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2012

## The status of Canada Goose *Branta canadensis* subspecies in Greenland

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Fox, Anthony D.; Sinnett, David; Baroch, John A.; Stroud, David A.; Kampp, Kaj; Egevang, Carsten; and Boertmann, David, "The status of Canada Goose *Branta canadensis* subspecies in Greenland" (2012). *USDA National Wildlife Research Center - Staff Publications*. 1136.  
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# The status of Canada Goose *Branta canadensis* subspecies in Greenland

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(Med et dansk resumé: Status og forekomst af Canadagåsens underarter i Grønland)

**Abstract** Three subspecies of the Canada Goose (*Branta canadensis interior*, *B.c. parvipes* and *B.c. hutchinsii*) have been re-reported from Greenland, where the species has increased dramatically as a breeding and summering bird in the last 30 years. We report results of catch data, new observations, re-examination of archive photographs and museum specimens that show the subspecies *interior* is the most common and widespread subspecies, which has been present in West Greenland since at least 1864 (predating the previous earliest record from 1976). Re-measurement of museum skins confirmed that all specimens of *parvipes* relate to individuals of the *interior* type, confirming *parvipes* has yet to be reported from Greenland. Observations and specimens also confirm the presence of the small *B.c. hutchinsii* as a rare summer visitor mainly between Disko Bay and Thule, with two recent records from East Greenland.

## Introduction

There has been recent speculation about the current status of the different subspecies of Canada Geese *Branta canadensis* occurring in West Greenland (Fox et al. 2011). At least three subspecies have previously been reported there: the small Cackling Goose (subspecies *hutchinsii* - now considered a distinct species *Branta hutchinsii* by the American Ornithologists' Union, Banks et al. 2004), the Lesser

Canada Goose (subspecies *parvipes*) and one larger type (subspecies *interior*, Salomonsen 1950, 1967, Boertmann 1994). The latter two subspecies are now considered part of *Branta canadensis* (Banks et al. 2004).

Sub-fossil goose remains show that a *Branta* species, considered to be one of the small Canada Goose subspecies, occurred in the interior of the Nuuk/Godthåb District during at least c. 1000-1400

A.D. and in the interior of the Sisimiut/Holsteinsborg District during c. 1200–1300 A.D. (Gotfredsen 2002), indicating that these were present and apparently more frequent in the past. However, the only authenticated record of Cackling Goose in Greenland was of a pair shot in Uummannaq district in 1914 (Salomonsen 1950). DB has also examined and verified a specimen shot in Sisimiut (68°N) before 1999 (in a private collection), and several field observations of Canada Geese both in Northwest Greenland (between Disko and Thule) and Northeast Greenland in recent decades include small Canada Geese (Bennike 1990, Best & Higgs 1990, Meltotte & Dinesen 2010, H. Ettrup in litt., J. Hansen pers. comm.), which were most likely Cackling Geese.

The Lesser Canada Goose (subspecies *parvipes*) was reported in 1863 and 1864 from Qeqertarsuaq on Disko, where a pair stayed and probably bred (Salomonsen 1950). The male was shot and the specimen is now in the Zoological Museum of the University of Copenhagen (ZMUC No. 65265). Salomonsen subsequently assigned all larger Canada Geese collected in Greenland to subsp. *parvipes* (3 specimens in ZMUC), and a breeding pair observed on Disko Island in 1979 was also assigned to this subspecies (Pedersen 1984).

The subspecies *interior* was reported for the first time from Greenland in 1976, when a pair was found nesting near Lille Narsaq south of Nuuk (Pedersen 1980). Since then the numbers of Canada Geese breeding and moulting in West Greenland have increased dramatically and breeding now takes place in the region between Paamiut at 62°N and Thule at 76°N (Frimer & Nielsen 1990, GWGS 1993, Boertmann 1994, Fox et al. 1996, Kristiansen et al. 1999, Boertmann & Egevang 2002, Fox & Glahder 2010, Rasmussen 2011). The Canada Geese which have contributed most to this increase have generally been ascribed to subspecies *interior*; confirmed for birds from around 67°N in central West Greenland by observations, capture, marking and measurement, satellite telemetry studies, genetic analysis and resightings and recoveries of marked individuals (Fox et al. 1996, Kristiansen et al. 1999, Scribner et al. 2003).

