

**POPULATION AND PRODUCTIVITY SURVEYS OF  
GREATER SNOW GEESE IN 2022**



*Réservoir Beaudet, Victoriaville, Québec  
Photo: Christian Marcotte*

**A REPORT TO THE USFWS AND THE ATLANTIC FLYWAY TECHNICAL SECTION, February 2023**

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## **SPRING POPULATION SURVEY**

The annual photographic survey of the Greater Snow Goose population on the spring staging grounds was conducted in spring 2022 after two years of suspension due to the COVID pandemic. A brief description of the survey methodology and the sampling procedure for photographic counts are given in Reed *et al.* (1998) and Calvert *et al.* (2007).

The survey was carried out on May 1<sup>st</sup> in southern Québec (including east of Ontario and north of New Brunswick) during optimal conditions. Each aircraft surveyed an area of the St. Lawrence River, its surrounding agricultural lands and major tributaries (Figure 1). The whole area was surveyed on the same day by five different aircraft. For 2022, the estimate of the size of the photographed spring population was 753,000 ± 29,000 geese (Figure 2; Appendix A). The population estimate is just above the population objective and about 5% higher than the 2019 estimate (714,000 ± 84,000), although there was some overlap between the confidence intervals for 2019 and 2022. Also, the productivity in 2022 was poor with only 3% of recruitment in the fall productivity survey, the second lowest since the implementation of the special measures in Canada which indicate a widespread breeding failure for this population.

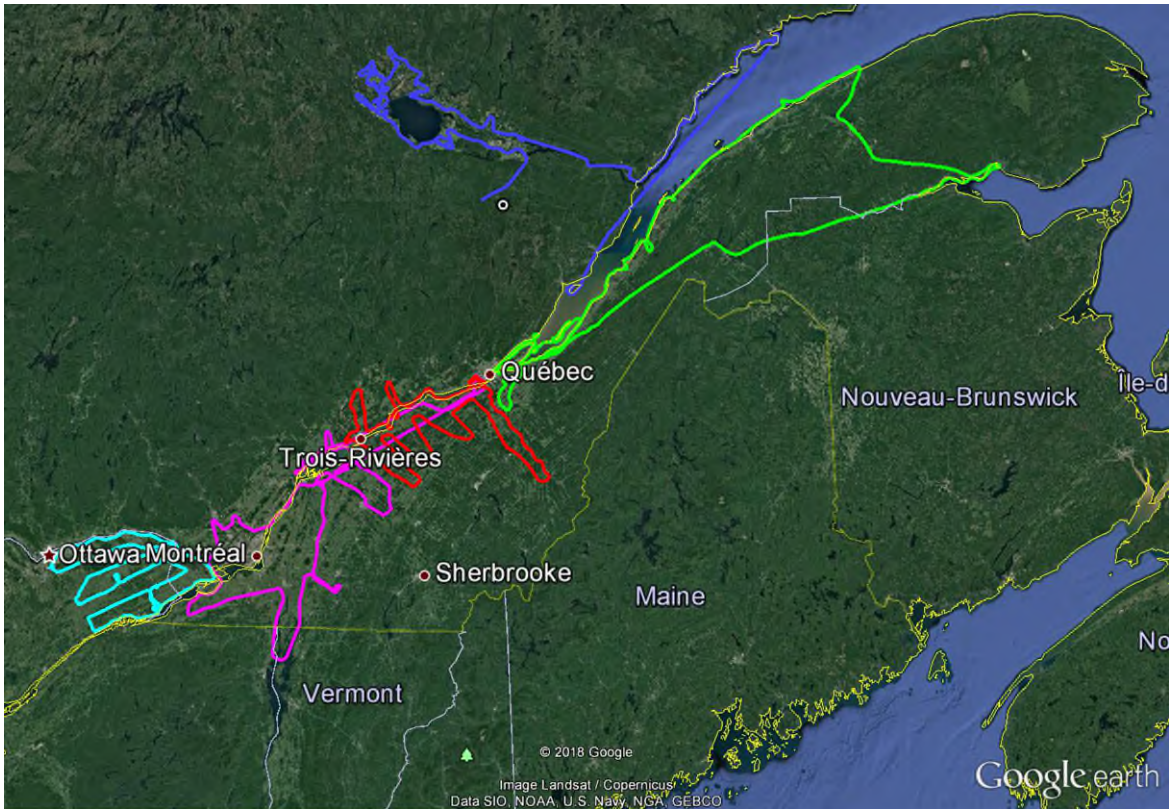
## **NESTING AREA –BYLOT ISLAND**

Nesting success (37%; proportion of nests hatching at least one egg) was very low and well below to the long-term average (Table 1). This was largely due to a relatively high activity of Arctic Foxes and avian predators around goose nests, which destroyed more nests than in normal years. Peak hatch was on 12 July, which is 3 days later than the long-term average (Table 1). Overall, nesting parameters of geese in 2022 were lower than normal.

