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BIOLOGY AND SUBSISTENCE HUNTING  
OF GEESE AT  
CHAGVAN BAY.

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Key Words: Emperor Geese, Pacific  
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Waterfowl Hunting, Spring  
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Chagvan Bay  
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## INTRODUCTION

Chagvan Bay and Nanvak Bay are known to be important staging and/or stopover areas for large numbers of Pacific Brant (Branta bernicola), and Emperor Geese (Chen canagica), during spring and fall migrations (Weir et al, unpublished). James G. King recorded 60,000 Emperor Geese and 32,000 Brant in both bays on May 28, 1964 (Dick & Dick, unpublished). Smaller numbers of Pacific White-fronted Geese (Anser albifrons frontalis), Cackling Canada Geese (Branta canadensis minima), and Taverner's Canada Geese (B.C. taverneri), also use the bays as stopovers. (Weir et al, unpublished).

In 1980 or 1981, the late Charles W. Stickland (then manager of the Clarence Rhode National Wildlife Refuge) received a verbal report that native hunters from the village of Goodnews were harvesting "boat-loads" of geese in Chagvan Bay during spring migration (L.Hotchkiss, personal comment). Because of concern over the role spring subsistence hunting might play in the continued decline of Cackling Canada Goose, Pacific White-fronted Goose, Pacific Brant, and Alaskan Emperor Goose populations, we sought to gather information regarding the spring subsistence harvest, as well as the biology of geese at Chagvan Bay during the spring migration of 1984. In this report, we will summarize information we collected at Chagvan Bay from May 3, to June 1, 1984.

## DESCRIPTION OF THE STUDY AREA

Chagvan Bay is a pristine estuary of approximately 13 square miles, located on the southwestern portion of Togiak National Wildlife Refuge, eight miles north of Cape Newenham (Figure 1). The bay is shallow enough that it can only be navigated in small motorized boats during the highest tide of a daily tidal cycle. Large and extensive Eelgrass (Zostera marina) beds are perhaps the most significant feature of the bay. Eelgrass is the single most important food of Brant, and is also an important food of Emperor Geese (Bellrose, 1980).

In our judgement there are a minimum of five square miles of eelgrass beds scattered throughout the bay, some of which are quite extensive. Sediments in the bay range from silt-clays to sands and gravel. The western shore of the bay is a long narrow spit, and the bay's only outlet is at its



extreme southwestern corner (Figure 2). The nature of the current at the outlet gives the bay its name; Chagvan is a Yu'pik word that means "swift water" (native hunter, personal comment).

#### METHODS

We arrived at Chagvan Bay on May 3, and had established our camp on the south spit (Figure 2) at the mouth of the bay by May 5, 1984. We monitored the arrival and departure of hunting parties from our camp and opportunistically, during the course of our field work around the bay. We restricted our activities so as not to interfere with subsistence hunting, and to avoid disturbing the geese.

We recorded the numbers of hunters in each hunting party we observed, their mode of travel to the bay, the duration of their stay; and tried to determine their place of origin. In some cases we were able to obtain information regarding the species composition, as well as total and daily bag contents of the waterfowl harvest; however, in most cases this was not possible. As a rule, we did not approach the hunters directly. For each hunting incident we observed, we recorded the type of hunting (pass or jump), the species involved, and the activity the birds were involved in when they were hunted.

To document the abundance and chronology of migration of geese, we conducted counts of feeding, roosting, and migrating flocks. We could not monitor the departure of goose flocks from the bay. We only detected the changes in the numbers of geese present in the bay by the result of our counts. We conducted counts of geese in the bay from vantage points on the shore as well as from an inflatable raft. To describe the biology and behavior of the geese, we censused goose flocks during entire tidal cycles; usually from an ebb high tide to an ebb low tide. We noted the activities of the flocks and spot-mapped their approximate locations on xerox copies of USGS topographic maps (1:63,360).

