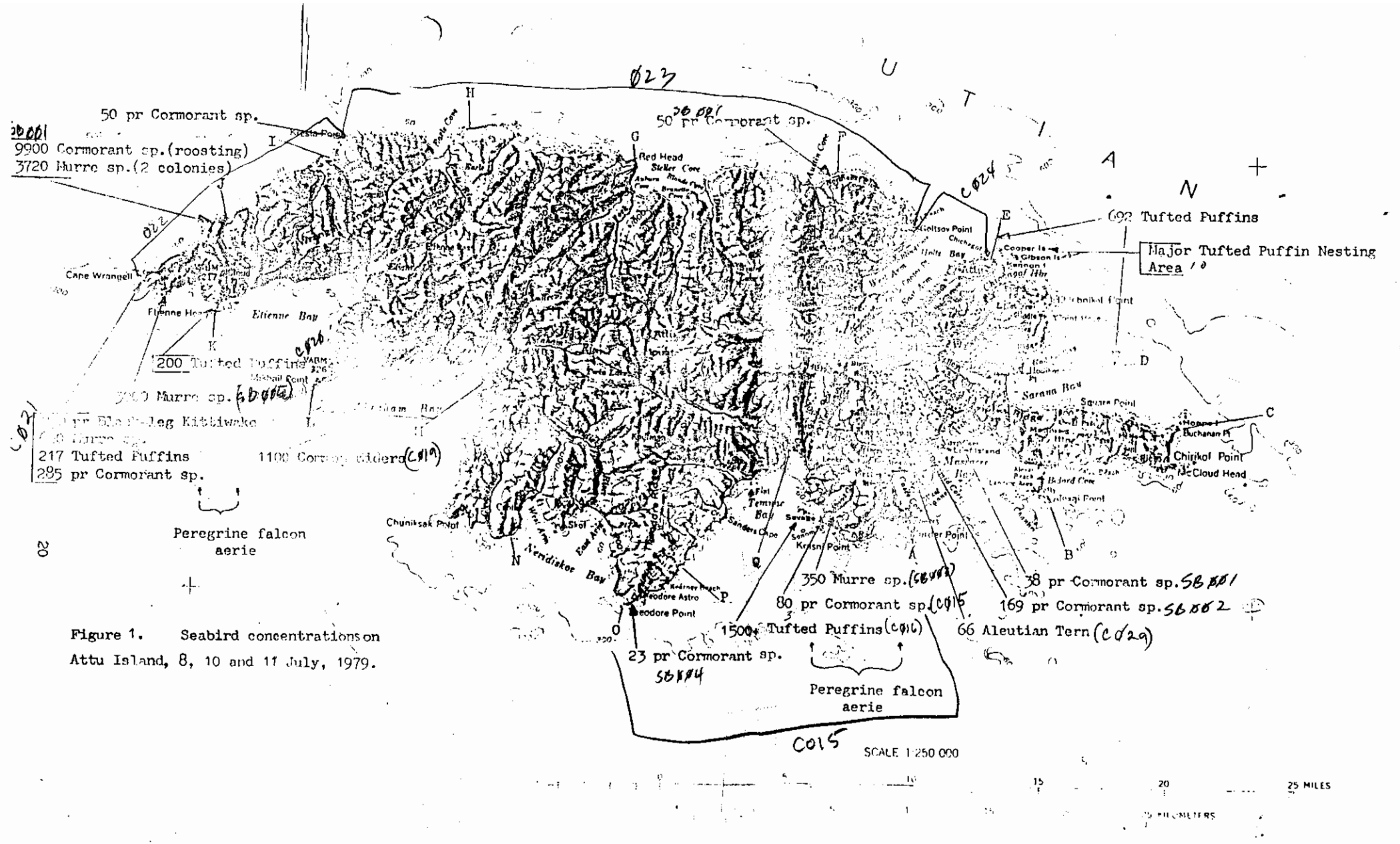

Figure 1. Seabird concentrations on Attu Island, 8, 10 and 11 July, 1979.

Agattu Island

Poor sea conditions and fog hampered the 1979 survey on Agattu Island, resulting in many rough estimates. Large swells during most of the three days spent circumnavigating prevented closer approach to the shoreline.

A fox eradication program is still in effect on Agattu, but the fox population is thought to be eliminated. No fox sign was seen this summer or fall after an individual was taken in the spring.

Red-faced and pelagic cormorants nested on numerous seacliffs scattered around the island but the area west of Krugloi Point held the largest breeding concentration. Total island cormorant numbers were up moderately from Trapp's results in 1975. Most cormorant chicks seen were about half adult size.

The largest number of seabird [illegible] were common and thick-billed murres. Aga Cove and [illegible] both had large murre colonies. The seacliffs from Karab Cove to Cape Sabak had scattered smaller murre colonies. Trapp (1[illegible] slightly higher concentrations in similar locations.

Tufted puffins were observed in large [illegible] off Gillon Point and west of Krugloi Point. Nesting appeared to still be limited to seaslopes protected from fox predation. The estimate based on the 1979 survey was 16,000 tufted puffins. [illegible] survey by (Trapp 1975) estimated a population of approximately 20,000. Horned puffins were observed on Agattu but in smaller numbers than tufted puffins.

Black-legged kittiwakes [illegible] or colonies on Agattu. The largest, situated west of Cape [illegible] ured over 5,000 nesting pair. Two smaller colonies were lo[illegible]nearby. Aga Cove also has a large black-legged kittiwake colony [illegible] been monitored with a permanent plot (See Section [illegible]). [illegible] black-legged kittiwake colony exists on Karab Cove. All [illegible] surveyed in 1979 revealed higher counts than noted [illegible].

Common eiders and glaucous-winged gulls both nested in moderate numbers. The glaucous-winged gull count in 1979 was double that of Trapp's in 1975. No common eider trend data is available. Broods were common in many of the sheltered coves.

Harlequin ducks and pigeon guillemots were regularly observed along the coastline. Two broods of mallards were also seen.

One peregrine falcon aerie was almost certainly present in Aga Cove near the kittiwake colony. A pair of adults was commonly seen in flight in that area. Peregrine falcons were observed in past years along the south shore of Agattu (Trapp 1975) but none were noted in 1979. A possible single gyrfalcon was observed by Henry along the northern shore near Kru[illegible].

Table 5. Population Counts for Agattu Island, July 5 and 6, 1979.

SPECIES		# COUNTED
Cormorant sp.		8420i
Cormorant sp.		2120n
Glaucous-winged gull		66n
	Adult	2700i
	Juv	350i
	Fledgling	440i
Black-legged kittiwake		8160n
	Adult	3401
Murre sp.		9210i
Pigeon guillemot		190i
Parakeet auklet		5i
Horned puffin		370i
Tufted puffin		3200i
Harlequin duck		320i
Common eider	Male	970i
	Female	1170i
	Duckling	340i
Peregrine falcon		1pr
Common raven		6i
Black oystercatcher		1i
Mallard		16i
	Duckl.	2br
Common loon		3i
Gyrfalcon		1i

br = brood
i = individual
n = nests
pr = breeding pair

Table 6. Population Estimates for Agattu Island, July 5 and 6, 1979.

SPECIES		# ESTIMATED
Cormorant sp.	(non-breeders)	5570i
Cormorant sp.		~~2120~~pr 903
Glaucous-winged gull		1350pr
Glaucous-winged gull	(non-breeders)	350i
Black-legged kittiwake	(non-breeders)	990i
Black-legged kittiwake		~~8160~~pr 5
Murre sp.		~~9210~~pr 585
Pigeon guillemot		170pr
Parakeet auklet	(non-breeders)	5pr
Horned puffin		930pr
Tufted puffin		~~8000~~pr 7465
Harlequin duck	(non-breeders)	400i
Common eiders	(partial breeders)	2500i
Peregrine falcon		1a
Peregrine falcon		3i
Common raven		6i
Black oystercatcher		1pr
		20i
Common loon		2pr
Gyrfalcon	(non-breeders)	1i

a = aerie
i = individual
pr = breeding pair

Table 7. Population Counts for Nizki Island, July 13 and 14, 1979.

SPECIES		# COUNTED
Cormorant sp.		3790i
Cormorant sp.		1060n
Glaucous-winged gull	(Adult)	400i
	(Juv)	50i
	(Fledgling)	4i
Black-legged kittiwake	(Adult)	11i
Pigeon guillemot		14i
Horned puffin		2i
Tufted puffin		110i
Harlequin duck		190i
Common eider	Male	350i
	Female	370i
	Duckling	210i
Peregrine falcon		1i
Common raven		5i

i = individual

n = nest

Alaid/Nizki Island

Because a sand spit connects these islands most years these two islands will be discussed together. The population counts and estimates however, are separate.

Alaid/Nizki Islands were declared fox-free in 1976. Seabird nesting was observed in areas that were previously extremely vulnerable to fox predation. Visits to these islands since 1976 reveal expanded nesting each year as a result of fox eradication.

The cormorant population on Nizki has appeared to mushroom since the 1975 survey by Trapp. A smaller but significant increase in cormorants has occurred on Alaid. Cormorant nests were present on almost all available cliff-nesting habitat. Alaid has more seaslope habitat that would have been inaccessible to fox, possibly explaining the smaller increase on Alaid.

A large increase in the common eider population has also occurred. Trapp (1975) counted a maximum of 108 birds on both islands combined on 24 July, 1975. The 1979 count reached almost 1,300 eiders. Many of these were females with broods. The heaviest nesting appeared to occur on Nizki. Common eiders were abundant along the entire shoreline of both islands. Harlequin ducks have also showed an increase in habitat use on Alaid/Nizki compared with Trapp's findings (1975).

As with previous species, glaucous-winged gull populations have grown since fox removal. Trapp's estimates in 1975 indicate sparse gull use. The 1979 survey found glaucous-winged gulls to be numerous and common breeders.

Tufted puffins were observed to nest heavily around Nina Point on Alaid and around northwest side of Nizki. These locations are generally located on slopes accessible to fox predation. Expansion into more vulnerable areas is beginning to occur. Trapp's estimate in 1975 is too general to be compared with the 1979 survey. Tufted puffins appear to show a slow response time for expanding their range following fox removal, unlike other seabirds. Horned puffins were uncommon on Alaid/Nizki.

A small black-legged kittiwake colony was present on the north side of Alaid. All nests were adjacent to an just inside a small sea cave.

One peregrine falcon aerie and another suspected aerie were observed on the north shore of Alaid. A single bird was seen on Nizki Island.

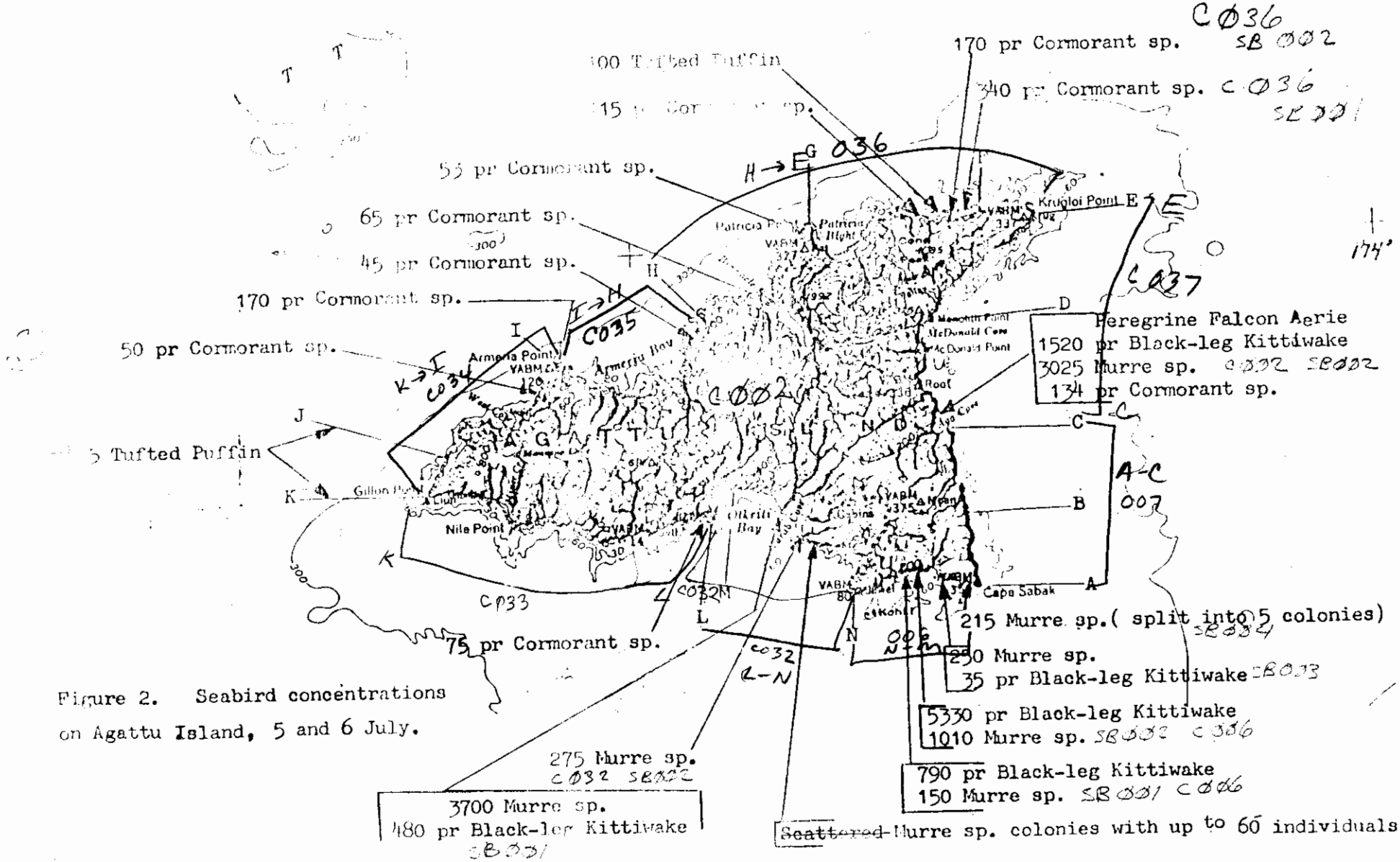

Figure 2. Seabird concentrations on Agattu Island, 5 and 6 July.

Table 8. Population Counts for Alaid Island, July 13 and 14, 1979.

SPECIES		# COUNTED
Cormorant sp.		4990i
Cormorant sp.		1590n
Glaucous-winged gull	(Adult)	760i
	(Juv)	240i
	(Fledgling)	14i
Black-legged kittiwake		1240i
Black-legged kittiwake		120n
Murre sp.		2i
Pigeon guillemot		6i
Horned puffin		8i
Tufted puffin		243i
Fork-tailed petrel		1i
Harlequin duck		10i
Common eider	Male	160i
	Female	2i
	Duckling	70i
Peregrine falcon		2i

i = individual

n = nest

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Table 9. Population Estimates for Nizki Island, July 13 and 14, 1979.

SPECIES		# ESTIMATED
Cormorant sp.	(non-breeders)	2370i
Cormorant sp.		~~1060~~pr 440
Glaucous-winged gull		200pr
Glaucous-winged gull	(non-breeders)	50i
Black-legged kittiwake	(non-breeders)	11i
Pigeon guillemot		12pr
Horned puffin		5pr
Tufted puffin		275pr
Harlequin duck	(non-breeders)	200i
Common eiders	(partial breeders)	1000i
Peregrine falcon		1i
Common raven		5i

i = individual

pr = breeding pair

C013

Table 10. Population Estimates for Alaid Island, July 13 and 14, 1979.

SPECIES		# ESTIMATED
Cormorant sp.	(non-breeders)	2860i
Cormorant sp.		1590pr 141
Glaucous-winged gull		380pr
Glaucous-winged gull	(non-breeders)	240i
Black-legged kittiwake	(non-breeders)	1260i
Black-legged kittiwake		~~120pr~~
Murre sp.	(non-breeders	24i
Pigeon guillemot		5pr
Horned puffin		20pr
Tufted puffin		610pr
Harlequin duck	(non-breeders)	150i
Common eider	(partial breeders)	400i
Peregrine falcon		6i
Peregrine falcon		~~2a~~

a = aerie

i = individual

pr = breeding pair

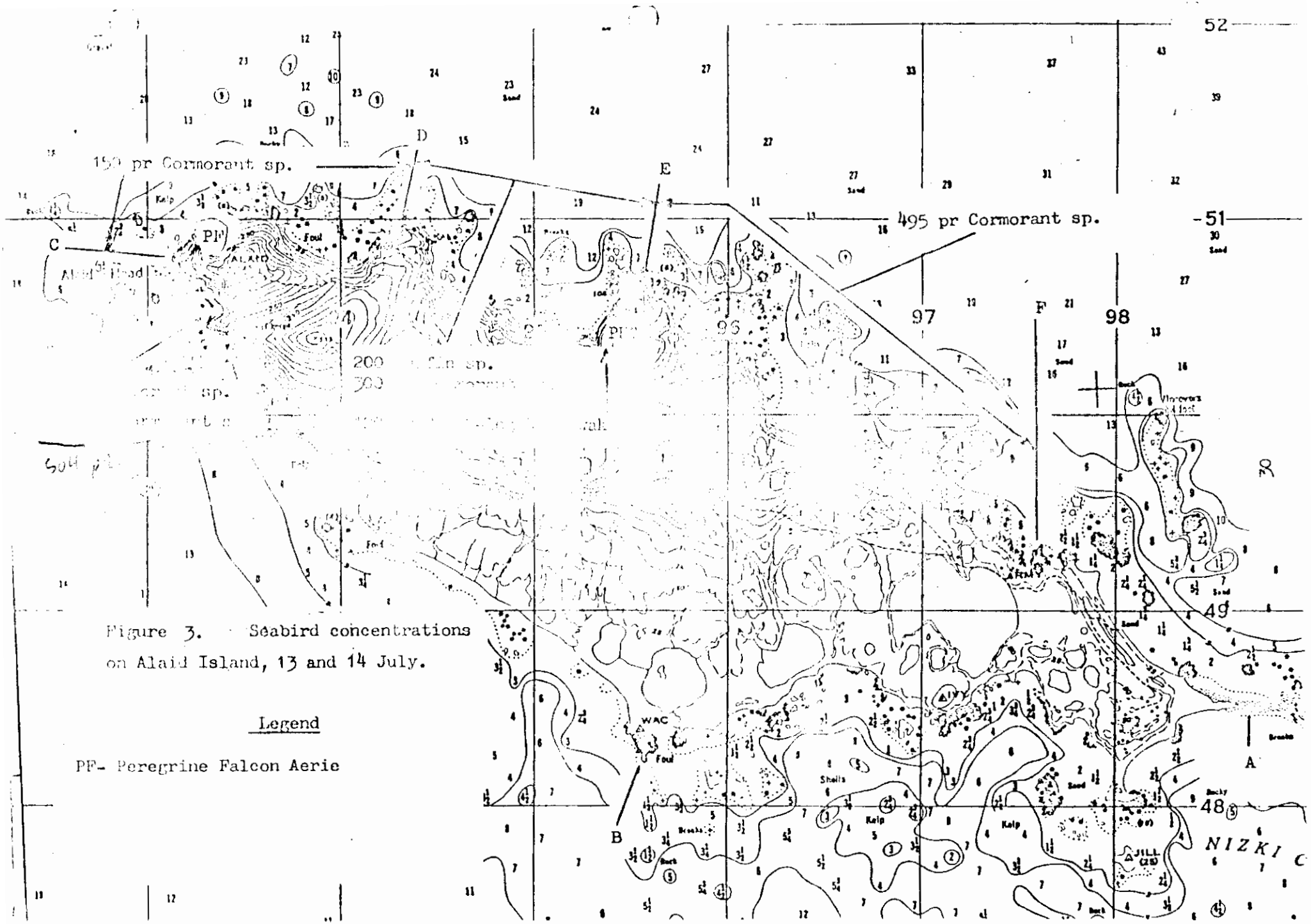


Figure 3. Seabird concentrations on Alaid Island, 13 and 14 July.

Legend

PF- Peregrine Falcon Aerie

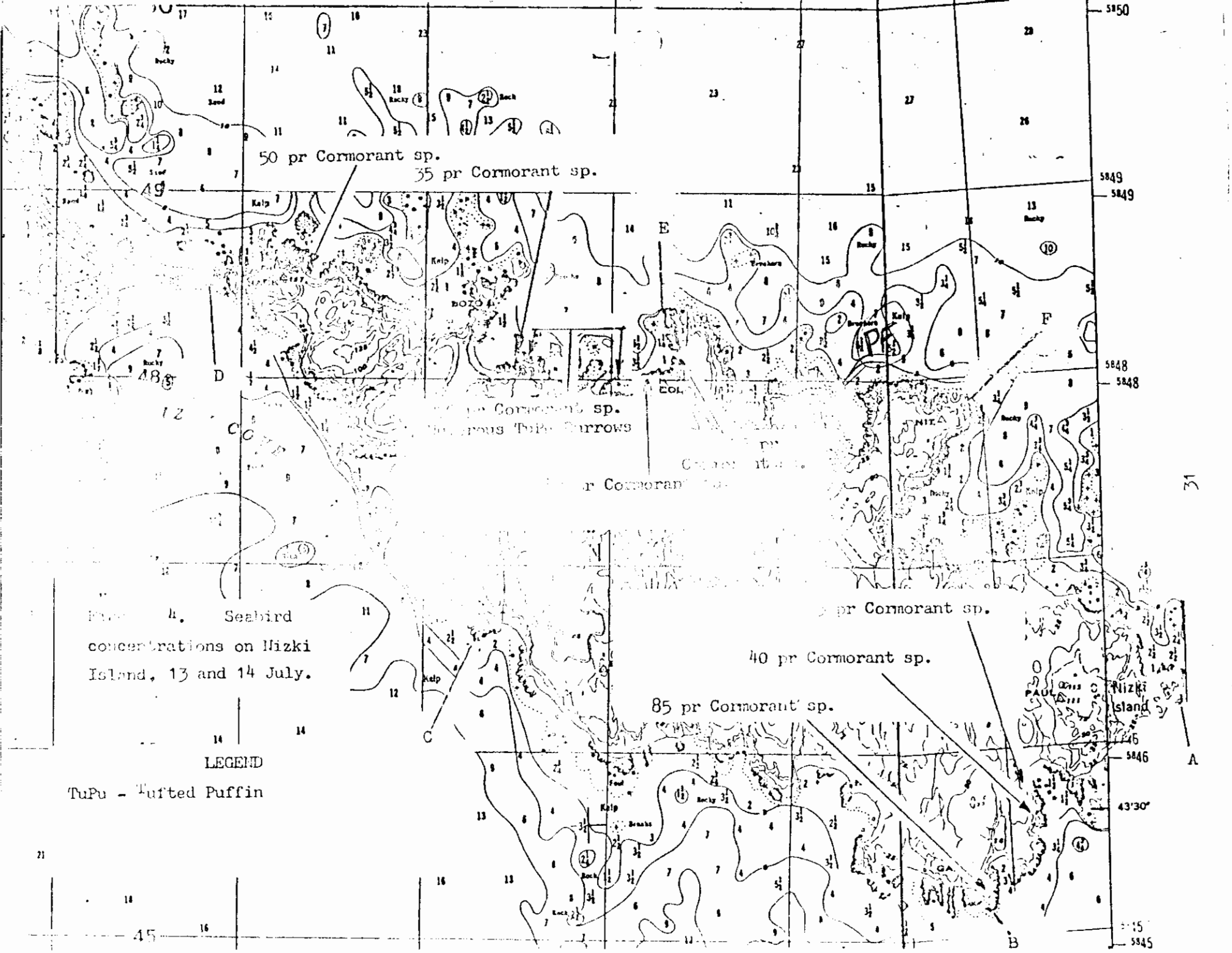


Figure 4. Seabird concentrations on Nizki Island, 13 and 14 July.

July, Lie, Lotus, and Hammerhead Island

July, Lie, and Lotus Island primarily serve as high density cormorant roosting sites. Earlier surveys by Sekora (1972) reported similar results. Glaucous-winged gulls were abundant on the Lotus Island group, including some nests. These small islands in Shemya Pass had little other seabird use.

Hammerhead Island is the largest island in Shemya Pass and is very sparsely vegetated. We were able to visit the island onshore and made a ground count of virtually all puffin burrows. Tufted puffins and glaucous-winged gulls both nested in high density on Hammerhead. We estimated about 75% of the tufted puffin burrows observed were used as nesting burrows based on random checks and information from Sealy, 1973. Common eiders nested on the island in smaller numbers. Some eider nests were found adjacent to gull nests, but still appeared to be somewhat successful. The large number of nesting puffins and gulls is probably why the vegetation was so sparse and bare ground over most of the island.

Cormorants used the island for a nesting and roosting site.

Table 11 Population Counts for July Island, July 13, 1979.

SPECIES		# COUNTED
Cormorant sp.		190i
Glaucous-winged gull (Adult)		10i
Tufted puffins		2i
Common eider	Male	3i
	Female	4i

Table 12. Population Counts for [illegible] Island, July 13, 1979.

SPECIES		# COUNTED
Cormorant sp.		690i
Cormorant sp.		1n
Glaucous-winged gull (Adult)		350i
	(Fledgling)	410i
Pigeon Guillemot		1i
Tufted puffin		150i
[illegible] puffin		[illegible]
Harlequin duck		1i
Common eider	Male	17i
Common eider	Female	8i
Common eider		10n

i = individual

n = nests

* Individually counted from land.

Table 13. Population Estimates for July Island, July 13, 1979.

SPECIES		# ESTIMATED
Cormorant sp.	(non-breeders)	190i
Glaucous-winged gull	(non-breeders)	10i
Tufted puffins	(non-breeders)	10i
Common eider	(non-breeders)	10i

Table 14. Population Estimates for Hammerhead Island, July 13, 1979.

[illegible]		# ESTIMATED
Cormorant sp.	(non-breeders)	690i
Cormorant sp.		35n
Glaucous-winged gull		175pr
Pigeon Guillemot		1pr
Tufted puffin		225pr
Harlequin duck	(non-breeders)	10i
Common eider	(partial breeders)	50i

i = individual

pr = breeding pair

Table 15. Population Counts for Lie Island, July 13, 1979.

SPECIES	# COUNTED
Cormorant sp.	100i
Glaucous-winged gull (Adult)	6i

Table 16. Population Counts for Lotus Island Group, July 13, 1979.

SPECIES	# COUNTED
Cormorant sp.	1900i
Glaucous-winged gull (Adult)	220i
(Fledgling)	30i
Harlequin duck	7i
Common eider	29i
	12i

i = individual

Table 17. Population Estimates for Lie Island, July 13, 1979.

SPECIES		# ESTIMATED
Cormorant sp.	(non-breeders)	100i
Glaucous-winged gull		6i

Table 18. Population Estimates for [illegible]s Island Group, July 13, 1979.