The *interior* subspecies breeds from Ontario to northern Québec and winters along the Atlantic coast of North America in Connecticut, New Jersey, New York, Pennsylvania, Delaware and Maryland (Mowbray et al. 2002). Given that the smaller forms of Canada Geese tend to breed furthest north in North America (Owen 1980, Mowbray et al. 2002), and that few Canada Geese in the northern part of

the range in Greenland have been identified to subspecies (Fox et al. 2011, but see Best & Higgs 1990), it is logical to expect that small Canada Geese could make up a substantial amount of the Canada Geese recorded in the northern parts of West Greenland – between Disko Bay (69°N) and Thule (76°N).

Recent results from a goose-catching programme and field observations in Northwest Greenland enabled us to gather more support for this hypothesis, which stimulated the re-examination of some old photos and re-measurements of the specimens kept in ZMUC. These investigations threw up some new and surprising interpretations of the Canada Goose subspecies occurring in Greenland, which we now present here.

## Materials and methods

Twenty-four non-breeding Canada Geese were caught on 18 July 2008 in a drive net enclosure by a lake just north of the Thule Air Base, in Northwest Greenland (76.57°N 68.66°W) as part of a larger surveillance programme to screen a range of birds species in Greenland for Highly Pathogenic Avian Influenza (HPAI) under a cooperative agreement between the Ministry of Fisheries, Hunting and Agriculture (APNN) in Greenland, the Danish Department of Food and Agriculture, and the National Wildlife Disease Program of the United States Department of Agriculture. These geese were swabbed for HPAI and fitted with Copenhagen ZMUC metal rings, and linear measurements were taken of head and tarsus length (after Dzubin & Cooch 1992). These measurements were compared to a set of the same measurements from 99 individuals showing features characteristic of *interior* birds caught further south in Isunngua (67.08°N, 50.53°W) during 8 different drive net catches on different dates between 12 and 24 July 2008. Tarsus measurements taken during these more southerly catches were of tarsus bone (Dzubin & Cooch 1992) and so these measurements were inflated by an extra 21% to equilibrate to the tarsus length measurement based on calibrations of subsequently caught geese where both measurements were taken.

A breeding record of Canada Geese of the subspecies *parvipes* in 1979 on Disko Island was approved by the Danish Rarity Committee based on photographs taken of the breeding bird and the eggs (Pedersen 1984). These photos were taken by KK and were re-examined by KK, DB and ADF in February 2012. The six specimens of Canada Geese obtained from Greenland that are kept in the ZMUC were also re-measured and examined in February 2012 by DB.

