PRODUCTION OF EPP CANADA GEESE NEAR CAPE CHURCHILL IN 2002

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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 9-19 June 2002. A total of 42 nests was found in initial searches of 732 ha of wetlands in 14 primary sample areas, 55 nests were located in searches of 6 coastal sample areas, and 38 nests were located in 5 additional sample units north, south, and east of the primary units. Five additional nests were located subsequent to initial nest searching, resulting in a total of 140 nests. Nest density (unadjusted for observability) in the primary sample areas was 5.74 nests per 100 ha of wetland—comparable to nest density recorded on the Nestor One study area in the mid-1990s, but 29% lower than the nest density observed in 2001. Clutch size in 136 nests with eggs present when located averaged 3.63; lower than the long-term mean of 3.91 (1976-2002), but near the clutch size expected

based on the established relationship between mean clutch size and median hatch date. Estimated median hatch date was 4 July, and ranged from 29 June to 10 July—the second latest estimated median hatch date in the period 1976 through 2002. Nesting success calculated as the average apparent success rate of nests active when first located during initial nest searching (0.36) and the 28-day survival of nests based on exposure days (0.78) was 0.57—similar to the average nesting success of 0.63 observed during the 1990s. Based on these estimates of nest density, clutch size, and nesting success, gosling production at Nestor One was approximately 11.9 per 100 ha of wetland—near the average of 16.5 goslings per 100 ha of wetlands observed in the 1990s. Thus, production at Nestor One in 2002 was near average levels observed in the 1990s, in spite of late phenology that resulted in late nesting by Canada geese on the study area.

In 2002, data on nesting 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 nesting success of geese to long-term variation in weather, predation, and competition from snow geese, and
3) locate nesting geese for inclusion in an ongoing telemetry study of brood movements.

Methods

Data on numbers of nesting Canada geese, clutch sizes, and nesting success were collected in 14 primary and part or all of 10 supplemental sample areas near Nestor One, 8 km south of Cape Churchill, MB. Detailed methods and study areas were described by Didiuk (1980). Ground surveys were conducted by the first crew from 9–12 June and by the second crew from 14–19 June (nest searching was completed on 19 June). From 20–27 June, the second crew conducted breeding bird and calling frog surveys, assisted with preparation for capture of adult geese on nests as part of a telemetry study on brood movements, and checked nest status of located nests. Capture of adult geese at nests and determination of nest fate for located nests was completed by Minnesota Cooperative Fish and Wildlife Research Unit personnel, with assistance from personnel from Wapusk National Park in late June and early July.

An experimental Arctic fox removal program was initiated in 1994 on the Nestor One study area; it continued in 1995, 1996, and 1997. No fox removals have been conducted on the study site as part of this project in since 1997, and no fox removal occurred in 2002.

Results and Discussion

Relatively high winter snowpack was present at Cape Churchill during late winter 2002 and was accompanied by lower than average temperatures in April and May. At Churchill, there were 711 heating degree-days in May 2002, higher than the average of 603 and 57% higher than the 452 heating degree-days recorded in May 2001. Field activities were planned to coincide with an average to late hatch. The estimated date of the earliest Canada goose egg laid on the study area in 2002 was 24 May.

Density of Nests:--A total of 42 nests was found in initial searches of 732 ha of wetlands in 14 primary sample areas near Nestor One. Fifty-five nests were located in searches of 6 coastal sample areas and 38 nests were located in 5 additional sample units north, south and east of the 14 primary units. Five nests were located subsequent to initial surveys or outside of surveyed sample areas, for a total of 140 nests located on the Nestor One study area in 2002. Nest density (unadjusted for observability) in the primary sample areas was 5.74 nests per 100 ha of wetland—comparable to nesting density recorded on the Nestor One study site in the mid-1990s (Table 1). Nest density estimated in 2002 was slightly higher than that expected based on the long-term decline in nest density at Nestor One (Fig. 1).

Clutch Size:--Mean clutch size (n = 136 nests with eggs present when located) of Canada geese was 3.63 in nests located at Nestor One (Table 2) in 2002. The mean clutch size at Nestor One was lower than the long-term mean of 3.91 (1976-2002), and near that expected from the established relationship between clutch size and median hatch date (Fig. 2).

Hatch Dates and Nesting Success:--Ages of eggs were determined by flotation and candling in 136 Canada goose nests located during nest searching at Nestor One in 2002. Mean stage of incubation at the time of first visit was 7 days and the median hatch date predicted from ages of eggs in the nest was 4 July, ranging from 29 June to 10 July. Predicted hatch date for 99% of nests was within 5 days of the predicted median hatch date. Of nests found during initial nest searching (n = 135), 4 (3.0%) had been destroyed prior to being located. Nesting success (28-day survival) calculated from the first day of incubation to the first nest visit was 0.78. 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 1995). Apparent nesting 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 0.36 (47 hatched, 76 failed, 6 were abandoned, and fate of 2 nests was undetermined) compared to 0.69 in 1998, 0.75 in 1999, 0.11 in 2000 and 0.85 in 2001. Nesting success calculated as the average apparent success rate of nests active when first located during initial nest searching (0.36) and the 28-day survival of nests based on exposure days (0.78) was 0.57—similar to the average nesting success of 0.63 observed during the 1990s (Table 1).