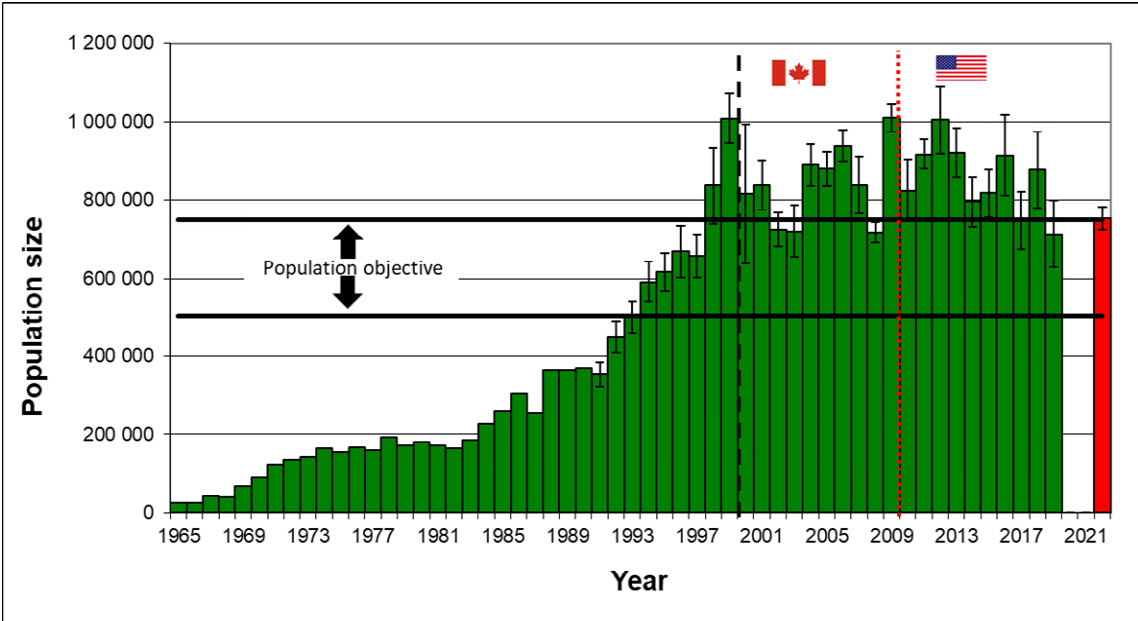
## **BANDING – BYLOT ISLAND**

From 9 to 15 August, we banded geese with the assistance of a helicopter. Goose flocks were rounded up and driven by people on foot into a holding pen made of plastic netting. All captured geese were sexed and banded with a metal band, and all recaptures (web-tagged or leg-banded birds) were recorded. A sample of young and adults was measured (body mass and length of culmen, head, tarsus and 9th primary).

The banding operation was difficult this year because we lost seven days due to bad weather and mechanical problems with the helicopter. We conducted only 5 drives between the Camp 2 area and the Qarlikturvik Valley. We banded a total of 662 geese, including 34 young that had been marked with web-tags at hatch. In addition, we recaptured 46 adults that were banded in previous years. The young:adult ratio among geese captured at banding (0.53:1) was much lower than last year and well below the long-term average (Table 1). Mean brood size toward the end of brood rearing (2.28 young, n = 111; counts conducted between 31 July and 12 August) was also below the long-term average. By combining information on brood size and young:adult ratio at banding, we estimated that only 47% of the adults captured were accompanied by young, a very low value (Table 1). Overall, these results are indicative of a very low production of young on Bylot Island by the end of the summer.



**Figure 1.** Map illustrating the five sectors surveyed for Greater Snow Geese in 2022.



**Figure 2.** Estimated population size of the Greater Snow Goose, 1965-2022. The black dashed line indicates the start of special conservation measures in Canada, the red dotted one the Conservation Order in United States.

