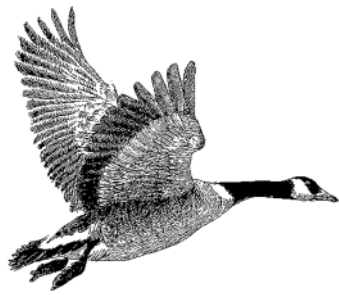# A BREEDING PAIR SURVEY
OF CANADA GEESE IN NUNAVIK - 2025

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During the 1960's, aerial surveys identified the Ungava Peninsula in northern Québec as the primary nesting area for Atlantic flyway Canada geese (Kaczynski and Chamberlain 1968). Malecki and Trost (1990) used a more quantitative approach to estimate the number of breeding pairs throughout the boreal forest and Ungava Peninsula. Their findings confirmed that the highest densities were located along the coastal areas of Ungava Bay and Hudson Bay. In 1993, an annual survey was initiated in northern Québec using methods developed by Malecki and Trost (1990) (Bordage and Plante 1993). The objective of this survey is to monitor the status of the Atlantic population by estimating the number of breeding pairs. This report presents the results of the 2025 breeding ground survey.

SURVEY METHODS

The survey followed the methodology of Malecki and Trost (1990). Aerial transects were flown in a Quest Kodiak on wheels at 30-45 m above ground level and a ground speed of 140 km/h. The survey is timed to cover the mid to late incubation period. The survey has been completed each year since 1993, except for 2013, 2020 and 2021.

Observers recorded the number of geese observed as singles, pairs, or in groups (3 or more geese) within 200 m of each side of the plane. We occasionally observed multiple pairs of geese in close association (< 10-15 m apart). We classified these geese as grouped birds, since they were unlikely to be associated with a territory. Observers also recorded similar information for other waterfowl species. Coordinates for each location were generated using a global positioning system (GPS) and stored on a lap-top computer. Transect width was calibrated before the survey began.

The number of indicated pairs on a given transect was the sum of the singles and pairs observed by both observers. The total number of geese was the sum of grouped geese plus indicated pairs. The density of breeding pairs and total population density was estimated using a stratified quotient estimator

and the variance was calculated using the jack-knife procedure (Cochran 1977). The estimates

presented in this report are not adjusted for visibility bias and thus represent an index to the population.

SURVEY STRATIFICATION

The survey area (north of 51º latitude and west of 67º longitude) was originally stratified based on

Malecki and Trost's (1990) modification of northern Québec's ecoregions (Gilbert et al. 1985). In 2012,

we modified survey strata to better capture differences in goose density by 1) adding a 20-mile buffer to

the Hudson Bay coastal zone, 2) adding a 10-mile buffer to the Ungava Bay coastal zone, 3) shifting the

portion of the Hudson Bay coastal zone south of Inukjuak and the portion of the Ungava Bay coastal zone

northwest of Kangirsuk into the interior stratum, and 4) combining the interior tundra and taiga into a

