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CENSUS OF PERMANENT STUDY PLOTS FOR MARINE BIRDS AT NUNIVAK

ISLAND IN 1982

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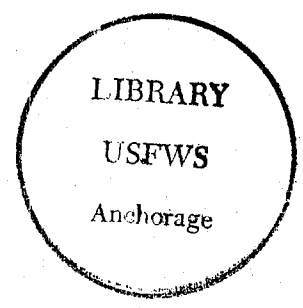


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YUKON DELTA NATIONAL WILDLIFE REFUGE
U.S. FISH AND WILDLIFE SERVICE
BETHEL, ALASKA
ALASKA REGION



In 1978, cliff-nesting seabirds at Nunivak Island were surveyed, and five permanent study plots were delineated for future evaluations of population changes (Ritchie 1978). In 1980 a small island (Kegaktuk I.) in Duchikthluk Bay, which has been an arctic tern nesting colony for years (R. Davis pers. comm.), was surveyed for terns and nesting ducks for the purpose of including this area as an additional permanent study plot (see Byrd 1980).

In 1982, a very late year phenologically on the Yukon Delta National Wildlife Refuge (Byrd et al. 1982), the first censuses were conducted of the permanent study plots since their establishment. This report summarizes our findings, compares them with previous counts, and provides recommendations for future surveys.

METHODS

Only four of the five permanent study plots established by Ritchie (1978 and Figures 1a-1c) were censused in 1982. Rough seas prevented access to the north side of Nunivak which is required to reach one of the plots (#1). Two observers censused one plot (# 3) from an observation point on a nearby headland. The other three plots (#'s 2, 4, and 5) were observed from a 21-foot Boston Whaler by up to three observers.

When viewing a cliff through 10 X binoculars from a rolling boat, it is relatively simple to become confused about whether we had missed or duplicated counts of birds in densely-packed clusters. Therefore, all observers counted one species at a time, and then recounted up to three times per species per plot to insure accuracy. With up to 12 counts for a species in a plot, it was obvious which individual counts were erroneous because of incomplete or double coverage. Those counts that were obviously too high or too low were omitted. The remaining counts were averaged to provide the population estimates.

In addition to counts, we photographed each plot through a 200 mm lens with Tri-X film from a distance of 50 to 75 meters, depending on the size of plots. Photographs were later taped together to provide composites for each plot, and birds were counted using a magnifying glass.

To allow comparisons, murres, kittiwakes, and cormorants were counted as in individual murres, individual kittiwakes in some plots but nests in others, and nests of pelagic cormorants.

The Kegaktuk Island study plot (Figure 2) was censused by three observers walking abreast over the entire area. All nests were examined to determine the clutch size and stage of incubation. Arctic terns did not remain on the ground at the approach of observers, but flew off nests and circled high overhead. An attempt was made by each observer to count birds in the air, and an average was agreed upon.