SPECIES		# ESTIMATED
Cormorant sp.	[illegible]	1900i
Glaucous-winged gull		110pr
Harlequin duck	(non-br[illegible])	10i
Common eiders	(non-[illegible])	50i

i = individual

pr = breeding pair

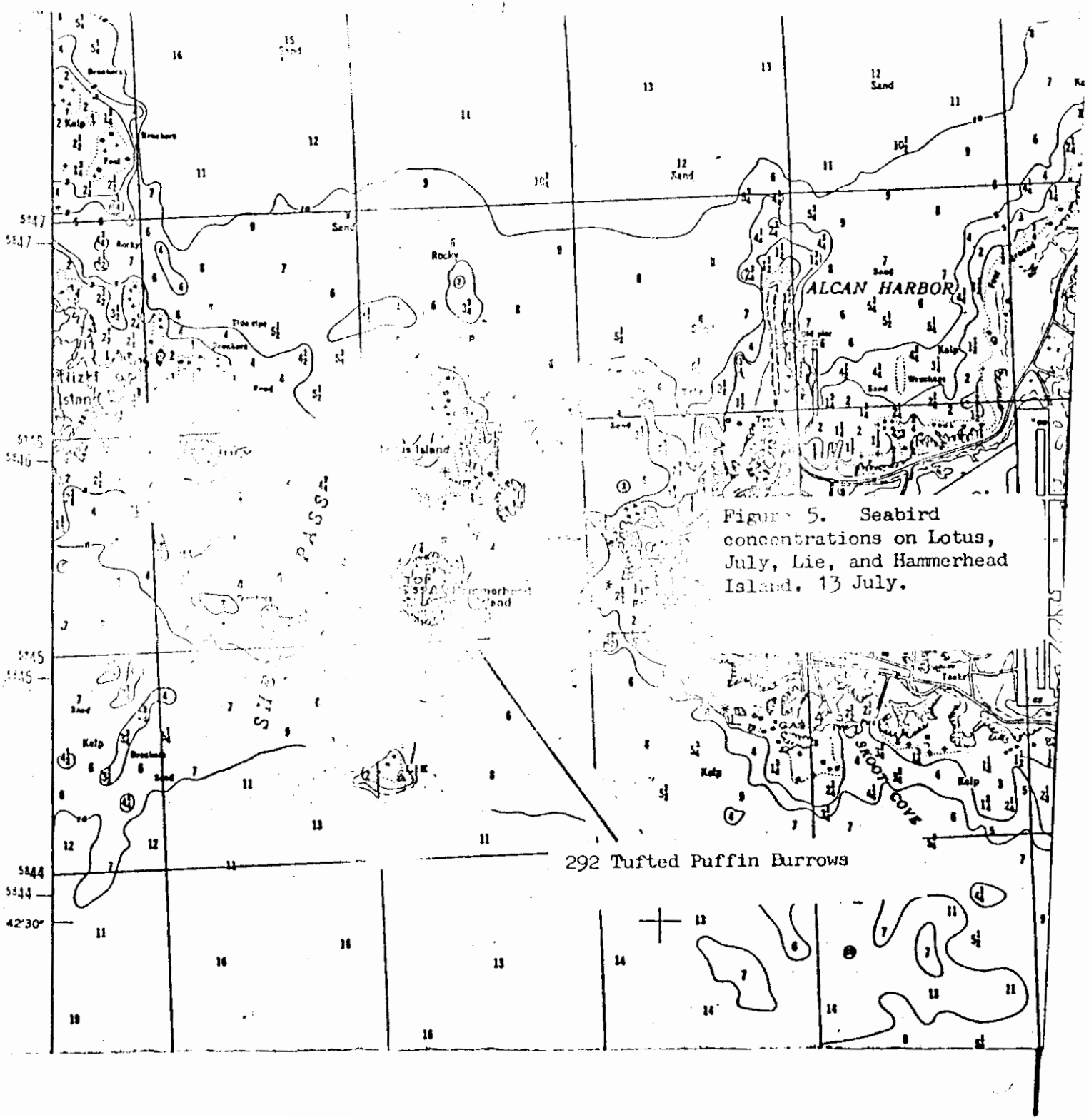


Figure 5. Seabird concentrations on Lotus, July, Lie, and Hammerhead Island, 13 July.

Shemya Island

The circumnavigation of Shemya Island was not completed due to fog and rough sea conditions on the south side. Ground observations on the south side revealed little seabird use, however. The human activity and arctic fox population present on Shemya have restricted available habitat. Population estimates were based on the survey counts in addition to habitat evaluation of the unsurveyed south shore.

Red-faced cormorants and glaucous-winged gulls were the most common seabirds observed on Shemya. An increase in the cormorant population has occurred since Trapp (1975) estimated 900. The only nesting cormorants were observed on offshore rocks.

Glaucous-winged gulls and [illegible] both breed on Shemya in small [illegible]. Non-breeding [illegible] harlequin ducks were numerous along the rocky [illegible].

C011

Table 19. Population Counts for Shemya Island, July 18, 1979.

SPECIES		# COUNTED
Cormorant sp.		3800i
Cormorant sp.		130n
Red-faced cormorant		430i
Pelagic cormorant		50i
Glaucous-winged gull	(Adult)	550i
	(Juv)	260i
	(Fledgling)	2i
Black-legged kittiwake		43i
Common murre		2i
Tufted puffin		15i
Ancient murrelet		18i
Harlequin duck		200i
Common eider	Male	250i
	Female	210i
	Duckling	5i
Common raven		10i
Snow sp.		1i

i = individuals

n = nests

Table 20. Population Estimates for Shemya Island, July 18, 1979.

SPECIES		# ESTIMATED
Cormorant sp.	(non-breeders)	3800i
Cormorant sp.		~~130pr~~
Red-faced cormorant	(non-breeders)	430i
Pelagic cormorant	(non-breeders)	50i
Glaucous-winged gull		300pr
Glaucous-winged gull	(non-breeders)	300i
Black-legged kittiwake	(non-breeders)	50i
Common murre	(non-breeders)	2i
Tufted puffin		45pr
Ancient murrelet	(non-breeders)	18i
Harlequin duck		250i
Common eider		500i
Common raven		20i
Loon sp.	(non-breeders)	1i

ARFO

i = individuals

pr = pairs


SHEMYA ISLAND
130 pr Cormorant sp. on offshore rocks
ALCAN HARBOR
SKOOT COVE
Kelp
Sand
Rocky
Tanks
Jetty
Rock

Buldir Island

Buldir Island was the first island surveyed in 1979. Weather conditions were good with the exception of rough water around Middle and Outer Rock. Large numbers of seabirds were present around most of the island but East Cape held the densest concentration. Buldir was spared introduction of arctic fox, which is reflected by the large number of burrow nesting birds and the only remaining population of Aleutian Canada geese (See 1979 Breeding Population Estimate of Aleutian Canada Geese on Buldir Island, Henry and Early 1979).

Crested, least, cassin's, and whiskered auklets were noted during the 1979 work on Buldir but no counts were made. The best known figures exist from Byrd's work during 1974-76 (Byrd 1978). Ancient murrelets, fork-tailed and leach's storm petrel were seen during permanent plot work (Section VI) and at night. [illegible] (Byrd 1978) are found in Table 23 for [illegible].

The largest auklet colony was located on North Talus, east of Northwest Point. Two other large auklet concentrations existed on the island, one on the south talus of [illegible] and another on the eastern slope above Talus Creek. A [illegible] auklet colony was noted on Bull Point. A cassins auklet colony [illegible] in Permanent Plot #6 on Crested Point. Middle Rock off Northwest Point supported several species of breeding auklets in small numbers.

Nesting common and thick-billed murres were abundant on the steep cliffs of Buldir. Byrd's estimate (1978) is slightly lower than the estimate from the 1979 census. The largest concentration of murres was present around East Cape, numbering [illegible] individuals. Other murre colonies were scattered along the eastern shore. Outer Rock held a large murre concentration, while Middle Rock supported a smaller colony.

Black-legged and red-legged kittiwakes were in large numbers on Buldir. It is one of two islands in the Aleutian chain that supports a breeding red-legged kittiwake colony (Byrd 1978). Black-legged kittiwake numbers were found to be more than [illegible] of the red-legged species. Byrd (1978) also estimated a higher ratio of black-legged to red-legged kittiwakes and a slightly lower total population than the 1979 census. The main kittiwake concentration was along the entire eastern shore, especially centering around East Cape. Outer Rock supported over 3,000 nesting pair of kittiwakes. Only a small colony of red-legged kittiwakes was observed nesting on Middle Rock.

Northern fulmars were observed nesting in large numbers mainly above the murre colony on East Cape. A few scattered fulmar nests were noted along the eastern seacliffs. The number of breeding pair estimated in 1979 was double that of earlier surveys (Byrd 1978).

Red-faced and pelagic cormorants were present in relatively low numbers on Buldir. Byrd (1978) found similar results. Cormorant nests were found scattered along much of the island. The largest concentration existed along the northeast slopes. Outer and Middle Rock both had moderate numbers of nesting cormorants.

The counts of tufted and horned puffins during the 1979 survey are considered low. Byrd (1978) estimated the population of each puffin species at 10,000 breeding pair. The largest numbers were observed off Northwest Point and around North Talus. Middle Rock has a moderate breeding population of both horned and tufted puffins. The Talus Creek area also contains numerous breeding [illegible], as observed during the 1979 goose work.

Glaucous-winged gulls are abundant breeders on Buldir. The largest nesting colonies were observed [illegible] Shore Plateau, South Marsh, near Pon, and in Tip Valley. Scattered nesting occurred on the seaslopes and beaches. The 1979 count during circumnavigation was similar to Byrd's (1978) estimate of the glaucous-winged gulls on Buldir. A breeding pair estimate based on the inland colonies and the 1979 shoreline census are more than double Byrd's estimate. The large offshore fishing industry near Buldir is thought to support the dense gull population.

Common eiders, harlequin ducks, [illegible] Aleutian Canada geese [illegible] occasionally seen along the beach or flying along the seaslopes. One surf scoter and one black scoter were noted near East Cape during the survey.

Breeding peregrine falcons and bald eagles were both present on Buldir. Two eagle aeries were located during the 1979 goose work. Four adults and one juvenile were seen during this time also. Both pair of breeders appeared to be unsuccessful in [illegible]. All the peregrine falcon aeries were located during the goose work also. Most of the aeries were concentrated along the eastern shore, in close proximity to the high density seabird colonies. The breeding success of these aeries was not known, although four juveniles were observed chasing gulls over North Marsh in late July. Byrd (1978) estimated four to five breeding pair of peregrine falcons on Buldir.

TABLE 21. POPULATION COUNTS FOR BULDIR ISLAND , JUNE 23-24,1979.

SPECIES	# COUNTED
Cormorant sp.	1,100 i
Cormorant sp.	45 n
Red-faced Cormorant	80 i
Red-faced Cormorant	60 n
Pelagic Cormorant	140 i
Pelagic Cormorant	70 n
Northern Fulmar	200 i
Northern Fulmar	620 n
Parasitic Jaeger	3 i
Glaucous-winged Gull (Adult)	4,770 i
(Juv)	23 i
Black-legged Kittiwake	12,600 n
Red-legged Kittiwake	5,200 n
Aleutian Tern	1 i
Murre sp.	15,700 i
Common Murre	50 i
Thick-billed Murre	170 i
Pigeon Guillemot	80 i
Whiskered Auklet	+
Cassin's Auklet	+
Crested Auklet	+
Least Auklet	+
Parakeet Auklet	350 i
Horned Puffin	1,440 i
Tufted Puffin	1,830 i
Black-headed Gull	4 i
Harlequin Duck	60 i
Common Eider (Male)	70 i
(Female)	7 i
Aleutian Canada Goose	36 i
Surf Scoter	1 i
Black Scoter	1 i
Peregrine Falcon*	5 a
Peregrine Falcon	2 i
Bald Eagle (Adult)*	4 i
Bald Eagle (Juv)*	1 i
Bald Eagle *	2 a

* Counts not made during circumnavigation
i = individual
n = nest
a = aerie
+ = present

TABLE 22. POPULATION COUNTS FOR OUTER ROCK, BULDIR ISLAND, JUNE 24, 1979.

SPECIES	# COUNTED
Cormorant sp.	70 i
Cormorant sp.	30 n
Red-faced Cormorant	34 i
Red-faced Cormorant	27 n
Glaucous-winged Gull (Adult)	50 i
(Juv)	2 i
Black-legged Kittiwake	2,180 n
Red-legged Kittiwake	940 n
Murre sp.	4,660 i
Common Murre	1 i
Thick-billed Murre	1 i
Pigeon Guillemot	3 i
Ancient Murrelet	200 i
Crested Auklet	+
Least Auklet	+
Whiskered Auklet	+
Parakeet Auklet	+
Horned Puffin	50 i
Tufted Puffin	90 i

i = individual
n = nest
+ = present

TABLE 23. POPULATION COUNTS FOR INNER ROCK, BULDIR ISLAND, JUNE 24, 1979.

SPECIES	# COUNTED
Cormorant sp.	3 i
Glaucous-winged Gull (Adult)	32 i
Tufted Puffin	27 i

TABLE 24. POPULATION COUNTS FOR MIDDLE ROCK, BULDIR ISLAND, JUNE 24, 1979.

SPECIES	# COUNTED
Cormorant sp.	120 i
Cormorant sp.	80 n
Red-faced Cormorant	8 i
Red-faced Cormorant	8 n
Glaucous-winged Gull	50 i
	1 i
Black-legged Kittiwake	800 i
Red-legged Kittiwake	200 n
Murre sp.	1,340 i
Pigeon Guillemot	7 i
Horned Puffin	220 i
Tufted Puffin	160 i
Harlequin Duck	7 i

i = individual
n = nest

TABLE 25. POPULATION ESTIMATE FOR BULDIR ISLAND [1], JUNE 23-24, 1979.

SPECIES		# COUNTED
Northern Fulmar		~~620~~ pr 5
Fork-tailed Storm Petrel*		~~270,000 pr~~
Leach's Storm Petrel*		~~410,000 pr~~
Cormorant sp.	(non-breeders)	~~1,080~~ i 887
Cormorant sp.		~~160~~ pr 124
Red-faced Cormorant		~~100~~ pr 48
Pelagic Cormorant	(non-breeders)	50 i
Pelagic Cormorant		~~70~~ pr 14
Parasitic Jaeger*		~~50 pr~~
Glaucous-winged Gull		6,000 pr
Glaucous-winged Gull	(non-breeders)	26 i
Black-headed Gull	(non-breeders)	4 i
Black-legged Kittiwake		14,800 pr
Red-legged Kittiwake		6,340 pr
Aleutian Tern	(non-breeders)	1 i
Murre sp.		21,500 pr
Common Murre		50 pr
Thick-billed Murre		120 pr
Pigeon Guillemot		80 pr
Ancient Murrelet*		~~3,500 pr~~
Whiskered Auklet*		~~3,500 pr~~
Cassins Auklet*		~~200 pr~~
Crested Auklet*		~~250,000 pr~~
Least Auklet*		~~150,000 pr~~
Parakeet Auklet*		~~3,500 pr~~
Tufted Puffin		5,300 pr
Horned Puffin		4,300 pr
Harlequin Duck	(partial breeders)	70 i
Common Eider	(partial breeders)	100 i
Peregrine Falcon		~~18 i~~ 15 i
Bald Eagle		5 i
Aleutian Canada Goose		150 pr
Common Teal		15 i
Surf Scoter	(partial breeders)	1 i
Black Scoter	(partial breeders)	1 i
Snowy owl		1 i

[1] = Estimate includes Inner, Middle, and Outer Rock
* = Estimates from Byrd (1978)
i = individual
pr - breeding pair

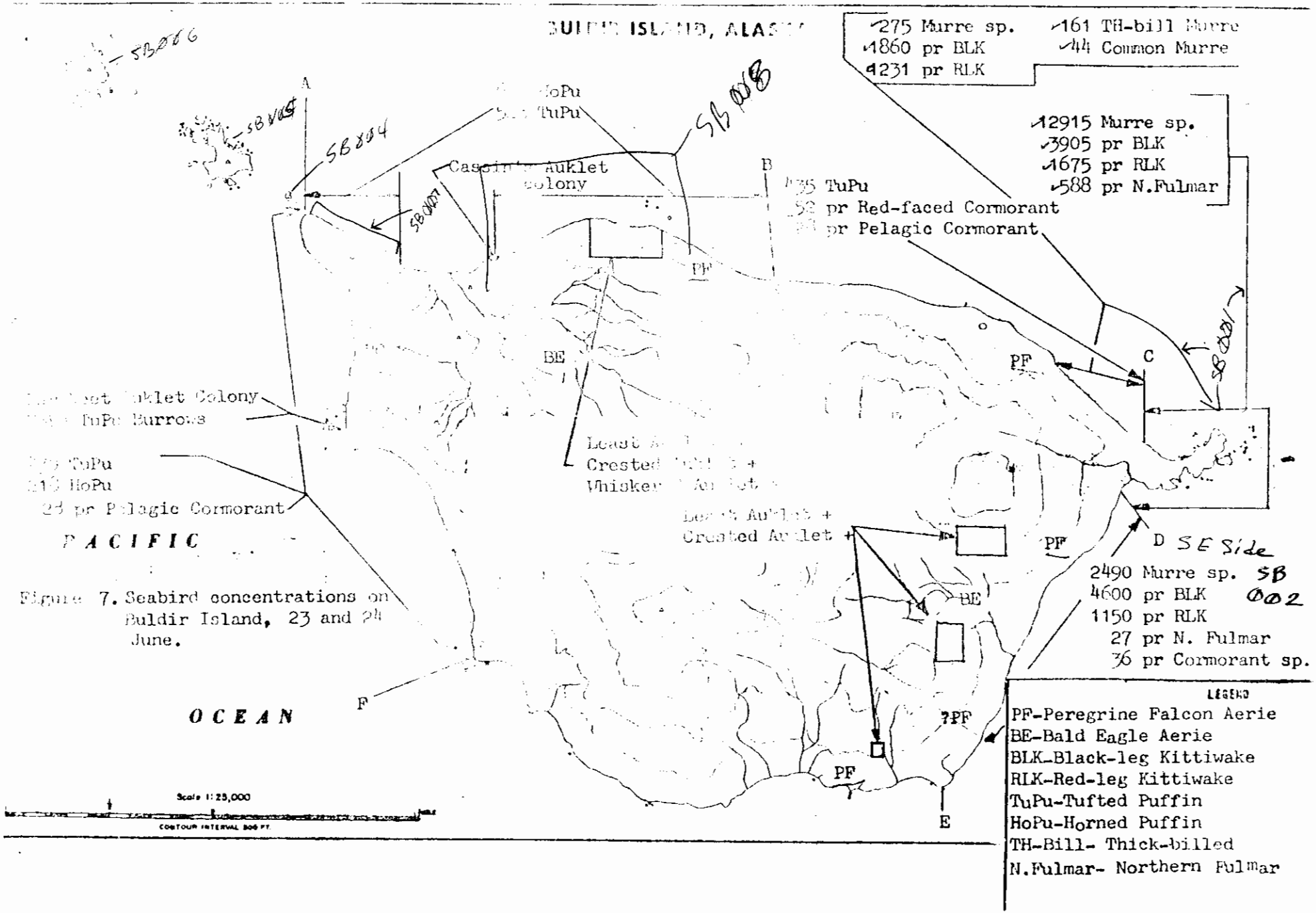


Figure 7. Seabird concentrations on Buldir Island, 23 and 24 June.

Segula Island

Segula Island has few nesting seabirds with the exception of the large auklet colony immediately south of Gula Point (see Auklet Census section). The presence of arctic fox, especially concentrated around the auklet colony, probably kept nesting seabird numbers reduced and confined to inaccessible habitat. Previous surveys of the island covered the auklet colony only (Sekora 1972).

Cormorant nests were generally scattered except one small concentration on a cliff-face east of Gula Point. Tufted and horned puffin numbers were sparse around the entire island. Pigeon guillemots and parakeet auklets were abundant in close offshore waters. Glaucous-winged gulls were presumed to breed in areas protected from fox predation.

Segula appears to have a small breeding population, as 10 peregrine falcons were observed during the survey. One aerie was located but several others are thought to occur. One peregrine was observed taking a least auklet from the evening return flight to the colony. Eight bald eagles were seen flying and floating Segula. The only aerie observed was located on Chuginadak.

Table 26. Population Counts for Segula Island, July 24, 1979

SPECIES	# COUNTED
Cormorant sp.	260i
Cormorant sp.	70n
Northern fulmar	1i
Glaucous-winged gull Adult	210i
	23i
Murre sp.	8i
Pigeon guillemot	80i
Parakeet auklet	210i
Least auklet	
Crested auklet	
Horned puffin	110i
Tufted puffin	110i
Harlequin duck	34i
Bald eagle	5i (1a)
Juvenile	3i
Peregrine falcon	10i (1a)
Common raven	3i

a = aerie

i = individual

n = nest

Rg 94

Table 27. Population Estimates for Segula Island, July 24, 1979.

SPECIES		# ESTIMATED
Cormorant sp.	(non-breeder)	170i
Cormorant sp.		~~70~~pr 25
Glaucous-winged gull		105pr
Glaucous-winged gull		23i
Murre sp.		4i
Pigeon guillemot		72pr
Parakeet auklet		810pr
Least auklet		~~474,000i~~
Crested auklet		~~46,975i~~
Horned puffin		275pr
Tufted puffin		275pr
Harlequin		50i
Bald eagle		9 ~~81~~ (3a) 6adult 3Imm JE
Peregrine falcon		10i 5a 3a
Common raven		3i

ARPO

i = individual

pr = breeding pair

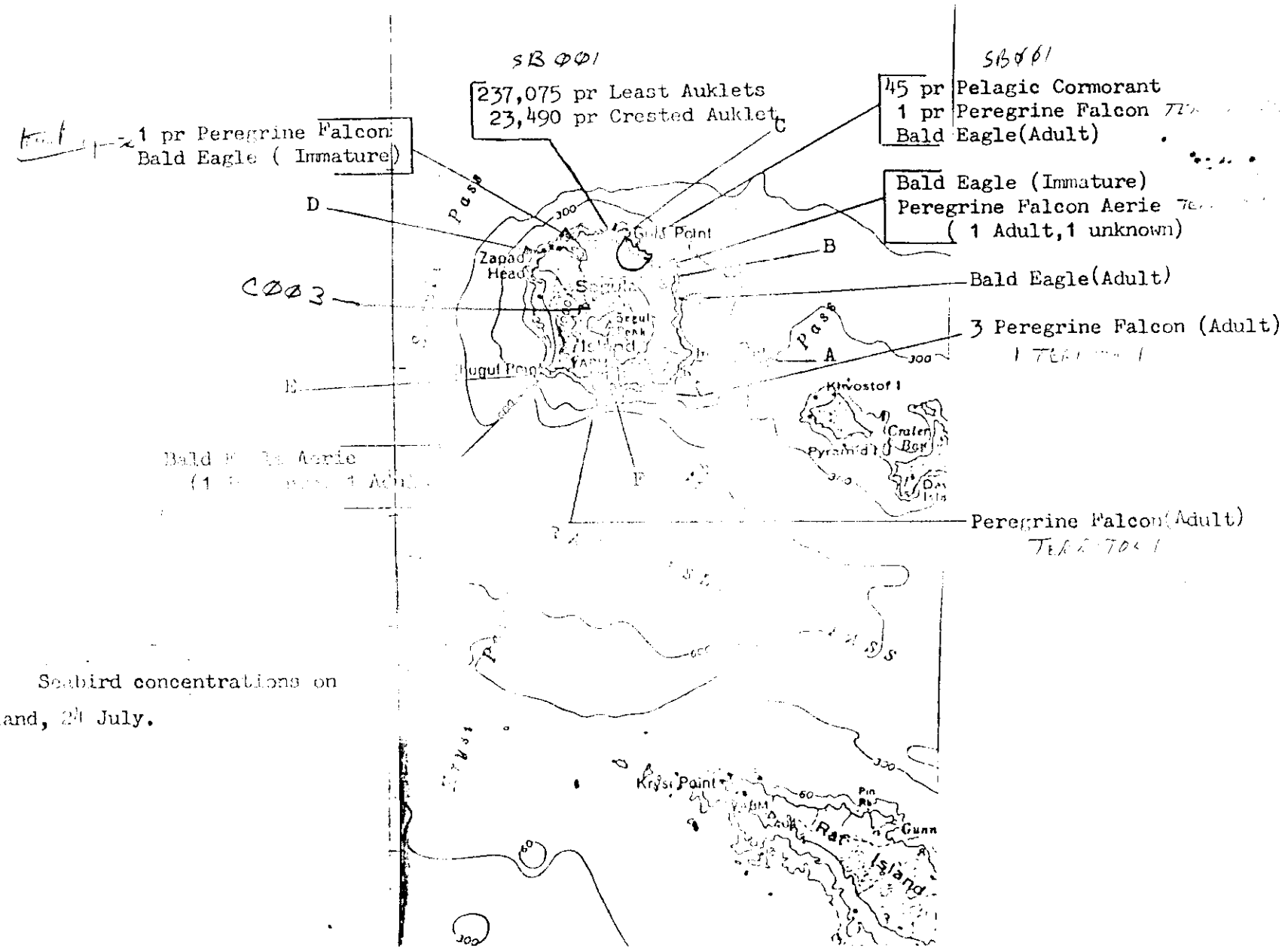


Figure 7. Seabird concentrations on Segula Island, 24 July.

Khvostof Island

Khvostof Island is a small fox-free island with few cliff-nesting birds. Horned puffins and tufted puffins were numerous breeders. Sekora (1972) estimated over 6,000 tufted puffins on Khvostof, similar to the population estimate from the 1979 census.

A small number of black oystercatchers were observed around Khvostof, indicating a probable breeding population. More individuals were observed there than any other island surveyed in 1979.

A large increase has appeared to occur in the glaucous-winged gull population since Trapp/Rhode surveyed Khvostof in 1975. Their count of 20 breeding pair is far below the estimate in 1979 of 115 breeding pair.

Six peregrine falcons were [illegible] Khvostof, including four juveniles and two adults. One ju[illegible] circled the S/V Aleutian Tern for about ten minu[illegible] present on the northeast side of the island.

Pyramid Island

Pyramid Island is a small columnar rock arising between Davidof and Khvostof. Horned and tufted puffins were the only numerous seabirds observed. Population estimates by Sekora (1972) are similar to estimates made from the 1979 census. The upper vegetated slopes supported breeding tufted puffins, horned puffins, [illegible] gull-billed gulls.

Table 28. Population Counts for Khvostof Island, July 24, 1979.

SPECIES	# COUNTED
Cormorant sp.	130i
Cormorant sp.	12n
Black oystercatcher	6i
Parasitic jaeger	2i
Glaucous-winged gull (Adult)	230i
Glaucous-winged gull (Juvenile)	40i
Murre sp.	14i
Thick-billed murre	20i
Pigeon guillemot	34i
Least auklet	3i
Parakeet auklet	15i
Horned puffin	900i
Tufted puffin	1290i
Common eider Female	5i
Duckling	7i
Peregrine falcon	6i (1a) (4 immature 2 ADULTS)

a = aerie
i = individual
n = nest

Table 29. Population Counts for Pyramid Island, July 24, 1979.

SPECIES		# COUNTED
Cormorant sp.		5i
Glaucous-winged gull	Adult	70i
	Juvenile	5i
Common murre		1i
Pigeon guillemot		13i
Parakeet auklet		2i
Horned puffin		140i
Tufted puffin		180i

i = individual

Table 30. Population Estimates for Khvostof Island, July 24, 1979.

SPECIES		# ESTIMATED
Cormorant sp.	(non-breeders)	120i
Cormorant sp.		12pr
Black oystercatcher		3pr
Parasitic jaeger	(possible breeders)	2i
Glaucous-winged gull		115pr
Glaucous-winged gull	(non-breeders)	40i
Murre sp.	(non-breeders)	28i
Thick-billed murre	(non-breeders)	40i
Pigeon guillemot		30pr
Parakeet auklet	(possible breeders)	15pr
Horned puffin		2250pr
Tufted puffin		3230pr
Common eider	(seasonal breeders)	25i
Peregrine falcon		6i (2)

Table 31. Population Estimates for Pyramid Island, July 24, 1979.

