PRODUCTION OF EPP CANADA GEESE NEAR CAPE CHURCHILL IN 2003

Personnel: Field Investigators

David E. Andersen	Minnesota Coop. Fish & Wildlife Res. Unit, St. Paul, MN
Bob Nack	Minnesota Coop. Fish & Wildlife Res. Unit, St. Paul, MN
Kevin Doherty	Minnesota Coop. Fish & Wildlife Res. Unit, St. Paul, MN
Jeff Dittrich	Minnesota Dept. of Natural Resources, Baudette, MN
Michelle McDowell	U.S. Fish and Wildlife Service, Rice Lake NWR, MN
Murray Gillespie	Manitoba Conservation, Winnipeg, MB
Brian Haglund	Manitoba Conservation, Oak Hammock, MB
Dave Best	U.S. Fish and Wildlife Service, East Lansing, MI
Tom Smith	Iowa Department of Natural Resources, Marshalltown, IA
Steve Maxson	Minnesota Dept. of Natural Resources, Bemidji, MN
Mike Schroer	Missouri Department of Conservation, Columbia, MO
Clint Boal	Texas Coop. Fish & Wildlife Res. Unit, Lubbock, TX
Bruce Golden	Arkansas Game & Fish Commission, Gregory, AR
Greg Lundie	Wapusk National Park, Churchill, MB
Carmen Spiech	Wapusk National Park, Churchill, MB

Collaborators and Cooperating Agencies

Bruce Batt	Ducks Unlimited
Frank Bowers	U.S. Fish and Wildlife Service, Atlanta, GA
Dale Caswell	Canadian Wildlife Service, Winnipeg, MB
Bob Reside	Parks Canada, Churchill, MB
Scott Sutton	Parks Canada, Churchill, MB
Brian Lubinski	U.S. Fish and Wildlife Service, Twin Cities, MN
Murray Gillespie	Manitoba Dept. of Natural Resources, Winnipeg
Andy Raedeke	Missouri Dept. of Conservation, Columbia
Jeff Lawrence	Minnesota Dept. of Natural Resources, Bemidji
J. Michael Checkett	Arkansas Game and Fish Commission, Little Rock
Rollin Sparrowe	Wildlife Management Institute, Washington
Scott Walter	University of Wisconsin-Richland, Richland Center, WI
Steve Wilds	U.S. Fish and Wildlife Service, Twin Cities, MN
Guy Zenner	Iowa Dept. of Natural Resources, Clear Lake

Abstract:--Nest searching for Eastern Prairie Population Canada geese was conducted on the Nestor One Study Area near Cape Churchill, Manitoba from 4-11 June 2003. A total of 57 nests was found in initial searches of 732 ha of wetlands in 14 primary sample areas, 57 nests were located in searches of 6 coastal sample areas, and 44 nests were located in 3 additional sample units south and east of the primary units. Two nests were located subsequent to initial surveys or outside of surveyed sample areas, for a total of 160 nests located on the Nestor One study area in 2003. Nest density (unadjusted for observability) in the primary sample areas was 7.79 nests per

100 ha of wetland— near the highest nest density recorded on the Nestor One study site since the late 1980s, and 36% higher than that estimated in 2002. Clutch size in 143 nests with eggs present when located averaged 4.51—higher than the long-term mean of 3.93 (1976-2003) and the clutch size expected based on the established relationship between mean clutch size and median hatch date. Estimated median hatch date was 25 June, and ranged from 17 June to 1 July, with 77% of nests initiated on or before 23 May 2003 (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 (0.68) and the 28-day survival of nests based on exposure days through nest location (0.59) was 0.63—equal to 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 22.21 per 100 ha of wetland—above the average of 16.5 goslings per 100 ha of wetlands observed in the 1990s and estimated production of 11.9 goslings per 100 ha of wetland in 2002. Gosling production at Nestor One in 2003 was above the average observed in the 1990s, with average nest success, relatively high nest density, and higher than average clutch size.