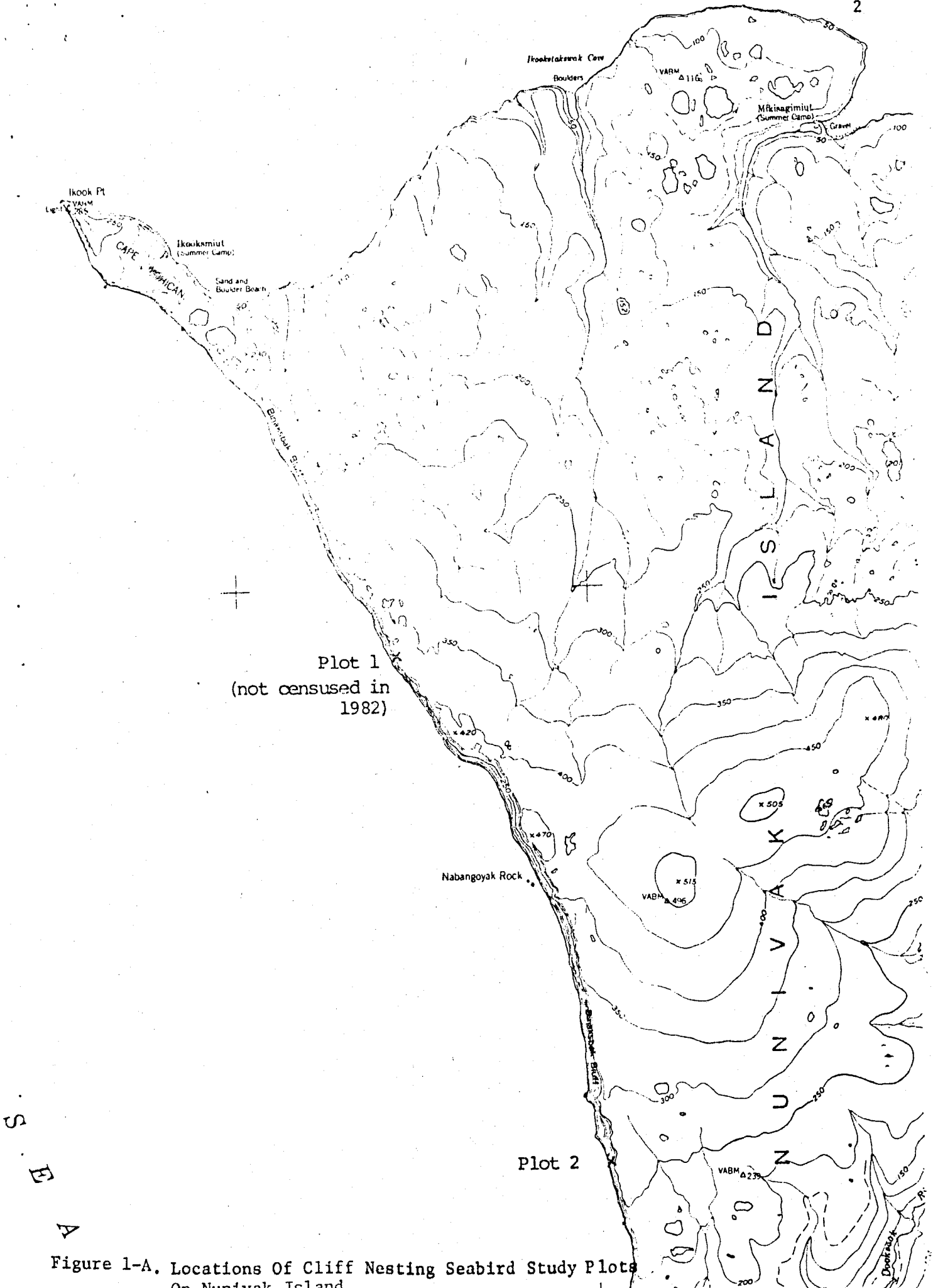


Figure 1-A. Locations Of Cliff Nesting Seabird Study Plots On Nundvak Island.

