BREEDING POPULATIONS OF TULE WHITE-FRONTED GEESE IN NORTHWESTERN CANADA

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THE Tule White-fronted Goose (*Anser albifrons gambelli*) is one of the least known of the North American wild geese. Available information has been largely limited to observations and collected specimens of wintering birds. The migrational routes are virtually uncharted and breeding areas unknown. The basis for considering *gambelli* to be a valid subspecies is discussed by Swarth and Bryant (1917), Kuroda (1929), Dalgety and Scott (1948), Todd (1950), and Delacour (1954). Reasons for lack of specific information are the comparative rarity of *gambelli*, and the fact it is usually confused with the Pacific White-fronted Goose (*A. a. frontalis*).

Because of the mystery surrounding this goose and the fact it had been listed as possibly endangered by the International Union for the Conservation of Nature and Natural Resources, an expedition to the region of the delta of the MacKenzie River in northwestern Canada was undertaken in 1964. The purpose of the expedition was to try to locate breeding colonies of *A. a. gambelli*, and to collect live birds for a controlled propagation program. Reports that isolated and uninvestigated White-fronted Goose populations nested in this region made it a likely area to search. The expedition, which was originally reported by Elgas (1965), was sponsored and financed by World Wildlife Fund. It was actively supported by the Canadian Wildlife Service, the United States Fish and Wildlife Service and was under the leadership of Bob Elgas and Jack Kiracofe. On 2 July 1964, the expedition arrived at Inuvik, Northwest Territories where a base camp was established. The town of Inuvik is approximately fifty miles east of Aklavik and is on the east side of the MacKenzie River delta. Recognition for his support is given Dick Hill, Manager of the Canadian Wildlife Service Research Laboratory at Inuvik and to Tom Barry, Resident Biologist for the Canadian Wildlife Service. The technical advice and field support given by Mr. Barry was invaluable.

On 5 July we made an aerial examination of the Old Crow Flats. Old Crow Flats is in the northern portion of the Yukon Territory, about 150 miles west of Inuvik. It is a plateau 60 to 70 miles in diameter and rather isolated from the northern coastal plain and the MacKenzie delta area by rugged mountain chains. Here is the source of the Old Crow River. The Flats are characterized by thousands of lakes, sloughs, and potholes surrounded for the most part by a dense brushy growth. Predominant vegitation

TABLE 1

CHARACTERISTICS OF LIVING WHITE-FRONTED GEESE (*ANSER ALBIFRONS*) CAPTURED IN NORTHWESTERN CANADA, JULY 1964

Specimen Number	Sex	Age When Captured	Chord of Wing (mm)	Exposed Culmen (mm)	Tarsus (mm)	Weight	Color Compared with frontalis
1	♂	Adult	413	57	77	7 lb 11 oz	Darker brown
2	♂	Juvenile	407	56	77	6 lb 9 oz	Intermediate gray-brown
3	♂	Juvenile	405	58	78	7 lb 9 oz	Intermediate gray-brown
4	♂	Yearling	434	58	80	7 lb 2 oz	Darker brown
5	♀	Adult	394	53	78	6 lb 6 oz	Intermediate gray-brown
6	♀	Juvenile	410	49	74	5 lb 6 oz	Darker brown
7	♀	Juvenile	395	49	77	6 lb 9 oz	Darker brown
8	♀	Juvenile	388	54	74	7 lb 2 oz	Darker brown

Nos. 1, 3, 6 and 8 measured 15 February 1968, Nos. 2 and 7 measured 26 November 1964, Nos. 4 and 5 measured September 1965.

consists of spruce, willows, and alders with an undergrowth of various grasses, sedges, and mosses. The "bush" formed a heavy overgrowth condition prevailing virtually to the shoreline of the numerous lakes and ponds. Open, grassy areas were little evident.

Our preliminary search of the Flats revealed few geese, none of which appeared to be breeding birds. We then flew to the village of Old Crow, where we consulted with Charlie Peter Charlie, head man of the village and chief of the Loucheaux Indians. Charlie had spent his entire life in the area and was perhaps more familiar with Old Crow Flats, and its wildlife, than any living man. On a map furnished by the Royal Canadian Mounted Police, Charlie indicated a specific location, in the southwest portion of the Flats, known to his people as Dry Lake, and said we could expect to find breeding White-fronted Geese there. We immediately flew to the suggested location, landed, and spent considerable time in searching the area. While adult and young (breeding) geese were in evidence the heavy brush made observation difficult. We were eventually successful in capturing two downy young Whitefronts, approximately a week old. Unfortunately, a close study of parent birds was not possible since they were not yet in the molt. In flight, however, they appeared larger and darker than examples of *frontalis* with which we were familiar in Alaska. The two downies were darker than any White-fronted goslings I had previously seen. Their distinction from

A. a. frontalis goslings was similar to that of downy *Branta canadensis occidentalis* as compared to downy *B. c. moffitti.* These two goslings, both of which were females, were kept alive for propagation and subsequent study. They are numbers 6 and 7, Table 1.