In 2003, 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 in anticipation of a telemetry study of brood movements.

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 4-11 June 2003. The second crew assessed nest fate from 18-28 June 2003. Other activities at Nestor One included assessing known arctic fox dens for occupancy, conducting anuran calling surveys, and assessment of passerine nests located during and subsequent to systematic nest searching.

Results and Discussion

At Churchill, there were 467 heating degree-days in May 2003, considerably lower than the average of 603 and 34% lower than the 711 heating degree-days recorded in May 2002. A series of warm days in late May and relatively warm temperatures throughout the month of May resulted in early snow melt and early spring phenology. Field activities were planned to coincide with an average hatch at Cape Churchill. The estimated date of the earliest Canada goose egg

laid on the study area in 2003 was 11 May.

Density of Nests:--A total of 57 nests was found in 2003 during initial searches of 732 ha of wetlands in 14 primary sample areas near Nestor One. Fifty-seven nests were located in searches of 6 coastal sample areas and 44 nests were located in 3 additional sample units (units 14E, 14S, and 8S) south and east of the 14 primary units. Two nests were located subsequent to initial surveys or outside of surveyed sample areas, for a total of 160 nests located on the Nestor One study area in 2003. Nest density (unadjusted for observability) in the primary sample areas was 7.79 nests per 100 ha of wetland—near the highest nest density recorded on the Nestor One study site since the late 1980s (Table 1). Nest density estimated in 2003 was slightly higher than that expected based on the long-term trend in nest density at Nestor One (Fig. 1).

Clutch Size:--Mean clutch size (n = 143 nests with eggs present when located) of Canada geese was 4.51 in nests located at Nestor One (Table 2) in 2003; one of the highest mean clutch sizes observed at Nestor One during the period from 1976-2003 (Table 2). The mean clutch size at Nestor One was higher than the long-term mean of 3.93 (Table 2), and above that expected from the established relationship between clutch size and median hatch date (Fig. 2).

Hatch Dates and Nest Success:--Ages of eggs were determined by flotation and candling in 143 Canada goose nests located during nest searching at Nestor One in 2003. Mean stage of incubation at the time of first visit was 11 days and the median hatch date predicted from ages of eggs in the nest was 25 June, ranging from 17 June to 1 July. Predicted hatch date for 97% of nests was within 5 days of the predicted median hatch date. Of nests found during initial nest searching (n = 158), 16 (10.0%) 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 0.59. 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 0.68 (96 hatched, 46 were destroyed or were abandoned, and fate of 2 nests was undetermined) compared to 0.75 in 1999, 0.11 in 2000, 0.85 in 2001, and 0.36 in 2002. Nest success calculated as the average apparent success rate of nests active when first located during initial nest searching (0.68) and the 28-day survival of nests based on exposure days (0.59) was 0.63—similar to the average nest success of 0.63 observed during the 1990s (Table 1).

Production Forecast for 2003:--The median estimated hatch date of Canada geese at Nestor One in 2003 was 25 June—near the mean for the period 1976-2001 (Table 1). The mean clutch size of 4.51 was higher than that predicted from the established relationship between breeding phenology and clutch size at Cape Churchill (Fig. 2). Nest density was 7.79 nests per 100 ha of wetland in the 14 primary survey areas at Nestor One, higher than densities observed in the 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 1976-2003 at Nestor One. Based on these estimates of nest density, clutch size, and nest success, gosling production at Nestor One was approximately 22.21 per 100 ha of wetland—above the average of 16.5 goslings per 100 ha of wetlands observed in the 1990s (Table 1), and approximately twice the

estimated gosling production in 2002.

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 10 (91%) of 11 known fox dens in or near 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 high on the study site, with burrows, winter nests, droppings, and live lemmings regularly observed during nest searching. As evidence of high lemming abundance, 8 snowy owl nests were located at Nestor One during and subsequent to nest searching. Average clutch size at time of location was 6.1, and owls were regularly observed with lemmings.