**Table 1.** Productivity data of Greater Snow Geese nesting on Bylot Island, Nunavut over the past decade.

	2013	2014	2015	2016	2017	2018	2019	2020	2021	<b>2022</b>	Average <sup>e1</sup>
Nest success	67%	91%	77%	73%	56%	50%	82%	64%	--	<b>37</b>	66
Median date of hatching	10 July	8 July	9 July	9 July	8 July	11 July	4 July	11 July <sup>2</sup>	10 July <sup>2</sup>	<b>12 July</b>	9 July
Number of geese banded	4 865	2 001	3 675	4 357	3 216	2 951	2 985	--	2 160	<b>662</b>	
J:Ad	1.10:1	1.19:1	0.99:1	0.91:1	0.88:1	0.94:1	1.20:1	--	1.02:1	<b>0:53:1</b>	1.02:1
Brood size at banding	2.51	2.58	2.08	2.35	2.14	2.34	2.65	--	2.51	<b>2.28</b>	2.48
% of adults with juveniles at banding	88%	92%	95%	78%	83%	81%	91%	--	81%	<b>47%</b>	82%

**FALL PRODUCTIVITY COUNTS**

The proportion of juveniles measured during family counts in fall flight conducted in southern Québec was 3%, the second lowest proportion of juveniles since the implementation of the special measures in Canada (Figure 3; Appendix A).

The very low proportion of young recorded in fall suggests which indicate a widespread breeding failure for this population in the High-Arctic this year.

**ACKNOWLEDGEMENTS**

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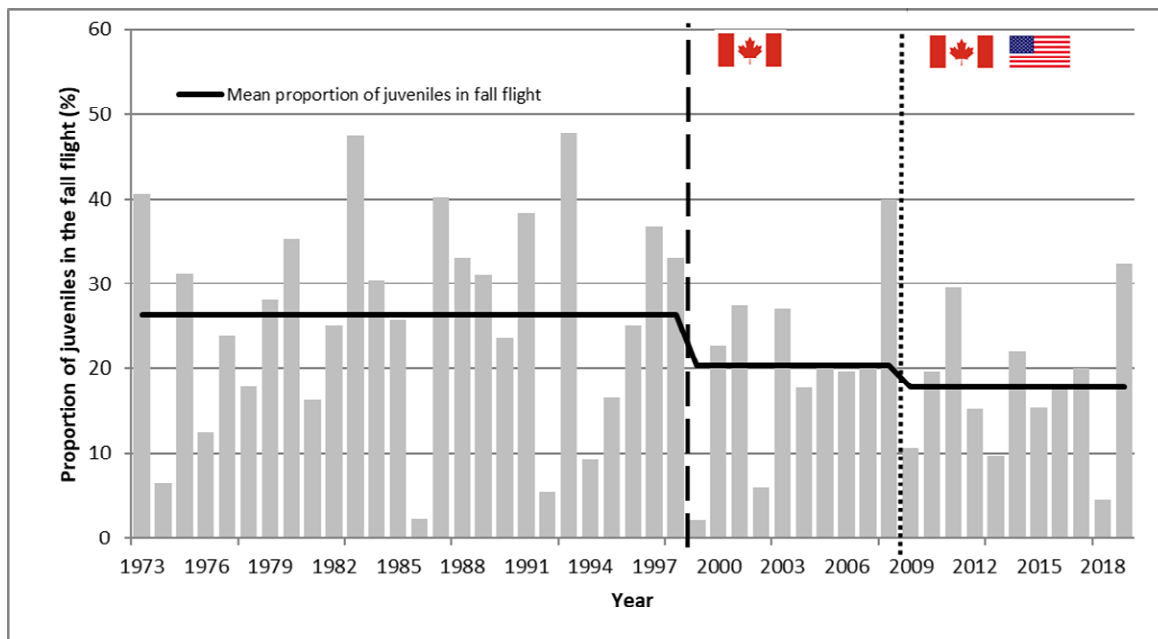
Members of Bylot field party included Marie-Christine Cadieux<sup>4</sup>, Pierre Legagneux<sup>3</sup>, Josée Lefebvre<sup>1</sup>, Christian Marcotte<sup>1</sup>, Simon Bourbeau<sup>1</sup> and several graduate and undergraduate students.

<sup>1</sup> Period 1989-2019

<sup>2</sup> Canadian Wildlife Service

<sup>3</sup> Oiseleurs

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**Figure 3.** Productivity counts in the fall flight in Québec, 1973-2022. The black line indicates the long-term proportion of juveniles, the black dashed one, special conservation measures implementation in Canada and the red dotted one indicates the implementation of the Conservation Order in the United States.

