PRODUCTION OF EPP CANADA GEESE NEAR CAPE CHURCHILL IN 2004

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Abstract:--Nest searching for Eastern Prairie Population Canada geese was conducted on the Nestor One Study Area near Cape Churchill, Manitoba from 16-21 June 2004. A total of 6 nests was found in initial searches of 732 ha of wetlands in 14 primary sample areas, 11 nests were located in searches of 6 coastal sample areas, and 7 nests were located in 3 additional sample units south and east of the primary units. A total of 24 nests was located on the Nestor One study area in 2004. Nest density (unadjusted for observability) in the primary sample areas was 0.82 nests per 100 ha of wetland— the lowest nest density recorded on the Nestor One study site from 1976-2004, and 89% lower than that estimated in 2003. Clutch size in 21 nests with eggs present when located averaged 2.19—lower than the long-term mean of 3.87 (1976-2004) and the clutch size expected based on the established relationship between mean clutch size and median hatch date. Estimated median hatch date was 11 July, and ranged from 7 to 15 July, with no nests initiated on or before 23 May 2004 (the date used to define "bust" production). Nest success calculated as the average apparent success rate of nests active when first located during initial nest searching (0.15) and the 28-day survival of nests based on exposure days through nest location (0.33) was 0.24—considerably lower than the average nest success of 0.63 observed

during the 1990s. Based on these estimates of nest density, clutch size, and nest success, gosling production at Nestor One was approximately 0.43 per 100 ha of wetland—the lowest productivity recorded from 1976-2004 and well below the average of 33.48 goslings per 100 ha of wetlands observed during that period.

In 2004, data on nest density and reproduction of Eastern Prairie Population (EPP) Canada geese were collected near Cape Churchill in order to:

1) obtain production indices for regulatory purposes;
2) aid in relating density, clutch size, and nest success of geese to long-term variation in weather, predation, and competition from snow geese, and
3) locate nesting Canada and snow geese as part of a study of factors affecting nest depredation.

Methods

Data on numbers of nesting Canada geese, clutch sizes, and nest success were collected in 14 primary and 9 supplemental sample areas near Nestor One, 8 km south of Cape Churchill, MB. Detailed methods and study areas were described by Didiuk (1980) and Walter (1999). Two survey crews searched sample areas for nesting birds and subsequently assessed nest fate of Canada goose nests located during surveys. The first crew conducted systematic searches of primary and supplemental sample areas from 16-21 June 2004. The second crew monitored nests located by the first crew and assisted in data collection related to assessing historic collared lemming (*Dicrostonyx richardsoni*) abundance and anuran distribution and relative abundance, and conducted breeding bird surveys.

Results and Discussion

At Churchill, there were 807 heating degree-days in May 2004, considerably higher than the 457 heating degree-days recorded in May 2003, and approximately 34% higher than the long-term average for May. Late winter storms and relatively cold temperatures resulted in high snowpack and very late spring phenology (Fig. 1). Field activities were planned to coincide with a late hatch at Cape Churchill—the first crew arrived in Camp beginning on 10 June, near the start of incubation. Snow cover at Cape Churchill in early June was near 100% (Fig. 1), diminishing to 50% by mid-June. The estimated date of the earliest Canada goose egg laid on the study area in 2004 was 4 June, almost a month later than in 2003.

Density of Nests:--A total of 6 nests was found in 2004 during initial searches of 732 ha of wetlands in 14 primary sample areas near Nestor One. Eleven nests were located in searches of 6 coastal sample areas and 7 nests were located in 3 additional sample units (units 14E, 14S, and 8S) south and east of the 14 primary units. None were located subsequent to initial surveys or outside of surveyed sample areas. Thus, a total of 24 nests was located on the Nestor One study area in 2004. Nest density (unadjusted for observability) in the primary sample areas was 0.82 nests per 100 ha of wetland—the lowest density recorded on the Nestor One study site since

surveys began in 1976 (Table 1). Nest density estimated in 2004 was lower than that expected based on the long-term trend in nest density at Nestor One (Fig. 2).

Clutch Size:--Mean clutch size (n = 21 nests with eggs present when located) of Canada geese was 2.19 in nests located at Nestor One (Table 2) in 2004; the lowest mean clutch size observed at Nestor One during the period from 1976-2004 (Table 1). The mean clutch size at Nestor One was below that expected from the established relationship between clutch size and median hatch date (Fig. 3).

