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memorandum

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DATE: July 20, 1983

REPLY TO
ATTN OF: Acting Refuge Manager, Yukon Delta NWR

SUBJECT: Cackling Canada Goose Nesting Populations - Yukon Delta NWR

TO: Operations Manager - South *AC 7/26*

For your review I've attached Bill Butler's report on his summer work with cackling Canada geese. Copies of this have also been sent to Dirk Derksen and Skip Ladd to expedite review prior to the Flyway Technical Committee Meeting.

Attachments

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* GPO : 1981 O - 341-526 (6304)

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UNITED STATES GOVERNMENT

memorandum

DATE: July 19, 1983

REPLY TO
ATTN OF: Wildlife Biologist William Butler, Yukon Delta NWR

SUBJECT: Cackling Canada Goose Nesting Populations - Yukon Delta NWR

TO: Refuge Manager, Yukon Delta NWR

Forty sample plots ranging in size from 81-313 acres (total: 7041 acres) were systematically located throughout 120 miles of coastal zone cackling Canada Goose (CCG) nesting habitat in 1982. Plots were censused on foot by teams of two people in both 1982 and 1983. All islands and peninsulas were searched on each plot. Surveys on all plots were conducted after peak incubation and prior to peak of hatch. Searches required 3-6 hours to complete depending on plot size and number of nests encountered. Nests of all species found on plots were recorded.

The number of CCG nests found on all plots was 489 in 1982 and 554 in 1983. The mean nesting densities for the 40 plots are shown in Table 1.

Table 1. Mean nesting densities of cackling Canada geese nesting on the Yukon Delta National Wildlife Refuge as estimated from 40 nesting plots (numbers of nests/square mile).

Year	Mean	S.D.	Variance	Range
1982	47.4	48.0	2040.1	0-265.4
1983	52.1	60.2	3534.1	0-327.1

The plot data is poor for estimating significant differences in nesting CCG pairs between 1982 and 1983 because of high variation in nesting densities between plots within years and high overall variation between years. The plots, however, are placed throughout the Yukon Delta CCG nesting range (in areas considered to be good nesting habitat) and provide a better index to the population than has been available in past years.

The total number of nesting pairs found on the plots was slightly higher in 1983 than in 1982. The mean number of nesting pairs per plot was also slightly higher in 1983. In 1982 break-up on the Yukon Delta occurred very late. Nesting by cackling Canada geese could not be initiated until habitat became available. Under such conditions energy reserves required for reproduction are utilized prior to nesting and fewer birds would be expected to nest. In 1983 break-up occurred early on the delta. Thus, an

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increase in mean nesting densities and total number of nesting pairs in 1983 would be expected.

Eight of the CCG plots censused in 1982 and 1983 were also censused in 1981. These plots are located in the Hazen Bay area of the Yukon Delta National Wildlife Refuge (NWR) from Kashunuk River south to the Azun River. The plots range from 160-240 acres in size and total 1520 acres.

The total number of CCG nests found on these plots were 138 in 1981, 132 in 1982, and 103 in 1983. The mean nesting densities from these plots is shown in Table 2.

Table 2. Mean nesting densities of cackling Canada geese nesting on the Yukon Delta National Wildlife Refuge as estimated from 8 nesting plots (numbers of nests/square mile).

Year	Mean	S.D.	Variance	Range
1981	59.5	23.2	471.2	32.0 - 88.0
1982	57.8	39.7	1381.9	12.0 - 128.0
1983	44.7	15.5	209.8	16.0 - 56.0

Because of the variation known to exist (Table 1) in the overall sample of 40 plots censused in 1982 and 1983, we present the data for this subset cautiously and because it represents the only sample of plots censused for three years. The data indicate that for these 1520 acres at least, numbers of nesting CCG have decreased since 1981.