Because we were unfamiliar with Chagvan Bay, and due to the difficulties inherent in counting, from the ground, large numbers of birds dispersed over larger areas of ground; our counts only reflect the relative abundance of geese. Whenever possible we counted the numbers of birds by using hand tally meters. In most cases, however, we "countimated" the numbers of birds in units of five hundred or one thousand. This was the only way to

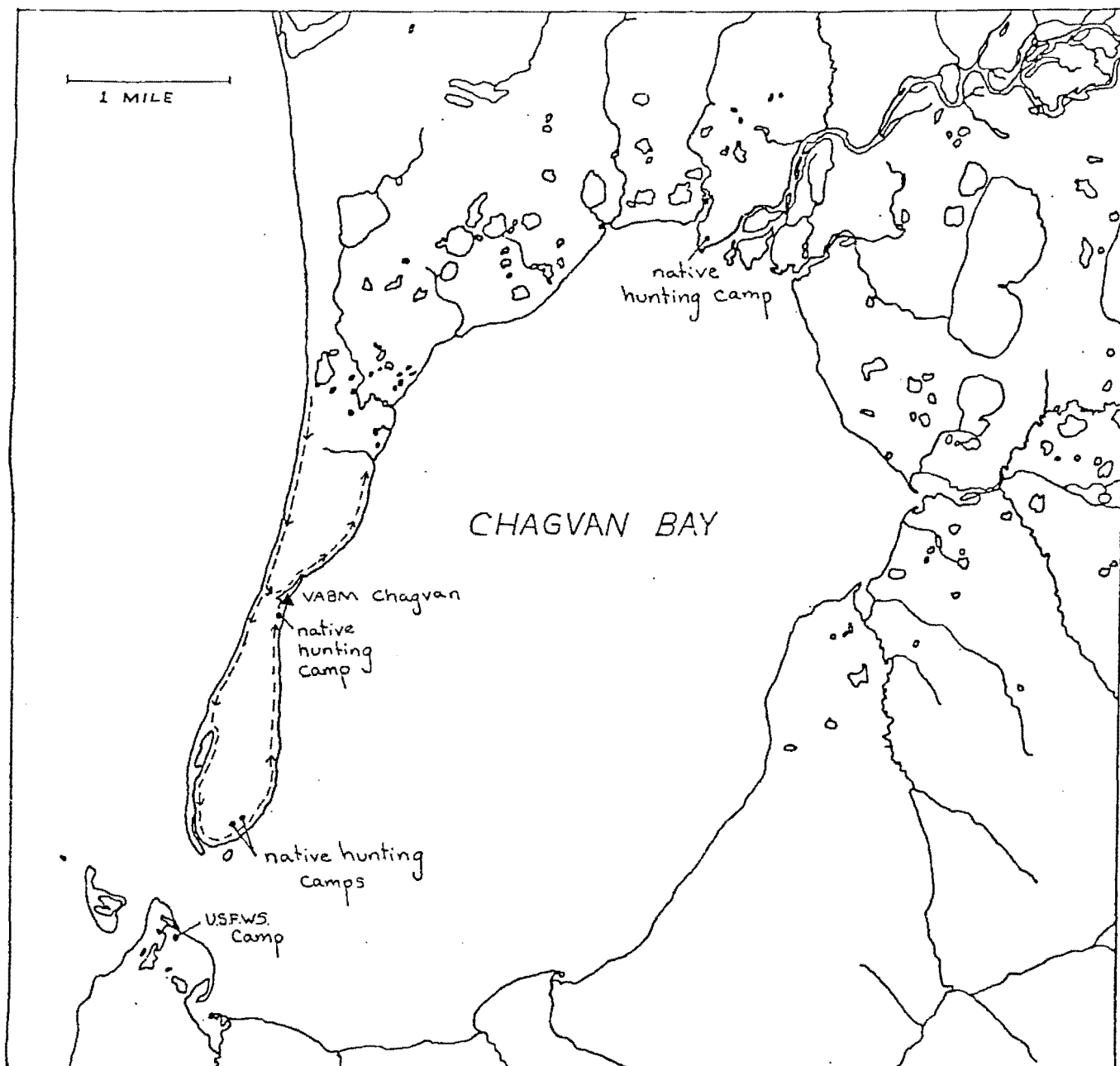


Figure 2. Map of Chagvan Bay, Togiak N.W.R., Alaska, showing the location of the camps used by native subsistence waterfowl hunters, USFWS field camp and the routes used by native hunters arriving at the bay on all-terrain vehicles during May 1984.

make counts when the birds were so far away as to prevent censusing. Our counts are likely to be 20-30 percent low; especially during the period of peak abundance.

Emperor Geese occurred in a dispersed fashion. Peak numbers occurred at the beginning of our stay, before we had become familiar with the area. Our counts of Emperor Geese are undoubtedly very low, and do not adequately describe the chronology of migration. Because we were in the field daily, however, we developed a "gestalt" for the chronology of the Emperor Goose migration. On the other hand, Brant concentrated in large flocks, and we were able to conduct systematic counts during their stay on the bay; especially during low tides when they foraged on eelgrass beds.