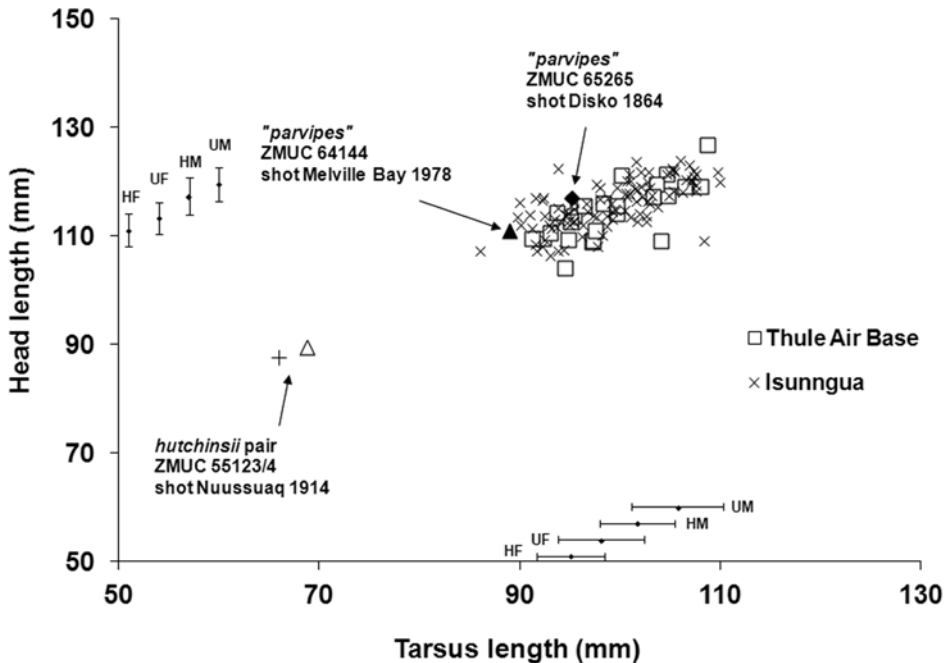


Fig. 1. Head length versus tarsus length for a sample of 24 Canada Geese caught near Thule Air Base (76.57°N 68.66°W; open squares) and 99 in Isunngua (67.08°N, 50.53°W; crosses). There were no statistical differences between either measurement at the two stations (see text for details), confirming that all birds from both groups belonged to subspecies *Branta canadensis interior*. The measurements of the two small subspecies *B. c. hutchinsii* in the Zoological Museum, University of Copenhagen (specimens 55123 and 55124) fell well outside the main cluster, while the two specimens labelled as "parvipes" (specimens 64144 and 65265) fell within the measurements of *interior* (from which they did not differ in plumage either). Also shown are the means  $\pm$  standard deviation of these measures taken from samples of known *interior* Canada Geese of both sexes caught in Hudson Bay (labelled HM and HF;  $n = 2735$  males and 2996 females respectively for head measurements,  $n = 595$  males and 727 females for tarsus) and Ungava Bay (UM and UF;  $n = 1627$  males and 1723 females for head measurements,  $n = 361$  males and 366 females for tarsus) between 1997 and 2006; data kindly supplied by courtesy of Richard Cottar, Canadian Wildlife Service.

Hovedlængde og tarsuslængde målt på 24 Canadagæs fanget i nærheden af Thule Air Base (76,57°N 68,66°W; firkanter) og 99 fanget i Isunngua (67,08°N, 50,53°W; kryds). Der var ingen statistiske forskelle mellem målene fra de to stationer (se tekst for detaljer), hvilket bekræfter at disse fugle tilhørte samme underart: *B. c. interior*. De samme mål er vist fra de to *B. c. hutchinsii* i Zoologisk Museums samlinger (katalognummer 55123 og 55124), og de ses at ligge langt uden for interior-målene. De to skind mærket "parvipes" (katalognummer 64144 og 65265) falder inden for målingerne af *interior*, og disse skind afveg heller ikke i form eller fjerdragt fra denne underart. Vist på figuren er også hovedlængde og tarsuslængde (middelværdi + standard-afvigelse) af kendte *interior* Canadagæs af begge køn fanget i Hudsonbugten ( $n = 2735$  hanner (mærket HM) og 2996 hunner (HF) for hovedlængde og  $n = 595$  hanner og 727 hunner for tarsuslængde) og dels i Ungava Bugt ( $n = 1627$  hanner (mærket UM) og 1723 hunner (UF) for hovedlængde og  $n = 361$  hanner og 366 hunner for tarsuslængde) mellem 1997 og 2006 (Richard Cottar, Canadian Wildlife Service, in litt).

## Results

The range of head and tarsus measurements are shown in Fig. 1; there were no significant differences between the measurements of birds from Thule Air Base and Isunngua (head  $t_{121} = 1.45$ ,  $P = 0.15$ ; tarsus  $t_{121} = 0.06$ ,  $P = 0.95$ ), confirming that the geese caught in the Thule area were also likely of the *interior* subspecies. Comparison with measure-

ments taken from *interior* birds caught in Ungava and Hudson Bays, Québec shows these not to be significantly different from those from either site in Greenland (Fig. 1).

During the course of the catching programme, Canada Geese were also encountered at other sites near Thule Air Base. On 14 July 2008, 25 non-breeding adults were found close to the base, as were

Table 1. Measurements of the six Canada Goose specimens from Greenland kept in ZMUC, undertaken by DB in February 2012. All measurements are shown in mm. Note that 64346 is a skin without feet and bill. According to Bellrose (1980), *parvipes* has a bill length within 41–45 mm, *hutchinsii* 31–34 mm, and *interior* 49–56 mm.