SPECIES		# ESTIMATED
Cormorant sp.	(non-breeders)	5i
Glaucous-winged gull		35pr
Glaucous-winged gull	(non-breeders)	5i
Pigeon guillemot		11pr
Parakeet auklet	(non-breeders)	2pr
Horned puffin		350pr
Tufted puffin		450pr

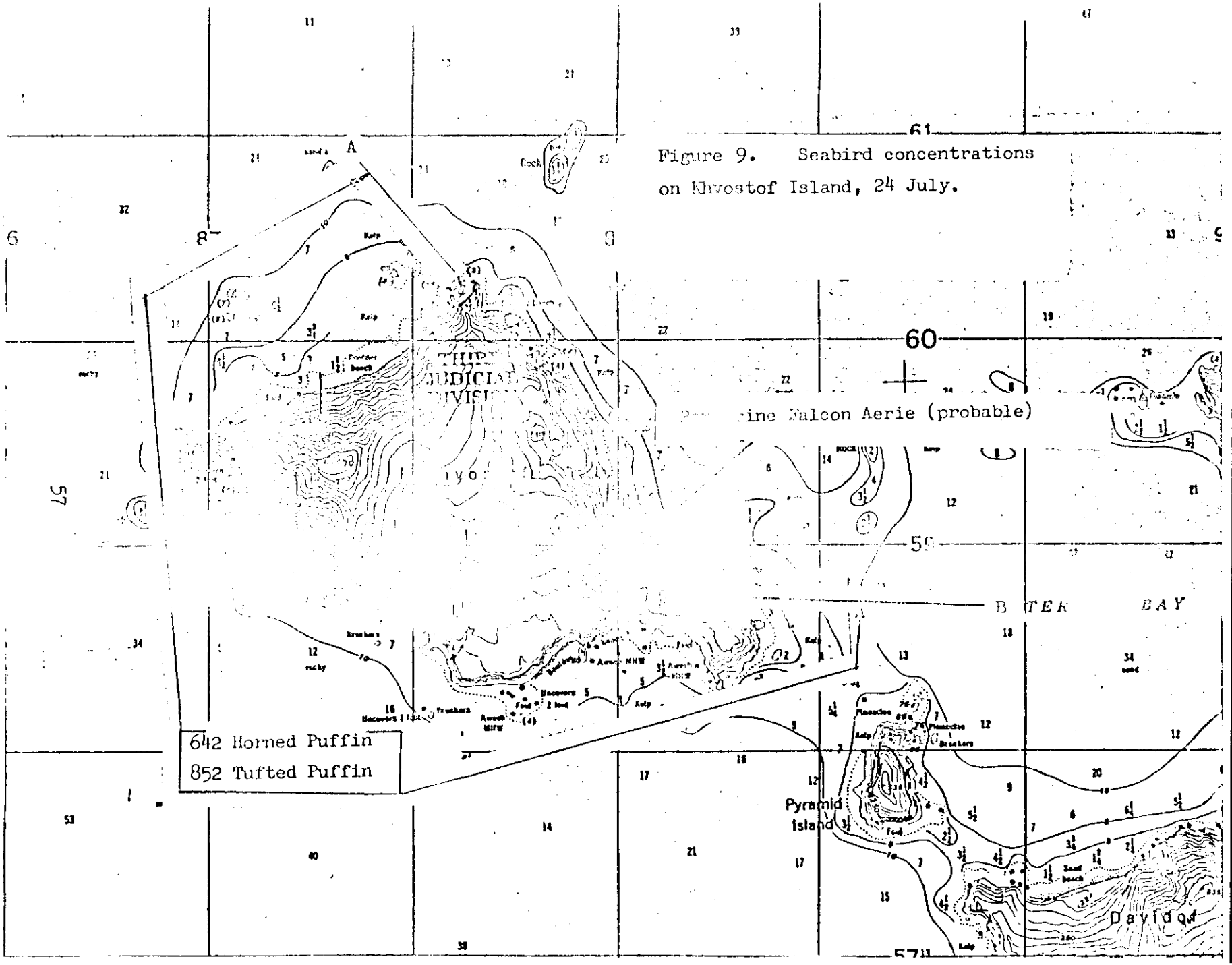


Figure 9. Seabird concentrations on Khvostof Island, 24 July.

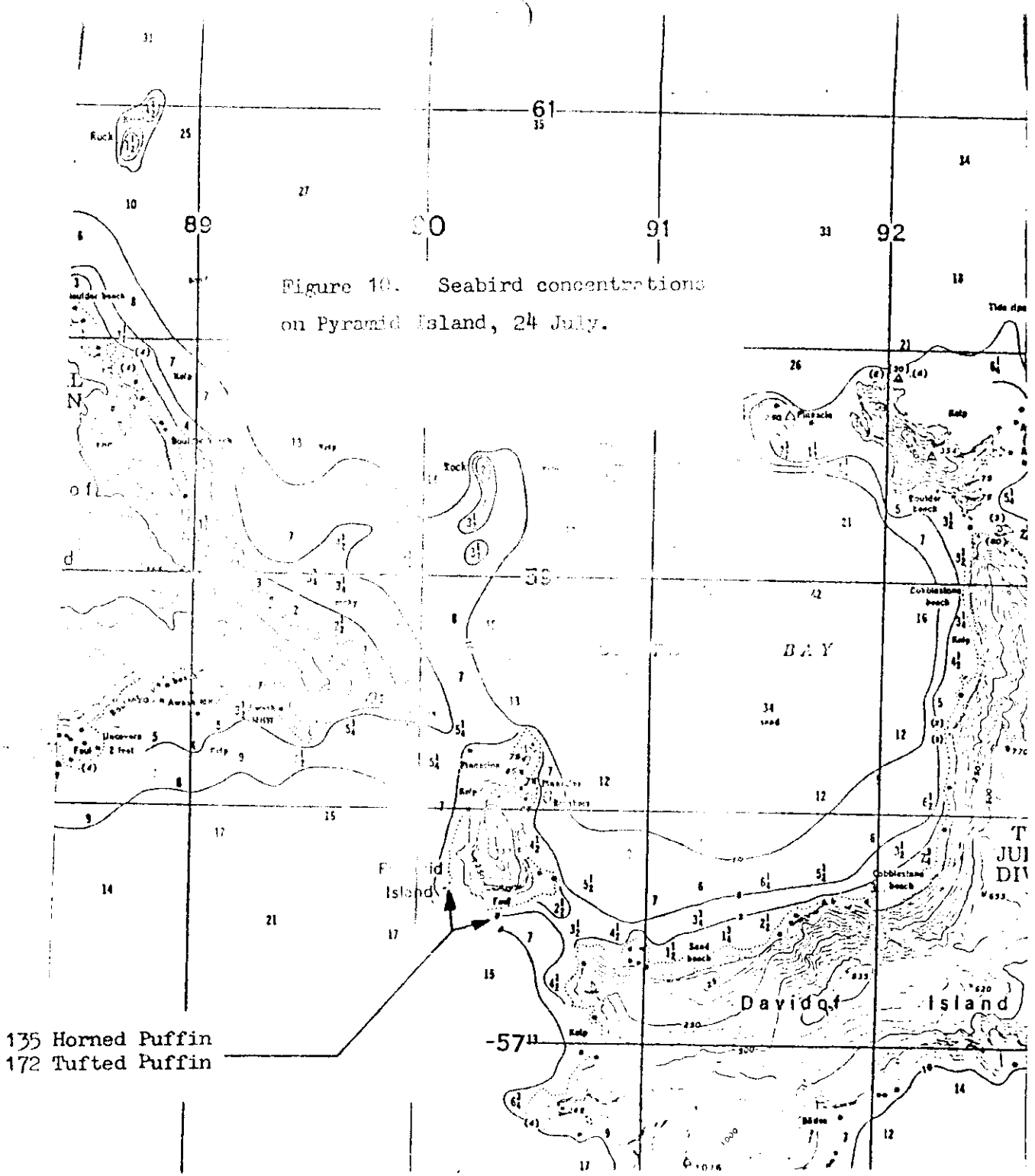


Figure 10. Seabird concentrations on Pyramid Island, 24 July.

Davidof Island

Davidof Island has a low variety of nesting seabirds, and like Khvostoff, is also fox-free. Horned and tufted puffins were extremely abundant along the entire eastern shore. Trapp (1976) estimated several thousand pair of horned puffins on Davidof, but noted tufted puffins were more numerous. The 1979 survey found that horned puffins were the most abundant species seen.

One murre colony was located near the southeast end, containing both thick-billed and common murres. A minimum count of 250 birds was made in 1976 by Trapp, noting that common murres predominated. The 1979 survey estimated almost twice the 1976 count, and the colony composition showed a majority of thick-billed murres.

Just above the murre colony was a northern fulmar colony with an estimated 60 nesting pair. This colony was discovered by Trapp in 1976 and estimated at 29 individuals.

Pelagic cormorants, red-faced cormorants, and glaucous-winged gulls all nest in small numbers on Davidof. Pigeon guillemots were common in the offshore waters.

A pair of adults and two juvenile peregrine falcons were seen during the survey of Davidof. One adult bald eagle was observed at the north end.

Table 32. Population Counts for Davidof Island, July 24, 1979.

SPECIES	# COUNTED
Cormorant sp.	200i
Cormorant sp.	110n
Red-faced cormorant	15n
Pelagic cormorant	5n
Northern fulmar	60n
Black oystercatcher	1i
Glaucous-winged gull (Adult)	350i
" " " (Juv)	10i
" " " (Nestling)	2i
Murre sp.	90i
Common murre	110i
Thick-billed murre	220i
Pigeon guillemot	90i
Least auklet	1i
Parakeet auklet	14i
Horned puffin	2320i
Tufted puffin	141i
Common eider (Male)	2i
Bald eagle (Adult)	1i (2)
Peregrine falcon	4i (2)
Common raven	2i

i = individuals

n = nests

Table 33. Population Estimate for Davidof Island, July 24, 1979.

SPECIES		# ESTIMATED
Cormorant sp.	(non-breeders)	26i
Cormorant sp.		~~110~~pr 15
Red-faced cormorant		15pr
Pelagic cormorant		5pr
Northern fulmar		~~60pr~~
Black oystercatcher		1pr
Glaucous-winged gull		175pr
Glaucous-winged gull	(non-breeders)	10i
Murre sp.		~~180i~~ 130
Common murre		220i
Thick-billed murre		~~440i~~ 225
Pigeon guillemot		80pr
Parakeet auklet	(possible breeder)	14pr
Horned puffin		~~5800~~pr 4911
Tufted puffin		3530pr
Common [illegible]	(non-breeders)	5i
Bald eagle		~~1pr~~ (1a)
Peregrine falcon		2 4i (1a)
Common raven		2i

i = individual
pr = breeding pair

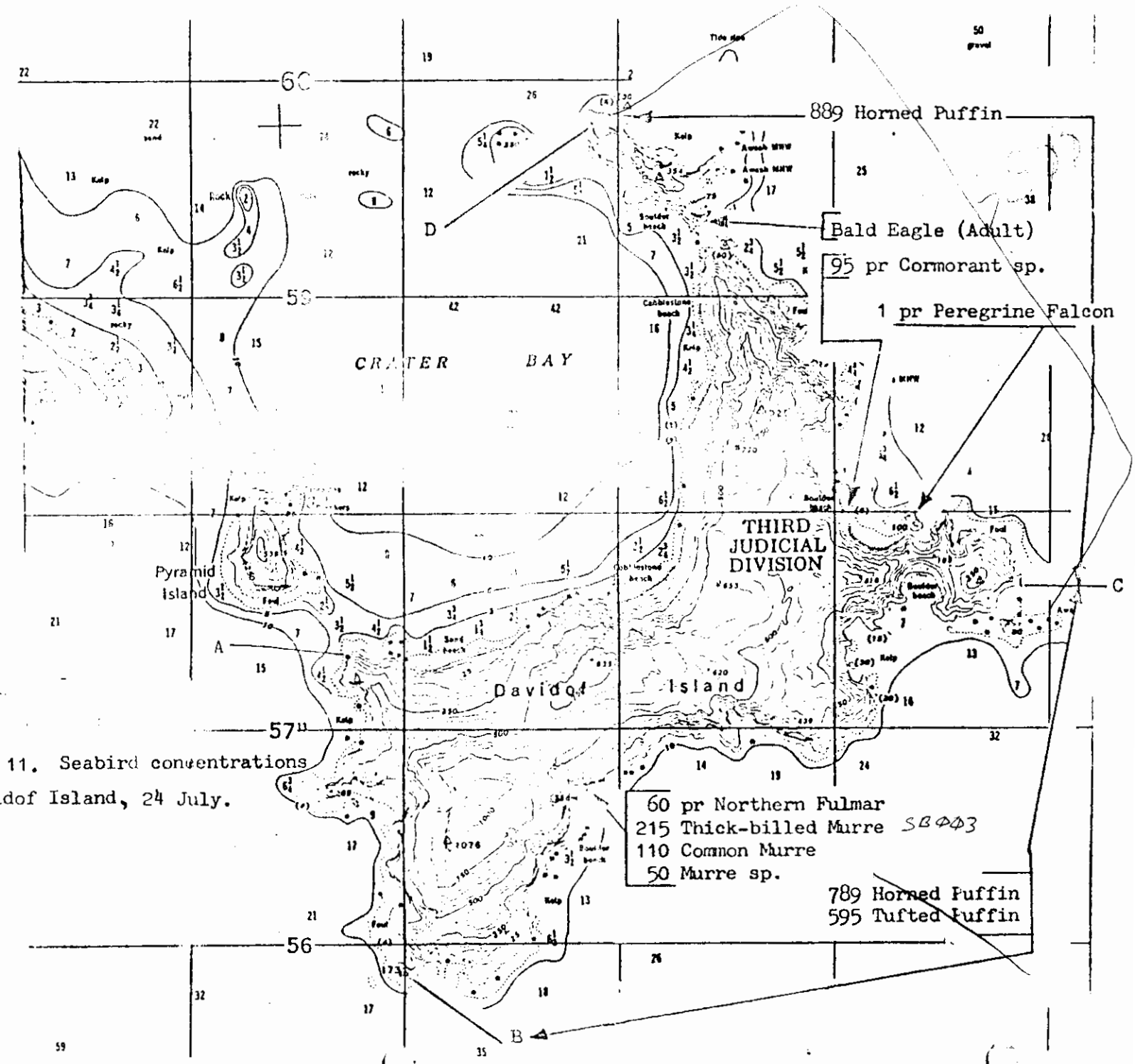


Figure 11. Seabird concentrations on Davidof Island, 24 July.

Table 34. Population Estimates of Migratory Birds on Individual Islands, 1979. (Numbers in parenthesis are percentages.)

SPECIES	8,10-11 Jul ATTU	5-7 Jul AGATTU	13-14 Jul ALAID	13-14 Jul NIZKI	13 Jul HAMMERHEAD	13 Jul JULY, LIE & LOTUS	18 Jul SHEMYA	23-24 BULL
Common loon	3(-)	4(-)						
Red-throated loon	2(-)						1(-)	
Loon sp.								1,240
Northern fulmar								540,000
Fork-tailed storm petrel								820,000
Leach's storm petrel							50(.8)	190
Pelagic cormorant							430(6.8)	200
Red-faced cormorant								
Cormorant sp.	40,520(40.8)	9,810(14.1)	6,040(58.2)	4,490(66.6)	692(44.6)	2,190(87.4)	4,060(63.8)	1,400
Aleutian Canada goose								1,200
Mallard	11(-)	20(-)						
Common teal								1
Harlequin duck	1,[illegible](1.0)	500(0.6)	150(1.4)	200(3.0)	10(0.6)	1(0.4)	250(3.9)	70
Common eider	11,[illegible](11.1)	2,500(3.6)	[illegible]	1,000(14.8)	50(3.2)	6(2.4)	50(7.8)	100
Surf scoter								
Black scoter								
Red-breasted merganser								
Bald eagle								
Gyrfalcon		(-)						
Peregrine falcon	[illegible]	3(-)	[illegible]					1
Snowy owl	[illegible]	[illegible]						
Black oystercatcher		2(-)						
Parasitic jaeger								100
Glaucous-winged gull	7,630(7.7)	3,050(4.3)	1,200([illegible]	[illegible]	350(23.5)	23(9.4)	900(14.1)	12,020
Black-headed gull								
Black-legged kittiwake	3,020(3.0)	17,410(24.8)	1,500([illegible]	[illegible]			50(0.8)	29,600
Red-legged kittiwake								12,680
Aleutian tern	70(0.1)							
Arctic tern	25(-)							
Common murre							2(-)	100
Thick-billed murre								240
Murre sp.	16,260(16.5)	18,420(26.5)	24(0.2)					43,000
Pigeon guillemot	250(0.3)	340(0.5)	10(0.1)	24(0.4)	2(0.1)			160
Horned puffin	1,100(1.1)	1,850(2.7)	40([illegible]	10(0.1)				4,300
Tufted puffin	18,300(18.4)	15,850(22.9)	1,220([illegible]	550(8.1)	450(29.0)	10(0.4)	90(1.4)	5,300
Crested auklet	10(-)							500,000
Least auklet								300,000
Cassin's auklet								40
Whiskered auklet								7,000
Parakeet auklet		10(-)						7,000
Marbled murrelet	10(-)							
Ancient murrelet							18(0.3)	7,000
Common raven	24(-)	[illegible](-)		5(-)			30(0.3)	
	99,271	[illegible]	10,390	[illegible],741	[illegible],394	2,[illegible]	6,[illegible]	2,[illegible]

Jun IR	24 Jul SEGULA	24 Jul KHVOSTOF	24 Jul DAVIDOF	24 Jul KRAMID	SPECIES TOTAL	% TOTAL COMPOSITION
					7	-
					2	-
					1	-
(-)			120(0.6)		1,360	(0.04)
(23.6)					540,000	(17.71)
(35.7)					820,000	(26.90)
(-)			10(-)		250	(0.01)
( )			30(0.1)		[illegible]	(0.02)
(0.1)	310(0.1)	[illegible]	246(1.2)	[illegible].3)	[illegible]	(2.29)
(0.1)					[illegible]	(0.06)
(-)						-
(-)					[illegible]	-
(-)	50(-)				[illegible]	(0.07)
(-)		[illegible]	5(-)		[illegible]	(0.51)
(-)						-
(-)						-
						-
(-)	8(-)		2(-)			-
						-
(-)	10(-)	(-)	4(-)			-
(-)						-
		(-)	2(-)		[illegible]	-
(-)		(-)			[illegible]	-
(0.5)	233(-)	[illegible]	260(1.3)	[illegible].3)	[illegible]	[illegible] 0.32)
(-)						
(1.3)					[illegible]	(1.19)
(0.6)					12,000	(0.42)
(-)					[illegible]	-
					2	-
(-)			220(1.1)		[illegible]	(0.01)
(-)		50(0.3)	440(2.1)		228	(0.02)
(1.9)	4(-)	[illegible](0.2)	180(0.9)		72,616	(2.56)
(-)	144(-)	[illegible] (0.5)	160(0.8)	[illegible].3(1.3)	1,172	(0.04)
(0.2)	550(0.1)	[illegible] (39.3)	11,600(56.8)	[illegible](41.0)	24,660	(0.81)
(0.2)	550(0.1)	(55.[illegible]	7,060(34.5)	[illegible](52.8)	56,[illegible]	(1.87)
(21.9)	46,975(9.0)				[illegible]	(17.94)
(13.0)	474,300(90.4)				[illegible]	(25.40)
(-)					[illegible]	(0.01)
(0.3)					7,000	(0.23)
(0.3)	1,620(0.3)	[illegible](0.3)	28(.1)	[illegible].2)	8,692	(0.29)
					10	-
(0.3)					7,018	(0.23)
	3(-)		2(-)		[illegible]	-
	[illegible],547	[illegible]	[illegible]	[illegible]	[illegible]	[illegible].00%

V. MAMMALS AND NON-MIGRATORY BIRDS

This section will be further broken down into Marine Mammals and Land Mammals and Non-Migratory Birds to facilitate reporting. An island-by-island account is given in each section and distribution maps and tables are included for Marine Mammals. A summary of marine mammal counts is given for comparison purposes and quick reference.

A. Marine Mammals

Four species of marine mammals were recorded during the 1979 coastline surveys; the sea otter (Enhydra lutris), harbor seal (Phoca vitulina), Steller sea lion (Eumetopias jubatus) and northern fur seal (Callorhinus ursinus).

Data were also collected on [illegible] sea sightings made during the [illegible], both from the vessel visited and from the R/V Aleutian Tern. These sightings include the minke whale (Balaenoptera acutorostrata), killer whale (Orcinus orca), pilot whale (Globicephla macrorhyncha), Dall porpoise (Phocoenoides dalli) and harbor porpoise (Phocoena phocoena). Two dead, stranded beaked whales were also found and partially necropsied and measured. One, a Baird's beaked whale (Berardius bairdii), was stranded on the southeast shore of Buldir Island and the second beaked whale, a Ziphius cavirostris, was stranded on the north shore of Nizki Island. These specimens will be sent to Dr. James Mead at the Smithsonian Institute. All measurements and samples taken from these whales will be sent for identification, also.

Attu Island (Table 35, Figure 12)

Attu was surveyed July 8, 10 and 11. Of the total 393 sea otters counted, all but seven were seen on the north and east sides of the island between Murder Point and Earle Cove. Thirty percent of the otters seen were pups. Dr. Jim Estes, et al, counted a total of 640 otters in late July of this year from Earle Cove to Murder Point (Estes, pers. comm.). Estes' counting methods were similar to ours except he used a 16' Boston Whaler, surveyed during optimal weather conditions, counted exclusively for sea otters and observed more critically offshore than we did. Hopefully a study may be done in the near future to develop a correction factor for sea otter counts based on observing conditions. We realize our count is minimal due to the fact that we probably did not see all animals present, due to ocean swell (large at times), occassional rain and the fact that we were simultaneously surveying other wildlife species under a time constraint.

Table 35. Marine Mammal Transects on Attu Island, 1979.

TRANSECT DESIGNATION

	A - B	B - C	C - D	D - F	E - F	F - G	G - H	H - I	I - J	J - K	K - L	L - M	M - N	N - O	O - P	P - Q	QA	TOTAL
Date	8 Jul	8 Jul	8 Jul	8 Jul	11 Jul	11 Jul	11 Jul	11 Jul	11 Jul	10 Jul	10 Jul	10 Jul	10 Jul	10 Jul	10 Jul	10 Jul	10 Jul	
Start Time	0740	1140	[illegible]	1645	1345	[illegible]	1005	[illegible]	0845	[illegible]	1700	[illegible]	1330	1120	1050	0930	0800	
Finish Time	1140	1445	1645	1845	1545	[illegible]	1050	[illegible]	0930	[illegible]	1810	[illegible]	1440	1240	1120	1030	0925	
SPECIES																		
Steller's sea lion																		
Bulls					[illegible]	[illegible]	[illegible]			217?								2?5
Cows/yearlings										1525?								1925?
[illegible]										[illegible]								652?
[illegible] nonbreeders		122	[illegible]	2?				[illegible]	915	?27		1						2250?
Total		122		22	3	[illegible]	1	[illegible]	915	2?10		1						6052?
[illegible]																		
[illegible]	149	50	[illegible]	39	65	47?	67	[illegible]	12	5	16	31	15	23	8	41	41	700?
[illegible]	24	22	[illegible]	19?	11	[illegible]	29	[illegible]	2	1	7	[illegible]	6	7	5	9	23	213
Total	173	72	[illegible]	57	76	[illegible]	96	[illegible]	14		[illegible]		21	30	13	50	66?	913
Sea otter																		
Adults	27	37	[illegible]	[illegible]	16	[illegible]	11					[illegible]		2		1	2	277
[illegible]	17	5	13?	29?	26	[illegible]	10							1				116
Total	44	42	[illegible]	90	72	[illegible]	21					1		3		1	2	393

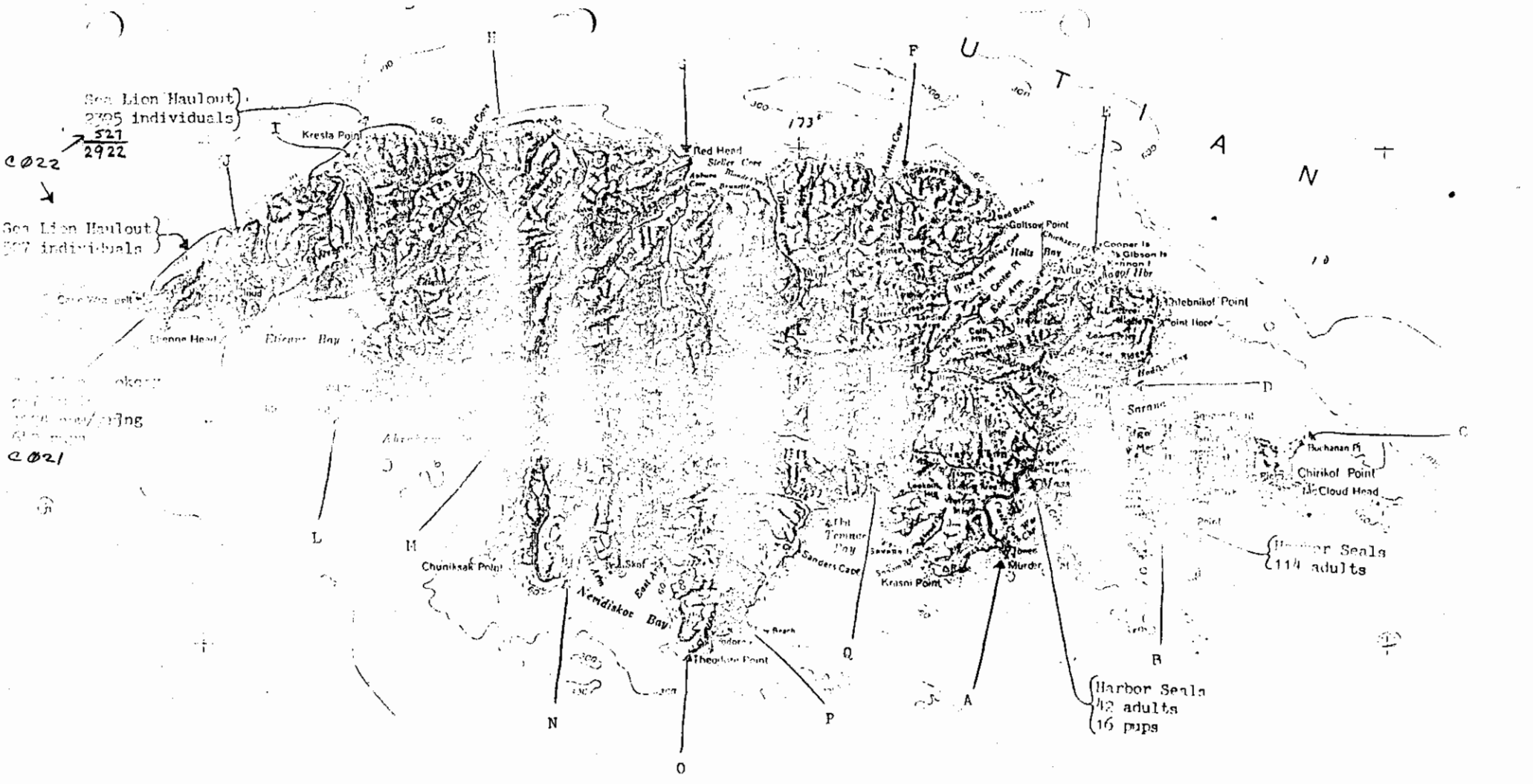


Figure 12. Distribution of Marine Mammals on Attu Island
July 8,10,11 1979
A,B,C,...= Transect Key Marks

Between about 1910 and 1959 no sea otters were observed in the Near Island group during surveys. However, in 1956 Refuge Manager R.D. Jones moved five otters from Amchitka to Attu and liberated them. Their survival is unknown but in 1959 scattered reports of sea otters in the Near Islands began (Kenyon 1969). Kenyon conducted an extensive aerial survey of Attu in early May of 1965 and counted 13 individuals. These sightings were also confined to the north and east shore of the island. Sekóra (1972) estimated about 25 otters just in the area of Chichagof Harbor.