On 6 July a flight was made from Inuvik eastward to the Kugalik River, about 80 miles distant, where a single White-fronted gosling was taken. This gosling again proved to be a female and was retained for the propagation program (No. 8, Table 1). It was interesting to note that this gosling, which was approximately a week old, was following an adult Lesser Canada Goose (*Branta canadensis parvipes*) and its own parents were not seen. We could but speculate as to the reason, but presumably the gosling had become separated from its own parents and had been adopted by the Lesser Canada. The Kugalik River area was much different from the Old Crow Flats in that a more open and grassier condition existed. Here the willow and alder scrub was replaced by large grassy areas and the contrast between the two conditions was striking. Our time was limited and our visit to the Kugalik was brief, so that our examination of the area was quite inadequate. Presumably other breeding White-fronted Geese may have been utilizing the area and further observation would have been desirable. It was noted that the natal down of the Kugalik River gosling was characterized by the same dark color as the two taken the day before at Old Crow Flats. Downy young Whitefronts reported by Hanson, Queneau, and Scott (1956) from the Perry River, N. W. T. were described as paler rather than darker than *frontalis* downies, and the adults collected there only slightly larger and darker than Alaska specimens.

On 13 July a second trip was made to Old Crow Flats, with headquarters established at the Canadian Wildlife Service cabin at Shafer Lake. This time, banding of White-fronted Geese was undertaken utilizing equipment made available by Tom Barry of the Canadian Wildlife Service. Due to the heavy brush in the Dry Lake area, efforts to band geese there were unsuccessful, although two more downy young were taken (Nos. 2 and 3, Table 1). These two goslings, both males, were approximately two weeks old and were slightly paler than the previously taken young.

Inasmuch as the darkness of plumage of adult *A. a. gambelli* is considered diagnostically significant (Fig. 1) it might be well to again note that the five downies taken by the expedition also displayed a darkness when compared to downy young *A. a. frontalis* of similar age. Downies No. 6 and No. 7 (Table 1), collected at Old Crow Flats and downy No. 8 (Table 1) taken on Kugalik River—all females, were approximately one week old when taken. All three were much darker than downy young of *frontalis* of comparable age. Downies No. 2 and 3 (Table 1), both males, were approximately two

FIG. 1. Captive White-fronted Geese. *Anser albifrons gambelli* in foreground and *Anser albifrons frontalis* in rear. Both are females.

weeks old when taken. Although slightly paler than downies 6, 7 and 8 they were still considerably darker than *frontalis* downies of similar age.

In order to find terrain suitable for trapping geese for banding, it was necessary to move to an area to the eastward where a more open condition existed. Here on the larger lakes, flocks of molting geese were congregated and we were able to trap and band 50 birds. Of these, four have subsequently been recovered, two in Saskatchewan, one in Texas, and one in northcentral Mexico. The geese were captured by utilizing nylon netting which was staked out to form fence-like wings in the water which led into a pound trap on land. The flightless geese were herded into this trap from the water with the float

plane. In the trapping area, which was roughly 30 miles east of Dry Lake, no breeding adult geese or goslings were encountered. It is possible that the adult birds may have come some distance to molt and may not have been representative of the breeding population of the region. Three of these, two adults, Nos. 1 and 5 and a young of the preceding year, No. 4, Table 1, were retained for propagation.

At the end of the field work, the eight live geese were transported to the United States where five, Nos. 1, 2, 3, 6 and 8, have been kept for study by Bob Elgas at Big Timber, Montana, and three, Nos. 4, 5 and 7 by Jack Kiracofe at Boiling Springs, Pa.