## RESULTS

### ABUNDANCE OF GEESE AND CHRONOLOGY OF MIGRATION

Ice cover for Chagvan Bay was 45 percent on April 13 (L. Hotchkiss, personal comment), but had increased to 98 percent by April 23. Dau and King recorded 40 percent ice cover on the bay on April 28 (Dau, unpublished); and it was still 40 percent when we arrived at the bay on May 3. All of the ice went out of the bay on the outgoing tides of May 4-6.

We did not observe any geese in Chagvan Bay during an aerial reconnaissance flight on April 23. Dau and King recorded White-fronted and Emperor Geese on the bay on April 28, (Table 1) but did not observe any Brant or Canada Geese on Nanvak or Chagvan Bays on this date. The only Snow Geese we observed consisted of a flock of 58 birds flying north on May 4. Hotchkiss and Fisher recorded White-fronted Geese, Emperor Geese, Canada Geese, and Brant in Chagvan Bay on May 4 (Table 1).

We first observed Emperor Geese on May 3 when, amidst the broken ice along the north and east sides of the bay, we counted 700. We recorded flocks of Emperor Geese arriving at Chagvan Bay from May 3-9; and on May 6, we counted 6,000 while they were feeding within site of our camp. It is our impression that peak numbers of Emperor Geese occurred in Chagvan Bay during the second week of May, and declined gradually thereafter. Lee Hotchkiss estimated (personal comment) the peak of Emperor Geese in Chagvan and Nanvak Bays numbered 12,000 birds. Small numbers (50-100) of Emperor Geese remained in the bay on June 1, when we broke camp.

Table 1. Aerial counts of geese in Chagvan Bay and Nanvak Bay, Togiak National Wildlife Refuge, Alaska, during April and May 1984.

<u>Source</u>	<u>Date</u>	<u>Chagvan Bay</u>				<u>Nanvak Bay</u>			
		<u>WFGO</u>	<u>EMGO</u>	<u>BRAN</u>	<u>CAGO</u>	<u>WFGO</u>	<u>EMGO</u>	<u>BRAN</u>	<u>CAGO</u>
1	28 April	5,500	30						
2	30 April		50	3,600	500		40	1,200	75
3	4 May	150	2,500	5,000	2,500		1,000	1,800	150
2	18 May			35-40,000					
2	24 May	900		15,000	4,500	300		5,000	1,500

Sources:

- 1 = Dau, unpublished.
- 2 = Hotchkiss, Togiak N.W.R. files.
- 3 = Hotchkiss and Fisher, Togiak N.W.R. files.

Abbreviations:

- WFGO - White-fronted Goose
- EMGO - Emperor Goose
- BRAN - Brant
- CAGO - Canada Goose



We first observed Brant amongst the broken ice along the north and east sides of the bay, when we counted about 700 birds on May 3. Peak numbers of Brant occurred during the third week of May (Tables 1 and 2). Our ground counts indicate significant numbers of Brant departed from Chagvan Bay on May 20, 21, and 26.

On May 7, we observed two or three flocks of light-bellied Brant (*Branta bernicla hrota*); one of 5 birds, and one or two of 15 birds each. We also observed a single light-bellied bird on May 18.

Peak abundance of Canada Geese occurred during the third week of May (Table 1). We only observed small scattered flocks of Canada Geese from the ground; including only one pair of Cackling Canada Geese (*B.C. minima*). All of the remaining Canada Geese we observed were of intermediate size, (*B.C. taverneri* or *B.C. panipes*).

#### BEHAVIOR OF BRANT AND EMPEROR GEESE

The majority of the Brant and Emperor Goose flocks we observed, entered the bay by flying over the narrowest point of the north spit, near the USGS Chagvan benchmark (Figure 3); however, many flocks also entered the bay by flying east over the channel at the southwestern corner of the bay, as well as over the southern portion of the north spit. Only Canada Geese arrived at Chagvan by flying overland, directly from the south.

While in the bay, Brant and Emperor Geese behaved like shorebirds; primarily roosting during high tides and moving to eelgrass beds to feed from one to three hours before ebb low tides. The geese roosted on a variety of habitats, including ice slabs, beaches and shores, sand and gravel bars, and brackish marshes; as well as out on the bay itself, (Figure 4).