Production Forecast for 2002:--The median estimated hatch date of Canada geese at Nestor One in 2002 was 4 July—later than any year during the period 1976-2001 except 1983 (Table 1). The mean clutch size of 3.63 was near that predicted from the established relationship between breeding phenology and clutch size at Cape Churchill (Fig. 2). Nest density was 5.74 nests per 100 ha of wetland in the 14 primary survey areas at Nestor One, similar to densities observed in the mid-1990s, but considerably lower than densities observed from 1976 through the mid-1980s, and slightly above the value predicted from the density-year relationship from 1976-2002 at Nestor One. Based on these estimates of nesting density, clutch size, and nesting success, gosling production at Nestor One was approximately 11.9 per 100 ha of wetland—near the average of 16.5 goslings per 100 ha of wetlands observed in the 1990s (Table 1).

No fox were removed as part of this project on the study area in 2002. Fox density on the study

area appeared to be relatively high, based on observations and indications of activity at dens. Fox sign was abundant, with 12 (80%) of 15 known fox dens in the study area that were checked exhibiting evidence of fox activity. Fox were observed on the study area frequently during nest searching. Lemming density also appeared to be moderate to high on the study site, with burrows, winter nests, droppings, and live lemmings regularly observed during nest searching.

It is not clear what were the primary factors influencing nest densities and productivity on the study area in 2002. Late winter snows resulting in high spring snowpack and cool temperatures through mid-June likely delayed nesting. When the first crew arrived on the study site on 1 June, snow cover exceeded 90%, and geese were observed standing in pairs, suggesting that incubation had not yet been initiated. No nests were observed for almost a week, delaying initiation of nest searching until 9 June. Based on previous years of late spring phenology on the study area, nest densities were expected to be quite low, with the possibility that most geese would forgo nesting altogether. No nests were initiated on or prior to 23 May, the date used in the EPP plan as indicative of a reproductive "bust." However, nest density was comparable to that in the recent past, suggesting that nesting was initiated by most birds that breed in the study area. Predation rate on nests was slightly higher than in most recent years (Table 1). Fox density on the study area appeared relatively high, and relatively few snow geese moved their broods to the study area (Bob Nack, personal communication) following hatch. Thus, predation pressure on Canada goose nests may not have been buffered by snow geese as it may be in some years.

Finally, snow goose nest density was higher than in most years, but dramatically lower than in 2001 on the Nestor One study area. 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 (0.82 nests per 100 ha of wetland), and 8 snow goose nests were located in total. This number is unadjusted for observability, which is lower for snow geese than for Canada geese (personal observation). Thus, the status of snow goose nesting on the study area is not clear, although it appears that even in relatively poor production years for snow geese, the number of snow geese nesting at Nestor One has increased.

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

Table 1. Indices to production of Canada geese at Nestor One near Cape Churchill, Manitoba, 1976-2002.

Year	Median Hatch Date	Nests per 100 ha[a]	Mean Clutch	% Nesting 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	5.74	3.63	57.25	11.9
Mean $\pm$ SD	24 June $\pm$ 7	12.7 $\pm$ 9.5	3.91 $\pm$ 0.43	62.2 $\pm$ 17.9	35.4 $\pm$ 36.5

[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 nesting success from the first visit to final nest fate.

Table 2. Clutch size of Canada geese at Nestor One, 2002.

Clutch Size									
1	2	3	4	5	6	7	No. Destroyed Clutches[a]	Total No. Nests	Mean Clutch Size[b]
4	24	33	33	34	2	0	4	135	3.60

[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; excludes active nests located subsequent to initial nest searching (n = 5).

Figure 1. Canada goose nest density estimated for the core Nestor One study area near Cape Churchill from 1976 through 2002. 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 = 65.4 – 0.0324(YEAR); $r^2 = 0.6751$, $F_{1,25} = 51.95$, $P < 0.0001$).

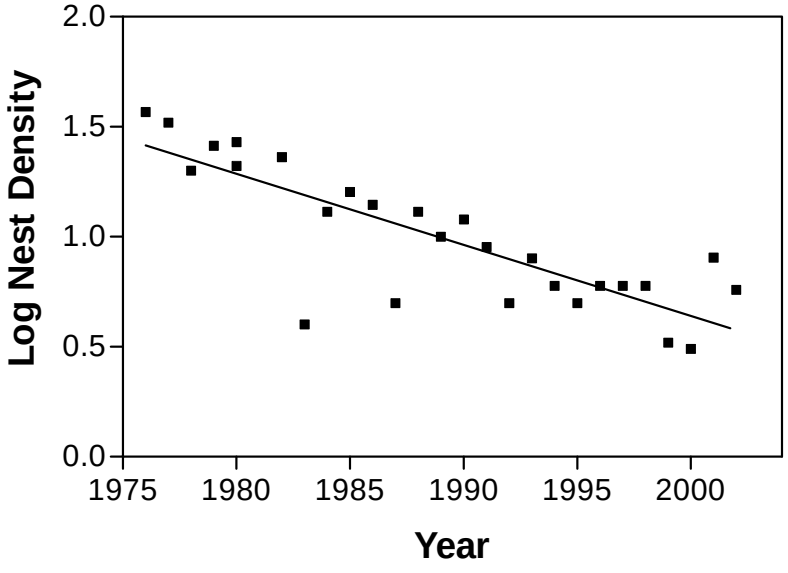

Figure 2. Relationship between mean clutch size and median hatch date for Canada geese nesting near Cape Churchill from 1976 through 2002. (Regression equation: MEAN CLUTCH SIZE = 1414.8 – 0.0405(MEDIAN HATCH DATE); $r^2 = 0.4891$, $F_{1,25} = 23.93$, $P < 0.0001$).