For two 240 acre plots on the Onumtuk study area CCG nesting data is available for 14 years from 1969-1983 (1974 omitted). The data displayed in Table 3 is the best long term nesting density information taken from the same plots on the Refuge. A linear regression analysis was done to determine if nesting density on the plots changed with relation to time (Figure 1). The trend on both plots is downward. On Onumtuk 1 the trend is significant ($t=2.52$, $P < .05$). On Onumtuk 2 the trend is not significant ($t=1.59$, $P > .05$). Care should be exercised in interpreting the information since the "r" values (indicating the degree to which the nesting density estimates on each plot over 14 years approximate a declining straight line) are low.

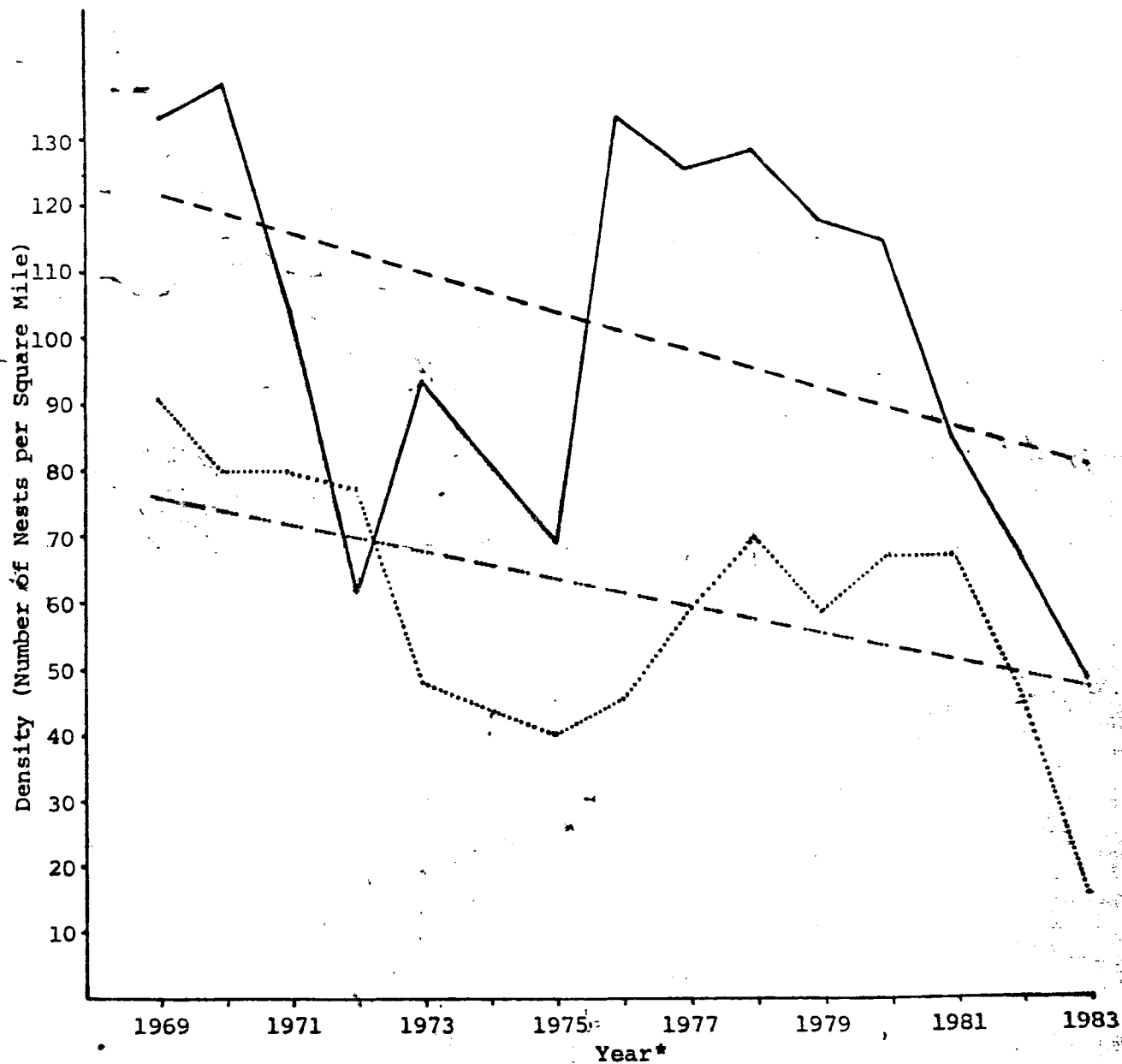
In 1982 an estimate of the available CCG habitat on all study plots was made. Potential territories (defined as an island or group of islands at least 75 feet from the nearest island or group of islands) were counted on each plot. Since this is a qualitative estimate it was not repeated and the numbers of potential territories were considered to be the same in 1982 and 1983.