Målinger (mm) af de seks Canadagåse-skind fra Grønland opbevaret på ZMUC, foretaget af DB i februar 2012. Bemærk at 64346 mangler fødder og næb. Ifølge Bellrose (1980) har *parvipes* en næblængde inden for 41–45 mm, *hutchinsii* 31–34 mm og *interior* 49–56 mm.

Catalogue Number	Location on label	Locality taken	Date taken	Sex	Bill length	Bill depth	Head	Wing length	Tarsus	Re-identification
65265	<i>parvipes</i>	Disko	1864	male	50.6	25.8	117	425	95	<i>interior</i>
64346	<i>parvipes</i>	Disko	19 June 1971	male	-	-		424	-	<i>interior</i>
64144	<i>parvipes</i>	Melville Bay	20 August 1978		48.0	24.4	111	397*	89	<i>interior</i>
64143	<i>parvipes</i>	Disko	4 May 1978	male	49.6	26.0		465/457	98	<i>interior</i>
55123	<i>hutchinsii</i>	Nuussuaq	10 June 1914		32.4	17.5	87,8	373	66	<i>hutchinsii</i>
55124	<i>hutchinsii</i>	Nuussuaq	10 June 1914		34.0	19.9	89,5	386/388	69	<i>hutchinsii</i>

\* bird in primary moult

five breeding pairs with at least 13 young (one pair still incubating eggs). A helicopter survey of Booth Sound in mid June 2008 located nine Canada Geese just north of the Sound (76.96°N, 71.11°W) with three nesting pairs adjacent and another two nesting pairs south of Drown Bay (76.84°N, 70.68°W). During a ground visit to the area between Booth Sound and Drown Bay 76.89°N, 70.74°W on 22 July 2008, at least five pairs were seen with seven goslings, but the ground team considered that there could have been many more because of their cryptic plumage and behaviour. All the Canada Geese observed were considered to be of the *interior* subspecies, as they were of similar size, form and coloration to those captured in the Thule area.

During a half day visit to Itsaku by CE (71.67°N 53.95°W) on the eastern side of the Svartenhuk Peninsula on 22 July 2010, 128 breeding pairs of large subspecies Canada Geese (almost certainly subspecies *interior*) were present, with a further 292 individuals in flocks. In addition, four roosting individuals of a smaller form were observed (not assigned to subspecies, but most likely *hutchinsii*).

The images taken of the breeding Canada Goose on Disko Island in 1979 clearly show a long-billed, long-necked large form of Canada Goose, almost certainly of the subspecies *interior*. The size of the eggs in the nest could be measured approximately based on the scale provided by a lens cap in the image, and corresponded to 85–90 x 57–59 mm, too large for *hutchinsii* (mean 75 x 53 mm, MacInnes & Dunn 1988) or *parvipes* (mean 79 x 53 mm, Ely et al. 2008), but approximately corresponding to those of *interior* from Canada (e.g. 85 x 58 mm (Hanson 1965), 84 x 57 mm (Manning 1978)).

The bill, tarsus and wing measurements of the six specimens of Canada Geese from Greenland that are kept in the ZMUC are presented in Table 1. Compared to the measurements available for subspecies *parvipes* (e.g. Bellrose 1980, Mowbray et al. 2002), the four ZMUC specimens of this subspecies were clearly too large to be of that subspecies, but all fell well within the range of *interior* measurements (Fig. 1), which they resembled in plumage characteristics and proportions.

# Discussion

The new results presented here indicate that only two subspecies of Canada Goose have occurred with certainty in Greenland. They also show that the colonisation and expansion of the *interior* population continues in Greenland and that it is now well established in West Greenland (both breeding and moulting birds) from Svartenhuk to north of 76°N. To the south of Svartenhuk large numbers breed and moult on Nuussuaq, Disko Island and the land south of Disko Bay at least as far south as Paamiut (62°N). Large Canada Geese (most likely *interior*) are also reported with increasing frequency from Northeast Greenland. The numbers there have so far been small, in flocks of up to six individuals, but as pairs have been observed at several occasions, breeding may be expected to be reported in the near future.

