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WHITE-CHEEKED GEESE IN NEBRASKA

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INTRODUCTION

The intent of this paper is to summarize the current state of knowledge regarding White-cheeked Goose subspecies whose occurrence can be documented in Nebraska. The name "White-cheeked Goose" is used in reference to the various taxa included within the two species Canada Goose (*Branta canadensis*) and Cackling Goose (*B. hutchinsii*), as constituted by the American Ornithologists' Union (AOU; 2004). Using culmen measurements, confirmation of both species' and the "expected" subspecies' occurrence in Nebraska was documented, but culmen measurements alone could not confirm occurrence of any of the "unexpected" subspecies.

TAXONOMY

As many as 10 subspecies of White-cheeked Goose were described by the AOU (1957), five of which (*interior*, *maxima*, *parvipes*, *taverneri*, and *hutchinsii*) were assumed to occur in Nebraska by Rapp et al. (1958). Since then there have been additional attempts to delineate subspecific relationships. Palmer (1976) attempted to clarify the evolutionary histories and relationships among populations and modified the AOU (1957) classification. These works and others have left considerable taxonomic confusion that also impacts our understanding of the subspecies found in Nebraska. The most recent treatment is that of Mowbray et al. (2002), who listed 11 subspecies of White-cheeked Goose. Genetic studies have shown that two groups can be discerned within these 11 subspecies, one containing 7 large subspecies and the other 4 small subspecies. Recently, the AOU (2004) designated these two groups full species, Canada Goose (*B. canadensis*), consisting of the 7 large subspecies *canadensis*, *interior*, *maxima*, *moffitti*, *parvipes*, *occidentalis*, and *fulva*, and Cackling Goose (*B. hutchinsii*), consisting of the 4 small subspecies *hutchinsii*, *taverneri*, *minima*, and *leucopareia*.

PUTATIVE NEBRASKA OCCURRENCE

According to ranges described by Mowbray et al. (2002), Bellrose (1976), and Palmer (1976), subspecies of Canada Goose likely to occur in Nebraska are *interior*, *maxima*, *parvipes*, and *moffitti*, and of Cackling Goose the only likely subspecies is *hutchinsii*.

B. c. interior is a medium-large goose that breeds in east-central Canada and migrates primarily along the Mississippi Flyway, with small numbers using the Missouri Valley, and winters from Squaw Creek NWR in northwest Missouri southward. This subspecies would be expected in eastern Nebraska as a migrant, but is a large goose and thus difficult to separate in the field from *maxima* and *moffitti* and their intergrades (see below).



Canada Goose (Interior) (*Branta canadensis interior*)
Photo courtesy of Stephen J. Dinsmore

B. c. maxima was the original breeding White-cheeked Goose in Nebraska, but was virtually extinct by 1900. Its rediscovery and re-introduction throughout Nebraska have made it once again a common bird in the state. Introductions in Nebraska of *moffitti*, whose currently-described breeding and wintering ranges are west of the Rockies and thus Nebraska (Mowbray et al. 2002), have confused the genetic makeup of resident Nebraska birds. Indeed, Palmer (1976) merged the two taxa as *moffitti*. Both *maxima* and *moffitti* and their introgressants winter in Nebraska; many are probably resident, and most large Canada Geese in Nebraska are in this *maxima/moffitti* group. Interestingly, these large resident geese, especially first and second year nonbreeders, but also a few failed adult breeders, undertake a major molt migration in June to the western Hudson Bay area, returning in fall with other migrant White-cheeked Geese. This results in many fall migrant goose flocks containing some very large Canada Geese.

B. c. parvipes is of uncertain status in Nebraska due to difficulty of separation in the field from larger subspecies and from Cackling Goose. Its range, as currently understood (Mowbray et al. 2002), suggests that it migrates through the Panhandle and the Lake McConaughy area, and in decreasing numbers eastward perhaps to central Iowa, and winters in small numbers in Nebraska but mostly from southeast Colorado southward. As the smallest of the Canada Goose subspecies, it is difficult to separate from Cackling Goose, with which it has been thought to interbreed to a considerable extent in northern Canada (Mowbray et al. 2002). Recent studies, however, indicate that gene flow is minimal, allowing recognition of *parvipes* and *hutchinsii* as distinct taxa and the consequent split of White-cheeked Geese into separate species (AOU 2004; McLaren 2004; Shields and Wilson 1987;

Wagner and Baker 1990; Pearce et al. 2000). Separation in the field of *parvipes* from smaller individuals of *moffitti* is also difficult. Flocks of small, paler-breasted Canada Geese in central and western Nebraska are likely to be *parvipes*.

B. c. moffitti, as described by Mowbray et al. (2002), in its natural state occurs just to the west of Nebraska, but may pass through the western Panhandle as an occasional migrant. However, many “park” and re-established geese in Nebraska are intergrades of *moffitti* and *maxima* (see above).