single stratum. This change created 3 strata: 1) Ungava Bay coast, 2) Hudson Bay coast, and 3) interior
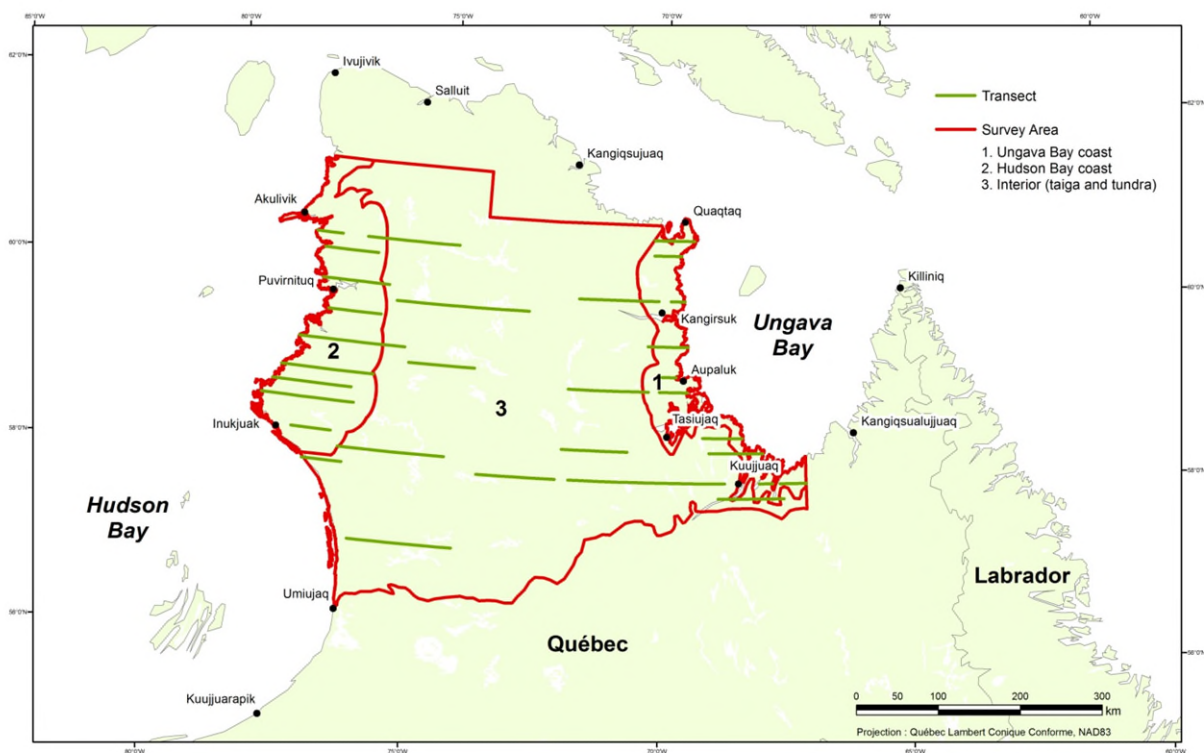
(Figure 1).

Figure 1. Location of survey strata and aerial transects in Nunavik.

HABITAT CONDITIONS AND PRODUCTIVITY ASSESSMENT

Transects were surveyed between June 15 and 25. The long-term average date of nest initiation is May 28 on the Hudson Bay coast and May 24 on the Ungava coast (Cotter et al. 2013). Snow and ice cover on May 31st was more extensive at the end of May in 2025 compared to 2024 and 2023 (Figure 2).

In addition, this year as well as in 2023, two transects and exploratory tracks were conducted north of the Puvirnituq Mountains with the goal of reviewing the design of the actual survey. Those data are not included in this report.
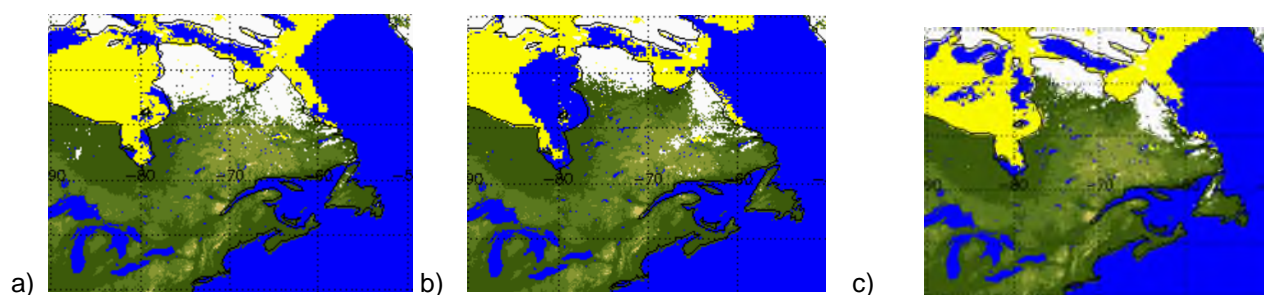

Figure 2. Snow depth and ice cover maps for northern Quebec from the last day of May in a) 2025, b) 2024, c) 2023