Harbor seals were distributed fairly evenly along the Attu coastline. However, two small, but noteworthy areas of concentration occurred: one offshore rock in Massacre [illegible] adult and 16 pup seals and a large rock off Alaid Point [illegible] 114 adults. Twenty-three percent of all seals seen were [illegible].

Approximately 46 percent of the sea lions observed on Attu were associated with rookeries, either [illegible] bulls, cows, yearlings or pups. Attu's only sea lion rookery is located at Cape Wrangell and a count of 217 bulls, 1924 [illegible] 672 pups was made. A haul-out area of 527 animals was seen at Cape Wrangell and a major haul-out area around Kresta Point contained about 2400 individuals.

Agattu Island (Table 36, Figure 13)

A total of 94 sea otters were counted on Agattu [illegible] the densest concentrations found on the western portion of the island from Otkriti Bay to Ameria Point. In 1965, Kenyon observed only 4 otters during aerial surveys of Agattu. These were seen in the Otkriti Bay area (Kenyon 1969). Sekora (1972) observed 3 individuals on the same bay.

There are two major sea lion [illegible] on Agattu. One, on Gillon Point, contained [illegible] individuals [illegible] pups and the other at Cape Sabak had 6,312 sea lions. Both of these counts are absolute minimums, especially for pups, as heavy swells prevented accurate counts.

Four fur seals were observed during the circumnavigation. Two individuals were seen near Otkriti Bay and another two on the northwest end of the island.

Alaid Island (Figure 14)

Two adult sea [illegible] were seen [illegible] both sides of Alaid Island. Sekora (1972) makes no mention of otter observations in the Semichi group; and Kenyon [illegible] also [illegible] in the island group but, from indistinct [illegible] one was [illegible] around Alaid Island.

Table 16. Marine Mammal Transects on Agattu Island, 1979.

	TRANSECT DESIGNATION															
	A - B	B - C	C - D	D - E	E - F	F - G	G - H	H - I	I - J	J - K	K - L	L - M	M - N	N - A	TOTAL
Date	5 Jul	5 Jul	5 Jul	5 Jul	5 Jul	6 Jul	6 Jul	6 Jul	6 Jul	6 Jul	6 Jul	6 Jul	7 Jul	7 Jul	
Start Time	1130	1240	1520	1720	1900	0755	1300	1420	1530	1840	1930	2115	1220	1100	
Finish Time	1240	1400	1720	1830	1945	1020	1420	1600	1800	1915	2115	2145	1420	1220	
SPECIES															
Steller's sea lion															
Bulls	125	2			1		10		22	92	33			1	286
Cows/Yearlings	1678	10								425	206		1		2320
Pups	118									40	25				183
Subadult/Nonbreeders	89								42						131
Unidentified	2010	12												2490	4512
Total	3931	24			1		10		64	557	264		1	2491	7432
Harbor seals															
Adults	3	3		6	12	67	25				13	1	6		136
Pups		1		4	2	20							1		32
Total	3	4		10	14	87	25				13	1	7		204
Sea otters															
Adults	1	2	1	1			2	3	11		11	10	24	1	67
Pups			1	1					5		7	2	11		27
Total	1	2	2	2			2	3	16		18	12	35	1	94
Porpoises									2				2		4

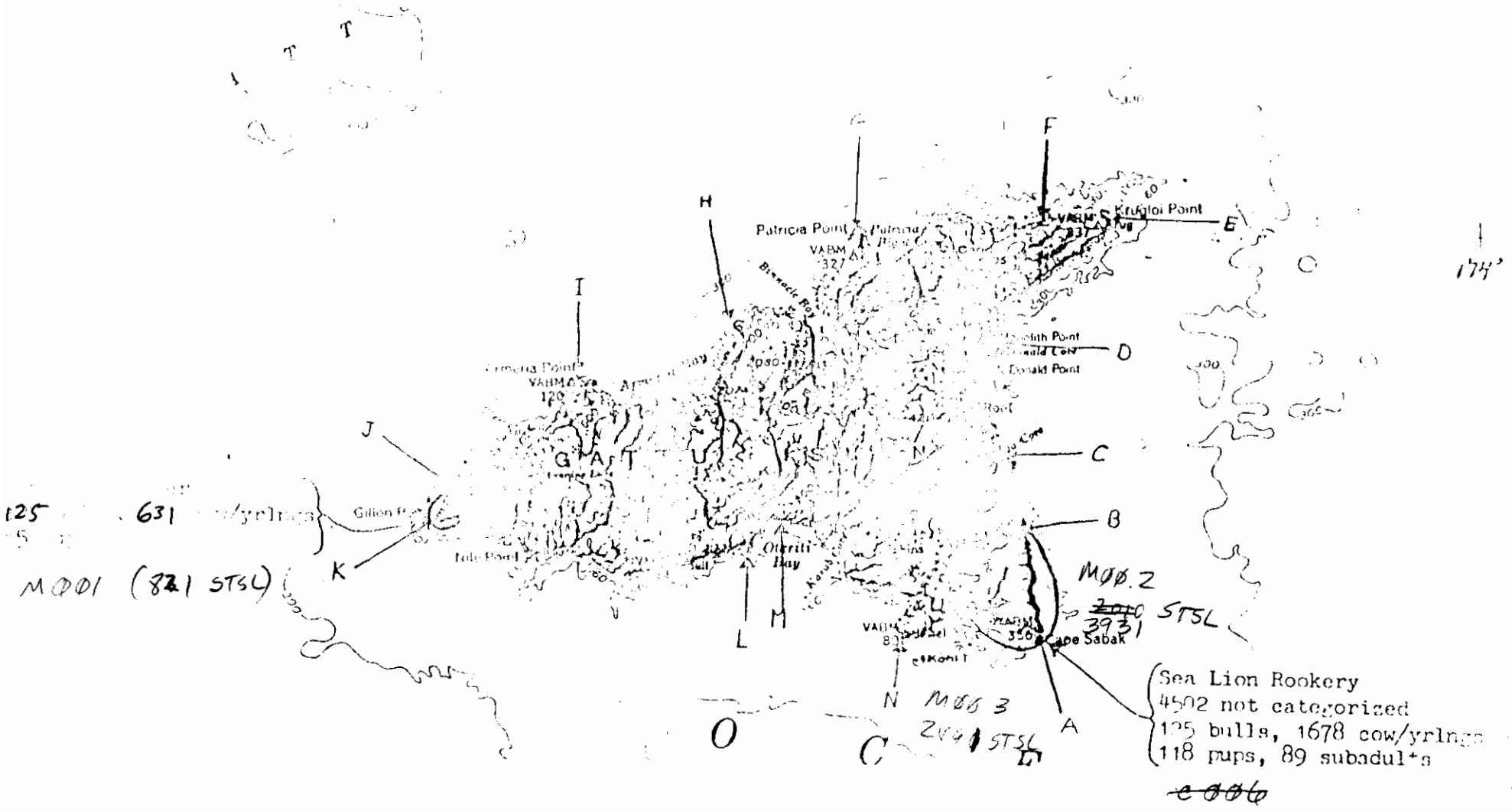


Figure 13. Distribution of Marine Mammals on Agattu Island July 6-7, 1979.

A, B, C, ... = Transect survey marks.

About 85 percent of the total 173 harbor seals observed were on the southeast side of the island. Sixteen percent of all seals seen were pups.

Two haul-out areas and one rookery for sea lions were observed. One haul-out site contained 550 bulls and subadults and was located on the north side of the sand spit connecting Alaid with Nizki. The other haul-out area had 140 bulls and 1,060 subadults and was on the southwest end of Alaid. The rookery was located on the north side of the island just east of Alaid Head and contained 40 bulls, 585 cows/yearlings, and about 100 pups. A total of 26 percent of the sea lions were involved in reproductive activity either as harem bulls, cows, yearlings or pups. Trapp (1975) estimated a total island population of about 4,500 to 5,000 sea lions compared to our total count of only 2,842 animals. Undoubtedly our counts are minimums whereas Trapp observed a greater percentage of the total population as observations were made most of the summer.

One dead fur seal was found washed up on the north side of Alaid Island, and the skull collected.

Nizki Island (Figure 15)

No sightings of sea otters were made on Nizki Island. Kenyon (1969) observed 6 on the southeast shore in 1965.

Harbor seals were primarily spread along the coast with 36 percent being pups. Small and scattered groups of bull and subadult sea lions were seen along the coast. No rookeries were observed.

A small, dead Baird's beaked whale about 14 feet long, was found in a small cove on the north side of Nizki. The skull and stomach contents were collected. See appendix for measurements and pertinent data.

Shemya Pass Island Group (Hammerhead, July, Lotus and Lie Islands) (Figure 16)

Large areas of gradually exposed rocks around these islands provided habitat for large numbers of harbor seals. A total of 222 individuals were seen, of which 11 percent were pups. One subadult sea lion was observed off July Island. No sea otters were seen.

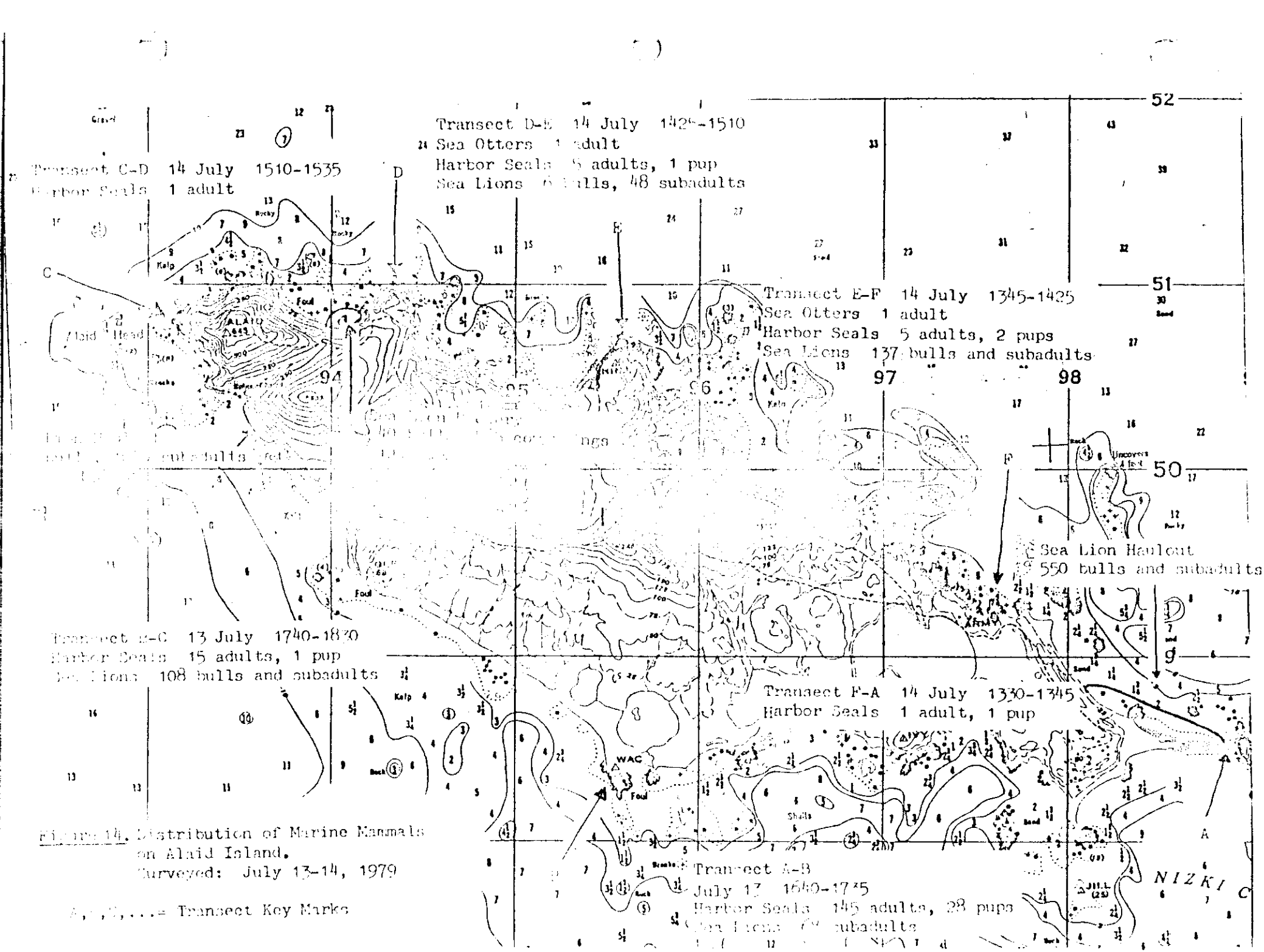


Figure 14. Distribution of Marine Mammals on Alaid Island.
Surveyed: July 13-14, 1979

A, B, C,... = Transect Key Marks

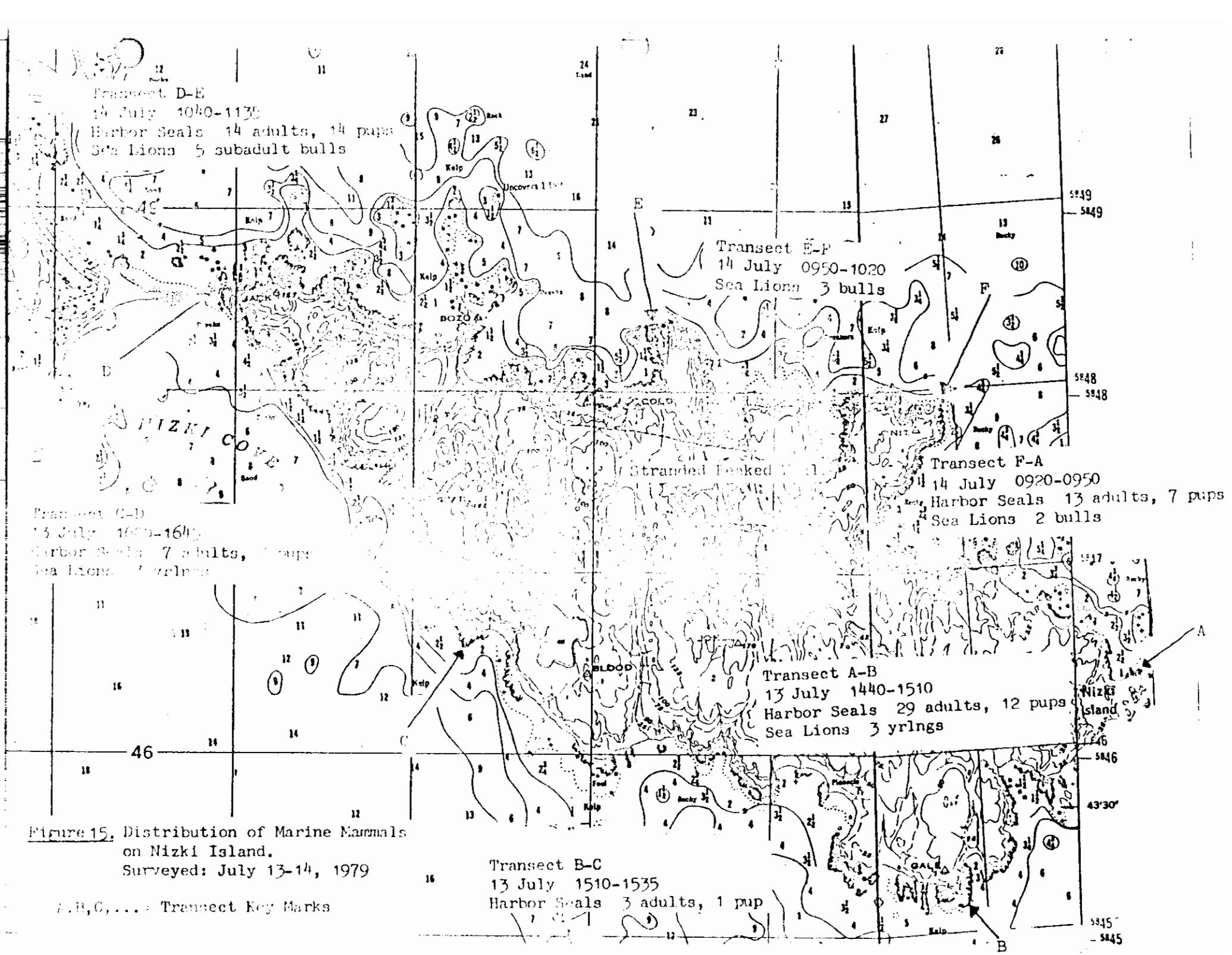


Figure 15. Distribution of Marine Mammals on Nizki Island.
Surveyed: July 13-14, 1979

A,B,C,.... Transect Key Marks

Hammerhead Island was interesting in that there were four, well decayed cetacean skulls on top (50 ft. msl). One fragment was probably from a large balaenopterid whale (fin or sei) and the other three were odontocete skulls, probably from a whale 15-20 feet in length (judging from the Nizki - collected whale skull). Unfortunately all were too decayed to collect. How the whale skulls got there is a matter of speculation but they may have been moved there by Aleuts or possibly by a U.S. Geological Survey team as there is a bench mark on the top. It is doubtful if any natural action would have placed them there.

Shemya Island (Figure 17)

Transects D to E and E to A on the south side of Shemya were not surveyed due to bad weather. It may have been possible that several species were missed but the habitat is not ideal for haul-out sites.

No sea otters were observed this year compared to 4 seen in 1965 by Kenyon (1969). Sekora (1972) made no mention of otter sightings on Shemya.

Harbor seals were distributed evenly along the areas surveyed with the exception of a concentration of 80 adults on outlying rocks on the east end of the island. Only 3 percent of the seals seen were pups.

A major sea lion haul-out ground was located on outlying rocks on the northeast point of the island where 100 bulls and 1,420 subadults were counted.

Buldir Island (Table 37 and 38, Figure 18)

In addition to the circumnavigation of Buldir on 23 and 24 June, numerous observations were made during the Aleutian Canada goose work there from 4 to 30 June.

A total of 74 sea otters were seen on Buldir during the circumnavigation. This compares to 15 seen in 1965 (Kenyon 1969). Kenyon also speculates that the modern breeding population became established on Buldir relatively recently (1962). Our data indicates the population continues to increase at a fairly rapid rate. The main areas of concentration we saw were on the southwest side of the island and off Northwest Point.

Figure 16. Distribution of Marine Mammals on the Hammerhead, July, Lotus, and Lie Island Group.
Surveyed: July 13, 1979
Time: 1400-1410

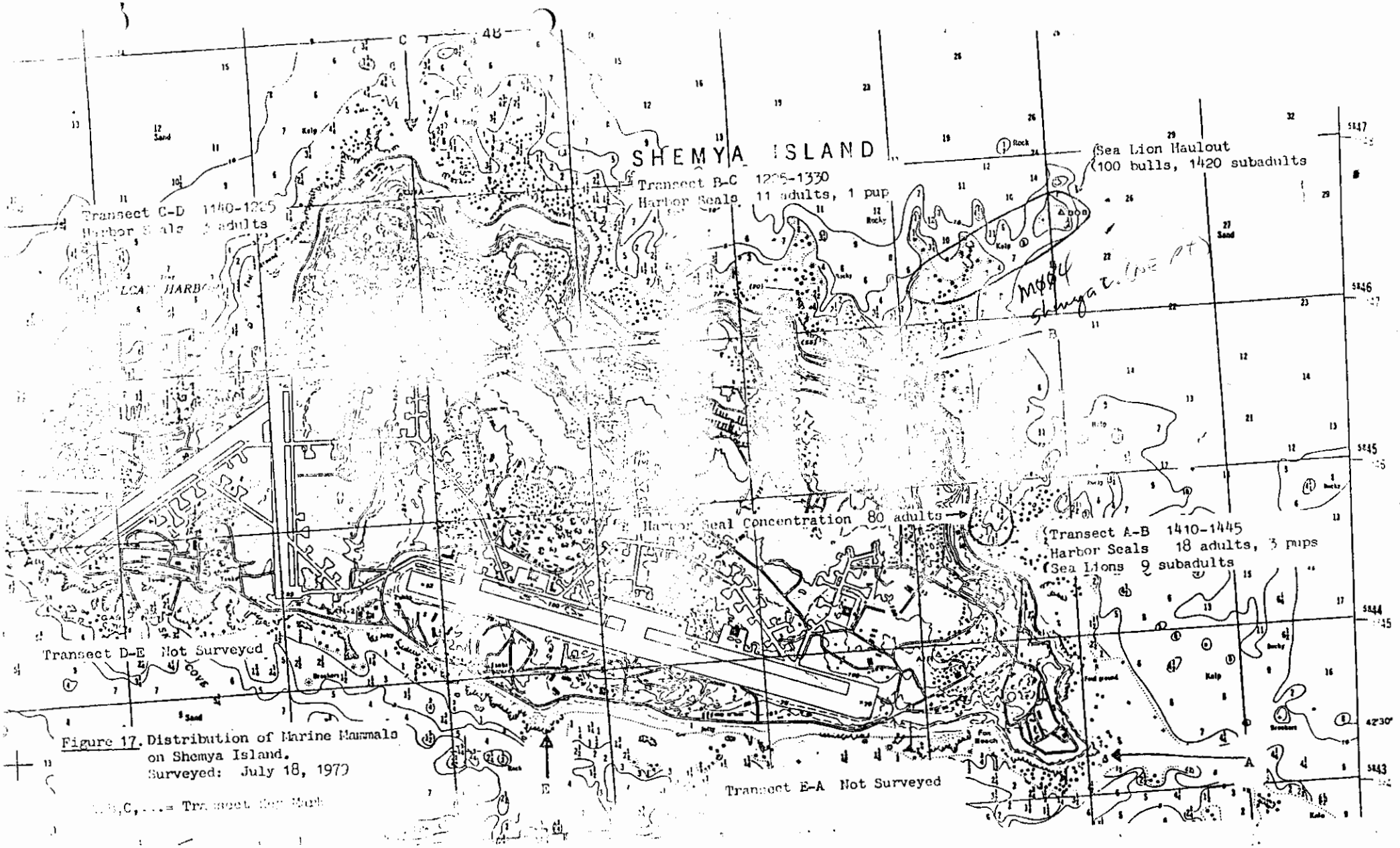


Figure 17. Distribution of Marine Mammals on Shemya Island.
Surveyed: July 18, 1979

A,B,C,... = Transect Corner Mark

Table 37. Marine Mammal Transects on Buldir Island, 1979.

	TRANSECT DESIGNATION									
	A - B	B - C	C - D	D - E	E - F	F - A	Inner Rock	Mid Rock	Outer Rock	TOTAL
Date	23 Jun	23 Jun	23 Jun	24 Jun	24 Jun	24 Jun	23 Jun	23 Jun	23 Jun	
Start Time	1330	1500	1615		1220	1115	1900	1915	1940	
Finish Time	1500	1600	1730	1345		1220	1915	1940	2010	
SPECIES										
Steller's sea lion										
Bulls	253	234	55	24	39	[illegible]	16	61	5	884
Cows/Yearlings	92[illegible]	2		240	[illegible]6	2[illegible]	185	478	44	3894
Pups	4[illegible]			[illegible]5	[illegible]3	[illegible]	44	200	2	1142
Subadult/Nonbreeders	[illegible]	54	[illegible]	[illegible]	[illegible]	[illegible]	12	10	1	340
Total	16[illegible]	290	[illegible]	[illegible]	[illegible]	2[illegible]	257	749	52	6260
Harbor seals										
Adults	1	10	3	3						17
Pups			5							5
Total	1	10	8	3						22
Sea otters										
Adults	4	2		4	11	15		10	17	63
Pups	1			1	1	[illegible]		1	6	11
Total	5	2		5	12	16		11	23	74
Fur seals		1			1					2

Like sea otters, the harbor seals were concentrated on the southwest side and off Northwest Point. This is probably due, in part, to the many outlying tidal rocks in these areas which provide suitable haul-out grounds.

Buldir has the densest sea lion population of all islands surveyed in 1979. The largest rookery was centered around Northwest Point and the associated outlying rocks. Buldir also had the largest percentage (95%) of animals involved with breeding.

Our protracted stay on the Island permitted us to conduct some experimental counts on the sea lion rookery between North Bight and Northwest Point. (See Table 35). These counts were aimed at establishing the best method of surveying sea lions (highest count assumed best) and to establish the reproductive status of the rookery. Our preliminary results indicated the counts from the hillside directly above the rookery using 10 x 50 binoculars and a 15-45 power zoom spotting scope produced the highest counts. Reproductive success was judged from the percentage of cows with pups and was 60 percent on June 16. Parturition and fresh placentas were still being observed as of that date.

Murie (1959) presents evidence that fur seals once bred on Buldir Island as reported to him by Aleuts on Attu and Attu Islands. However, sightings of fur seals in recent years on Buldir are rare. Two males were seen on Buldir in 1977 (Day et al 1978). This year two fur seals were seen during the island survey. One was seen swimming off North Bight on 7 June by A. Taber. In addition 12 decomposed carcasses were counted during the Beached Animal Survey in North Bight on 14 June. (See Section VI)

Killer whale (Orcinus orca) pods were seen twice off Buldir. On 5 June a group of six, including two large males, two medium size cows or juvenile males and two small juveniles were seen swimming west through North Bight near the sea lion rookery. On 21 June, a group of four killer whales (one male, two medium-sized cows or juveniles, and one calf) were seen north of East Cape.

A large, stranded beaked whale (possibly a Baird's beaked whale) was discovered on the south side of East Cape during circumnavigation. However, the animal was not measured and necropsied until 25 July due to small sea lion pups in the area during the circumnavigation. The whale's lower jaw and stomach contents were collected and was sent to Dr. Mead. See appendix for measurement data.

Table 38. Steller Sea Lion Rookery Counts, North Bight, Buldir Island, 1979.

DATE	TIME	BULLS	COWS/ YEARLINGS	PUPS	% PUP/ COW	EXTRAPOLATED PUP COUNT	COUNT TYPE	BINOCS SPOTTING SCOPE
10 June	1730 1900	6	28	12	43%		Peripheral Group A[1]	10X50 Binocs
13 June	1745 1915	6	50	27	54%		Peripheral Group A[1]	10X50 Binocs
[illegible] June	2200 2215	7	63	34	54%		Peripheral Group A[1]	10X50 Binocs
16 June	1700 1830	24	254	153	60%		Peripheral Group A & B	10X50 Binocs
16 June	1700 1830	104	1014	153		608	Rookery Total[1]	15-45S Spotting Scope
25 June	1320 2400	171	925	470	51%		Rookery Total(Zodiac)[2]	10X50 Binocs
27 June	1800	139	839	406	48%		Rookery Total[3]	Questar 52X
28 June	0800	139	919				Rookery Total[3]	Questar 52X

[1]Counted from hillside 100-200 feet above rookery.

[2]Counted from zodiac during seabird/marine mammal transect/survey of Buldir Island.

[3]Counted from 200 foot hillside East Side North Bight .75 miles from rookery.