Some of the largest concentrations of Brant we observed, were of roosting birds along the north and northeastern shores of the bay, near the outlets of freshwater streams.

During the majority of low tides, the eelgrass beds were in the southeastern portion of the bay (Figure 4). This area had beds which were the most frequently exposed, or water depths that were shallow enough to allow the geese to feed.

During the infrequent, extreme low tides, the geese fed in a more dispersed fashion; scattering onto eelgrass beds throughout the bay (Figure 4).

TABLE 2

Ground counts of Brant at Chagvan Bay during May, 1984. These counts represent near censuses of the entire bay. Probably some birds were missed on each count; however, the counts were conducted from similar vantage points and are likely to represent trends in the numbers of birds present.

Observers	Date	# of Brant	Comments
ML,SJ,TP	5/12	20,736	Feeding in eelgrass beds throughout the bay during low tide.
ML,TP	5/19	23,000- 26,000	Roosting in the northern portion of the bay during high tide.
TP	5/20	33,000	Feeding in the southeast portion of the bay during low tide.
TP	5/21	16,000- 21,000	Same as 5/20
TP	5/23	16,000	Same as 5/20
TP	5/25	12,000- 16,000	Roosting in the northern portion of the bay during high tide.
TP	5/27	3,200	Feeding in the southeast portion of the bay during low tide.
TP	5/28	2,800	Roosting in the northern portion of the bay during high tide.
TP	5/30	800	Same as 5/29

Observers: ML - Mark Lisac  
 SJ - Scott Johnston  
 TP - Tom Pogson

TABLE 3

Summary of information collected regarding hunting parties involved in the spring subsistence waterfowl hunting at Chagvan Bay, Togiak NWR, during May, 1984.

A. Frequency distribution of the size and tenure of hunting parties at Chagvan Bay (including their mode of transportation to the bay):

Number of Parties	Number of Hunters Per Party	Number of Days at Chagvan Bay	Method of Transportation
3	1	1	ATV
4	2	1	ATV
4	3	1	ATV
1	2	5	
1	3	8	
1	8	7	
1	3	3	
1	2	2	

B. Total Number of Parties Observed: 16  
5 from Goodnews Bay, 1 from Togiak, 10 from Platinum

C. Total Number of Hunters Observed: 41

D. Species of Waterfowl Taken: Northern Pintail, Steller's Eider, Canada Goose, White-fronted Goose, Emperor Goose, and Black Brant

E. Known or Estimated daily and/or Total Bag of Two (2) Hunting Parties:

Party No. 1 (Three Hunters, stayed eight [8] days and took a total of 30-40 Emperor Geese; on one day ea. hunter took 2 Emperors, a minimum of 7 Emperors each on a second day, and 5, 2, and 4 Emperors on a third day).

Party No. 2 (Eight Hunters, stayed seven [7] days, taking 58, 30, 21, 11, & 7 geese each during the first six [6] days of their stay. These numbers include: 5-Canada Geese, 3-Snow Geese, 2-White-fronted Geese, and the rest were Brant and Emperor Geese).