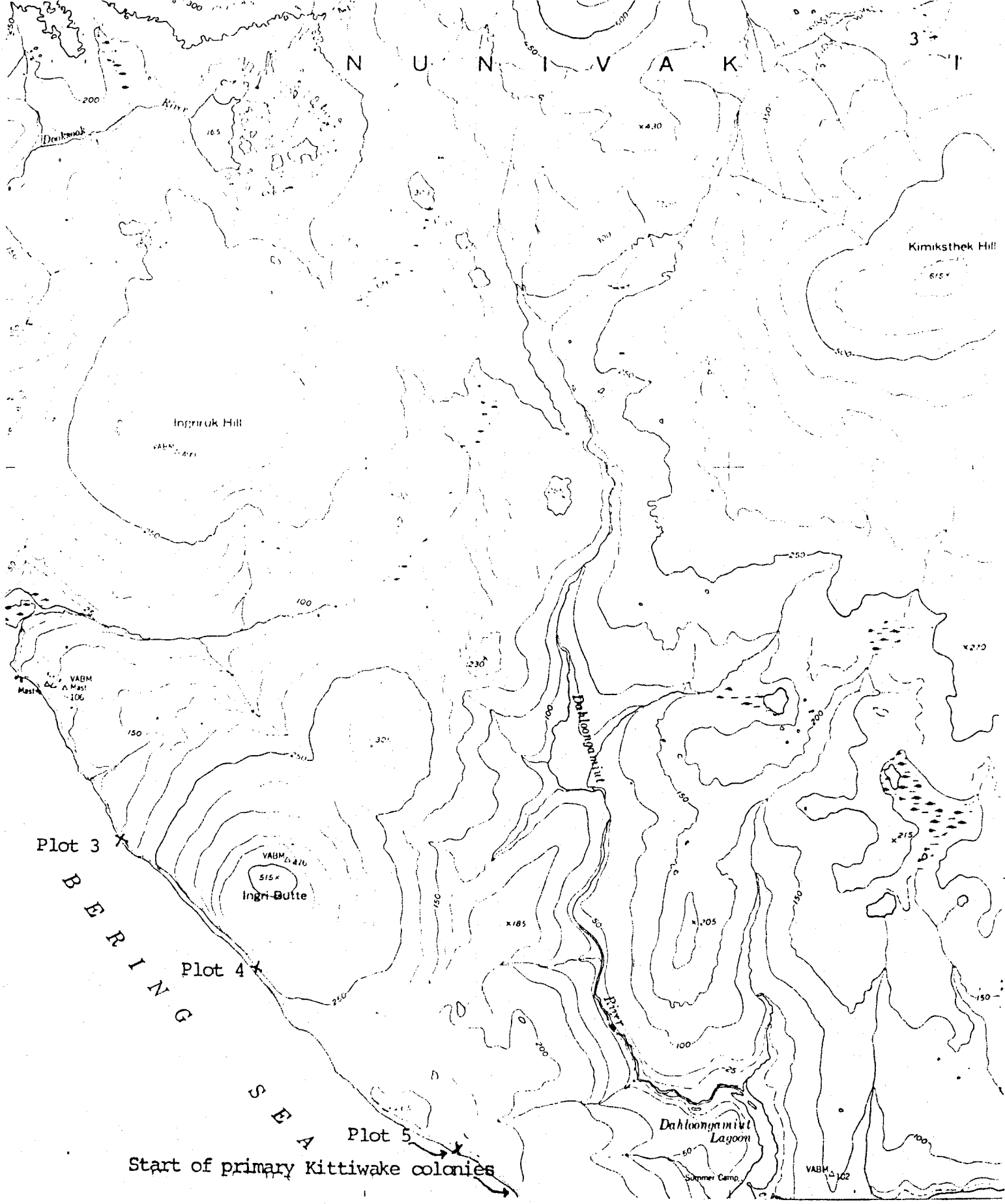
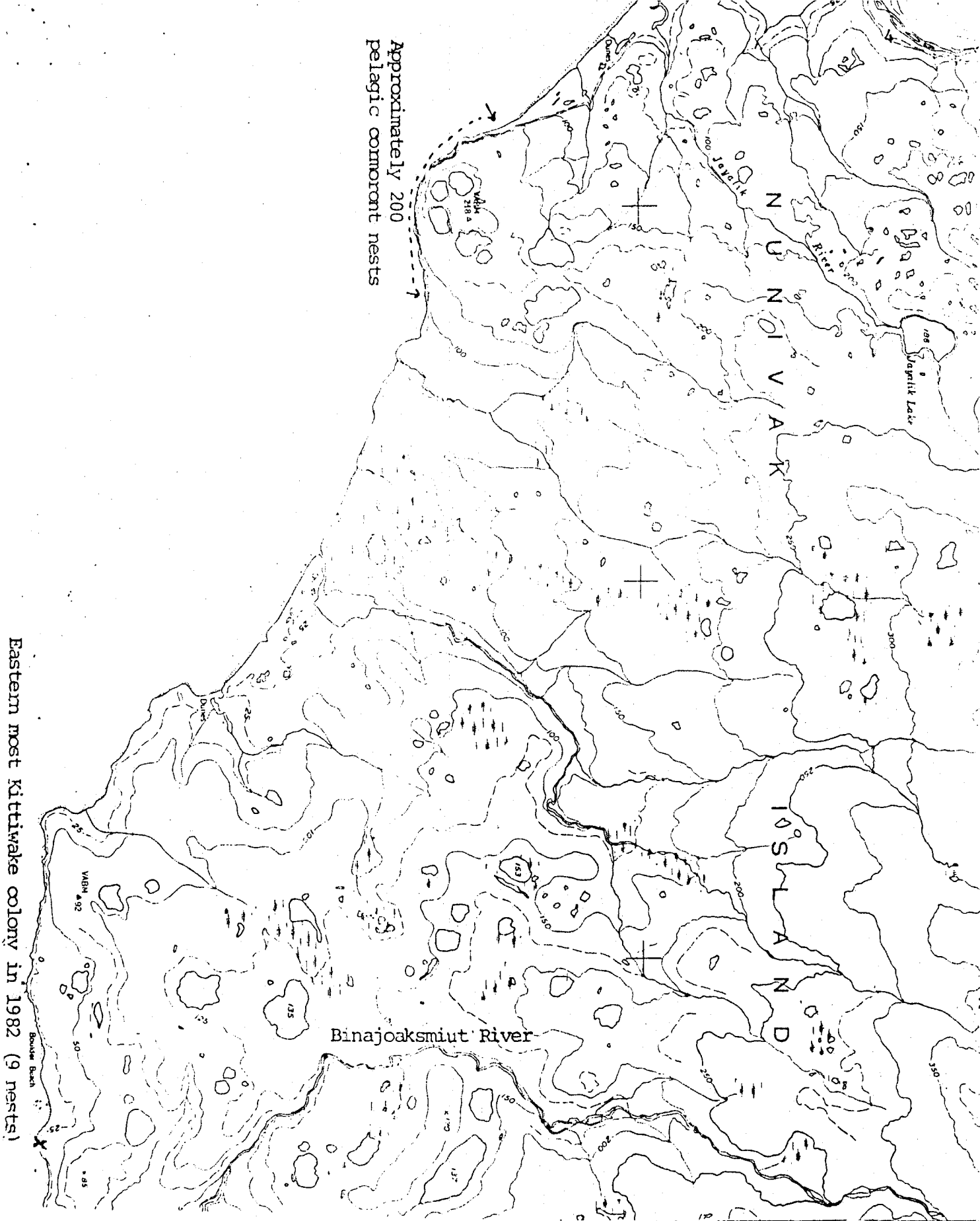