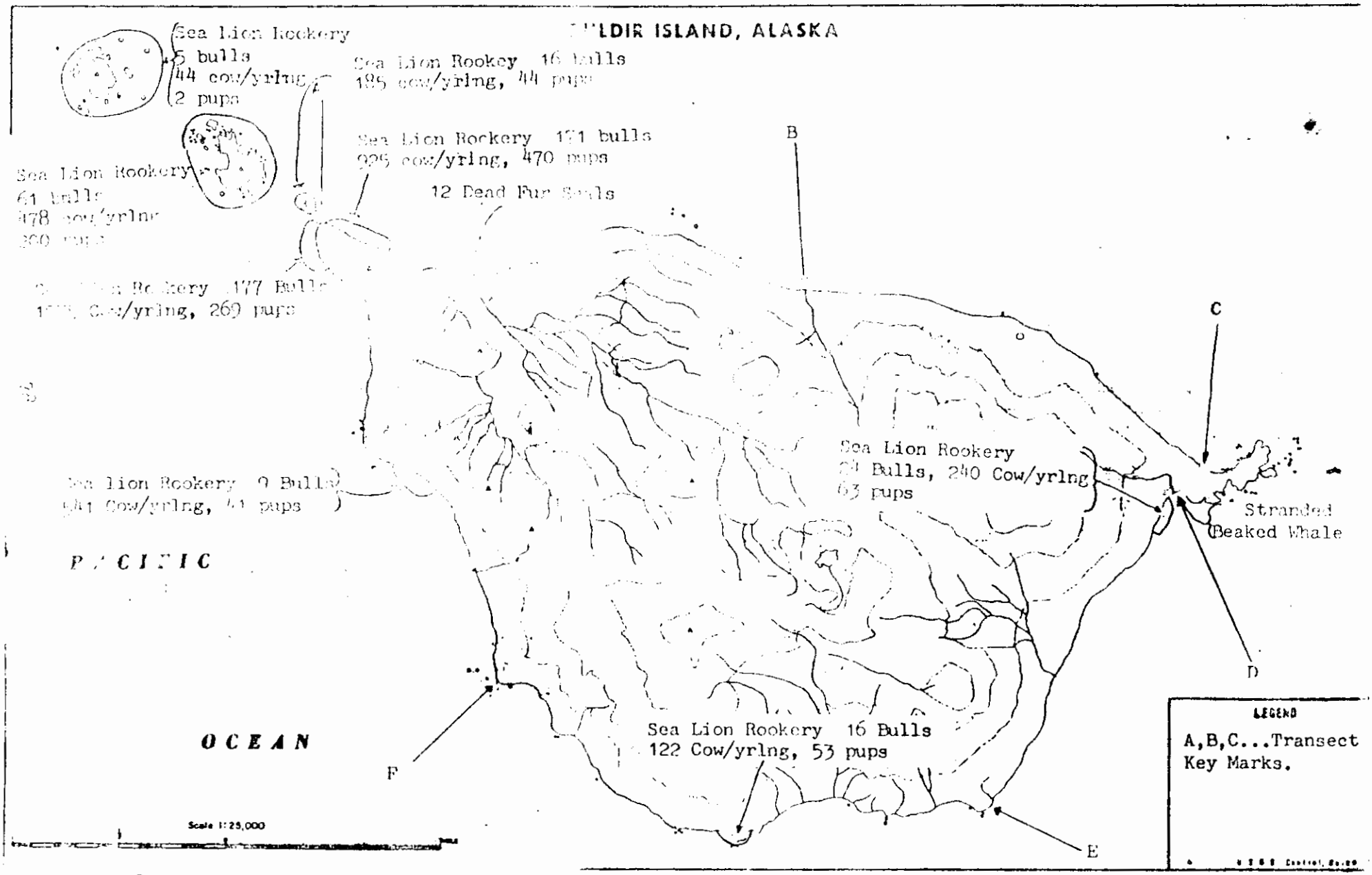


Figure 18. Distribution of Marine Mammals on Buldir Island, June 23-24, 1979.

Segula Island (Figure 19)

Segula Island has a relatively impoverished marine mammal population compared to Buldir Island and the Near Island Group.

A total of 98 sea otters were counted around Segula with 22 percent of the total being pups. The otters were dispersed evenly along the coastline.

Only 18 harbor seals were seen with 22 percent being pups. Only 102 bulls and subadult sea lions were counted around the island.

Khvostof, Pyramid [illegible] Islands (Figure 20 and 21)

These three islands are treated as one group due to their small size, close proximity and similar habitat.

Sea otter pups considered [illegible] percent of the total number of otters observed. Harbor seals were observed around all three islands. On Davidof Island the seals were noticeably absent on the long southeast side but more concentrated on the northeast side. Approximately 24 percent of the harbor seals seen were pups.

A total of only three sea lions were observed. These were all males.

B. Land Mammals and [illegible]ratory Birds

Two species of land mammals and non-migratory birds were observed this season. These are the arctic fox (Alopex lagopus) and rock ptarmigan (Lagopus [illegible]). These two islands differ in habitat and the degree to which they were surveyed and therefore will be discussed separately.

Attu Island

It is thought that foxes are not native to Attu Island (Bancroft 1886). The low number of fox observations, low number of fox trails and the low density coastal orientation of birds indicates that foxes are not abundant on Attu. Cape Wrangell, with its relatively large population of seabirds and marine mammals support the island's densest concentration of fox. Twenty-four individuals were seen there during work this season. Seven of these animals were collected at Cape Wrangell, and their skulls were sent to Dr. Phil Gipson at the University of Alaska Cooperative Wildlife Research Unit for possible ancestrial identification. See Table [illegible] for details.

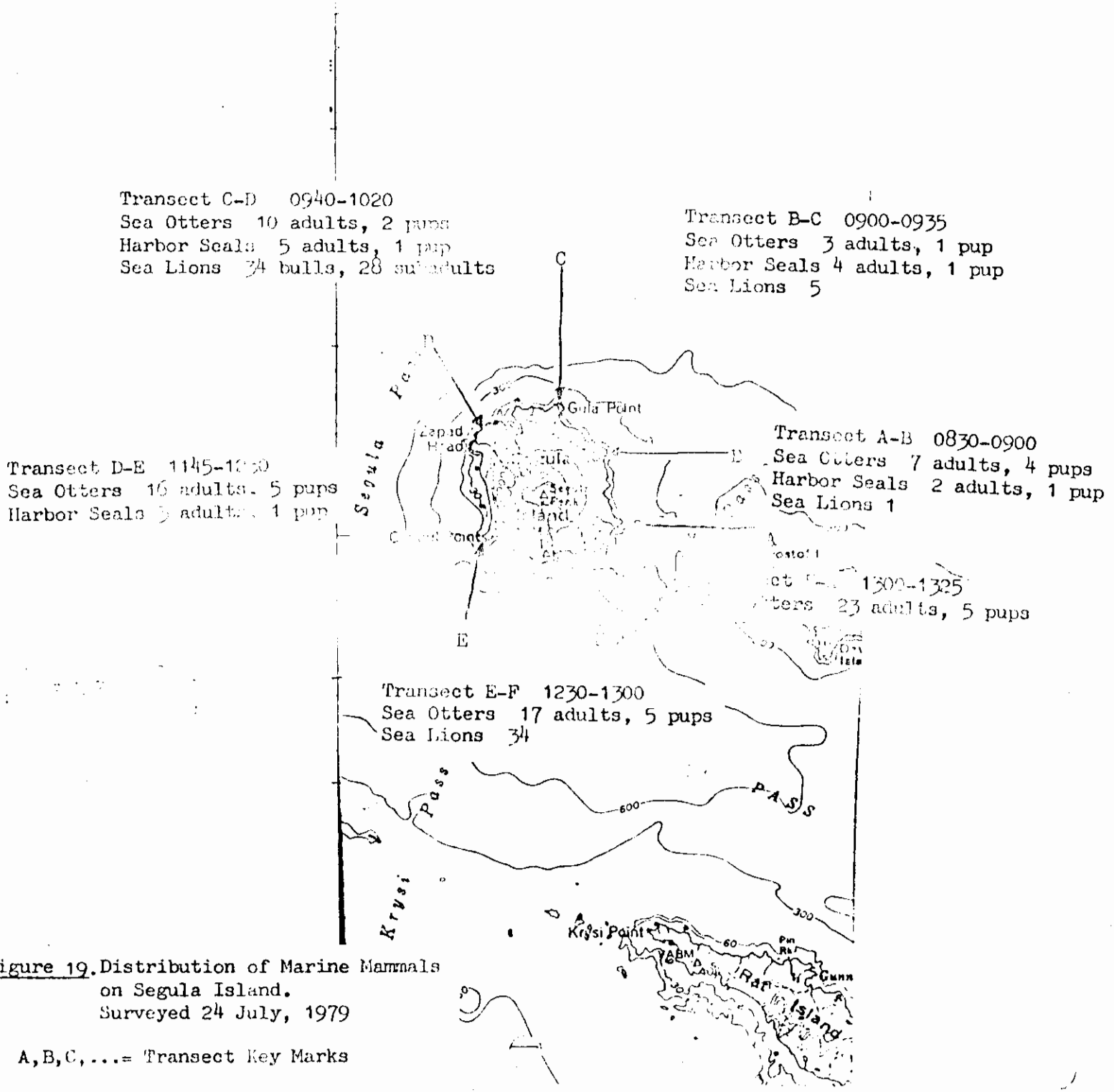


Figure 19. Distribution of Marine Mammals on Segula Island. Surveyed 24 July, 1979

A,B,C,...= Transect Key Marks

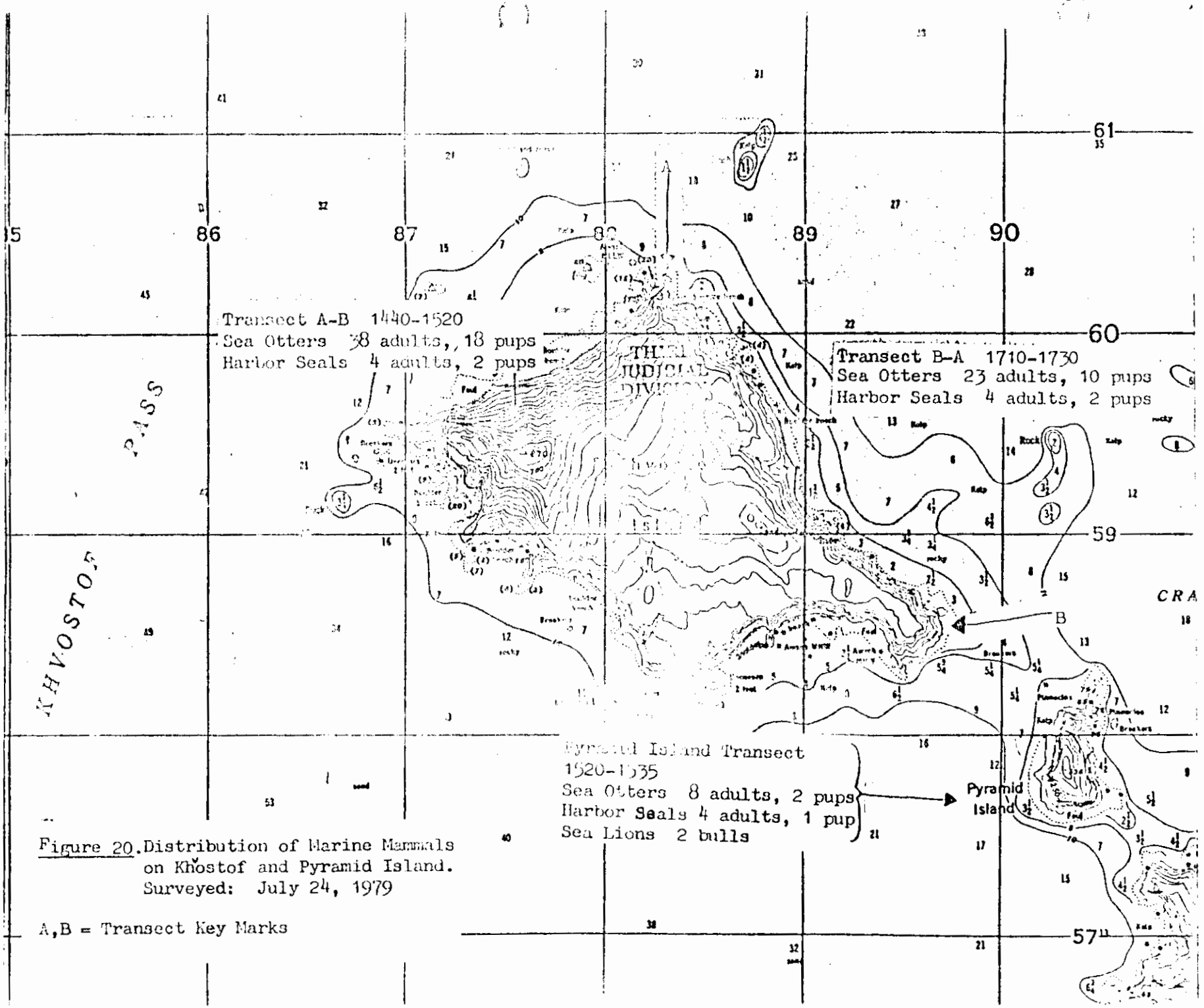


Figure 20. Distribution of Marine Mammals on Khostof and Pyramid Island. Surveyed: July 24, 1979

A,B = Transect Key Marks

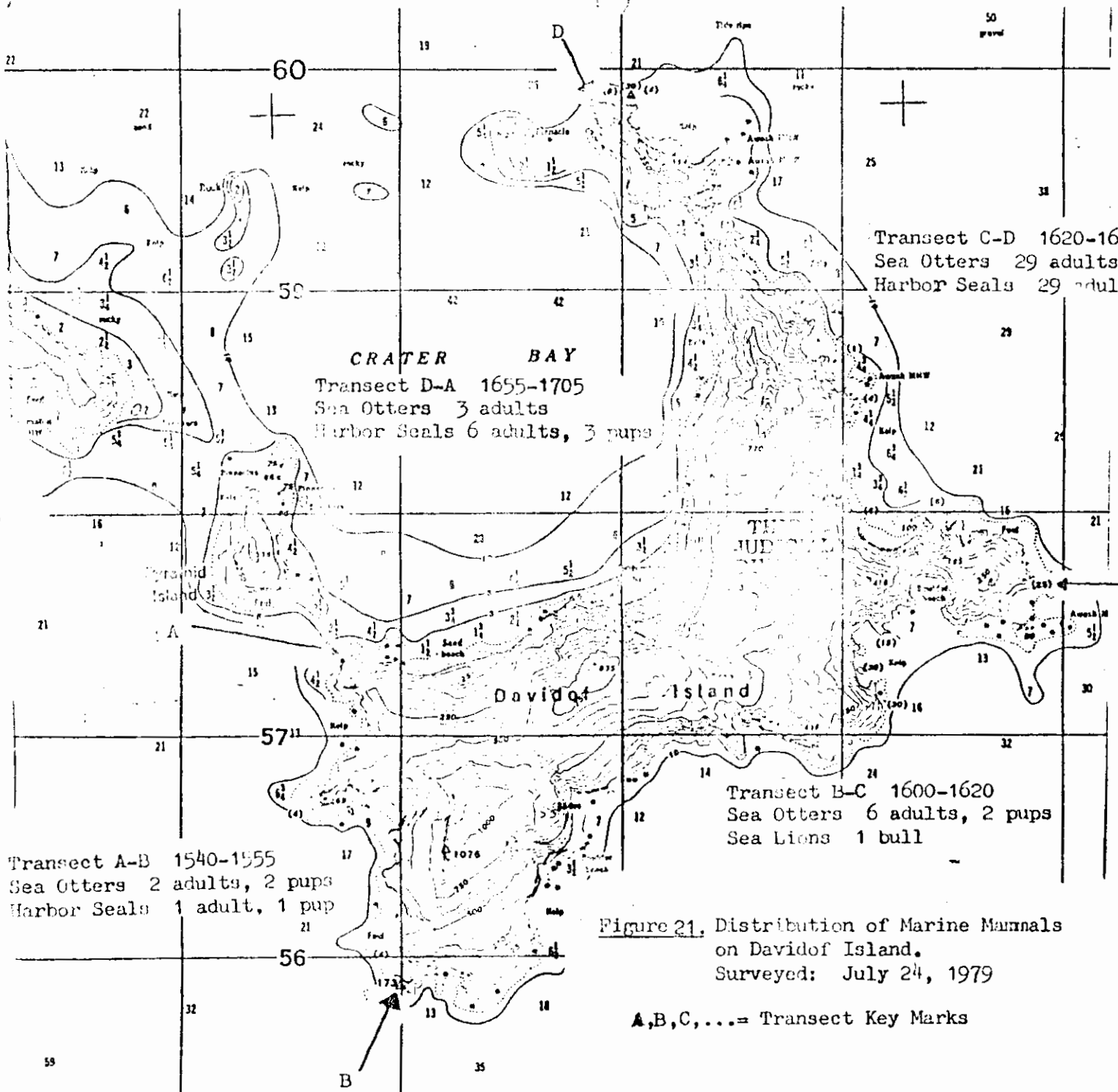


Figure 21. Distribution of Marine Mammals on Davidof Island.
Surveyed: July 24, 1979

A,B,C,...= Transect Key Marks

Table 39. Steller Sea Lion Populations on Selected Aleutian Islands.

ISLAND/LOCATION	ESTIMATED NUMBER OF SEA LIONS				
	1959 Kenyon & Rice(1961)	1965 Kenyon & King(1965)	1969-72 Sekora	1978 Refuge Survey	1979 Refuge Survey
Near Islands					
ATTU ISLAND					
Cape Wrangell	5,000	? 4,000	6,900		3,316
Chirikof Point	10		1,600		122
Entire South Side			85		1
Chichagoff Harbor			900		22
Kresta Point					2
ATTU TOTAL					6,[illegible]
AGATTU ISLAND					
Gillon Point	3,000	1,300	750	1,500	[illegible]
Ochrit[illegible] Bay	100			0	
Cape Sabak	3,300		8,635	8,100	6,5[illegible]
AGATTU TOTAL					7,4[illegible]
ALAID ISLAND					
Alaid(west end)	2,500	2,500	2,500		2,[illegible]
ALAID TOTAL				4,800	2,842
SHEMYA ISLAND					
rocks off N[illegible] S.	[illegible]	2,000	650		1,5[illegible]
Rat Islands					
BULDIR ISLAND					
South Shore	2,500	3,500	4,350		1,62[illegible]
N.W. Cape				1,850	4,[illegible]
BULDIR TOTAL					6,260
SEGULA ISLAND	—				
Gula Point			133		
Chugul Point			115		
SEGULA TOTAL					[illegible]

Table 3. Population of Marine Mammals for Individual Islands, 1979.

Dates Surveyed	BULDIR ISLAND Jun 23,24	AGATTU ISLAND Jul 5,6,7	ATTU ISLAND Jul 8,10,11	SHEMYA PASS ISLAND GROUP Jul 13	NIZKI ISLAND Jul 13,14	ALAID ISLAND Jul 13,14	CHEGVA ISLAND Jul 18	SEGULA ISLAND Jul 24	KHVOSTOF ISLAND Jul 24	PYRAMID ISLAND Jul 24	DAVIDOF ISLAND Jul 24	TOTALS
Steller's sea lion												
Bulls	884	286	225		10	186	100	34		2	1	1,728
Cows/Yearlings	3,894	2,320	1,925			585						8,724
Pups	1,142	183	642			100						2,067
Subadult/nonbreeders	340	4,643	3,2[illegible]	1	6	1,971	1,429	28				11,668
Unidentified								40				40
Total	6,260	7,432	6,0[illegible]	1	16	2,842	1,529	102		2	1	24,777
[illegible]												
[illegible]	17	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	14	8	4	[illegible]	1,547
[illegible]	5	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4	1	[illegible]	409
[illegible]	22	29[illegible]		[illegible]	10[illegible]	[illegible]	[illegible]	35	12	5	[illegible]	1,956
[illegible]	1.8	4.2			8.7	[illegible]	[illegible]	[illegible]	2.9	-	[illegible]	Ave 6.94
[illegible]												
[illegible]	63	[illegible]				2		[illegible]	61	[illegible]	[illegible]	594
[illegible]	11	27						[illegible]	28	2	[illegible]	221
[illegible]	74	94	[illegible]			2		98	89	10	55	815
[illegible]	6.2	(1.3)	[illegible]	-	-	0.2	-	6.2	21.7	-	8.7	Ave 6.70
Territorials	2	4										

1.6

A single Evermann's rock ptarmigan was observed in the Peaceful River Valley on 9 July. A short study was conducted on this race of ptarmigan by refuge personnel in the spring and early summer of 1977 (Tobish and Haflinger, 1977). Coast Guard personnel report numerous rats (Rattus norvegicus) in the Massacre Bay and Casco Cove areas but none were seen by survey personnel.

Agattu Island

The refuge has spent much time and effort over the past years attempting to rid Agattu Island of the introduced arctic fox. During the past two years M-44s have been approved and used as part of the fox eradication program. This spring, Assistant Manager Kent Hall checked the M-44s and also surveyed the island's coastline for fox sign. No fox sign was seen on any beaches visited and one fox was killed by an M-44 at Petrichia Bight. [illegible] been the last fox on Agattu but trapping and hunting [illegible] several years to confirm elimination of this species. Old fox trails can still be seen crisscrossing the island and these will as well as a reduced nesting wildlife population will persist [illegible] ture. Already, however, one notices an increase in bird [illegible] habitat that was once vulnerable to foxes.

Alaid and Nizki Islands

Both of these relatively low lying and presently connected islands had the arctic fox eliminated in 1976. [illegible], as a result of fox eradication, bird nesting [illegible].

Shemya Island

Arctic fox are abundant on [illegible] personnel consider the blue fox the island "symbol" [illegible] them. Norway rats are common on the island also.

Buldir Island

No land mammals or non-migratory birds as discussed above, are present on Buldir Island.

Segula Island

Arctic foxes are concentrated in the vicinity of the auklet colony just south of Gula Point. While setting up auklet plots in this colony, two den sites were discovered: one with the remains of five least auklets near the entrance. At least ten foxes were seen or heard barking during the auklet plot work on the evenings of 23 and 24 July. Four fox pups and a den site were seen on the south side of the island east of Chugul Point.

No ptarmigan were seen during the circumnavigation, while working the auklet plots, or during a brief inland survey on the north side of Zapad Head.

Khvostof, Pyramid and Davidof Islands

There are no existing records of Arctic fox introductions on these islands and from our observations, none exist there. No on-land survey was made, but detailed land observations were made from the Zodiac while circumnavigating. The presence of nesting puffins and gulls in accessible locations to fox is further evidence none occur there. No ptarmigan were observed and it is doubted they are on the islands due to the topography and limited area.

Table 41 . SEX AND WEIGHT OF SEVEN ARCTIC FOXES COLLECTED AT CAPE WRANGELL, ATTU ISLAND, 10 JULY 1979

FIELD NO.	SEX	WHOLE BODY WEIGHT
1	Male	4313 g.
2	Female	4540 g.
3	Female	4313 g.
4	Female	3859 g.
5	Male	4767 g.
6	Male	4427 g.
7	Female	3859 g.

$\bar{x}$ Female Weight - 4142.3 g. (N=4)

$\bar{x}$ Male Weight - 4502.3 g. (N=3)

VI. MISCELLANEOUS ACTIVITIES AND OBSERVATIONS

A. Beached Animal Surveys

We conducted a total of three beached animal surveys during the summer of 1979. Two were initiated in 1977 and one 1976. The transect on the south side of Alaid Island was done 13 July, the transect on the northwest side of Nizki was done 14 July and the transect at North Bight on Buldir Island was completed 14 June. The results from these surveys are presented in Table 42.

B. Terrestrial Transects

Inland bird transects. Nine permanent inland bird transects were completed this season on four different islands. All transect locations are presented in Day et al (1978). Three transects were run on Alaid, two on Nizki, three on Agattu and one on Buldir Island. The transects on Agattu Island were run by Dan and Janice Yparraguirre.

These transects should be run regularly, if possible, as arctic fox have recently been removed from these islands and bird recovery should be carefully monitored.

Methods of transect calculations are discussed in Day et al (1978). Transect results for 1977 through 1979 are on Table 43 and all inland transect data are included in refuge files.

Beach transects. Six permanent beach bird transects were surveyed this season on three different islands. The data is summarized on Table 44 and specific information is included in refuge files. A total of almost 600 individual birds were observed in all transects and Buldir Island accounted for 67% of the total.

C. Pelagic Bird Transects

In addition to colony seabird work, pelagic surveys were used to record at-sea distribution and abundance of seabirds. Methods used are described by Spindler (1976). Past data is on file at the refuge office.

During 1979, a total of 64 transects were completed aboard the R/V Aleutian Tern. A total of 23 were done in the Near Islands, 33 in the Rat Islands and nine in the Delarofs during the period 31 May to 2 August. All were done west of Tanaga Island. See Tables 45 through 47 and Figures 21 through 24.

Table 42. Results of Beached Animal Surveys on Three Islands in the Western Aleutians, 1979.

DATE RUN	BULDIR* (NORTH BIGHT) #1 14 June	ALAID #1 13 July	NIZKI #1 14 July	TOTALS
Cormorant sp. (Ad.)	1		1	2
(Imm.)		2		2
Pelagic cormorant (Ad.)			2	2
(Imm.)				0
Red-faced cormorant (Ad.)			1	1
(I				0
Glaucous-winged gull	1			1
(Imm.)	8			8
Herring gull (Ad.)	1			1
Black-headed gull (Ad.)	1			1
Common murre (Ad.)			1	1
Auklet sp.	1			1
Sea otter (Ad.)	1			1
Steller's sealion(sub		1	1	2
(pup)	1			1
Northern fur seal	12			12

*One coconut shell found on Buldir beach.

Table 43. Comparisons of Inland Transects Run from 1977 to 1979 on Several Western Aleutian Islands Recently Eradicated of Arctic Fox*

AVERAGE NUMBER OF BIRDS PER HECTARE**

	1977			1978			1979		
ISLAND	Lapland Longspur	Snow Bunting	Rock Sandpiper	Lapland Longspur	Snow Bunting	Rock Sandpiper	Lapland Longspur	Snow Bunting	Rock Sandpiper
Alaid	4.45	0.486	0	3.55	0	0.292	2.83	0.06	0.296
Nizki	3.44	0	0.143	4.04	0	0.271	3.72	0	0.036
Agattu	2.94	0	[illegible]	[illegible]	0.213	[illegible]	2.50	0.750	0.457

* [illegible] eradicated as fol[illegible] 1976, Agattu [illegible]

** Number of birds equals average of six transects on each island (Alaid-2, Nizki-2, Agattu-3).

Table 44. Results of Beach Bird Transect Surveys on Three Islands in the Western Aleutians, 1979.