B. h. hutchinsii is a small pale-breasted Arctic goose which migrates through most of Nebraska, with highest concentrations in the Rainwater Basin in spring. Although typical individuals can be separated in the field from *parvipes*, many small White-cheeked Geese are difficult to place into either Canada or Cackling Goose. The western and central Platte Valley (Grand Island to Scottsbluff) should be the area of greatest overlap of *parvipes* and *hutchinsii* in Nebraska.

The taxon *B. h. taverneri* has been reported in Nebraska (Rapp et al. 1958), although its occurrence is undocumented. Palmer (1976) considered this taxon a result of interbreeding between *B. c. parvipes*, the smallest subspecies of the “large” Canada Goose group, *B. canadensis*, and *B. h. minima*, a component of Cackling Goose, but McLaren (2004) concluded that, as with *parvipes* and *hutchinsii*, there is little or no evidence for regular interbreeding between the genetically distinct *parvipes* and *minima*, reinforcing the validity of the Canada-Cackling species split.



Cackling Goose (*Branta hutchinsii*)
Photo courtesy of Stephen J. Dinsmore

There are old reports of occurrence of *B. c. minima* in Nebraska, but cited evidence (measurements, see below) does not exclude *hutchinsii*. More recent field observations of small brown-breasted geese are more problematic, however; similar reports in Ontario and on the Atlantic Coast have been considered dark examples of *hutchinsii* or escapes (Abraham 2005). Nevertheless, it is possible that occasional strays of the northwest Pacific Coast and Alaska populations of Cackling Goose might occur in Nebraska.

METHODS

Armed with this background information, I decided to investigate which White-cheeked Goose subspecies could be documented for Nebraska. An interesting paper was published by DuMont and Swenk (1934), who presented measurements and, importantly, gender, of 404 specimens of White-cheeked Geese collected in the central Platte Valley 1 Oct-11 Dec 1884 and 18 Mar-11 Apr 1885. DuMont and Swenk concluded that 17 of the 404 were *hutchinsii* (4%), 325 *leucopareia* (80%), and 62 *canadensis* (15%). At that time, *leucopareia* was used for birds currently named *parvipes* or *moffitti*, and *canadensis* for larger birds currently *maxima*, *moffitti*, or *interior*.

Swenk also noted measurements of specimens encountered in various collections that he visited, notably those of Brookings, Black, and Olsen, but also others. The few White-cheeked Goose specimens for which he recorded data were included in this study. The University of Nebraska State Museum (UNSM) collection has a few skins and skulls of White-cheeked Geese. These were examined by the author and Joel Jorgensen in January 2005 with the expert help of Thomas Labedz, Collection Manager.

A widely-reported measurement was chosen to determine subspecies, "exposed culmen", sometimes referred to as "bill" (Palmer 1976). This measurement is the distance from bill tip along the top of the culmen (mandible, or upper bill) to the base of the first feathers. In White-cheeked Geese, males generally have larger culmen measurements than females. Although there is considerable overlap between subspecies and gender in this measurement, the number of available Nebraska specimens of known gender help in improving accuracy of identification. I compared culmen data from the sources discussed above to reference measurements from Palmer (1976) and Mowbray et al. (2002) and used this as a basis for confirming the presence of White-cheeked Goose subspecies in Nebraska. Only culmen length was used; the intent of this study was to see whether these data could confirm at least the occurrence in Nebraska of Cackling and Canada Geese, as well as the expected subspecies. Thus a conservative approach required placing only those measurements which could be assigned unequivocally within known ranges for the expected subspecies, and omitting the remainder.

RESULTS AND DISCUSSION

Table 1 summarizes culmen measurements found in the various sources examined and compares these to ranges cited by Mowbray et al (2002) and Palmer (1976); the measurements from these two sources were combined but kept separate by gender, and are shown in Table 1 as "reference". Only 160 of the 404 specimens listed by DuMont and Swenk (1934) could be safely assigned to a subspecies; only these are included in Table 1.

TABLE 1. Culmen measurements (mm) of Nebraska White-cheeked Geese.

	<i>hutchinsii</i>	<i>parvipes</i>	<i>interior</i>	<i>maxima</i>
FEMALES				
reference	31.7-39.3	36.0-45.5	43.0-56.0	50.5-63.0
non-overlap range	<35.9	39.4-42.9	45.6-50.4	>56.0
DuMont and Swenk (1934)	33.0-35.6 (n = 9)	40.6 (n = 38)	45.7-48.3 (n = 40)	63.5 (n = 1)
UNSM skull (1991)				69.3 (n = 1)
MALES				
reference	32.3-43.8	38.0-46.0	46.0-61.0	55.6-72.0
non-overlap range	<38.0	43.9-45.9	46.1-55.5	>61.0
DuMont and Swenk (1934)	35.6 (n = 8)	45.7 (n = 32)	48.3-53.3 (n = 30)	63.5 (n = 2)
UNSM skin (1990)	34.9 (n = 1)			

Although only 160 of the 440 specimens listed by DuMont and Swenk (1934) could safely be assigned to subspecies (the others were within areas of overlapping measurements between subspecies), only one of the 440 was entirely outside the reference ranges of the four subspecies listed above. This was a very small male *hutchinsii*, culmen 30.5 mm. While this measurement is within the range of *minima*, it is probably more likely that this bird was small as a result of malnourishment or disease, a frequent phenomenon in wild geese (Leafloor et al. 1998, Abraham 2005). Also, young birds in their first fall may be only 90% of adult size (Abraham 2005). That the assignments in Table 1 are plausible is supported by the fairly even numbers of males and females assigned to each taxon; there is no reason to believe the collectors favored either gender, and White-cheeked Geese tend to be paired throughout their lives. It is also assumed here that approximately equal numbers of male and female White-cheeked Geese occur in Nebraska.