Figure 1- B. Locations Of Cliff Nesting Seabird Study Plots On Nunivak Island.



Eastern most Kittiwake colony in 1982 (9 nests)

Figure 1-C. Locations Of Cliff Nesting Seabird Study Plots On Nunivak Island.

The schedule of activities follows:

- 15 July Crew arrived at Mekoryuk from Bethel, attempted to travel to Duchikthluk Bay via Boston Whaler, but returned to Mekoryuk due to engine problems and high seas.
- 16 July Crew traveled to the refuge cabin at Duchikthluk Bay, but seas were too high to visit seabird colonies.
- 17 July Seas were too high to visit seabird areas, Kegaktuk Island was censused.
- 18 July Seas were too high to visit seabird areas, vegetation on the sand dunes near Duchikthluk Bay was scrutinized to subjectively evaluate muskox winter range.
- 19 July Seas were too high to visit seabird areas, several streams entering Duchikthluk Bay were surveyed to orient new employees to this type of habitat.
- 20 July Travelled to Dahloongamiut Lagoon via Boston Whaler, cliff nesting seabirds as far north as Nabangoyak Rock were observed, birds on permanent study plots were censused.
- 21 July Returned to Mekoryuk.
- 22 July Returned to Bethel.

RESULTS AND DISCUSSION

Cliff-nester Plots

Distribution - The general distribution of the colonies of cliff-nesting birds seemed to be similar to that found by Ritchie in 1978, except a small colony of kittiwakes (9 nests and 26 birds) was found near the Binajoaksmit River (Figure 1-C), farther east than any kittiwakes previously reported.