#### REFERENCES

Calvert, A. M., G. Gauthier, Eric T. Reed, L. Bélanger, J.-F. Giroux, J.-F. Gobeil, M. Huang, J. Lefebvre and A. Reed. 2007. Present status of the population and evaluation of the effects of the special conservation measures. Pages 5–64 in Reed, E.T. and A.M. Calvert (eds.). Evaluation of the special conservation measures for Greater Snow Geese: Report of the Greater Snow Goose Working Group. Arctic Goose Joint Venture Special Publication. Canadian Wildlife Service, Sainte-Foy, Québec.

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**APPENDIX A.** Greater Snow Goose Population and productivity estimates from southern Québec, 1996-2022.

Year	Estimated spring Population <sup>1</sup>	Percentage of young during fall flight <sup>2</sup>		Brood size <sup>3</sup> during fall	
		Mean	No. geese	Mean	No. broods
1965	25 400				
1966	25 400				
1967	40 900				
1968	38 900				
1969	68 800				
1970	89 600				
1971	123 300				
1972	134 800				
1973	143 000	41	800	2.94	49
1974	165 000	6	7 282	2.19	119
1975	153 800	31	17 579	2.71	1 294
1976	165 600	13	20 847	2.46	419
1977	160 000	24	10 297	2.28	396
1978	192 600	18	9 679	2.34	309
1979	170 100	28	20 849	2.65	1 226
1980	180 000	35	12 120	2.76	651
1981	170 800	16	10 683	2.30	229
1982	163 000	25	9 577	2.48	661
1983	185 000	47	12 353	2.86	1 246
1984	225 400	30	39 781	2.63	2 434
1985	260 000	26	33 700	2.49	1 682
1986	303 500	2	22 998	1.89	74
1987	255 000	40	33 278	2.77	1 882
1988	363 800 <sup>4</sup>	33	40 246	2.76	2 444
1989	363 200	31	29 191	2.59	2 014
1990	368 300	24	20 313	2.54	830
1991	352 600	38	15 102	2.69	1 247
1992	448 100	5	32 252	2.06	404
1993	498 400	48	24 163	2.75	2 743
1994	591 400	9	16 444	2.44	242
1995	616 600	17	19 519	2.47	665
1996	669 100	25	22 595	2.34	1 247
1997	657 500	37	17 586	2.69	1 222
1998	(836 600) <sup>5</sup> 741 200	33	17 982	2.52	144

<sup>1</sup> from aerial photo counts

<sup>2</sup> from visual ground counts

<sup>3</sup> broods accompanied by 2 parents

<sup>4</sup> no spring survey conducted; a population model was used (Gauvin & Reed 1987)

<sup>5</sup> estimates in brackets have been corrected to account for flocks not observed during the survey, using data from a telemetry study.

1999	(1 008 000) <sup>5</sup>	803 400	2	20 394	2.09	91
2000	(816 500) <sup>5</sup>	577 300	23	20 468	2.54	1 302
2001		837 400	28	22 106	2.36	1 072
2002		725 000	6	18 930	1.91	274
2003		678 000	27	15 900	2.36	1 092
2004		957 600	18	26 206	2.44	1 031
2005		814 600	21	29 022	2.38	1 470
2006		1 017 000	20	23 338	2.34	1 143
2007		1 019 000	21	25 453	2.28	1 371
2008		718 000	40	32 020	2.62	3 188
2009		1 009 000	11	28 969	2.08	753
2010		824 000	20	27 030	2.26	1 533
2011		917 000	30	31 719	2.42	2 291
2012		1 005 000	15	25 822	2.19	834
2013		921 000	10	31 749	1.86	693
2014		796 000	22	28 233	2.15	1 893
2015		818 000	16	25 672	1.94	997
2016		915 000	18	27 886	2.14	1 245
2017		747 000	20	23 193	2.20	1 335
2018		877 000	5	27 955	1.94	317
2019		714 000	32	23 053	2.50	1 743
2020		-	16	21 390	2.28	947
2021		-	21	24 476	2.50	1 202
<b>2022</b>		<b>753 000</b>	<b>3</b>	<b>24 240</b>	<b>1.85</b>	<b>177</b>
1973-1998		-	26	-	2.52	-
1999-2008		-	20	-	2.33	-
2009-2022		-	17	-	2.15	-