DATE RUN	ALAID #1 13 July	ALAID #2 14 July	NIZKI #1 14 July	NIZKI #2 14 July	NIZKI #3 14 July	BULDIR (NORTH BIGHT) #1 14 June	TOTAL
Common eider (male)	0	0	1	0	0	0	1
(female)	8	1	2	0	0	1	12
Glaucous-winged gull (Ad.)	17	0	0	0	0	350+	367+
(Imm.)	11	0	0	0	7(Fledg)	20+	38+
Winter wren	0	3	6	3	1	21	34
Mallard (female)	0	0	0	0	1	0	1
Song sparrow	3	15	30	4	4	6	62
Lapland longspur	3	0	0	0	1	0	4
Snow bunting (male)	4	10	10	2	6	0	32
(Female & Juv.)	2	12	17	5	5	0	41
TOTAL	48	41	66	14	25	398	592

Table 45. Pelagic bird transects in the Delarof Islands, 1979. ($N = 9$, $\bar{x} = 86.2$ birds/km^2)

SPECIES	FREQUENCY OF OCCURRENCE (PERCENT)
Northern Fulmar	100
Laysan Albatross	89
Unid. Auklet	89
Least Auklet	67
Tufted Puffin	56
Horned Puffin	22
Glaucous-winged Gull	33
Unid. Murre	22
Fork-tailed Petrel	11
Leach's Petrel	11
Parakeet Auklet	11
Black-legged Kittiwake	11

Table 46. Pelagic bird transects in the Rat Islands, 1979.
(N = 29, $\bar{x}$ = 136.6 birds/km^2)

SPECIES	FREQUENCY OF OCCURRENCE (PERCENT)
Northern Fulmar*	90
Tufted Puffin	79
Glaucous-winged Gull	72
Laysan Albatross	[illegible]
Fork-tailed Petrel	[illegible]
Black-legged Kittiwake	[illegible]
Least Auklet	[illegible]
Horned Puffin	[illegible]
Unid. Auklet	[illegible]
Unid. Murre	[illegible]
Unid. Shearwater	[illegible]
Parakeet Auklet	[illegible]
Black-footed Albatross	10
Ancient Murrelet	[illegible]
Unid. Cormorant	[illegible]
Crested Auklet	[illegible]
Red Phalarope	10
Unid. Tern	7
Unid. Jaegar	[illegible]
Pigeon Guillemot	7
Unid. Murrelet	[illegible]

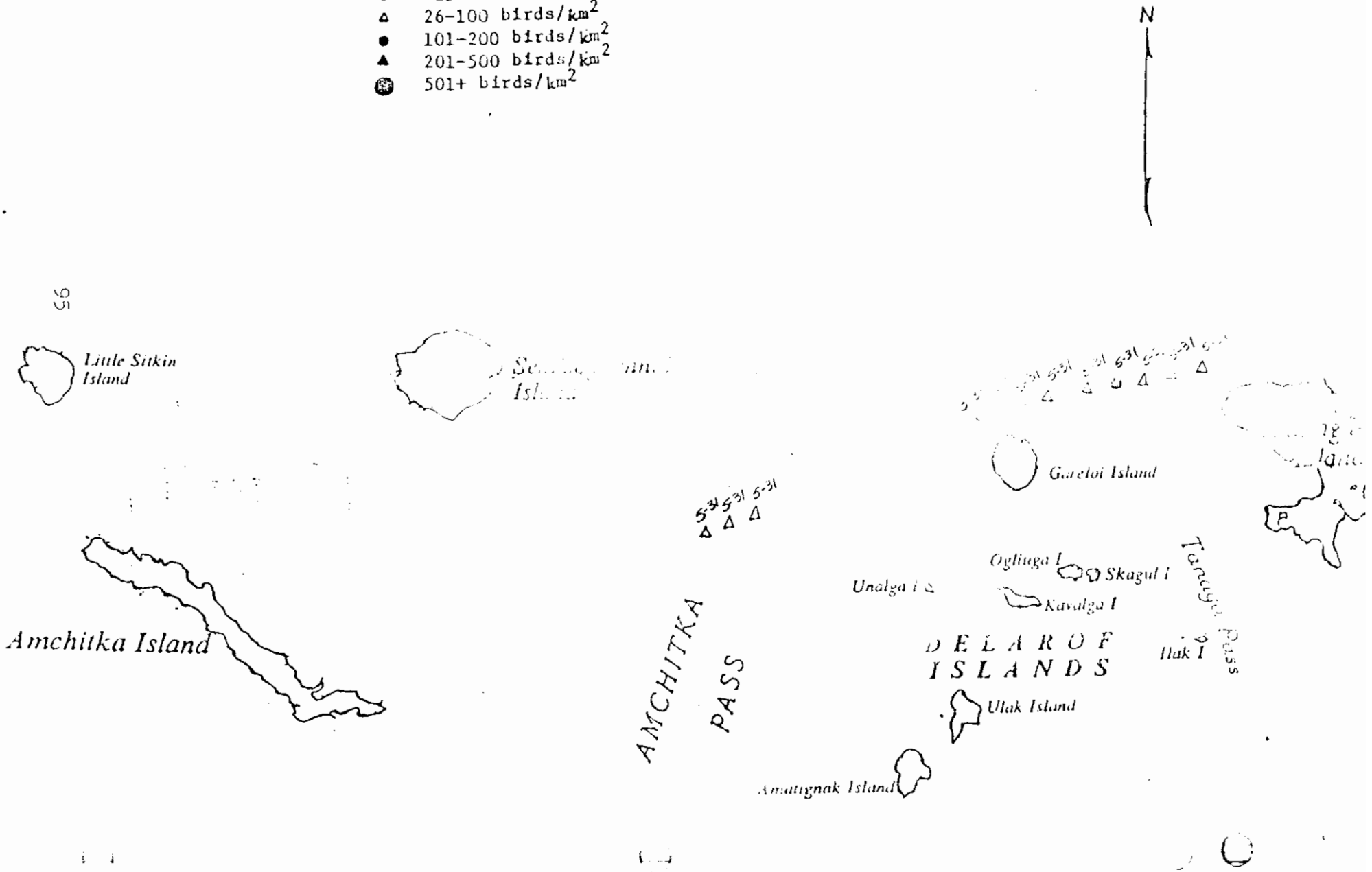
* Light phase comprised 4.4 percent of all fulmars observed (N = 756).

Table 47. Pelagic bird transects in the Near Islands, 1979.
($N = 26$, $\bar{x} = 77.4$ birds/km^2)

SPECIES	FREQUENCY OF OCCURRENCE (PERCENT)
Glaucous-winged Gull	96
Tufted Puffin	92
Northern Fulmar	81
Black-legged Kittiwake	61
Unid. Shearwater	46
Unid. Murre	42
Unid. Cormorant	35
Laysan Albatross	23
Fork-tailed Petrel	23
Horned Puffin	19
Ancient Murrelet	15
Pigeon Guillemot	12
Crested Auklet	12
Black-footed Albatross	8
Unid. Auklet	4
Unid. Murrelet	4
Unid. Tern	4
Leach's Petrel	4

Figure 21 Pelagic transects in the Delarof Islands, 1979.
(Month/day transects indicated after each symbol.)

- ○ 25 birds/km^2
- △ 26-100 birds/km^2
- ● 101-200 birds/km^2
- ▲ 201-500 birds/km^2
- ◉ 501+ birds/km^2



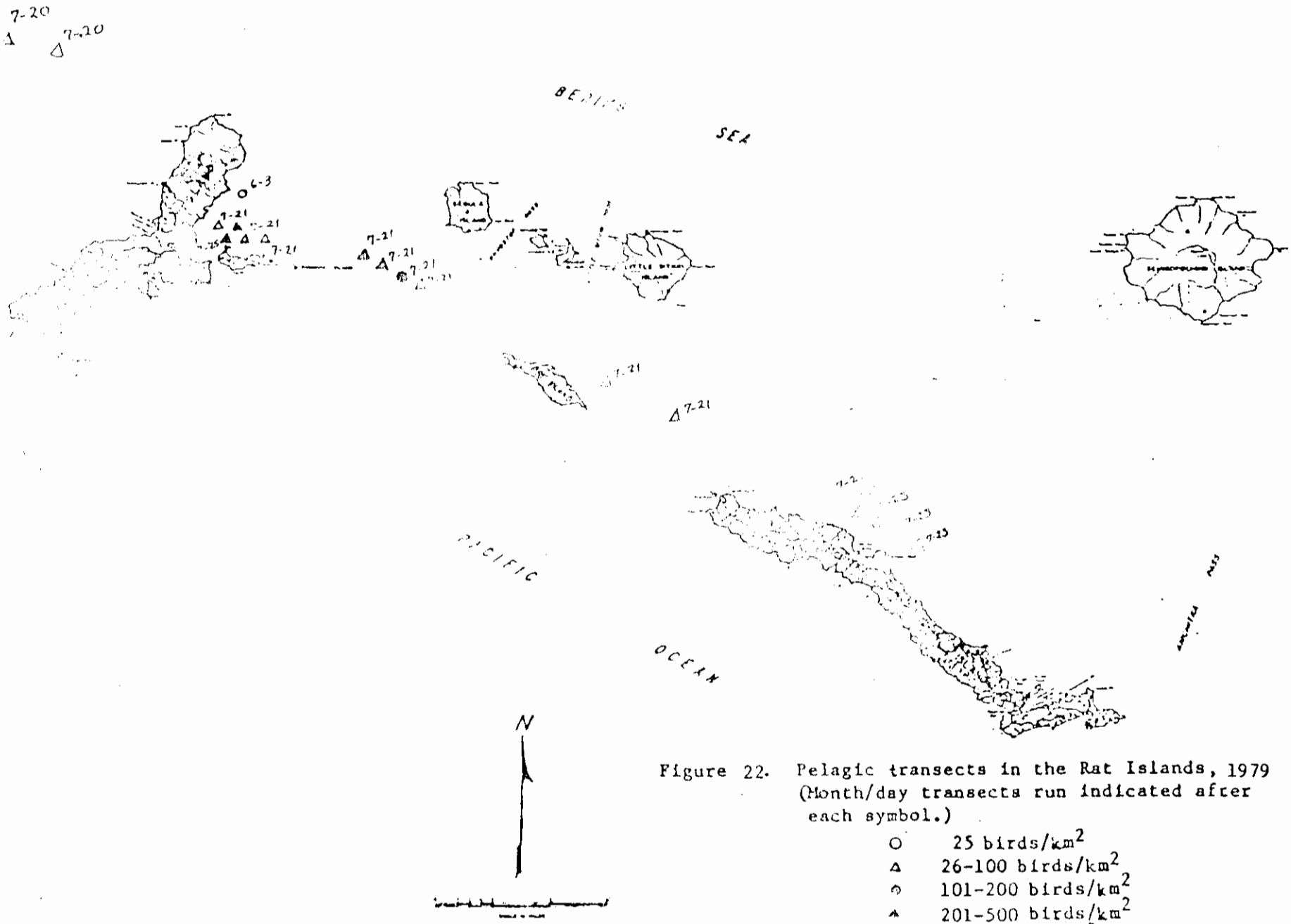


Figure 22. Pelagic transects in the Rat Islands, 1979 (Month/day transects run indicated after each symbol.)

- ○ 25 birds/km^2
- △ 26-100 birds/km^2
- ◎ 101-200 birds/km^2
- ▲ 201-500 birds/km^2
- ◠ 501+ birds/km^2

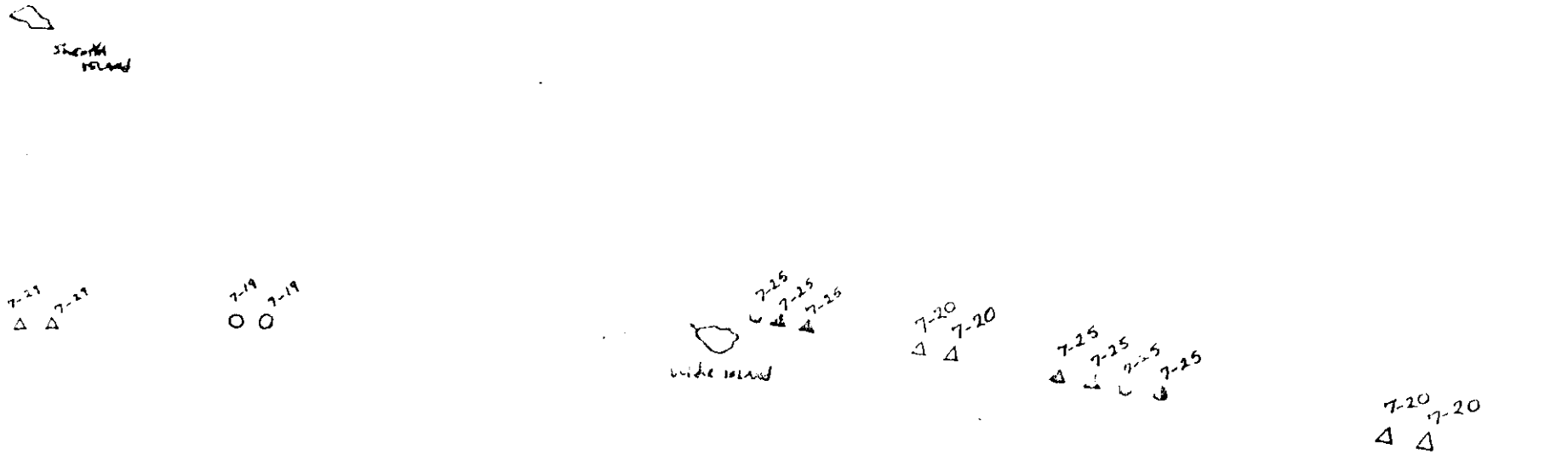


Figure 23 Pelagic transects from Shemya to Kiska Island, 1975. (Month/day transect indicated after each symbol

- O 25 birds/km^2
- △ 26-100 birds/km^2
- ◡ 101-200 birds/km^2
- ◭ 201-500 birds/km^2
- ◡ 501+ birds/km^2

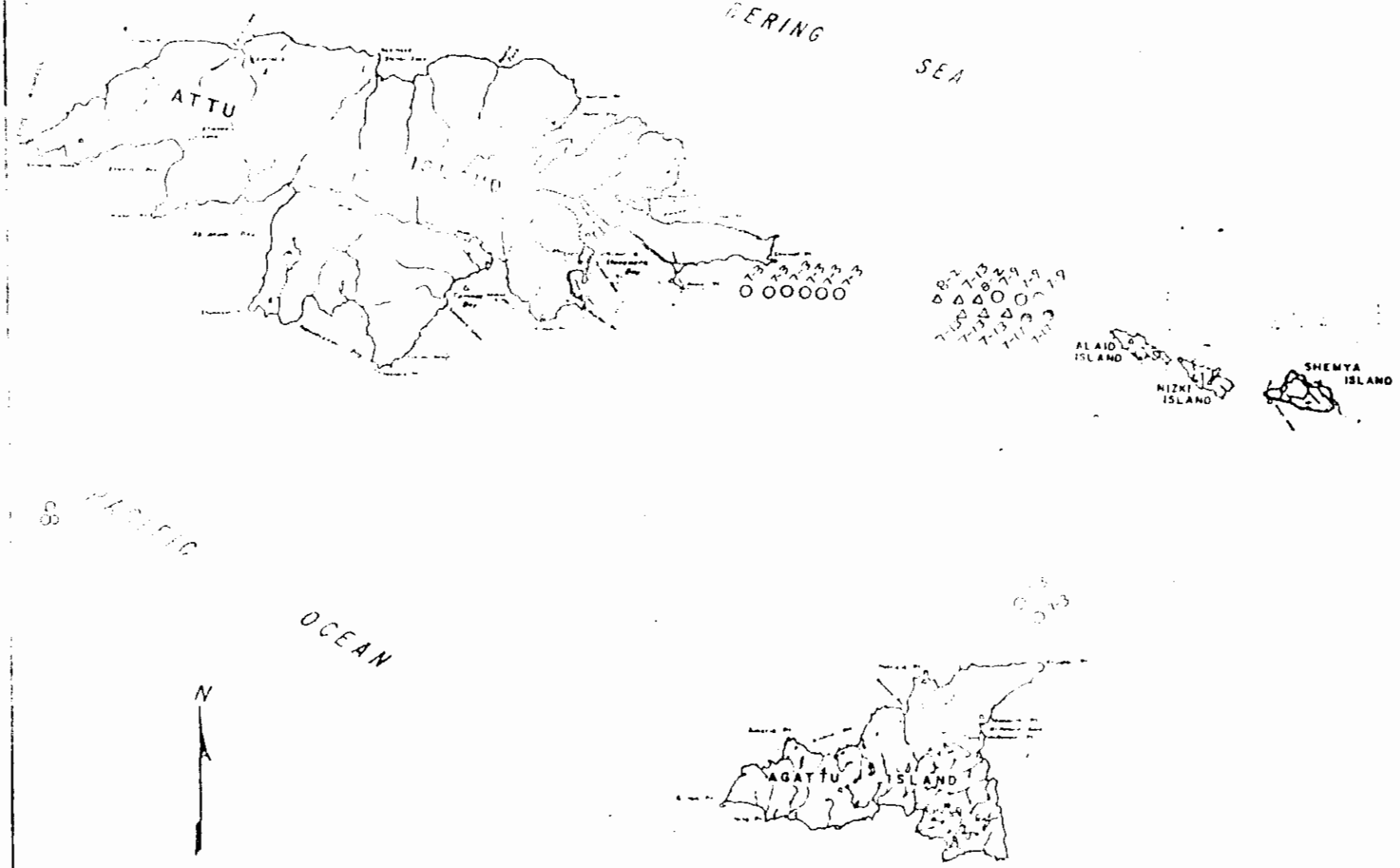


Figure 24. Pelagic transects in the Near Islands, 1979
(Month/day transect run indicated after each symbol)

- O 25 birds/km^2
- △ 26-100 birds/km^2
- ● 101-200 birds/km^2
- ▲ 201-500 birds/km^2
- ◯ 501+ birds/km^2

Table 48. Data on burrows and their status in permanent plots 1 through 6 at Buldir Island, 1979.

	DEAD END	SLUMP	INACTIVE	ACTIVE WITH JUST BIRDS	ACTIVE WITH EGG/ YOUNG	TOO DEEP TO TELL	TOTAL	DEAD END	SLUMP	INACTIVE	ACTIVE WITH JUST BIRDS	ACTIVE WITH EGG/ YOUNG	TOO DEEP TO TELL	TOTAL
			Plot #1							Plot #2				
FT SP					8		8					3		3
LE SP				4	4		8				2	2		4
Petrel	9		12	1	3	5	30			14	1	9	2	26
AN MU					2		2			1		4	1	6
CA AU							0							0
PA AU							0							0
Auklet/Murrelet							0							0
TU PU							0						4	4
Unknown species							0	1		18				19
TOTAL	9	0	12	5	17	5	48	1	0	33	3	18	7	62
			Plot #3							Plot #4				
FT SP				3	6		9				2	5		7
LE SP				3	2		5			1	3	5		9
Petrel	4		7		2	2	15			6	1	3		10
AN MU			1				1							0
CA AU							0							0
PA AU							0							0
Auklet/Murrelet							0							0
TU PU							0							0
Unknown species			8			1	9	6		5				11
TOTAL	4	0	16	6	10	3	40	6	3	12	6	13	0	40
			Plot #5							Plot #6				
FT SP				1	9		10				1	2		3
LE SP				3	14		17					7		7
Petrel	35	8	21		5	11	80	10	2	10		2	16	40
AN MU							0	3	1	1		5	7	17
CA AU							0				4	11		15
PA AU							0					1		1
Auklet/Murrelet	11	1	17		28	10	67	9	4	6		1	30	50
TU PU	1		2			10	13			1			5	6
Unknown species							0							0
TOTAL	47	9	40	4	56	31	197	22	7	18	5	29	58	139

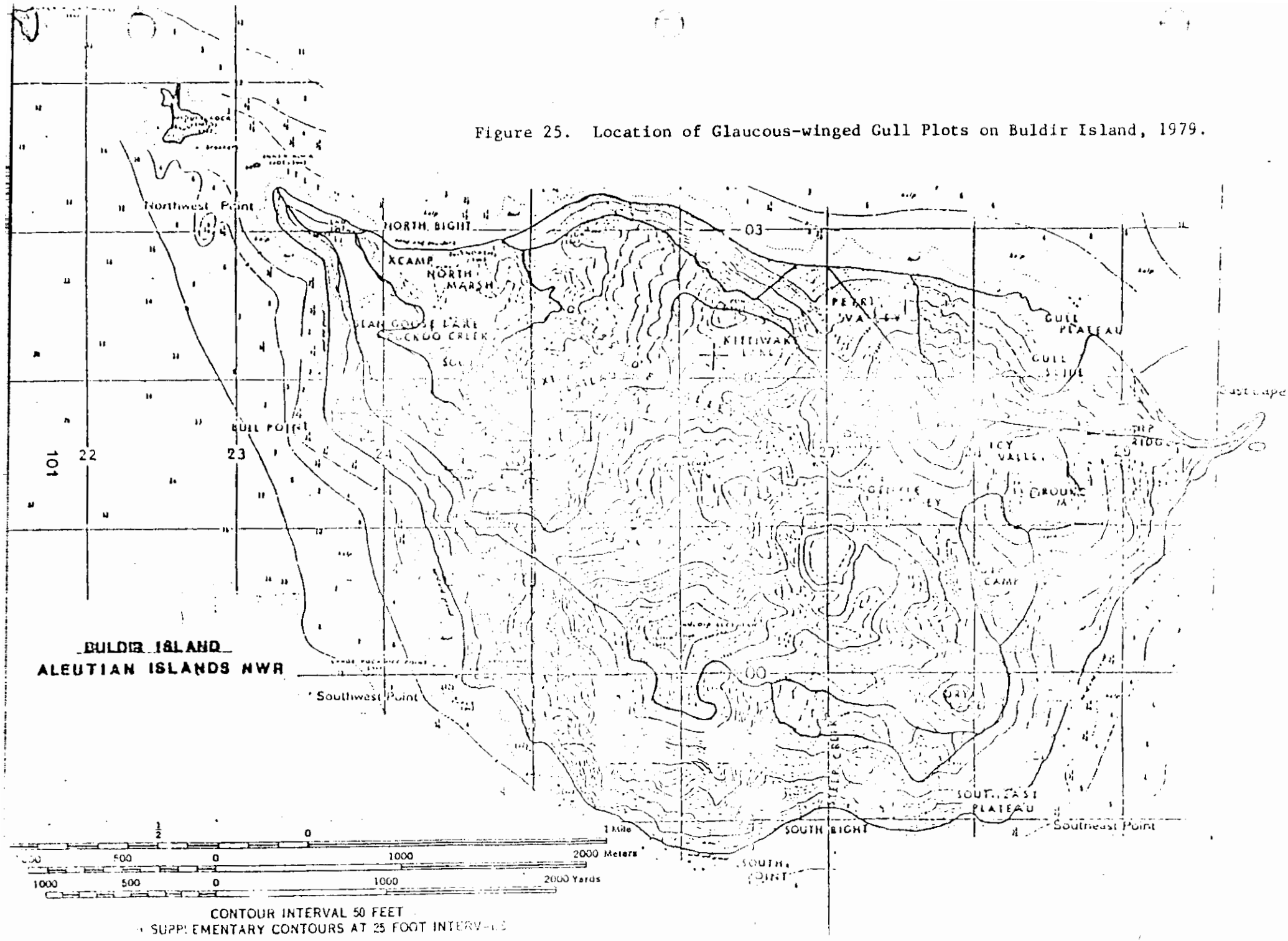
NOTE: FT SP=Fork-tailed storm-petrel;LE SP=Leach's storm-petrel;AN MU=Ancient murrelet;CA AU=Cassin's auklet; PA AU=Parakeet auklet: TU PU=Tufted Puffin

Table 49. Summary of Status of Burrows in Plots 1 through 6 at Buldir Island, 1979.

SPECIES	1979 # Burrows	1979 % of Total	1978 # Burrows	1978 % of Total
Total Petrels (FT, LE, UNK)	291	56.5	477	76.6
FT petrel-all	40	7.8	73	11.7
FT petrel-active*	40	7.8	72	11.6
LE petrel-all	50	9.7	141	22.6
LE petrel-active	49	9.5	135	21.7
Unk petrel-all	201	39.0	263	42.2
Total AN Murrelet	27	5.2	57	9.1
AN murrelet-active	12	2.3	49	7.9
Total CA Auklet	15	2.9	3	0.5
CA auklet-active	15	2.9	3	0.5
Total PA Auklet	1	0.2	1	0.2
PA auklet-active	1	0.2	1	0.2
Total Auklet/Murrelet	117	22.6	34	5.5
Auklet/Murrelet-active	29	5.6	23	3.7
Total TU Puffin	23	4.5	41	6.6
TU puffin-active	0	0.0	34	5.5
Total Unk Species	42	8.1	10	1.6
Total # Burrows	516	100.0	623	100.0

*Active = with eggs or young

Figure 25. Location of Glaucous-winged Gull Plots on Buldir Island, 1979.



Highest bird densities were found in areas of upwelling or near large bird colonies. The densest individual transect was 713 birds/km^2 was observed off Chitka Point, Amchitka Island. Total average mean density for all counts was 105.5 birds/km^2. The Delarofs averaged 86.2 birds/km^2 compared to 88.4 for the same area last year. The Rat Islands averaged 136.6 birds/km^2 compared to 125.7 last year and the Near Islands 77.4 birds/km^2 compared to 25.8 last year.

D. Permanent Plots

During 1979, nine permanent plots were checked on Nizki and Buldir Islands. Eight were established previous to this season and two were set up for the first time in 1979. Refer to Day, et al, (1978) for descriptions of plots, their location and monitoring methods.

Nizki Island. A puffin plot was established in 1978 on the west end of the island. The plot was checked on 14 July this year. No burrows were found either this year or last, but should expansion of nesting puffins take place, this plot should begin to pick up nests. It is critical to monitor this plot to record nesting trends of these birds following fox eradication. Another puffin plot should be established, if time permits, on Alaid.

Buldir Island. Eight permanent plots exist on Buldir presently to monitor seabirds. All birds captured in the burrows this season were banded or rebanded and most individual burrow entrances were marked where possible. Plot number 1 was checked on 26 and 28 June; number 2 was checked 13 and 16 June; number 3 on 25 and 28 June, number 5 on 18 and 24 June; number 6 on 26 June and both 7 and 8 on 6 June. The puffin, petrel and murrelet plots (#1 thru 4) were checked twice with a three to four day interval between checks.

Plots 7 and 8 were set up this year in an effort to monitor the glaucous-winged gull nesting population. These plots are superimposed on goose census plots Ig and Ih respectively (Figure 25). Refer to Table 50 below for information on the two gull plots.

Table 50. Data on Glaucous-winged gull plots checked on 6 June, 1979 on Buldir Island.

	Number of Eggs				
	0	1	2	3	4	TOTAL
No. nests Plot 7		0	7	30	0	37
No. nests Plot 8	1	1	3	26	0	31

Total burrows on plots 1 through 6 are down about 100. This may be the result in different observers doing the work. Many burrows connect with other ones and may or may not be counted. Numbered tags on each entrance may eliminate this problem. More Cassin's auklets were found this season on plot 6 than last season possibly because the date of check was approximately 3 weeks earlier-before young had fledged.

E. Auklet Census

In past surveys, (Sekora, et al [in press]. Day, et al 1978 and 1979), it has been found that auklets comprise a high proportion of the breeding bird population within the ATTR. Our survey this summer showed a reduced percentage (43.6%) due to the fact that Buldir Island contained enormous numbers (1.36 million) of petrels.

The Segula Island colony, located just south of Gula Point (Figure 26) was the only one observed this season. It was estimated to contain about 7.82 x 10^5 m^2 based on inland surveys and on-ship sightings from off-shore. We surveyed the colony on 23 July and worked the plots on 24 July. We estimated the colony was composed of three major categories of auklet population densities all intermixed within the area above. Areas of exposed talus and high auklet density comprised about 5% of the total area. Areas more vegetated and eroded contained medium to low densities and comprised an estimated 35% of the total area. The remaining 60% or about 4.7 x 10^5 m^2 were virtually not used. Plots were set up and checked on the two types of used habitat; two on the high density areas and two on the med-low areas. These plots were set up non-randomly in areas both representative of the habitat types and easily accessible.

The total estimated auklet population was just over 1/2 million birds of which 90% were least auklets and 10% crested. No other species of auklets were seen in the colony. We realize this is a very rough population estimate but yet gives us an idea of relative colony status until more detailed studies are made. Table 51 gives information on the plots monitored and Appendix III gives details on how the population estimate was made.

F. Rare Bird Observation

One scaled petrel (Pterodroma inexpectata) was observed flying northwest about 10-15 feet above the water between Agattu Island and Buldir Island (52 25'N 175 08'E) on 27 July 1979. Sighting was from R/V Aleutian Tern by William Henry and George Putney.

Table 51. Estimates of the Total Population of Auklets on the Segula Island Auklet Colony, 1979.

DENSITY TYPE	NO. PLOTS SAMPLED	NO. PLOTS IN DENSITY TYPE	AVERAGE NO. LEAST AUKLETS/PLOT	AVERAGE NO. CRESTED AUKLETS/PLOT	TOTAL EST. NO. LEAST AUKLETS	TOTAL EST. NO. CRESTED AUKLETS	TOTAL AUKLETS
[illegible]	2	[illegible]	455	5	178,150	19,575	197,725
Med-Low	3	2,74[illegible]	108	10	296,0[illegible]	27,[illegible]00	323,400
		3,12[illegible]			[illegible]74,1[illegible] 90%	46,975(10%)	521,125(100%)

LITERATURE CITED

Byrd, V.G. 1978. Birds of Buldir Island, Alaska with notes on abundance and nesting chronology. Aleutian Islands NWR. Unpubl. Rep. 124pp.