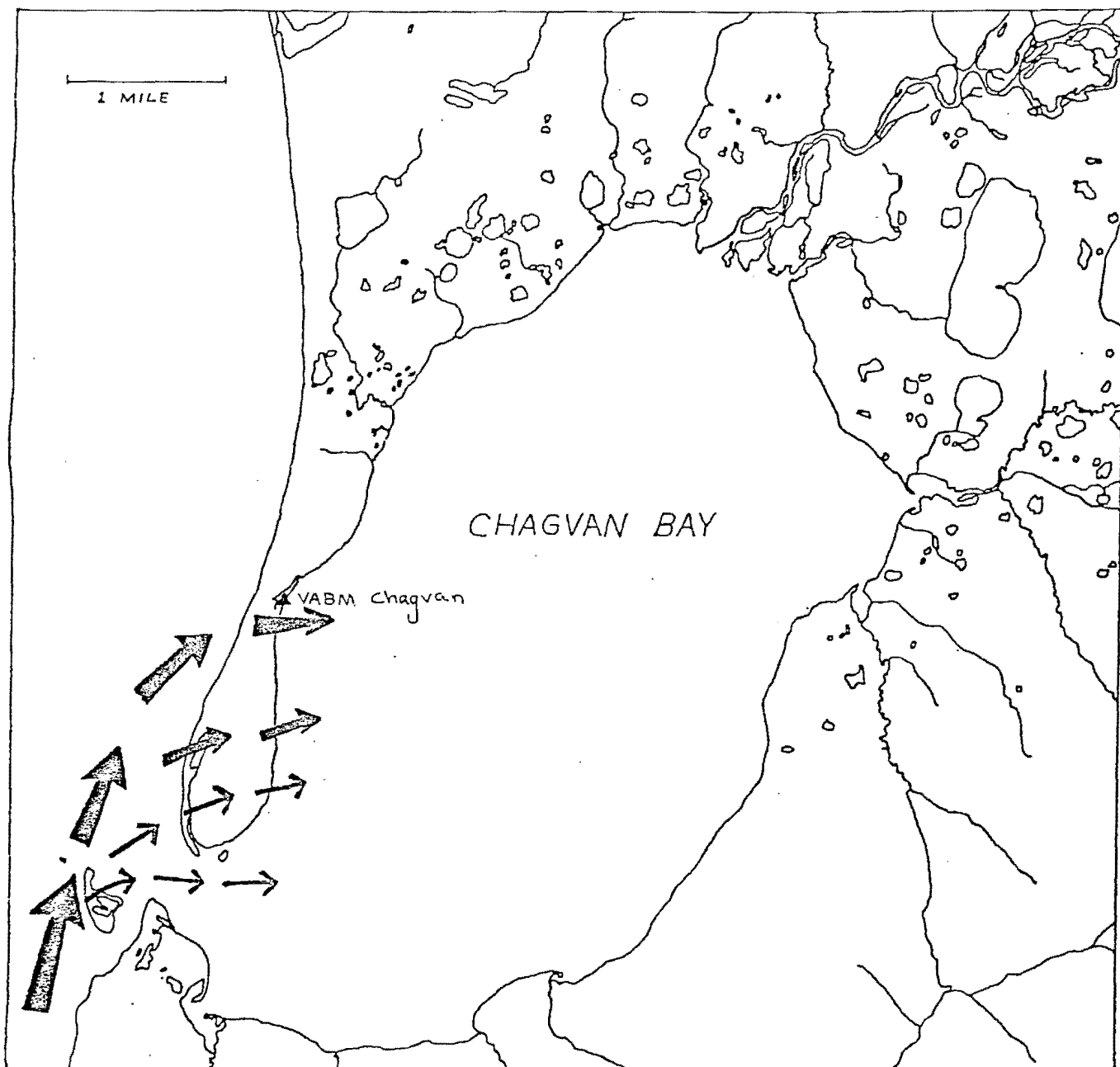


Figure 3. Map of Chagvan Bay, Togiak N.W.R., Alaska, showing routes used by Brant flocks arriving at the bay during May 1984. The size of the arrows indicates the relative importance of each route.