BREEDING PAIR AND TOTAL POPULATION ESTIMATES

The estimated number of breeding pairs on the Ungava Peninsula in 2025 (149,770 pairs; SE = 15,749) was higher than the 2024 estimate of 88,890 pairs (SE = 9,050) (Figure 3, Appendix 1). The total population estimate (indicated pairs x 2 + non-breeders) in 2025 (986,371 individuals; SE = 109,725) was higher than the 2024 estimate of 606,672 individuals (SE = 65,052) and similar to 2011 estimate (Figure 4, Appendix 1). The total population estimate includes breeding pairs, non-breeders (i.e., those not of breeding age), failed breeders, and molt migrants from other areas and should therefore be interpreted cautiously.
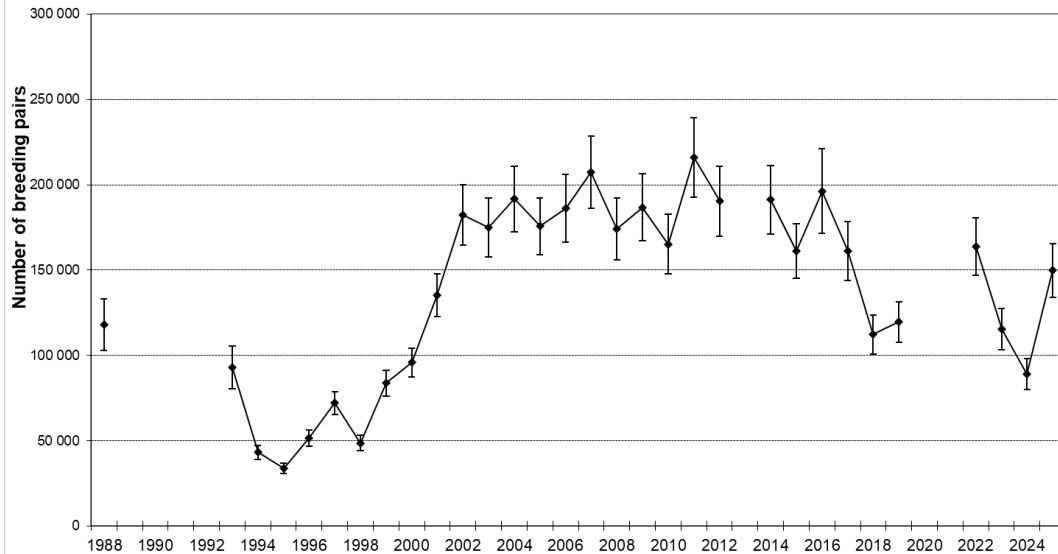
Figure 3. Estimated number (± 1 SE) of Canada goose breeding pairs on the Ungava Peninsula (No surveys were flown in 2013, 2020 or 2021).
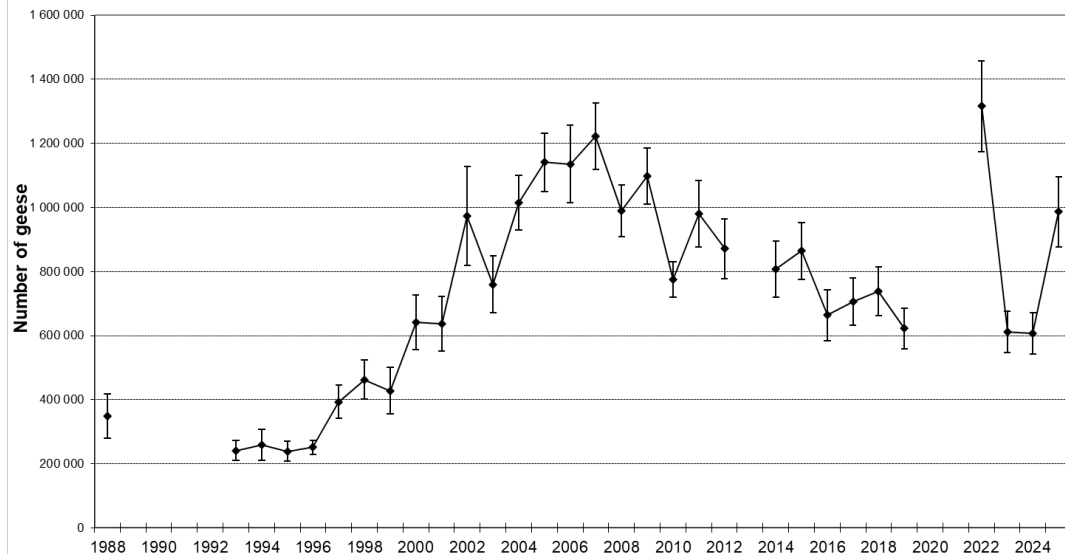

Figure 4. Estimated number (± 1 SE) of total Canada geese on the Ungava Peninsula (No surveys were flown in 2013, 2020 or 2021).