Populations - Pelagic cormorants, black-legged kittiwakes, and common murres were the three major species present in plots. Pelagic cormorants nested in only plot number 5 in 1978. In 1982 they nested again in the same plot, but in much lower densities (Table 1). Also in 1982 one of cormorant nest was found in plot number 2 where the species was not found in 1978. Cormorants are notorious for changing nesting locations (e.g. White et al. 1977); therefore, it is impossible to know if changes observed in the two study plots reflect overall population changes or just relocation.

In both plots (4 and 5) where individual kittiwakes were counted in 1978 and 1982, more birds were seen in the latter year, but fewer nests were found in 1982 in the two plots (2 and 3) where nests were recorded (Table 1) and Figure 1 for plot locations). The higher number of individuals in 1982 might have been the result of differences in the diurnal colony attendance patterns at the times of the two counts.

Table 1. Comparison of censuses of cliff-nesting birds in permanent study plots at Nunivak Island, 1978 and 1982.

	<u>Plot Number</u>									
	2		3		4		5		Total	
	1978	1982	1978	1982	1978	1982	1978	1982	1978	1982
Date censused (July)	21	20	25	20	26	20	26	20	21-26	20
Time censused (starting time)	1500	1210	1230	1430	1700	1115	1530	1050	1230-1700	1050-1430
Total Pelagic Cormoront nests	0	1	0	0	0	0	31	19	31	20
Total Black-legged Kittiwakes				80 (75)	220	315 (373)	580	1650 (1582)	800	1965
Kittiwake nests	300	120	67	42					367	162
Total Common murre	750	600 (39)	1900	800	1600	1500 (1603)	3600*	1900 (2464)***	7850	4800

*Counted 22 July at 2015 h.

**Counts in parentheses were derived from photographs taken at times of censuses

***Plot boundaries difficult to determine, perhaps more area included in count from photograph.

Murre counts were lower in every plot in 1982 than in 1978, but the proportion of the decline was drastically different among plots (Table 1).

Counts of kittiwakes and murre in 1982 from the boat were very similar to those made from photographs, except for murre in plot 5 where confusion over plot boundaries may have occurred (Table 1).

Diurnal and temporal changes occur in colony attendance patterns of kittiwakes and murre, and these must be understood to properly interpret counts of individual birds. When it is possible to count individual nests, this figure affords the least variable comparison of nesting pairs among years. Nevertheless, murre do not construct nests and it is often difficult to see kittiwake nests on high, vertical cliffs when the observer is at sea level (Ritchie 1978). Therefore, in these cases, counts of individuals must be used for comparisons. Theoretically, counts made at similar stages in the nesting cycle (not necessarily at identical dates) and times of the day would provide the most comparable counts.

Besides the major species counted in plots, other species of seabirds were seen in the vicinity. Horned and tufted puffins were common along cliff segments with numerous rock crevices, but no counts were made. Approximately 500 parakeet auklets were counted during the boat trip along Ingri Butte on 20 July. These auklets were seen entering and leaving crevices along cliff tops near plot 3.

Nesting Phenology - Pelagic cormorants had young ranging from very small to more than half grown in the nests we were able to view. Black-legged kittiwake eggs were roughly 60 to 70% hatched on 20 July 1982; of 34 nests seen clearly, five still had eggs, nine had small chicks, and 20 were empty (failures?) In 1978 hatching was apparently much earlier, beginning in early July (Richie 1978). Only three common murre were observed closely enough to discern their stage of nesting; one was on an egg, and two had chicks less than a week old. Murre too may have been later in 1982 than 1978 (Richie 1978)

Productivity - Cormorant broods (n=15) averaged 1.7 chicks. Of nine kittiwake broods, seven were singles and two had two chicks (x=1.2). No data were obtained on murre production.

Kegaktuk Island Plot:

Nesting Distribution - Although more nests were found in 1982 than in 1980, the main nesting area was similar both years (Figure 2).

Populations of Terns and Ducks - In 1982 nests were found of 25 pairs of ducks, 42 pairs of arctic terns, and 4 pairs of gulls (Table 2). The 1982 estimates of terns milling over the island was 150-200 compared to 300 in 1980. A comparison of tern nests was not possible because eggs had already hatched when we searched the area in 1980.