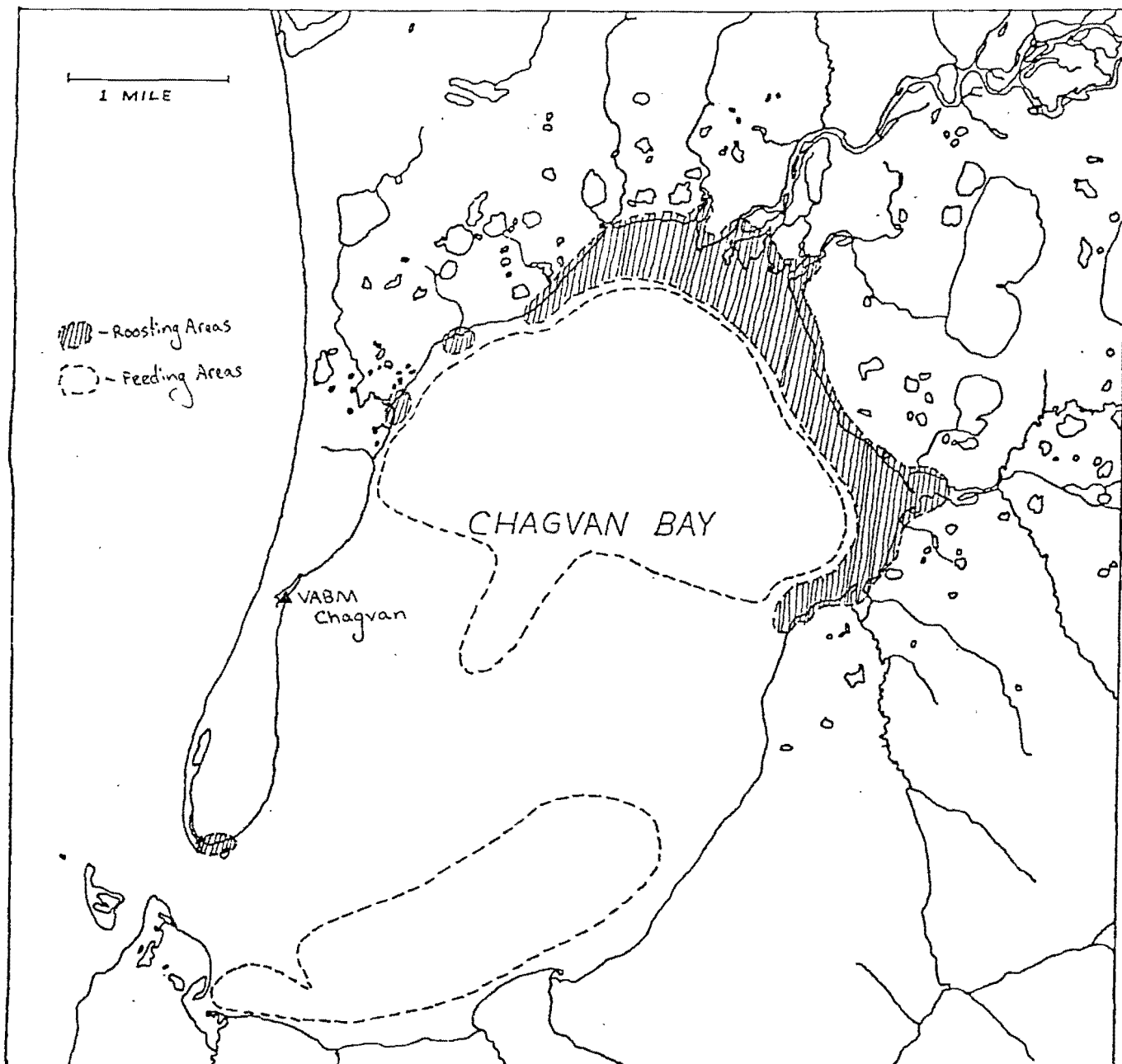


Figure 4. Map of Chagvan Bay, Togiak N.W.R., Alaska, showing areas frequently used by Brant for roosting and feeding during May 1984.

The geese also fed on eelgrass that was windrowed and transported to shallow waters and the shores at the north and northeastern end of the bay, near the roosts.

#### HUNTING PARTIES

During our stay at Chagvan Bay, we observed sixteen hunting parties. Six of the parties originated in the village of Goodnews Bay, and the remaining parties originated in the village of Platinum; with the exception of one party that originated in the village of Togiak (Figure 1).

All of the hunting parties that originated in Goodnews Bay, traveled to Chagvan in boats. Part of this is documented and part is assumed. All parties which arrived in boats and were interviewed originated in Goodnews. These interviews suggested all parties arriving in boats were from Goodnews. Likewise, all parties interviewed arriving on All Terrain Vehicles [ATV's], originated from Platinum with the exception mentioned above. Four of the groups arriving in boats came expressly to hunt. One party camped on the south tip of the north spit prior to the opening of the Security Cove herring fishery. With the exception of the herring crew and this party, all the boats were aluminum or wooden skiffs, between fourteen and sixteen feet in length.

The remaining ten hunting parties we observed all traveled to Chagvan Bay on ATV's (three-wheelers, motorcycles, & one four-wheeler). One native hunter interviewed had flown his own plane from the village of Togiak to Platinum; and he traveled to the bay on a three-wheeler. The most frequently used route of access to the bay by hunters using ATV's was across the narrowest point on the north spit (Figure 2).

On May 7, we observed a small airplane leaving the beach on the west side of the north spit. We cannot assert that the passengers of this plane hunted while they were at the bay, but it is possible.

All of the eleven hunting parties arriving at the bay on ATV's, remained for one day only. All of the hunting parties arriving in boats stayed between two and eight days. (Table 3--summarizes information regarding the size of hunting parties and the tenure of their stay at the bay; the total number of hunters observed, and the species of waterfowl harvested; as well as the known and/or estimated daily and total bag content of 2 hunting parties interviewed by Mark Lisac.)