Hatch Dates and Nest Success:--Ages of eggs were determined by flotation and candling in 21 Canada goose nests located during nest searching at Nestor One in 2004. Mean stage of incubation at the time of first visit was 6 days and the median hatch date predicted from ages of eggs in the nest was 11 July, ranging from 7-15 July. Predicted hatch date for 100% of nests was within 5 days of the predicted median hatch date. Of nests found during initial nest searching (n = 24), 3 (12.5%) had been destroyed prior to being located. Nest success (28-day survival) calculated from the first day of incubation to the first nest visit was 0.33. This estimate is corrected for differences in the probability of discovery of active and depredated or abandoned nests (0.77 and 0.39, respectively; Walter 1996). Apparent nest success, calculated from termination visits (visits to the nest after eggs had hatched or the nest had been destroyed or abandoned) to nests that were active when first located, was 0.15 (3 hatched, 17 were destroyed or abandoned, and the fate of 1 nest was undetermined) compared to 0.11 in 2000, 0.85 in 2001, 0.36 in 2002, and 0.68 in 2003. Nest success calculated as the average of apparent success rate of nests active when first located during initial nest searching (0.15) and the 28-day survival of nests based on exposure days (0.33) was 0.24—considerably lower than the average nest success of 0.63 observed during the 1990s (Table 1).

Production Forecast for 2004:-- The latest spring phenology observed during the period from 1976-2004 at Cape Churchill apparently resulted in low productivity of Canada geese at Nestor One in 2004. The median estimated hatch date of Canada geese at Nestor One in 2004 was 11 July—the latest recorded during the period 1976-2004 (Table 1). The mean clutch size of 2.19 was lower than that predicted from the established relationship between breeding phenology and clutch size at Cape Churchill (Fig. 3), and the lowest recorded from 1976-2004 (Table 1). Nest density was 0.82 nests per 100 ha of wetland in the 14 primary survey areas at Nestor One—the lowest density recorded during the period 1976-2004 (Table 1) and lower than the value predicted from the density-year relationship from 1976-2004 at Nestor One (Fig. 3). Nest success was relatively low compared to the average of recent years (Table 1). Based on these estimates of nest density, clutch size, and nest success, gosling production at Nestor One was approximately 0.43 per 100 ha of wetland—the lowest production estimated at Cape Churchill during the period 1976-2004 (Table 1). No nests with estimated hatch dates were initiated on or prior to 23 May, the date used in the EPP plan as indicative of a reproductive "bust."

Fox density on the study area appeared to be relatively high, based on observations of foxes during field activities and indications of activity at dens. Fox sign was abundant, with 14 (82%) of 17 known fox dens in or near the study area that were checked exhibiting evidence of fox activity. Evidence at dens indicated that 5 (29%) likely supported breeding foxes. Foxes were

observed on the study area frequently during nest searching. Lemming density also appeared to be high on the study site, with burrows, winter nests, droppings, and live lemmings regularly observed during nest searching. Lemming density appeared similar to that in 2003, and higher than at any time prior to that during the past 15 years.

Finally, no snow goose nests were located on the study area in 2004. Prior to 2001, 0-2 snow goose nests were located annually during nest searching on the study area. In 2001, 55 snow goose nests (32 in the core study area) were located during nest searching. In 2002, 6 snow goose nests were located in the core study area, and 8 snow goose nests were located in total. In 2003, 94 snow goose nests were located at Nestor One. The number of snow geese nesting on the study area appears to be increasing, perhaps as a result of birds produced on the study area in 2001 returning as breeders in 2003, but a late year in 2004 with high snow cover through mid-June apparently resulted in reduced nesting or relocation by nesting snow geese at Nestor One.

Literature Cited

Didiuk, A.B. 1980. Summer movements and distribution of Canada geese near Cape Churchill, Manitoba. M.S. Thesis, Univ. of Wisconsin, Madison. 44pp.

Walter, S.E. 1996. Aspects of Canada goose nesting ecology in northern Manitoba: Age, visibility, and Arctic fox predation. M.S. Thesis, Univ. of Wisconsin, Madison. 63pp.

Walter, S.E. 1999. Nesting ecology of Eastern Prairie Population Canada geese. Ph.D. Thesis, University of Wisconsin, Madison. 204pp.

Table 1. Indices to production of Canada geese at Nestor One near Cape Churchill, Manitoba, 1976-2004.