Day, R.H., Tom J. Early and Eric P. Knudtson. 1978. A bird and mammal survey of the western Aleutians. Aleutian Islands NWR. Unpubl. Rep. 170pp.

Day, R.H., Brian E. Lavhead, Tom J. Early and Elaine B. Rhode. 1979. Results of a [illegible] survey of the western Aleutian Islands [illegible] NWR. Unpubl. Rep. 243pp.

Haflinger, K., Theodore [illegible]. Results of a population survey of the rock ptarmigan [illegible] Aleutian Islands NWR. Unpubl. Rep. 13pp.

Henry, W.G. and Tom J. [illegible]. Progress report on the study of Aleutian Canada geese at Buldir Island, Aleutian Islands, Alaska, 1979. Aleutian Islands NWR. Unpubl. Rep. 27pp.

Kenyon, K.W. 1969. [illegible] the eastern Pacific Ocean. N. Am. Fauna, No. 68. 353pp.

Schoen, J. 1978. [illegible] Wildlife Refuge wilderness study report. [illegible] Unpubl. Adm. Rep. 409pp.

Sowls, A.L., Scott A. Hatch, [illegible] J. Lensink. 1978. Catalog of Alaskan Seabird Colonies. [illegible] WS.

Spindler, M.A. 1976. Relative [illegible] r-shore seabird densities in the western Aleutian Islands as determined by transect counts in 1975 and 1976. [illegible] NWR. Unpubl. Rep. 71pp.

Trapp, J.L. 1975. [illegible] of Alaid and Nizki Islands, Aleutian Islands. [illegible] Islands NWR. Unpubl. Rep. 15pp.

_____.1976. Report on a brief biological survey of Davidof, Khvostof and Little Kiska Islands. Aleutian Islands NWR. Unpubl. Rep. 15pp.

1979

APPENDIX I

Actual Transect Data From Counts

Attu Circum...

1979

entered this column — nests

SPECIES	A-B	B-C	C-D	D-E	A1-B1	B1-D1		D1-E1	E1-F1	F1-G1	G1-H1 ?	H1-I1
					Hall, Henry, Tibbetts, Hall, Garrett							
Cormorant sp.	1450	2275	1566	4578	1055	~~300~~		153	895	302	507	605
Cormorant nest	311	23	63	14	105	—		28			47	30
RF Cormorant												
RFC Nest												
Pelagic Cormorant												
PC Nest												
Northern Fulmar												
Shearwater												
Black Oystercatcher												
Ruddy Turnstone												
Rock Sandpiper						1						
Northern Phalarope												
Parasitic Jaeger												
Pomarine Jaeger												
Glaucous-Winged Gull (entered adult + immature (not fledgling))												
Adult	491	315	247	580	866	547		226	248	370	772	402
Immature	51	40	23	12	25	50				8	5	
Fledgling	29	30	25	49		2					11	
Black-leg. Kittiwake												
Adult		340		712						1		
Immature		2										
Nest												
Arctic Tern												
Aleutian Tern	66											
Murre sp.	13	6		1	420	3			4	85	51	58
Common Murre												
Thick-billed Murre												
Pigeon Guillemot	4	8	1	5	55	21		1			17	17
Kittlitz's Murrelet sp.			1			2					2	
Auklet sp.					1							
Crested Auklet	5										2	
Least Auklet												
Whiskered Auklet												
Parakeet Auklet												
Horned Puffin	5	25	2	57	9	4		31	2	4	18	38
Tufted Puffin	73	157	313	692	1560	17		28	5	69	30	144
					107							

Attu Circumnavigation

SPECIES	029 A-B	014 B-C	028 C-D	027 D-E	Holtz Bay, Chichagof, Bell South A1-B1	B1-C1	C1-D1	D1-E1	024 E1-F1	023 F1-G1	G1-H1	H1-I1
Emperor Goose												
Common Teal												
Harlequin Duck	76	47	98	26	25	194		10	96	26	88	91
Oldsquaw												
Common Eider												
~~Adult~~ Male / Immature Male	322	470	1302	165	194	886		71	257	765	965	924
Female	386	127	137	87	178	194		23	128	120	135	92
Duckling	38			109		3						
Bald Eagle												
Adult												
Immature												
Peregrine Falcon					1							
Common Raven	9		5		3	2			1			
Mottled Murrelet	4					1						
Murrelet sp.	16										4 R.B.	
Mallard			18									
SEA Otter												
Adult	27	37	37	61	2	1			2		1	
Pup	17	5	11	29					1			
Harbor Seal												
Adult	149	50	47	39	41	41		8	23	15	31	16
Pup	24	22	14	18	23	9		5	7	6	12	7
SEA Lion								30				
Male /Yearlings		122	3	22							1	
Female												
Pup												
Loon sp.					2		1				2	
Yellow-billed Loon					1	1						
	8 Jul 79	8 Jul 79	[illegible]	8 Jul 79	10 Jul 79	10 Jul 79	10 Jul 79	10 Jul 79	10 Jul 79	10 July	10 July	10 July
(Hrs)	0810 1140	1410-1515 1515-1615	1445 1645	1645 1545	0800 0915	0915 1030	1045	1058 1120	1120 1240	1340 1440		1700 1810
Common Loon			1							1		

Atty

	021		019			all find ↓		
...CIES	I1-J1	J1-K1	K1-L1	L1-M1	M1-N1	N1-E	Total	
...peror Goose								
...mmon Teal								
...lequin Duck		9	15	22	23		846	
...dsquaw								
...mmon Eider								
~~Adult~~ Male	76	22	363	766	560	563	8732	10657
~~Immature Male~~								
Female	10	6	22	65	49	164	1925	
...uckling						72	222	
...d Eagle								
Adult								
...mmature								
...egrine Falcon	1						2	
...mon Raven					4		24	
Mallard			3♂		5♂ 2♀		11	
R.B. Mergansers				6	35		46	
Common Loon						1	3	
...Otter								
...ult				11	52	46	277	393
...p				10	17	26	116	
...bor Seal								
...ult	5	12	41	67	47	65	700	913
...up	1	2	6	29	17	11	213	
...Lion								
...Bull	217			1	4	3	373	6072
...male/Yearling	1924				1		1925	
...(non Breeders)	642						642	
Bull/Juvenile	527	915	~~1070~~ 1660				3132	
	July 10 1979	11Jul79	11July79	11Jul79	11Jul79	11Jul79		
...(Hrs)	1815 1915	0845 0930	0930 1000	1005 1050	1115 1230	1345 1545		
Marbled Murrelet							5	
Loon sp.							4	
Red-Throated Loon							2	

Attu

SPECIES	021 I-J	J-K	019 K-L	L-M	M-N	N-E	Total
Cormorant sp.	11,862	757	2908	2835	1615	5990	39596
Cormorant nest	290	38	160		65	150	1404
RF Cormorant							
RC Nest							
Pelagic Cormorant							
P. Nest							
Northern Fulmar							
ST Shearwater							
Black Oystercatcher							
Ruddy Turnstone							
Rock Sandpiper							
Northern Phalarope							
Parasitic Jaeger							
Pomarine Jaeger							
Glaucous-Winged Gull							
Adult	560	150	50	250	215	785	7074
Immature	30	45	75	100	30	28	525
Fledgling			90	125		5	366
Black-leg Kittiwake	1105		100				2559
Adult							2[illegible]5
Immature							1
Nest	225						225
Arctic Tern							66
Aleutian Tern							66
Murre sp.	7482						8123
Common Murre							
Thick-bill Murre							
Pigeon Guillemot	5			2			136
~~Kittlitz's~~ Murrelet sp.							5
Auklet sp.							1
Crested Auklet	1				1		9
Least Auklet							
Whiskered Auklet							
Parakeet Auklet							
Horned Puffin	6					17	218
Tufted Puffin	451		22		2	97	3660
Marbled Murrelet	Roost in good numbers possibly breeding						

Transects E-N, Holtz Bay to Red Head (North Side)

assigned to 023

110

ATTU Is. 1979

5 July

Hall
Henry
Beall
Timber

	007 A-B	007 B-C	031 C-D	031 D-E	E-F	031 F-G	G-H	035 H-I	034 I-J	034 J-K	034 K-L	034 Very close L-M
Cormorant sp.	630	776	503	160	249	1054	868	960	1110	505	724	34
Cormorant nest	181	132	306	35	20	777	148	310	55	5	100	
Red-faced Cormorant												
Red-faced Cormorant Nest												
Pelagic Cormorant												
Pelagic Cormorant Nest												
Northern Fulmar												
Sooty Shearwater												
Black Oystercatcher							1					
Ruddy Turnstone												
Black Sandpiper												
Northern Phalarope												
Parasitic Jaeger												
Pomarine Jaeger												
Glaucous-Winged Gull	177					66 nests		1				
Adult	177	119	146	114	175	290	134	208	293	76	334	27
Immature	7	5	-	2		87	20	94	105		30	
Fledgling	77	13	2			183	67	29	11		51	
Black-legged Kittiwake							?		4			
Adult	3	2	700*	1			2			1	15	5
Immature		-										
Nest			1520									
Arctic Tern												
Aleutian Tern												
Murre sp.	4	31	3075	15	4				84	54	148	15
Common Murre												
Thick-billed Murre												
Pigeon Guillemot	22	29	10	1	11	20	34	4	6	11	8	
Kittlitz's Murrelet												
Auklet sp.												
Crested Auklet												
Least Auklet												
Whiskered Auklet												
Parakeet Auklet							3		1			
Horned Puffin	18	73	10	29	5	60	29	35	53	16	12	
Tufted Puffin	75	316	82	31	96	162	242	197	348	435	770	69

*-flock distant from colony

AGATTU Is. 1979 (cont.)

SPECIES	007 A-B	007 B-C	037 C-D	037 D-E	E-F	F-G	G-H	036 H-I	034 I-J	J-K	033 K-L	032 L-M
Emperor Goose												
Common Teal												
Harlequin Duck	4♂	10♂		48♀		132	57	21	25		54	1
Eidsquaw												
Common Eider						1 nest (5)						
Adult Male	14	39	53	59	30	103	169	114	94		177	190
Immature Male												
Female	9	28	74	116	30	326	149	193	87	3	69	21
Duckling			55	35	12	46	48	45	20		43	
Bald Eagle												
Adult												
Immature												
Peregrine Falcon			1pr									
Common Raven						1	2			2	2	1
Mallard				5♂ 3♀	3	3♂ (1 brood)		1♀ (2 Broad)				1♂
Gyrfalcon (?)				1								
Common Loon						1		2				
Sea Otter												
Adult	1	2	1	1			2	3	11		11	10
"			1	1			7		5		11	2
Harbor Seal												
Adult	3	3	6	6	12	67	25	67	27	13	13	1
"		1	3	4	2	20		18	9			
Sea Lion	(2010)	12										
Male (Bull)	125	2			1		10		22	92	33	
Female/Yearlings	1678	10								425	206	
Pup	118									40	25	
Young Males/yearlings	89								42			
Calorhinus ursinus									?)			
Date	5 July	5 July	5 July	5 July	5 July	6 July	6 July	6 July	6 July	6 July	6 July	6 July
Time (Hrs)	1130-1240	1240-1400	1520-1720	1720-1830	1900-1995	0735-1020	1300-1420	1420-1600	1600-1800	1840-1915	1930-2115	2115-2145
						112		111				

AGATTU IS. (Cont.)
July 1979
Hall
Beall & Tobey

SPECIES	882 M-N	886 N-A				Total
Cormorant sp.	450	375				8418
Cormorant nest	34	15				2118
Cormorant						
Nest						
Pelagic Cormorant						
Nest						
Northern Fulmar						
Shearwater						
Black Oystercatcher						
Ruddy Turnstone						
Rock Sandpiper						
Northern Phalarope						
Parasitic Jaeger						
Pomarine Jaeger						
Glaucous-Winged Gull	432	170				2695 plus 66 nests
Adult						
Immature						350
Fledgling	7					440
Black-legged Kittiwake						
Adult	160	99	left out of book on map			988
Immature						
Nest	480	6160	6330 35 790 6160			2000 + 6160 = 8160
Arctic Tern						
Aleutian Tern						
Murre sp.	4020	1755				9205
Common Murre						
Thick-billed Murre						
Pigeon Guillemot	16	16				188
Kittlitz's Murrelet						
Auklet sp.						
Crested Auklet						
Least Auklet						
Whiskered Auklet						
Parakeet Auklet	1					5
Horned Puffin	14	15				369
Tufted Puffin	254	123				3200

IGATTU Is. (Cont)
July 1979

..CIES	M-N 032	N-A P06	Total
..ror Goose			
..mmon Teal			
..rlequin Duck	4		314
..dsquaw			
..mmon Eider			
..dult Male	22		964
Immature Male	3		5
Female	46	1	1162
..uckling	9		313
..id Eagle			
..Adult			
..mature			
..regrine Falcon			1 pr
..non Raven			6
Black Oystercatcher	1		1
Mallard			16 (+ 2 broods)
Common Loon			3
..ider			
..ult	24	1	67
..up	11		27 (94)
..or Seal			
..dult	6		236
..up	1		58
..ion		2,490 (No sexing possible)	4512
..ale		1	286
..emale / Yearlings	1		2320 (7432)
..p			183
(Fur Seal	2 (?)		14 (?)
Young of / Yearlings			13
	7 July 79	7 July 79	
..(Hrs)	1220	1100	
	1420	1220	
Gyrfalcon			1 (?)

ALAID ISLAND

SPECIES	A-B	B-C	C-D	D-E	E-F	F-A	
Cormorant sp.	730	420	604	759	554	330	4985
Cormorant nest	134	504	150	300	495	2	1585
Cormorant							
PC Nest							
Pelagic Cormorant			not included with Cor sp.				
Nest							
Northern Fulmar							
Sheartwater							
Black Oystercatcher							
Ruddy Turnstone							
Black Sandpiper							
Northern Phalarope							
Parasitic Jaeger							
Pomarine Jaeger							
Mucous-Winged Gull	17						
Adult	175	153	110	88	76	156	758
Immature	4	73	35	57		62	231
Fledgling	9	3		2			14
Black-leg Kittiwake		3					
Adult			2	240	7	1000	1252
Immature							
Nest				120			120
Arctic Tern							
Aleutian Tern							
Murre sp.	1			4	7		12
Common Murre							
Thick-bill Murre							
Pigeon Guillemot	2				4	1	6
Ancient Murrelet							
Auklet sp.							
Crested Auklet							
Least Auklet							
Whiskered Auklet							
Parakeet Auklet							
Horned Puffin	1			7			8
Tufted Puffin	11	9		10	12	1	43
Puffin Burrows				200			200
Bald Eagle				1			1

ALAID ISLAND

SPECIES	A-B	B-C	C-D	D-E	E-F	F-A				
Emperor Goose										
Common Teal										
Harlequin Duck	1			10	74	23			108	
Oldsquaw										
Common Eider (F broods)				1	3	2			6	?
Adult Male	37	14	7	21	41	31			151	
Immature Male										
Female	65	18	2	14	22	8			129	
Duckling	30			4	16	11			61	
Bald Eagle										
Adult										
Immature										
Peregrine Falcon			1	1					2	
Common Raven										
Sea Otter										
Adult				1	1				2	
Pup										
Harbor Seal										
Adult	145	15	1	5	5	1			172	
Pup	28	1		1	2	1			33	
Steller Sea Lion	✓	✓	✓	✓	✓	✓				
Male		140	40	6					186	
Female		(1100)	585	(48)					1693	
Pup			100						180	
Young Bulls	68	108			137	550			863	
	13 Jul	13 Jul	14 Jul	14 Jul	14 Jul	14 Jul				
Time (Hrs)	1645-1735	1740-1830	1510 1835	1425 1510	1315 1425	1350 1345				

NIZKI ISLAND

SIZE	A-B	B-C	C-D	D-E	E-F	F-A	TOT	JULY ISLAND	HAMMERHEAD ISL	LIE ISL	(GROUP) LOTUS ISL
[illegible] sp.	175	121	255	1100	257	343	3782	187	690	100	1900
[illegible] nest	173	63	221	550	18	26	1051		1		
Cormorant											
PC Nest											
Pelagic Cormorant				nesting adults							
Nest				not added in total							
Northern Fulmar											
Sheartater											
Black Oystercatcher											
Ruddy Turnstone											
Black Sandpiper											
Northern Phalarope											
Parasitic Jaeger											
Pomarine Jaeger											
Mucous-Winged Gull											
Adult	128	23	13	71	26	50	391	10	343	6	220
Immature	10		38				48				
Fledgling	0		1		2	1	4		410		30
Black-legged Kittiwake											
Adult	8	3					11				
Immature											
Nest											
Arctic Tern											
Aleutian Tern											
Murre sp.											
Common Murre											
Thick-bill Murre											
Pigeon Guillemot	5		1	2	3	3	14		1		
Kittlitz's Murrelet											
Auklet sp.											
Crested Auklet											
Least Auklet											
Whiskered Auklet											
Parakeet Auklet											
Horned Puffin						2	2				
Tufted Puffin	45	12	8	32	9		106	2	150		
									292 TU PU BURROWS		

NIZKI ISLAND

CIES	A-B	B-C	C-D	D-E	E-F	F-A	TOT	JULY 6 ISLAND	HAMMER-HEAD ISL.	LE ISL	LOTUS ISL
eror Goose											
mon Teal											
lequin Duck		39	38	91	8	11	187		1		7
squaw											
mon Eider (#Chicks)	(2)	(10)			(5)	(5)	22				
dult Male	81	67	46	86	48	21	349	3	17		29
mature Male											
emale	57	76	40	84	58	50	365	4	8		12
uckling	13	28	41	72	30	23	207		1		
d Eagle											
dult											
mature											
ggrin Falcon					1		1				
mon Raven		1				4	5				
Otter											
dult											
n											
or Seal											
dult	29	3	7	14		13	66		78	2	102
up	12	1	3	14		7	37		14	1	25
Lion											
ale				5 yg	3	2	10	1 yg.			
emale/yrling	3		3				6				
n											
	13 JUL	13 JUL	13 JUL	14 JUL	14 JUL	14 JUL		13 JUL	13 JUL	13 JUL	
(Hrs)	1440-1510	1510-1535	1615-1645	1040-1135	0950-1020	0920-0950		1310-1310	1315-1340	1340-1410	

★ HAMMERHEAD ISLAND — EIDER NESTS: 1 nest 1 chick, 3 nests 4 eggs, 2 nests 3 eggs, 2 nests 2 eggs, 2 nests 1 egg.

SHEMYA IS-

SPECIES	A-B	B-C	C-D	D-E	E-F	Total
Cormorant sp.	1840	1822				3792
Cormorant nest		130				130
Red Faced Cormorant			425			425
RFC Nest	not included with Com sp.					
Pelagic Cormorant			50			50
PC Nest						
Northern Fulmar						
Sooty Shearwater						
Black Oystercatcher						
Ruddy Turnstone						
Black Sandpiper						
Northern Phalarope						
Parasitic Jaeger						
Pomarine Jaeger						
Glaucous-winged Gull						
Adult	55	362	130			547
Immature	45	128	79			252
Fledgling		2				2
Black-legged Kittiwake		17	25			43
Adult	1					
Immature						
Egg						
Arctic Tern						
Aleutian Tern						
Murre sp.						
Common Murre		1	1			2
Thick-billed Murre						
Pigeon Guillemot						
Kittlitz's Murrelet						
Auklet sp.						
Crested Auklet						
Least Auklet						
Whiskered Auklet						
Parakeet Auklet						
Horned Puffin						
Tufted Puffin			15			15
ANCIENT MURRELET	17		1			18

NO COMPETE

SHEMYA IS.

SPECIES	A-B	B-C	C-D	D-E	E-F	Total
Steller Goose						
Common Teal						
Harlequin Duck	16	91	91			198
Oldsquaw						
Common Eider						
Adult Male	44	110	93			247
Immature Male						
Female	29	131	49			209
Duckling		5				5
Bald Eagle						
Adult						
Immature						
Peregrine Falcon						
Common Raven	1		9			10
LOON SPECIES		1				1
Sea Otter						
Adult						
Pup						
Harbor Seal						
Adult	98	11	3			112
Pup	3	1				4
Sea Lion						
Male		100				
Female YEARLINGS	9	1420				1429
Pup		?				
Date	18 Jul	18 Jul	18 Jul			
Time (Hrs)	1410-1445	1225-1330	1140-1225			

Buldir Island — 23 June, 24 19

Early
Henry
Beall
Taber

[Spe]cies	A-B	B-C	C-D	D-E	E-F	F-A	Inner Rock	Mid Rock	Outer Rock		Buldir Total	Buldir + Ro Total
[Cor]morant sp.	50	91	413	190	291	20	3	42	35		1100	1283
[Co]rmorant nest				30	4	11		73	30		45	148
Cormorant		18			5	1			7		75	117
[R]C Nest		52						8	27		52	87
Pelagic Cormorant	2	60			10						139	139
PC Nest		28		6	5	28					67	67
Northern Fulmar		67	130 ea 578 nests	27 nests							197/615	197/61[5]
[S]T Shearwater												
[Bl]ack Oystercatcher												
[Ru]ddy Turnstone												
[Ro]ck Sandpiper												
[N]orthern Phalarope												
[Pa]rasitic Jaeger	3										3	3
[Po]marine Jaeger												
[Gl]aucous-Winged Gull												
Adult	929	2050	31	280	470	1005	32	50	51		4765	4292
Immature	9	3			5	6		1	2		23	26
Fledgling												
[Bl]ack-[legged] Kittiwake								800				800
Adult		+									+	+
Immature												
Nest		1860	3905	4600					2177	[illegible]	10365	12542
Red-Legged Kittiwake Nest		1231	1675	1150				200	940		4056	5196
Aleutian Tern					1						1	1
[Mur]re sp.		275	12,911	2490				1335	1660	~1000	15676	21,671
Common Murre		44	4						1		48	49
[Thi]ck-bill Murre	1	161							1		162	163
Pigeon Guillemot	15	9	19	8	8	14		7	3		73	183
Ancient Murrelet									200			200
[Auk]let sp.	+	+									+	+
[Cr]ested Auklet	+	+							+		+	+
[Le]ast Auklet	+	+							+		+	+
[Wh]iskered Auklet									+			+
[Par]akeet Auklet						350			+		350	350
[Ho]rned Puffin	697	202	82	90	145	218	–	215	50		1439	1699
[Tuf]ted Puffin	523	435	135	90	215	430	27	160	85		1828	2100
Black Headed Gull	4					121					4	4

nest individuals not added to total

BUCHAN ISLAND 23-24 June

SPECIES	A-B	B-C	C-D	D-E	E-F	F-G	INNER ROCK	MID ROCK	OUTER ROCK	TOTAL
HARLEQUIN DUCK	5	23	20			3		7		
COMMON EIDER										
Adult Male	10	35				19				
Imm Male	1									
Female	4	3								
Peregrine Falcon		1			1					
A.C. GOOSE	4	2		5	22	23				
Bald Eagle Ad	2									
IMM										
Sea Otter										
Adult	4	2		4	11	15		10	17	63
Pup	1			1	1	1		1	6	11
Seal										
Adult	1	10	3	3						
Pup			5							
Harbour Seal		1			1					2
Lion	✓	✓	✓	✓	✓	✓				
Male	252	234	55	24	39	198	16	61	5	884
Female + yearling	925	2		240	396	1624	185	478	44	3894
Pup	470			63	53	310	44	200	2	1142
Sub-Adult	25	54	16♂	39♂	154 ♂ 140	15	12♂	10♂	1	340 (918)
White Winged Scoter		1								(676)
Black Scoter			1							1
DATE	23 Jun	23 Jun	23 Jun	24 Jun	24 Jun	24 Jun	23 Jun	23 Jun	23 Jun	
TIME (HRS)	1330-1500	1500-1600	1615-1700				1900-1915	1915-1940	1940-2010	
Dead Beaked whale ↑ central East Cap				1						

Beall, Segula Circumnavigation
Hevey
TAber
Early

SPECIES	A-B	B-C	C-D	D-E	E-F	F-A	Total
Cormorant sp.	35	93	16	22	45	47	258
Cormorant nest	1	50				11	62
Cormorant							
PFC Nest							
Pelagic Cormorant							
Nest							
Northern Fulmar				1			1
Sh Shearwater							
Black Oystercatcher							
Ruddy Turnstone							
Black Sandpiper							
Northern Phalarope							
Parasitic Jaeger							
Pomarine Jaeger							
Glaucous-Winged Gull							
Adult	29	38	50	41	24	24	206
Immature	2	1	5	3	5	4	23
Fledgling							
Black-legged Kittiwake							
Adult							
Immature							
Nest							
Arctic Tern							
Aleutian Tern							
Murre sp.		3				1	4
Common Murre							
Thick-billed Murre							
Pigeon Guillemot	16	20	17		21	2	76
Kittlitz's Murrelet							
Auklet sp.							
Crested Auklet							
Least Auklet							
Whiskered Auklet							
Parakeet Auklet	116	123	130	27	167	250	803
Horned Puffin	7	19	11	23	20	35	110
Tufted Puffin	5	11	11	28	6	49	110

Death, Henry, Tribal Early ... Segula Circumnavigation

SPECIES	A-B	B-C	C-D	D-E	E-F	F-A			Total		
Emperor Goose											
Common Teal											
Harlequin Duck		17	15		2			/	34		
Oldsquaw											
Common Eider											
Adult Male											
Immature Male											
Female											
Duckling											
Bald Eagle											
Adult	2	1		2					5	>	8 Total
Immature		1	1	1					3		
Peregrine Falcon		4	2		1	3			10		
Common Raven		3							3		
Sea Otter											
Adult	7	3	10	16	17	23			76	>	98 Total
Pup	4	1	2	5	5	5			22		
Harbor Seal											
Adult	2	4	5	3					14	>	18 Total
Pup	1	1	1	1					4		
Sea Lion	1	5			34				40	>	102 Total
Male			34						34		
Female/yearling			28						28		
Pup											
	29 Jul 79	29 Jul 79	29 Jul 79	29 Jul 79	29 Jul 79	29 Jul 79					
Time (Hrs)	0830	0900	0940	1145	1330	1300					
	0900	0935	1020	1230	1300	1325					
						124					

Circumnavigation [illegible], July 24, 1979 1/2

...ECIES	Khvostof Island A-B	Khvostof Island B-A	Khvostof Island total	Pyramid Island	Davidof Island A-B	Davidof Island B-C	Davidof Island C-D	Davidof Island D-A	Davidof Total	LeGrand Total
...morant sp.	109	6	~~115~~ 127	5	47	13	27	4	91 200	~~21~~
...rmorant nest	12		12				109		109	121
... Cormorant	not included with Corm sp.									
... Nest							15		15	15
...lagic Cormorant										
... Nest							5		5	5
...rthern Fulmar						60 nests			60 nests	60 nests
... Shearwater										
...lack Oystercatcher	6		6				1		1	7
...dy Turnstone										
...ck Sandpiper										
...rthern Phalarope										
...asitic Jaeger		2	2							2
...marine Jaeger										
...laucous-Winged Gull										
Adult	226	5	231	66	10	177	134	28	349	646
Immature	41		41	5			10		10	56
...ledgling					3		2		5	5
...ck-leg Kittiwake										
Adult										
Immature										
...est										
...ctic Tern										
...eutian Tern										
...rre sp.	14		14		35	51	1		87	101
...mmon Murre				1		110			110	111
...ick-bill Murre	20		20		1	216			217	237
...geon Guillemot	21	13	34	13	11	30	38	10	89	136
...ttlitz's Murrelet										
...klet sp.										
...sted Auklet										
...ast Auklet	3		3		1				1	4
...iskered Auklet										
...akeet Auklet	13	2	15	2	2	2		10	14	31
...rned Puffin	642	258	900	135	478	789	889	156	2312	3347
...fted Puffin	852	435	1287	172	270	595	190	350	1405	2864