All of the hunters we observed seemed to be using 12-gauge shotguns. Those hunters we interviewed used No. 4 shot. Members of one hunting party shared a .22 caliber rifle which they used to dispatch cripples. Drowned birds were retrieved by hunters on foot or using boats.

#### HUNTING INCIDENTS

We observed 14 hunting incidents (Table 4). The hunters engaged in pass shooting by concealing themselves on the base of cutbanks on the shore of the bay; behind grassy mounds and/or slabs of ice; and in blinds built out of overturned snow sleds or chunks of driftwood chinked with eelgrass. In early May, some hunters built blinds out of slabs of ice on gravel bars exposed by a low tide. Hunters took advantage of the predictable movements of geese to and from roosting and feeding areas, as well as the apparently transitional routes used by flocks of geese arriving at the bay, by stationing themselves at strategic locations (Figure 5).

On four occasions, hunters fired on birds from their boats while under power. Three of these incidents involved geese which were disturbed by hunters arriving at or departing from the bay. On one occasion, two of the hunters in a skiff stormed a gravel bar, flushing and firing on approximately 2,000 Steller's Eiders, killing eight birds.

#### DISCUSSION

##### ABUNDANCE OF GEESE AND CHRONOLOGY OF MIGRATION

Although our data is meager, it appears that peak abundance of White-fronted Geese, Emperor Geese, Canada Geese, and Brant were chronologically displaced. Peak numbers of White-fronted Geese occurred during the last week of April; whereas peak numbers of Emperor Geese occurred the second week in May; and Brant numbers peaked the third week of May. It is our impression that Brant arrived and departed from the bay throughout May. Therefore, the total number of birds stopping in the bay was much greater than the number present during the period of peak abundance.

Peak numbers of Canada Geese seem to have occurred during the last week of May. Small numbers of White-fronted Geese probably breed and/or molt in the freshwater wetlands north and northeast of Chagvan Bay. We observed single adults and pairs, both accompanied by last year's young; as well as small flocks of last year's young engaged in tolling behavior during the last two weeks of May.

TABLE 4

Species	Type of Hunting	Activity of Birds When Fired On:		
		Arriving Migrants	Feeding or Roosting Flight	Roosting
Emperor Goose	pass	1	3	
	jump			2
Brant	pass	3	2	
	jump			
White-fronted Goose	pass		1	
	jump			
Brant and Emperor Goose	pass			
	jump			1
Steller's Eider	pass			
	jump			1
Totals		4	6	4
Grand Total	14			



## BEHAVIOR OF BRANT AND EMPEROR GESE

On May 18, large numbers of herring (*Clupea harangus pallasii*) entered Chagvan Bay to spawn. During the following week, eelgrass leaves that washed ashore were covered with herring eggs. This herring spawning period seems to correspond with the peak abundance of Brant. Although we cannot confirm that Brant consumed large quantities of herring eggs incidental to feeding on eelgrass; it seems inevitable that they did. The peak abundance of herring spawning, in the Security Cove/Chagvan Bay area has occurred between May 5-May 30, in the years 1980-1984. (K. Francisco, personal comment). This year's peak spawning activity was the second latest during this five-year period. (ibid)

## HUNTING PARTIES

Because our camp was on the south spit, we could not adequately monitor the arrival of hunting parties that traveled to the bay using ATV's; therefore, the number of parties we recorded, arriving at the bay using ATV's, is obviously low.

It was our impression that hunters who traveled to the bay in boats, and remained for more than one day, were more successful than those hunters who remained for only one day. We did not interview any hunters using ATV's; however, those hunters on ATV's that we observed leaving the bay could have only had a few geese.

## HUNTING INCIDENTS

In general, hunters did not haze or purposefully disturb birds by using boats to facilitate hunting. During high tides, the opportunity for this type of activity was ample. Our limited interviews with some hunters indicated they were unaware of the large numbers of birds roosting and/or feeding out in the bay. There is the potential for a tremendous amount of disturbance, should hazing with boats become popular.

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CREDITS: PERSONAL COMMUNICATIONS

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2. Hotchkiss, Lee A. Assistant Refuge Manager/Pilot, Togiak National Wildlife Refuge, U.S. Fish and Wildlife Service, P.O. Box 10201, Dillingham, Alaska.

MAPS

1. Submitted (drawn) by: Karen Kincheloe, Volunteer, Togiak NWR.

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