Year	Median Hatch Date	Nests per 100 ha[a]	Mean Clutch	% Nest Success[b]	Goslings per km^2
1976	21 June	37	4.2	87	135
1977	15 June	33	4.3	97	137
1978	1 July	20	3.2	76	49
1979	30 June	26	4.3	85	95
1980	9 June	27	4.6	65	81
1981	23 June	21	4.1	57	49
1982	14 June	23	4.4	60	61
1983	10 July	4	3.2	51	7
1984	26 June	13	3.7	46	22
1985	21 June	16	3.4	45	24
1986	23 June	14	4.2	52	30
1987	30 June	5	3.4	62	11
1988	28 June	13	3.7	65	31
1989	29 June	10	3.5	42	15
1990	29 June	12	4.0	47	22
1991	23 June	9	4.1	69	24
1992	1 July	5	3.5	40	7
1993	16 June	8	4.0	42	14
1994	28 June	6	3.9	79	17
1995	30 June	5	3.9	63	18
1996	29 June	6	4.0	63	15
1997	28 June	6	4.2	87	20
1998	13 June	6	4.6	67	19
1999	15 June	3	3.9	72	9.3
2000	29 June	3	3.2	19	1.9
2001	18 June	8	4.5	83	30.2
2002	4 July	6	3.6	57	11.9
2003	25 June	8	4.5	63	22.2
2004	11 July	0.82	2.19	24.20	0.43
Mean $\pm$ SD	23 June $\pm$ 8	12.2 $\pm$ 9.5	3.87 $\pm$ 0.54	60.9 $\pm$ 18.6	33.8 $\pm$ 35.8

[a]Calculated as the number of nests per 100 ha of wetland habitat in the 14 primary sample areas on the Nestor One study area.
[b]Calculated as the average of 1) the probability of nest survival from the onset of incubation to the first visit (adjusted for visibility bias) and 2) apparent nest success from the first visit to final nest fate.

Table 2. Clutch size of Canada geese at Nestor One, 2004.

Clutch Size									
1	2	3	4	5	6	7	No. Destroyed Clutches[a]	Total No. Nests	Mean Clutch Size[b]
4	11	5	0	1	0	0	3	24	2.19

[a]The number of nests that had been destroyed when they were first located.
[b]Calculated from the number of eggs in nests that survived the interval between onset of incubation and our first visit.

Figure 1. Snow conditions at Nestor One on 12 June 2004.

Figure 2. Canada goose nest density estimated for the core Nestor One study area near Cape Churchill from 1976 through 2004. Nest density is reported as the $\log_{10}$ of nests per 100 ha of wetland in the 14 primary nest areas searched at Nestor One. (Regression equation: LOG NEST DENSITY = 68.8 – 0.0341(YEAR); $r^2 = 0.6512$, $F_{1,27} = 50.41$, $P < 0.0001$).

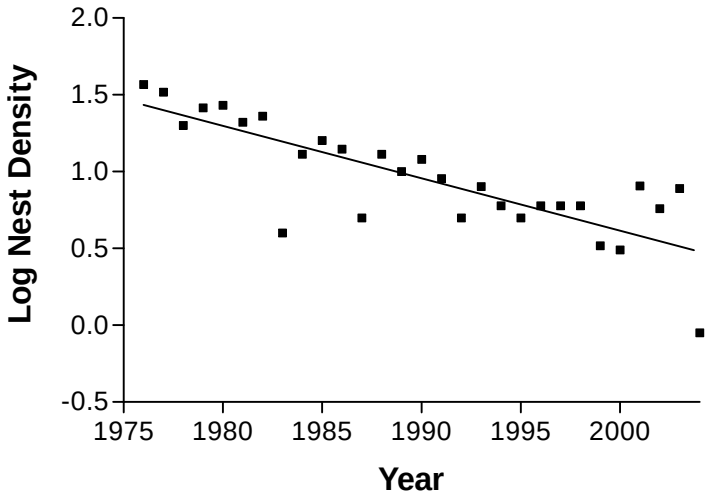

Figure 3. Relationship between mean clutch size and median hatch date for Canada geese nesting near Cape Churchill from 1976 through 2004. (Regression equation: MEAN CLUTCH SIZE = 12.68 – 0.0401(MEDIAN HATCH DATE [Julian date]); $r^2 = 0.549$, $F_{1,27} = 32.86$, $P < 0.0001$).