If the number of potential territories is a real measure of available habitat, the number of CCG nesting on a study plot should be related to the number of potential territories on each plot. Correlation analysis of the data shown in Table 4 indicates a strong relationship between the number of potential territories and the number of nesting CCG in 1982 ($R = .75$) and in 1983 ($R = .74$).

Table 3. Cackling Canada goose nesting data from two Onumtuk study plots on the Yukon Delta National Wildlife Refuge from 1969-1983 (1974 omitted).

Year	Onumtuk 1		Onumtuk 2	
	Nests per Square Mile	(No. of Nests)	Nests per Square Mile	(No. of Nests)
1969	90.6	(34)	133.3	(50)
1970	80.0	(30)	138.6	(52)
1971	80.0	(30)	104.0	(39)
1972	77.3	(29)	61.3	(23)
1973	48.0	(18)	93.3	(39)
1975	40.0	(15)	69.3	(26)
1976	45.3	(17)	133.3	(50)
1977	58.6	(22)	125.3	(47)
1978	69.3	(26)	128.0	(48)
1979	58.6	(22)	117.3	(44)
1980	66.6	(25)	114.6	(43)
1981	66.6	(25)	85.3	(32)
1982	45.3	(17)	66.6	(25)
1983	45.3	(17)	48.0	(18)
Mean	63.5		105.3	
S.D.	15.8		27.5	
Range	45.3 - 90.6		61.3 - 138.6	

Figure 1. Trend analysis of 14 years of Cackling Canada Goose nesting data (nests/square mile) on two 240 acre plots (Onumtuk 1 and 2) from the Yukon Delta National Wildlife Refuge.



..... Onumtuk I $r = -.5888$

—— Onumtuk II $r = -.4237$

*No data available for 1974

Table 4. Number of potential territories, number of cackling Canada Goose (CCG) nests, and percent occupancy of available territories from CCG plots on the Yukon Delta National Wildlife Refuge in 1982 and 1983.

Plot No.	Total Potential Territories ¹	Total No. of Cackler Nests		% Occupancy of Available Territories ²	
		1982	1983	1982	1983
6A	92	12	55	13	60
6B	106	10	34	9	32
8A	37	3	0	8	0
9A	48	0	1	0	2
9B	19	1	0	5	21
9C	94	0		0	
12A	57	18	38	32	67
12B	45	8	10	18	22
13A	14	0		0	
15A	88	20	12	23	14
15B	39	11	8	28	21
16A	45	30	16	67	36
17A	63	18	15	29	24
18A	29	0	0	0	0
19A	55	4	2	7	4
19B	57	5	5	9	9
20A	80	10	2	12.5	3
20B	53	2	2	4	4
22B	69	25	36	36	52
22C	71	13	21	18	30
23A	44	7	18	16	41
24A	14	0	0	21	0
24B	6	4	3	67	50
25A	95	14	21	15	22
25B	66	18	18	27	27
26A	8	3	2	37.5	25
26B	5	1	2	20	40
27A	100	13	15	13	15
28A	250	56	69	22	28
32B	62	12	17	19	27
33A	70	12	4	17	6
33B	93	15	14	16	15
37A	79	6	4	8	5
37B	41	3	3	7	7
Mean				18.8	22.0
Standard Deviation				15.6	18.0

1. Defined as an island or group of islands at least 75 feet from the nearest island or group of islands.

2. No. Nests/No. Potential territories X 100.

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