Greater scaup and oldsquaw nests were unexplicitly more abundant in 1982 than in 1980. The habitat was much drier in 1982 than two years previously (e.g. ponds on the east end to the island contained water in 1980 but were dry in

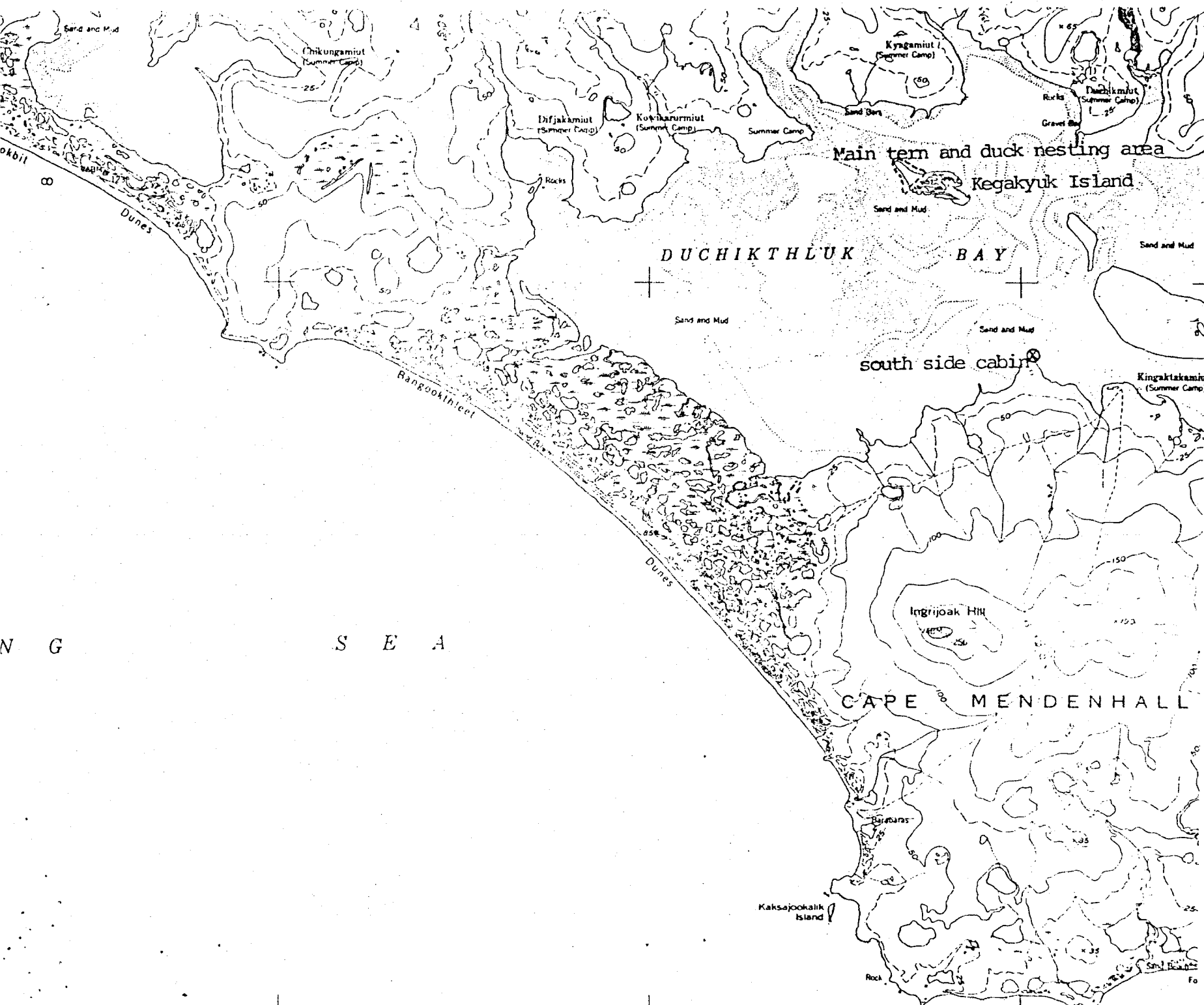


Figure 2. Map showing location of Kegaktuk Island.