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COMPARISON OF SURVEY STRATA

From 1993-2000, the density of breeding pairs was similar between the Hudson and Ungava Bay coastal zones (Figure 5). However, there has been a shift to a larger proportion of breeding pairs favoring the Hudson Bay coast since 2001. After a large reduction in 2024 on the Hudson Bay coast, the observed pair density increased dramatically in 2025. An increase in the density of breeding pairs was also observed on the Ungava Bay coast, where the density of pairs reached a high-level not seen since 2011. Overall, the Hudson Bay coast continued to contribute a much higher proportion of breeding pairs to the overall count compared to the Ungava Bay coast and the interior. Pair density along the Ungava Bay coast and in the interior has remained low and relatively stable, although notable increases in the Ungava Bay coast have been observed over the past two years (Figure 5).
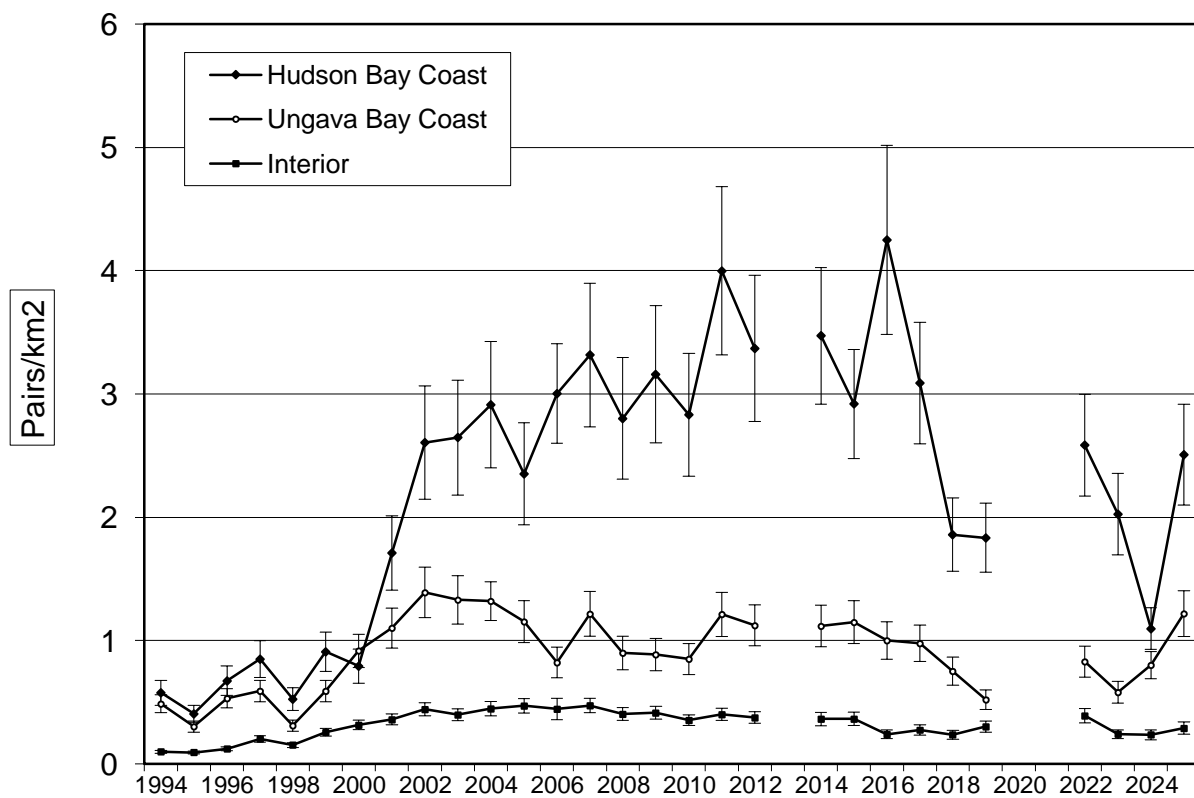

Figure 5. Average density (± 1 SE) of breeding Canada goose pairs for the Hudson Bay coast, Ungava Bay coast, and interior.