Khostof Island 2/2
July 24, 1979

SPECIES	Khostof clockwise A→B	B→A	total	Pyramid Island	Davidof Island A-B	B-C	C-D	D-A	Davidof total	Grand Total
Steller Goose										
Common Teal										
Harlequin Duck										
Oldsquaw										
Common Eider										
Adult Male										
Immature Male					2				2	2
Female	5		5							5
Duckling	7		7							7
Bald Eagle										
Adult								1	1	1
Immature										
Peregrine Falcon	2	4	6		1		2	1	4	10
Common Raven								2	2	2
Sea Otter										
Adult	38	23	61	8	2	6	29	3	40	109
Pup	18	10	28	2	2	2	11		15	45
Harbor Seal										
Adult	4	4	8	4	1		29	6	36	48
Pup	2	2	4	1	1		6	3	10	15
Sea Lion										
Male				2		1			1	3
Female										
Pup										✓
Date	July 24 1979	July 24 1979		July 24	July 24	July 24	July 24			
Time (Hrs)	1440 1528	1710 1730		1520 1535	1540 1555	1600 1620	1620 1655	1655 1705		

APPENDIX II

Cetacean Data Records

CETACEAN DATA RECORD

field no. _____
cat. no. _____

species Beaked Whale Species sex female length 14 feet
Date, time stranded or captured 14 July, 1979 date, time of data 2130
observer Andrew Taber, William Henry locality North side Nizki Island, Semichi Island Group, Western Aleutian Islands Lat. 52° 45' N Long. 173° 59' E

EXTERNAL DATA (specify units of measure used inches)

photographs or drawings 8 35mm photographs, 3 6x7 photographs (Tom Early)
tooth or baleen counts: left upper none right upper none l. lower none r. lower non
diameter largest tooth, length longest baleen plate _____ color of baleen _____
ectoparasites none observed

number of throat or ventral grooves none weight of specimen _____

MEASUREMENTS, BODY (specify units of measure used inches)

2. snout to center of eye	20.5	16. snout to end of ventral grooves	
3. snout to apex of melon		13. snout to genital slit	114.5
15. projection of lower jaw		14. snout to anus	120.5
4. length of gape		1. total length, snout to notch	168
5. snout to ear		17. blubber thickness, mid-dorsal	1
6. center of eye to ear		18. blubber thickness, mid-lateral	
7. center of eye to angle of mouth		19. blubber thickness, mid-ventral	
8. eye to blowhole (center)		21. girth at axilla	
9. snout to center of blowhole(s)	18.5	21a. girth at eye	
20. length of throat grooves		22. maximum girth	
10. snout to flipper		23. girth at anus	
11. snout to tip of dorsal fin	125	23a. girth ___ cm before notch	
12. snout to center of umbilicus			

MEASUREMENTS, APERTURES (specify units of measure used _____)

24. eye: height _____ length _____	27. blowhole(s): length 1 width	
25. length mammary slits: r. _____ l. _____	28. diameter ear opening: r. ___ l.	
26. length genital slit 3 anal slit _____		

MEASUREMENTS, APPENDAGES (specify units of measure used)

29. flipper length (anterior	17	33. length of dorsal fin base	12
30. flipper length (posterior)		34. width of flukes	
31. maximum width of flipper	4	35. length of flukes	
32. height of dorsal fin	7	36. depth of fluke notch	

INTERNAL DATA (specify units of measure used _____)

stomach contents (type and quantity) 24 squid beaks (collected) and bile. No fish bones or other solid material. Time did not permit a thorough examination.
internal parasites (see checklist) Several small worms found in the liver were collected, other areas not examined.
vertebral epiphyses: open _____ mm; closed, visible _____ closed, invisible _____
gonads: weight r. _____ l. _____ dimensions (LxWxD) r. _____ l. _____
pregnant? ___ fetus length ___ sex ___ lactating? ___ sperm in epididymus? ___
thickness of mammary gland _____ diameter corpus luteum ___ diameter uterine horn ___

SPECIMEN COLLECTION CHECKLIST

teeth or baleen		bulla		liver sample	
stomach contents	Yes	ectoparasites		kidney sample	
gonads		endoparasites	Yes	skull	Yes
mammary gland		blubber sample		skeleton	
ear plugs		muscle sample		fetus	
				other	

Remarks Flukes partially decomposed so fluke fork estimated. Skin color black, only dorsal surface mostly intact. Dorsal fin falcate

INSTRUCTIONS

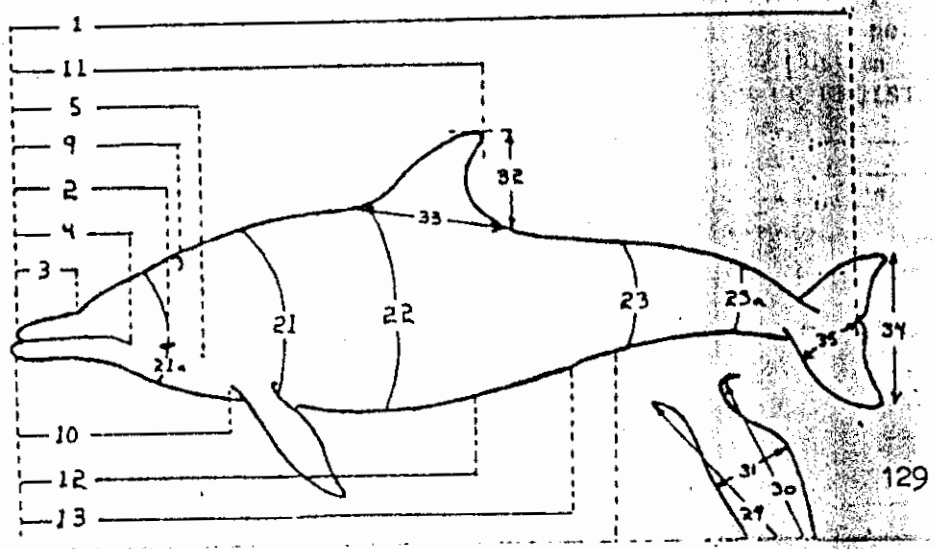
The metric system is preferred for measurements. If this is not used, the units must be specified. All measurements are taken in a straight line (as indicated on the diagram) with the exception of number 8, which is a curvilinear measurement. Note that measurements are taken from the tip of the upper jaw (snout), not the lower. If the snout is damaged, measure from the fluke notch. The ear is hard to locate, but may be found by shaving away the dark epidermis in the area of the ear. The ear canal is pigmented and will stand out against the white dermis. Throat grooves are short grooves found on the throat of beaked, sperm and gray whales; ventral grooves are long grooves found on balaenopterid whales. Ventral grooves should be counted between the flippers. The easiest way to take girths is to measure them from the middle of the belly to the middle of the back and double the measurement. Number 23a is the girth of the tailstock and is taken any convenient distance anterior to the fluke notch.

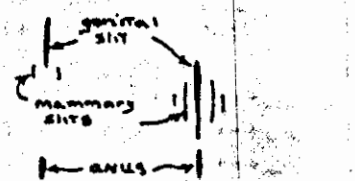
Vertebral epiphyses are read by making a tangential cut near an intervertebral joint, in the mid-thoracic region, exposing the epiphyseal joint and noting whether the epiphysis is fused to the body of the vertebra. For gonad dimensions, L is the longest dimension, W the widest dimension perpendicular to L, and D is the dimension perpendicular to both L and W. Weight of ovaries includes that of any corora lutea. Pregnancy may be indicated by a large corpus luteum, dilated and vascular uterine horn, vaginal mucus or a fetus. The flat diamenter of the uterine horn is measured at mid-length of the horn. In adult males the epididymus should be cut and checked for a milky fluid indicating the presence of sperm.

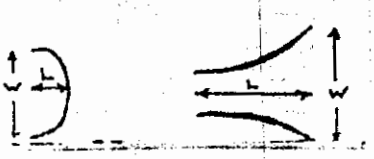
Photographs are extremely important, particularly lateral views of whole animals. Details of the head, genital region, pigmentation patterns, teeth or baleen, and appendages should also be taken. Specimens should be frozen or preserved in 10% neutral formalin, except stomach contents, which should be well washed and preserved in 70% alcohol. Skeletal elements should be fleshed and dried. Salt will help deter maggots and bacteria. Do not bury specimens unless there is no alternative. Be careful of loose teeth, bullae, hyoids and pelvic bones (which are located in the muscle near the anus). Enter mode of preservation (10% F., 70% Alc., dry, etc) on checklist.

The following areas should be checked for parasites. If there are none, enter no; if present, enter yes and detail on other side; if not examined, enter N E.

eye	NE	air sinuses	NE	intestine	NE	bile duct	NE
mouth	NE	esophagus	NE	rectum	NE	kidney renculi	NE
genital slit	NE	forestomach	NE	trachea	NE	kidney main duct	NE
anal slit	NE	main stomach	NONE	lungs	NE	urinary bladder	NE
nasal passages	NE	pyloric stomach	NE	liver	YES	blubber	NE
						muscle	







CETACEAN DATA RECORD

field no. _____
cat. no. _____

species Bairds Beaked Whale (?) sex male length 31 ft.
Date, time stranded or captured unknown date, time of data July 25,1979
observer Thomas Early, Andrew Taber locality South side East Cape, Buldir Isl.
Weatern Aleutian Islands, Lat. 52° 21.5' N Long. 175° 58' E

EXTERNAL DATA (specify units of measure used inches)

photographs or drawings _____
tooth or baleen counts: left upper ? right upper ? l. lower 1 r. lower 1
diameter largest tooth, length longest baleen plate ? color of baleen _____
ectoparasites none observed specimen very decayed

number of throat or ventral grooves _____ weight of specimen _____

MEASUREMENTS, BODY (specify units of measure used inches)

2. snout to center of eye		16. snout to end of ventral grooves	
3. snout to apex of melon		13. snout to genital slit	
15. projection of lower jaw		14. snout to anus	
4. length of gape		1. total length, snout to notch	372
5. snout to ear		17. blubber thickness, mid-dorsal	0.80
6. center of eye to ear		18. blubber thickness, mid-lateral	
7. center of eye to angle of mouth		19. blubber thickness, mid-ventral	
8. eye to blowhole (center)		21. girth at axilla	
9. snout to center of blowhole(s)	30	21a. girth at eye	
20. length of throat grooves		22. maximum girth	
10. snout to flipper		23. girth at anus	
11. snout to tip of dorsal fin		23a. girth ___ cm before notch	
12. snout to center of umbilicus		umbillicus to anus	84

MEASUREMENTS, APERTURES (specify units of measure used)

24. eye: height	length	27. blowhole(s): length	width
25. length mammary slits: r.	l.	28. diameter ear opening: r.	l.
26. length genital slit	anal slit		

MEASUREMENTS, APPENDAGES (specify units of measure used)

29. flipper length (anterior)		33. length of dorsal fin base	
30. flipper length (posterior)		34. width of flukes	
31. maximum width of flipper		35. length of flukes	91
32. height of dorsal fin		36. depth of fluke notch	

INTERNAL DATA (specify units of measure used _____)

stomach contents (type and quantity) Filled with fish bones, small gravel and a small quantity of fluid. All ottoliths, squid beaks, and eye lenses (?) collected.
internal parasites (see checklist) non observed.

vertebral epiphyses: open _____ mm; closed, visible _____ closed, invisible _____
gonads: weight r. _____ l. _____ dimensions (LxWxD) r. _____ l. _____
pregnant? _____ fetus length _____ sex _____ lactating? _____ sperm in epididymus? _____
thickness of mammary gland _____ diameter corpus luteum _____ diameter uterine horn _____

SPECIMEN COLLECTION CHECKLIST

teeth or baleen		bulla		liver sample	
stomach contents		ectoparasites		kidney sample	
gonads		endoparasites		skull	
mammary gland		blubber sample		skeleton	
ear plugs		muscle sample		fetus	
				other Lower jaw	X

Remarks Whale first observed stranded June 24, 1979 already decayed with bones protruding from a pectoral flipper. Advance state of decay on July 25 prevented taking of highly accurate measurements. The dorsal fin was completely decayed and the skin was all sluffed off. Lower jaw collected but teeth missing from socket. Stomach contents divided into two bottles (70% Alcohol); one containing fish vertebrae and one containing ottoliths and squid beaks and eye lenses.

INSTRUCTIONS

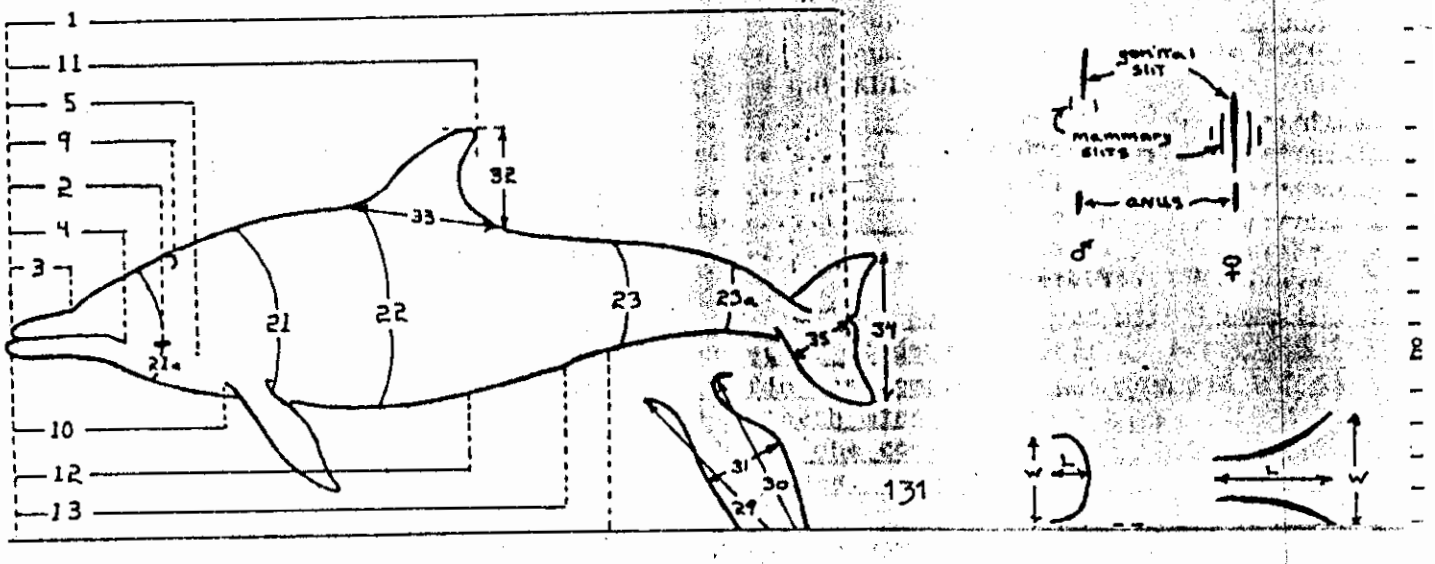
The metric system is preferred for measurements. If this is not used, the units must be specified. All measurements are taken in a straight line (as indicated on the diagram) with the exception of number 8, which is a curvilinear measurement. Note that measurements are taken from the tip of the upper jaw (snout), not the lower. If the snout is damaged, measure from the fluke notch. The ear is hard to locate, but may be found by shaving away the dark epidermis in the area of the ear. The ear canal is pigmented and will stand out against the white dermis. Throat grooves are short grooves found on the throat of beaked, sperm and gray whales; ventral grooves are long grooves found on balaenopterid whales. Ventral grooves should be counted between the flippers. The easiest way to take girths is to measure them from the middle of the belly to the middle of the back and double the measurement. Number 23a is the girth of the tailstock and is taken any convenient distance anterior to the fluke notch.

Vertebral epiphyses are read by making a tangential cut near an intervertebral joint, in the mid-thoracic region, exposing the epiphyseal joint and noting whether the epiphysis is fused to the body of the vertebra. For gonad dimensions, L is the longest dimension, W the widest dimension perpendicular to L, and D is the dimension perpendicular to both L and W. Weight of ovaries includes that of any corora lutea. Pregnancy may be indicated by a large corpus luteum, dilated and vascular uterine horn, vaginal mucus or a fetus. The flat diamenter of the uterine horn is measured at mid-length of the horn. In adult males the epididymus should be cut and checked for a milky fluid indicating the presence of sperm.

Photographs are extremely important, particularly lateral views of whole animals. Details of the head, genital region, pigmentation patterns, teeth or baleen, and appendages should also be taken. Specimens should be frozen or preserved in 10% neutral formalin, <u>except</u> stomach contents, which should be well washed and preserved in 70% alcohol. Skeletal elements should be fleshed and dried. Salt will help deter maggots and bacteria. Do not bury specimens unless there is no alternative. Be careful of loose teeth, bullae, hyoids and pelvic bones (which are located in the muscle near the anus). Enter mode of preservation (10% F., 70% Alc., dry, etc) on checklist.

The following areas should be checked for parasites. If there are none, enter no; if present, enter yes and detail on other side; if not examined, enter N E.

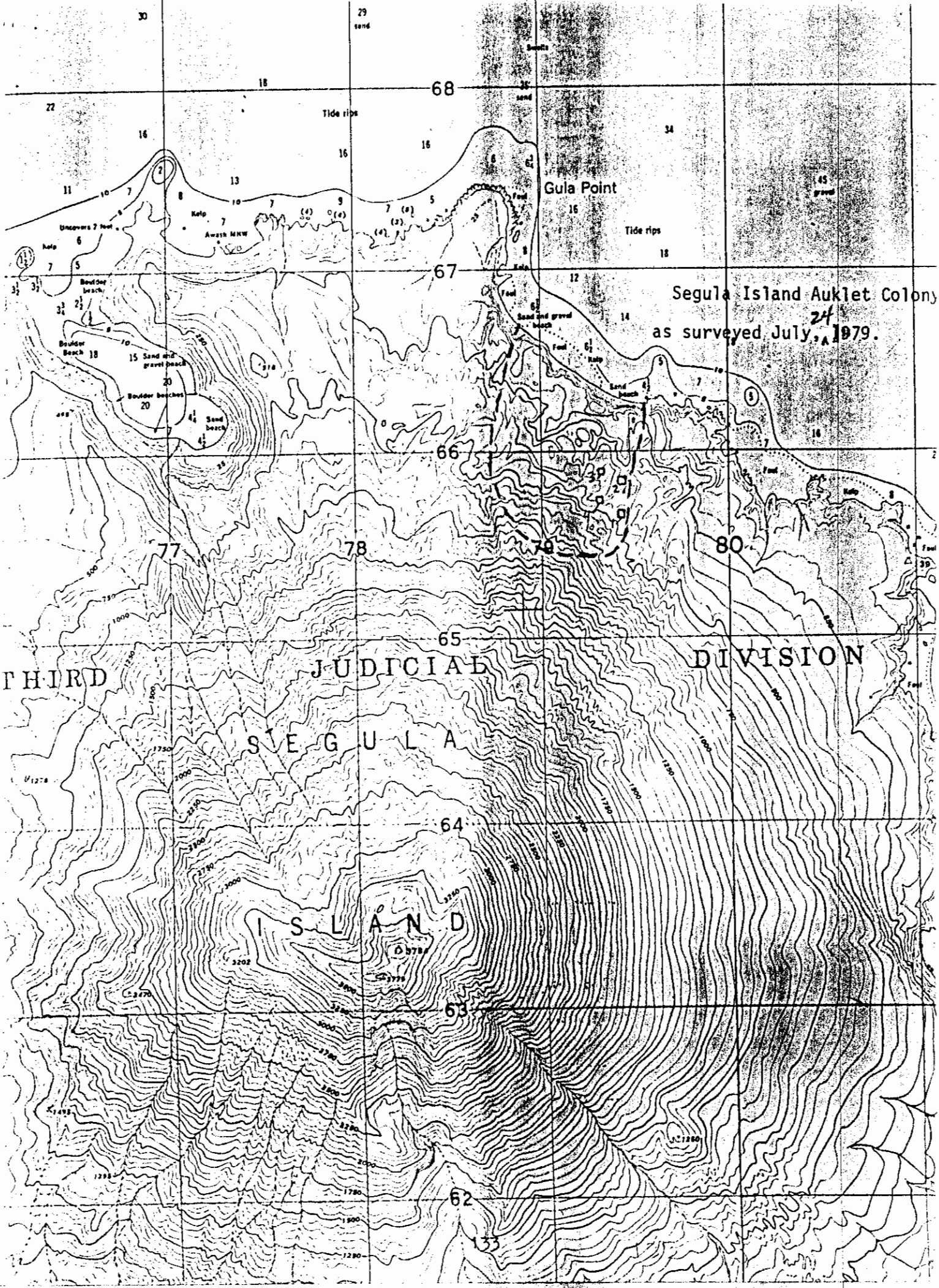
eye	NE	air sinuses	NE	intestine	NE	bile duct	NE
mouth	NE	esophagus	NE	rectum	NE	kidney renculi	NE
genital slit	NE	forestomach	NE	trachea	NE	kidney main duct	NE
anal slit	NE	main stomach	None	lungs	NE	urinary bladder	NE
nasal passages	NE	pyloric stomach	NE	liver	NE	blubber	NE
						muscle	



APPENDIX III

Segula Auklet Plot Data

132


Gula Point
Tide rips
Kelp
Awash MHW
Uncovers 2 feet
Boulder beach
Boulder Beach
Sand and gravel beach
Boulder beaches
Sand beach
Sand and gravel beach
Sand beach
Segula Island Auklet Colony
as surveyed July, 1979.
68
67
66
65
64
63
62
77
78
79
80
THIRD JUDICIAL DIVISION
S E G U L A
I S L A N D

SEQULA AUKLET PLOT #1

Elevation 475', Slope 25°, Aspect 270°. Habitat with Elymus-Umbel 50%, Festuca pp. 50%. DATE. 24 JULY 19

OBSERVER: JOCK BEALL

TIME	SPECIES	(A) START	(B) IN	(C) OUT	(D) END	NET GAIN
2000-15	CR	0	4	5	0	-1
	LST	26	49	41	4	+30
2030-45	CR	0	6	3	1	+2
	LST	3	58	30	4	+27
2100-2115	CR	0	7	6	1	+0
	LST	10	120	49	5	+76
2130-45	CR	5	18	6	2	+15
	LST	35	110	86	48	+11
2200-15	CR	1	15	0	0	+16
	LST	49	324	56	98	+219

$N = (A-D)+(B-C)\times 2$

CRESTED = 32 x 2 = 64 INDIVIDUALS — 8% CRESTED

LEAST 363 x 2 = 726 INDIVIDUALS — 92% LEAST

PRIME AUKLET HABITAT

SEQULA AUKLET PLOT #2

Elevation 275', Slope 2.0°, Aspect 280° Habitat with Bare Rock 30%, Elymus-Umbel 70%. 24 JULY 197

OBSERVER: HENRY

TIME	SPECIES	(A) START	(B) IN	(C) OUT	(D) END	NET GAIN
2000-15	CR	0	9	4	0	+5
	LST	8	26	21	6	+7
2030-45	CR	1	9	8	1	+1
	LST	5	27	14	4	+14
2100-15	CR	1	14	9	0	+6
	LST	7	44	124	6	+21
2130-45	CR	0	11	5	2	+4
	LST	9	39	28	14	+6
2200-15	CR	5	~~5~~ 2	3	2	+2
	LST	33	78	30	37	+44

$N = \sum (A-D) + (B-C) \times 2$

CRESTED $= 18 \times 2 = 36$ INDIVIDUALS (16%)

LEAST $= 92 \times 2 = 184$ INDIVIDUALS (84%)

PRIME AUKLET HABITAT

SEQULA AUKLET PLOT #3

Elevation 470', Slope 10°, Aspect 330° 24 JULY 1979
Habitat: Elymus-umbel 70%, Festuca 20%, Fern 10%
OBSERVER: Andy TABER

TIME	SPECIES	(A) START	(B) IN	(C) OUT	(D) GNF	NET GAIN
2000-15	CR	0	0	0	0	0
	LST	0	7	2	0	+5
2030-45	CR	0	4	0	0	+4
	LST	0	38	10	0	+28
2100-15	CR	0	1	2	0	-1
	LST	2	31	15	1	+17
2130-45	CR	0	2	1	0	+1
	LST	3	10	8	1	+4
2200-15	CR	0	4	3	1	0
	LST	0	27	14	3	+10

$N = (A-D) + (B-C) \times 2$

CRESTED = $4 \times 2 = 8$ INDIVIDUALS (6%)
LEAST = $64 \times 2 = 128$ INDIVIDUALS (94%)

SUB-PRIME HABITAT

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SEQUIA AUKLET PLOT #4

24 JULY 1979

Elevation: 500', Slope 10%, Aspect 280°, Habitat: Fern 65%, Festuca 30%, Elymus-Umbel 5%.

OBSERVER: TOM EARLY

TIME	SPECIES	(A) START	(B) IN	(C) OUT	(D) END	NET GAIN
2000-15	CR	0	0	0	0	0
	LST	0	1	2	0	-1
2030-45	CR	0	1	0	0	+1
	LST	0	8	0	0	+8
2100-15	CR	0	2	0	0	+2
	LST	0	17	9	3	+5
2130-45	CR	0	2	2	0	0
	LST	3	32	27	0	+8
2200-15	CR	1	3	1	0	+3
	LST	1	61	25	13	+24

$N = (A-D) + (B-C) \times 2$

CRESTED = $6 \times 2 = 12$ individuals (12% CRESTED)

LEAST = $44 \times 2 = 88$ individuals (88% LEASTED)

SUB-PRIME HABITAT

SEQULA AUKLET PLOT DATA.

24 July 197

① BY USE OF PLANIMETER THE FOLLOWING INFO. WAS GATHERED.

ON PLANIMETER – 0.235 = 1,000,000 Sq. METERS.

$\therefore \quad \frac{1{,}000{,}000}{0.235} \cdot \frac{X}{0.184}$ (FIGURE ON PLANIMETER FOR COLONY CIRCUMF.

$0.235X = 184{,}000$

$\boxed{X = 782{,}980 \text{ sq. METERS IN COLONY}}$

② COMPUTATION:

ASSUMING: 5% IS PRIME HABITAT OR 39,149 m^2
35% IS SUB-PRIME HABITAT OR 274,043 m^2
60% IS UNUSED HABITAT

THEREFORE: PRIME HABITAT PLOTS AVE: 50 i CRESTED
455 i LEAST

PER 100 m^2.

39,149 sq. meters × 50 ave crested aukets/100 sq. meters
× 455 ave. least aukets

= 391.5 × 50 = 19,575 CRESTED TOTAL PR
= 391.5 × 455 = 178,133 LEAST TOTAL PR

SUB PRIME HABITAT PLOTS AVE: 10 i CRESTED
108 i LEAST

PER 100 m^2

274,043 sq. meters × ave aukets/100 sq. meters. =

2740.43 × 10 = 27,404 i CRESTED TOT. Sub
2740.43 × 108 = 295,966 i LEAST TOT. Sub. P

THEN:

46,979	crested total for colony
474,099	Least total for colony
521,078	total aukets for colony

APPENDIX IV

Prey Remains Found in Bald Eagle Aerie
Buldir Island

PREY REMAINS FOUND IN BALD EAGLE AERIE ON BULDIR ISLAND, 1979. (AUGUST) ~~1980~~

PREY ITEM	NUMBER	PERCENT
TUFTED PUFFIN	7	26.9
CRESTED AUKLET	6	23.1
GLAUCOUS-WINGED GULL (CHICKS)	6	11.5
UNID. AUKLET	3	23.1
CANADA GOOSE (ADULTS)	2	7.7
" " (GOSLINGS)	2	7.7
TOTALS	26	100.0 %

AERIE LOCATED AT SOUTH END OF NORTH MARSH.