Table 2. Comparison of nests of various species of birds on Kegaktuk Island in Duchikthluk Bay, Nunivak, 1980 and 1982.

Species	Total Nests		Average Clutch		Stage of nesting		Comments
	1980	1982	1980	1982	1980	1982	
Greater Scaup	1	16	6.0	6.5*	Fresh	fresh to mid-incubation	
Oldsquaw	1	8	-	6.5	-	fresh to mid-incubation	
Common Eider	0	1	-	4.0			
Arctic Tern		42**		1.3	1 on egg at least 15 locals and 40 fledglings	30 on eggs, 2 hatching up to 10 hatched, no fledglings	In 1980 approximately 300 terns flying over colony (including 150-200 terns flying in 1982.
Glaucous-winged Gull	0	3				late in incubation	
Sabine's Gull	1	1	-	1.0	young chick	late in incubation	

*Abandoned nests with 2 and 1 eggs respectively not included; also clutches may have ultimately been higher since some pairs may have still been laying.

**32 with eggs or chicks, 10 with grass cups (may have already hatched).

1982), but a connection between this condition and nesting density was not apparent to us. The island is in the vicinity of a number of summer fish camps, and perhaps hunting or egging on the island was in 1980 rather than 1982. Since 1982 was such a late, dry spring, some normally acceptable nest sites may have been unavailable or unsuitable causing ducks to "crowd" into remaining acceptable sites like Kegaktuk Island.

Nesting Phenology - The nesting cycle of arctic terns was considerably later in 1982 than in 1980. In 1982 most terns were still incubating eggs (roughly 70 to 75%) during our survey on 17 July, whereas in 1980 during an earlier survey (12 July) nearly all eggs had hatched (Table 2).

CONCLUSIONS

The 1982 season was one of the latest on record phenologically on the Yukon-Kuskokwim Delta. Nunivak Island also had a late spring, which may have reduced nesting populations and/or success of cliff-nesting seabirds, as was apparently the case on other Bering Sea islands (St. Matthew, E. Rhode pers. comm; the Pribilofs, R. A. Day pers. comm.). Indeed, the counts of pelagic cormorants, black-legged kittiwake nests, common murre, and arctic terns were all lower in 1982 than in previous counts. Nevertheless, so many variables exist in colony attendance patterns of birds that strong conclusions should not be drawn about the overall populations at Nunivak.

RECOMMENDATIONS

The existing systems of study plots may be inadequate for determining population changes of cliff-nesting seabirds at Nunivak Island. If possible the number of plots censused should be increased to at least 10. At least half the plots should be viewed from land, and these should be accessible from the south side of the island if possible. Besides population indices, the plots observed from shore would provide information on nesting phenology and production.

Since it proved to be feasible, if time consuming, to make accurate counts of birds from photographs; (See Table 1 for comparison with visual counts) experiments with types of film (e.g. lower ASA's to get finer grains which would allow better clarity at high magnification), sizes of lens, and methods of photography (e.g. use of a monopod vs. hand-held) should be continued to be made.

The "new" kittiwake colony found in 1982 near the Binajoaksmiut River mouth should be added to the census and any extensions of nesting colonies of kittiwakes or murre east of Dahloongamiut Lagoon should be noted.

Plots designed specifically to gather information on cormorants (particularly production data) should be added to surveys. If possible the overall distribution of cormorants should be evaluated periodically.

Where possible, both numbers of adult kittiwakes on nesting cliffs and the number of nests should be counted, not just one or the other.

Surveys should be conducted about 7 to 15 July each year to standardize the period and avoid conflicts with other refuge commitments. If time allows, kittiwake and murre counts should be calibrated by counting adults on a sample plot every two hours all day to determine the diurnal attendance patterns. This should be done during each year censuses are conducted, and if possible on the same day censuses occur.

Censuses of permanent study plots should be conducted at least every two years, and ideally, a complete photo census of cliff-nesters should be done every five years.

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