LITERATURE CITED

Bordage, D., and N. Plante. 1993. A breeding ground survey of Canada geese in northern Québec-
　　　　1993. Can. Wildl. Serv., Québec Region. 17pp.

Cochran, W. G. 1977. Sampling techniques, 3rd ed. John Wiley and Sons, Inc. New York. 428pp.

Cotter, R.C., R. J. Hughes, P. May, P. Novalinga, J. Johannes, L. J. Hindman, and P. I. Padding. 2013.
　　　　Breeding biology of Atlantic population Canada geese in Nunavik, Northern Quebec. Arctic
　　　　66(3):301-311.

Gilbert, G., R. G. Helie, and J. M. Mondoux. 1985. Ecosystem sensitivity to acid precipitation for
　　　　Québec. Part a. ecoregions and ecodistricts of Québec. Environment Canada. Ecological Land
　　　　Classification Series No. 20. 87pp.

Humburg, D. D., F. D. Caswell, D. H. Rusch, and M. M. Gillespie. 1998. Breeding ground surveys for the
　　　　Eastern Prairie Population of Canada geese. Pages 9-20 in D. H. Rusch, M. D. Samuel, D. D.
　　　　Humburg, and B. D. Sullivan, eds. Biology and management of Canada geese. Proceedings of
　　　　the international Canada goose symposium, Milwaukee, Wisconsin.

Kaczynski, C. F., and E. B. Chamberlain. 1968. Aerial surveys of Canada geese and black ducks in
　　　　eastern Canada. U. S. Fish and Wildl. Serv. Spec. Sci. Rep., Wildl. 118. 29pp.

Malecki, R. E., and R. A. Trost. 1990. A breeding ground survey of Atlantic flyway Canada geese in
　　　　northern Québec. Can. Field Nat. 104:575-578.

Appendix 1. Number of breeding pairs and total Canada geese estimated for northern Quebec from 1993 to 2025.

Year	Breeding Pairs	SE Breeding Pairs	Total Geese	SE Total Geese
1993	92 992	12 466	241 407	30 599
1994	43 184	3 991	295 868	32 435
1995	33 995	3 045	284 868	28 713
1996	51 466	4 789	289 494	27 112
1997	72 079	6 584	443 549	43 642
1998	48 559	4 471	513 398	50 697
1999	83 750	7 629	468 318	45 138
2000	95 777	8 447	694 687	71 341
2001	135 196	12 533	602 417	59 919
2002	182 371	17 587	1 068 510	107 975
2003	174 942	17 246	864 307	86 550
2004	191 789	19 192	1 095 667	112 292
2005	175 679	16 737	1 218 919	126 490
2006	186 109	19 951	1 262 801	141 311
2007	207 262	21 115	1 296 708	132 434
2008	174 007	18 195	933 742	103 544
2009	186 844	19 713	1 202 943	128 024
2010	165 075	17 503	810 604	81 724
2011	216 032	23 230	980 181	104 201
2012	190 340	20 448	871 198	93 379
2013	No Survey			
2014	191 234	20 050	807 730	87 222
2015	161 302	16 041	864 357	89 343
2016	191 526	24 898	663 495	80 114
2017	161 147	17 246	705 926	73 125
2018	112 235	11 338	738 819	76 690
2019	119 530	11 962	622 063	64 062
2020	No Survey			
2021	No Survey			
2022	163 714	16 711	1 316 348	142 103
2023	115 328	12 221	611 590	64 870
2024	88 890	9 050	606 672	65 052
2025	149 770	15 749	986 371	109 725