Since the 1980s, the Cackling Goose may have been a rather rare summer visitor, occurring mainly in the region between Disko Bay and Thule and probably also in Northeast Greenland. Bennike (1990) reported small Canada Geese on Svartenhuk,



Nuussuaq, and west coast Disko Island during summer expeditions in 1989 and 1990, which he “with hesitation” assigned to the *hutchinsii* subspecies. Henning Ettrup (*in litt.*) reported 35–40 *hutchinsii* in eastern Svartenhuk in summer 1989. Best & Higgs (1990) saw 10 small Canada Geese associating with a single larger paler bird in Thule District in summer 1989. Meltofte & Dinensen (2010) reported seeing a small Canada Goose in Ørsted Dal (71°N 23°W), Northeast Greenland, in June 2009, and a small Canada Goose was observed at the Zackenberg research station (74.50°N 21.00°W) in August 2011 (J. Hansen pers. comm.). The southernmost record in West Greenland was the one from Sisimiut taken before 1999. During ground fieldwork associated with this study, there was no evidence for smaller-bodied individuals apart from the four seen at Itsaku in 2010, so there is no indication that this subspecies is more numerous or makes up more than a very small contribution to the numbers of Canada Geese currently summering in Northwest Greenland.

The specimens of the third subspecies reported from Greenland, *parvipes*, surprisingly all turned out to be *interior* birds on re-examination. We therefore assert that the presence of a goose of the *interior* form in West Greenland in 1864 (verified by examination of the specimen) antedates the previous first record of the subspecies in Greenland in 1976 by more than 100 years. This leaves no certain records of the *parvipes* subspecies in Greenland. As there are no specimens identified as *interior* in ZMUC, we assume that Salomonsen may in fact have misapplied the name *parvipes* instead of assigning these specimens to *interior*, since both forms were well recognised by the early 1950s (e.g. Hanson & Smith 1950, Todd 1951). The differences between the subspecies were synthesised by several authors at that time, most notably by Delacour (1954), who also provided measurements.

## Acknowledgements

We are extremely grateful to all the participants in the 2008 expedition to Isunngua, namely Ruth Cromie, Olivia Crowe, Becks Denny, Kenny Graham, David Hopkins, Becs Lee, Huw Thomas, and Rachael and Tom Stroud, for expending blood, sweat, tears and mosquito bites to collect the data. The field work at Thule and Booth Sound was funded by the US Department of Agriculture and we thank all those who supported that project that resulted in the successful catches. The Zoological Museum at the Natural History Museum of Denmark, University of Copenhagen (ZMUC) gave permission to access their specimens of Greenland Canada Geese. Finally we are deeply indebted to Richard Cottar (Canadian Wildlife Service, Québec) for

permission to use the measurements of *interior* Canada Geese from Ungava and Hudson Bays in Canada and to him and his colleague Jean Rodrigue for sharing their extensive knowledge of Canada Geese in Northern Québec.

## Resumé

### Status og forekomst af Canadagåsens underarter i Grønland

Tre forskellige underarter af Canadagås (*Branta canadensis interior*, *B. c. parvipes* og *B. c. hutchinsii*) er rapporteret fra Grønland, hvor arten har vist en voldsom fremgang gennem de sidste 30 år. Vi præsenterer her resultaterne af nye observationer samt en reevaluering af arkivfotografier og museumsskind, der alle viser at *interior* er den mest almindelige og udbredte underart i Vestgrønland. Genmåling af museets skind bekræfter, at alle eksemplarer mærket “*parvipes*” i virkeligheden er *interior*, og at der således ikke foreligger et eneste bekræftet fund af *parvipes* fra Grønland. Dette betyder også, at *interior* har forekommet i hvert fald siden 1864, hvilket er mere end 100 år tidligere end hidtil antages. Observationer og museumsskind bekræfter tilstedeværelsen af den lille *B. c. hutchinsii* som en sjælden sommergæst, primært mellem Disko Bugt og Thule, men også med to nylige observationer fra Østgrønland.

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Accepted 17 March 2012

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