The data in Table 1 confirm the occurrence in Nebraska of two species of White-cheeked Goose, Canada and Cackling, and within Canada, three subspecies, *parvipes*, *interior*, and *maxima*. At the time of collection of the specimens analyzed by Swenk, *maxima* was rare; this is supported by the finding that only one male and two females from DuMont and Swenk's paper shown in Table 1 were assigned to *maxima*. The number of birds assigned to *interior* is somewhat surprising, as this subspecies is generally thought to occur east of Nebraska, perhaps west to the

Missouri River Valley. It is possible that some of the birds assigned to *interior* are in fact *moffitti*, but this is unlikely in that when the DuMont and Swenk specimens were collected in the 1880s there were no re-introduced *moffitti*, as there are today. Thus the data suggest that *interior* may indeed occur in central Nebraska in good numbers, or possibly that in the 1880s it occurred rather further westward than it does today. DuMont and Swenk (1934) assigned 4% of the studied specimens to *hutchinsii*; Table 1 assigns 16 of the 160 specimens listed to *hutchinsii*, about 16%. This discrepancy possibly results from Swenk's inclusion in *leucopareia* of many of the larger *hutchinsii*.

OCCURRENCE OF OTHER WHITE-CHEEKED GOOSE TAXA IN NEBRASKA

Earlier authors mentioned other taxa of White-cheeked Goose occurring in Nebraska. Rapp et al. (1958) listed *taverneri* without documentation, and currently this name is used for Alaskan breeders that winter along the Pacific Coast. DuMont and Swenk (1934) used the names *leucopareia* and *canadensis*; the former is now restricted to the population breeding in the Aleutian Islands and wintering in California, and the latter to the easternmost subspecies of Canada Goose, breeding in eastern Canada and wintering along the Atlantic Coast.

Currently, many re-established populations of Canada Geese in Nebraska are intergrades of *maxima* and *moffitti*, and also possibly *interior*. These (along with *canadensis*) are the largest subspecies of Canada Goose. Although many re-established Canada Geese are sedentary, a large portion of the population undertakes an extensive molt-migration to the Hudson and James Bays area. According to Mowbray et al. (2002), 70% of these molting birds were 1-2 years old, with the remainder mostly failed adult breeders. This molt migration takes place in late May through mid-June, and returning birds would be expected with the usual fall influx of Canada Geese. Thus there should be a component of fall migrant Canada Geese that are *moffitti/maxima* intergrades. If these birds are returning from the Hudson and James Bay area, they would mingle with migrating *interior* and *hutchinsii*, which breed in that area, as well as migratory *parvipes* once Nebraska is reached. By comparison with these taxa, *moffitti/maxima* intergrades would appear very large except when with *interior*, which may only occur in numbers in extreme eastern Nebraska.

There is no documented occurrence of migratory Great Basin *moffitti* for Nebraska, despite the nearness of its migratory corridor to the western Panhandle. It seems entirely likely that a few migratory *moffitti* occur in the Panhandle. The Hi-Line Management Unit of Canada Geese (Hansen and Nelson 1964, Bellrose 1970) consists entirely of *moffitti* (Mowbray et al 2002); this population breeds east to north-central Colorado and migrates a short distance southward, wintering east to central Colorado (Mowbray et al 2002). The data in DuMont and Swenk (1934) contained no measurements that unequivocally confirm occurrence of *moffitti*; this is not surprising in that these specimens were collected in central Nebraska, where migratory *moffitti* would not be expected.

Recently, field reports have been received of small, dark-breasted geese identified as *minima*. Their identity remains a question; *minima* would be unlikely to occur in Nebraska as it breeds in western Alaska and winters in the Pacific Northwest. Swenk (Notes) cites measurements of two specimens considered to be *minima*; both, however, can be assigned safely to *hutchinsii*. Abraham (2005) cites

banding data that show that of over 9000 White-cheeked Geese banded between 1975 and 1994 in the central and western arctic breeding areas none were recovered east of the Missouri River.

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Correction to Winter Bird Numbers Article

Editor's Note: We regret that there was an error in the text of the Paul Johnsgard article "Recent Changes in Winter Bird Numbers at Lincoln, Nebraska" published in the March 2006 *Nebraska Bird Review* (Volume 74 Number 1). The last sentence in the first full paragraph on page 18 should read: "(The House Sparrow is declining annually at a rate of 2.5%, and the House Finch is increasing at an annual rate of 1.15%.)"