Relatively early loss of snow cover and average to early nest initiation apparently resulted in relatively high productivity of Canada geese at Nestor One in 2003. The first crew arrived in Camp on 3 June, approximately 1 week into incubation. Nest densities were relatively high in the core study area, and average to above average nest success and clutch size resulted in productivity high relative to average productivity during the past 10-15 years (Table 2). Clutch size was high relative to that predicted based on the historic relationship between median hatch date and clutch size. However, it is likely that median hatch date in 2003 was earlier than predicted, as the second crew observed Canada goose broods shortly after arrival, and observed no geese incubating after 23 June. Seventy-seven per cent of 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." Predation rate on nests was near the average of recent years (Table 1). Lemming density appeared higher than at any time during the past 15 years, and appeared to influence the abundance and behavior of potential nest predators. Fox density on the study area appeared relatively high, and nest density of avian predators was also high. However, predation pressure on Canada goose nests may have been buffered by lemming abundance, and perhaps, snow goose abundance (see below), compared to most years.

Finally, snow goose nest density in 2003 was the highest recorded during the period 1976-2003 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, and 8 snow goose nests were located in total. In 2003, 94 snow goose nests were located at Nestor One. Fifty-one nests were located in the core study area (6.97 nests per 100 ha of wetland) during initial nest searching, and 43 nests were located in 3 additional sample areas located south and east of primary search areas. One snow goose nest was discovered subsequent to initial nest searches outside of the core study areas. These numbers are unadjusted for observability, which is lower for snow geese than for Canada geese (personal observation). Thus, the number of snow goose 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.

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.

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Table 1. Indices to production of Canada geese at Nestor One near Cape Churchill, Manitoba, 1976-2003.

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	7.79	4.51	63.23	22.21
Mean $\pm$ SD	24 June $\pm$ 8	12.6 $\pm$ 9.4	3.93 $\pm$ 0.44	62.2 $\pm$ 17.5	34.9 $\pm$ 35.9

[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, 2003.

Clutch Size									
1	2	3	4	5	6	7	No. Destroyed Clutches[a]	Total No. Nests	Mean Clutch Size[b]
3	7	19	28	61	21	4	16	159	4.51

[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. Canada goose nest density estimated for the core Nestor One study area near Cape Churchill from 1976 through 2003. 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 = 60.5 – 0.0300(YEAR); $r^2 = 0.6342$, $F_{1,26} = 45.08$, $P < 0.0001$).

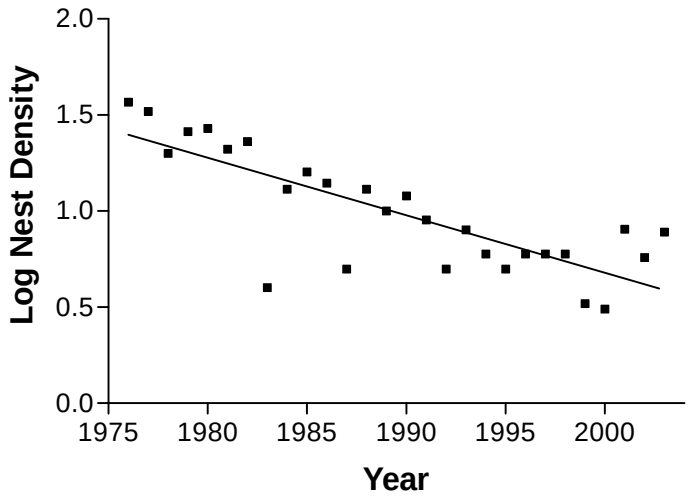

Figure 2. Relationship between mean clutch size and median hatch date for Canada geese nesting near Cape Churchill from 1976 through 2003. (Regression equation: MEAN CLUTCH SIZE = 10.94 – 0.0401(MEDIAN HATCH DATE [Julian date]); $r^2 = 0.451$, $F_{1,26} = 21.23$, $P < 0.0001$).