MEASUREMENTS

Comparative measurements of Tule and Pacific White-fronted Geese made by David Marshall, Bureau of Sport Fisheries and Wildlife, for field personnel working on the White-fronted Goose study 23 October 1963, from specimens in the Museum of Vertebrate Zoology, University of California, Berkeley, and the California Academy of Sciences, San Francisco:

Anser albifrons gambelli

Adult male (17 specimens)—Wing (chord), 441–480 (451) mm
Exposed culmen, 55–62 (58) mm

Adult female (12 specimens)—Wing (chord), 410–441 (432) mm
Exposed culmen, 49–59 (55) mm

Anser albifrons frontalis

Adult male (28 specimens)—Wing (chord), 391–441 (410) mm
Exposed culmen, 44–55 (50) mm

Adult female (31 specimens)—Wing (chord), 368–419 (400) mm
Exposed culmen, 42–51 (47) mm

Specimens *of Anser a. gambelli* from California in the U. S. National Museum were measured by J. W. Aldrich:

Male—Wing 427, 430, 438, and 452 mm
Culmen 58, 58, 60, 58
Tarsus 79, 82, 86, 81

Female—Wing 425, 401, 410 mm
Culmen 58, 57, 55
Tarsus 79, 79, 76

Adult specimens of *Anser a. frontalis* from Alaska in U. S. National Museum measured by J. W. Aldrich showed ranges and averages of measurements:

Male—(18) Wing 380–425 (404.8) mm
(20) Culmen 46.6–56.5 (51.6) mm
(20) Tarsus 68–81.5 (75.5) mm

Female—(15) Wing 362–405 (387.7) mm
(17) Culmen 46–54 (49.7) mm
(17) Tarsus 66–75 (71.1) mm

WEIGHTS OF ADULT *Anser albifrons*:

After Swarth & Bryant (1917):

(6) male *Anser a. gambelli* California 7 lb 1 oz–7 lb 8 oz (7 lb 4 oz)
(2) male *Anser a. frontalis* California 5 lb 0 oz–5 lb 6 oz (5 lb 4 oz)
(4) female *Anser a. gambelli* California 5 lb 5 oz–7 lb 0 oz (6 lb 5 oz)
(3) female *Anser a. frontalis* California 3 lb 14 oz–5 lb 8 oz (4 lb 12 oz)

Present study:

(3) male *A. a. gambelli* Old Crow Flats, Yukon 7 lb 11 oz; 5 lb 12 oz; 7 lb 9 oz
(2) female *A. a. gambelli* Old Crow Flats, Yukon 5 lb 6 oz; 7 lb 2 oz

After Hanson, Queneou and Scott (1956)

(2) male *A. a. albifrons* Perry River, N.W.T. 5 lb 10 oz and 6 lb 8 oz

DISCUSSION

It is suggested that the downy young taken at Old Crow Flats should be considered as representative of the Old Crow breeding population. The fact that downy young taken at Old Crow Flats did, upon maturing, develop into adults typical of the race *A. a. gambelli* indicates that, according to observations made by the Elgas-Kiracofe expedition, *gambelli* must be considered the breeding population of that area. It should be further noted that the expedition encountered no small pale breeding birds, *A. a. frontalis*, at Old Crow Flats and the small pale birds encountered were, in each case, nonbreeding molting birds. The mere presence of small pale birds in the breeding area would not necessarily be significant because of the well known tendency of adult nonbreeding geese of one race to wander considerable distances into the breeding grounds of another race.

In comparing the weights and measurements of Old Crow Flats and Kugalik River birds (Table 1) with those of *A. a. frontalis* and *A. a. gambelli* obtained from other sources, it is evident that the exposed culmens of these birds fall well within the range for *gambelli* and closer to the average for this subspecies. Wing (chord) measurements of these birds are small but cannot be satisfactorily compared due to the unusual amount of wear of wing tips which is commonly seen in pen-reared birds. Tarsus measurements are inconclusive. Weights are within the range of *gambelli* and greater than those of *frontalis*. Plumage color is typically darker brown or grey-brown than *frontalis*, as is characteristic of *gambelli*, with the exception of birds 2, 3 and 5, which are midway between the two forms. In combined characters, the Old Crow Flats birds seem to be referable to *gambelli* although they fall in the lower part of the size range of that race as represented by migrant specimens from California. It is possible the average of California specimens is not typical of the subspecies but abnormally high due to selection for large birds by the collectors. Further, it should be recalled that the type specimen

for *gambelli* came from Texas and the California birds may not be as typical of that race as are those from Old Crow Flats.

CONCLUSIONS

It is obvious that the Elgas-Kiracofe expedition in 1964 was unable to undertake as thorough an investigation of the White-fronted Goose populations of the MacKenzie River delta area, as would have been desirable. However, information obtained from the small samples collected, which are known to represent the breeding population of that area, indicates that these birds are referable to the subspecies which has been called *Anser albifrons gambelli* by previous reviewers of the taxonomy of the species.

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