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Taxonomy of Greater White-fronted Geese (Aves: Anatidae)

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Abstract.—Five subspecies of the Greater White-fronted Goose, *Anser albifrons* (Scopoli, 1769), have been named, all on the basis of wintering birds, and up to six subspecies have been recognized. There has been confusion over the application of some names, particularly in North America, because of lack of knowledge of the breeding ranges and type localities, and incorrect taxonomic decisions. There is one clinally varying subspecies in Eurasia, one that breeds in Greenland, and three in North America, one newly named herein.

Keywords: historical review, Holarctic, North America, subspecies

The Greater White-fronted Goose, *Anser albifrons* (Scopoli, 1769), is an abundant and important game-bird species throughout most of the Holarctic. It is recognized as being geographically variable; five subspecies (including the nominate) have been named, all on the basis of wintering birds. Because of the relative lack of specimens from the large arctic and subarctic nesting range, the breeding distribution of the named subspecies has been largely a matter of conjecture, particularly in North America. Further, an important part of the breeding range was not known until the 1980s. Of several authoritative treatments of waterfowl (Delacour 1954, Bellrose 1976, 1980; Palmer 1976, Johnsgard 1979), no two give the same breeding and wintering ranges for the American subspecies, and none provides a full taxonomic review. Ely et al. (2005) reviewed variation in the Holarctic breeding range of the species but did not relate this to winter distribution and did not attempt to revise the taxonomy.

Historical Application of Names

The name *Anser albifrons* (Scopoli, 1769) was applied to Greater White-

fronted Geese throughout their worldwide range until Hartlaub (1852) separated North American white-fronted geese, as *Anser gambelli*, from those of Europe on the basis of the greater size and different shape of the bill of the former. For the next three quarters of a century the name *gambelli* was applied to all North American (except Greenland) white-fronted geese by most American authors (e.g., American Ornithologists' Union [AOU] 1910), or to large examples of the species, wherever they occurred, by some European authors (see Todd 1950). Another name applied to American birds, *Anser frontalis* Baird, 1858, was based on young birds and was quickly placed in the synonymy of *gambelli* (Coues 1874, Baird et al. 1884, Salvadori 1895), where it remained for decades.

In 1917, Swarth and Bryant showed that two types of white-fronted geese winter in California, a population of larger, browner birds found mainly in the Sacramento Valley and smaller, grayer birds there and elsewhere. Swarth & Bryant (1917) called the larger birds (known by the English vernacular as Tule Geese) *A. a. gambelli* on the basis of the size of that form as noted by Hartlaub

(1852), despite the fact that Hartlaub's birds were supposedly from Texas and his comparison was with European rather than other American birds. The smaller California wintering birds were assumed to be the same as Eurasian *A. a. albifrons*. Because smaller birds were more abundant in California than large ones, Swarth & Bryant (1917) assumed that smaller breeding birds must be more abundant in Alaska, and that the larger birds bred farther eastward in Arctic America. Swarth and Bryant considered only California birds; they had no specimens or measurements from birds in the mid-continent region.

Hartert (1920), as translated by Kuroda (1929), was doubtful of the separation of *gambelli* from *albifrons* because occasional large birds occur in eastern Asia, not only in North America. He pointed out that recognition of subspecies should wait until separate breeding grounds had been determined. Kuroda (1929) cited large Canadian specimens in the British Museum (Natural History) from Repulse Bay and the Arctic Coast east of Ft. Anderson, presumably on their breeding grounds, as evidence of the eastern range of *gambelli*, supporting the views of Swarth & Bryant (1917). Although Kuroda doubted that the specimens in the Berlin Museum (including the lectotype selected by Stresemann) were really those seen and described by Hartlaub in 1852, he was convinced that there were large birds wintering in California and breeding in the eastern North American arctic, to which he applied the name *A. a. gambelli*, leaving the smaller North American birds to remain as *A. a. albifrons*. This treatment was followed by the AOU (1931) and Peters (1931).

When Dalgety & Scott (1948) named birds that breed in western Greenland and winter largely in Ireland and Scotland as *A. a. flavirostris*, they reviewed the taxonomy of American birds. They followed Swarth & Bryant (1917) in recognizing the

large Tule Geese in California as *A. a. gambelli* and considering the more abundant smaller form the same as *A. a. albifrons* of Eurasia. They pointed out that the name *gambelli* had wrongly been applied to some birds in both Greenland and Ireland on the basis of their large size. The race *A. a. flavirostris* was recognized as occasionally migrating to eastern North America, but that did not play an important role in the taxonomy of American birds.

Todd (1950) examined additional specimens of large birds from northern Canada, supporting the supposed breeding range of the large birds (*gambelli*) in the eastern North American arctic. He agreed with Kuroda (1929) that the birds in the Berlin Museum purported to be those on which Hartlaub based *A. gambelli* could not be the basis for the description of a large form, writing (p. 66): "Under the circumstances there can be no valid reason for further doubting the pertinence of Hartlaub's name *gambelli* on the basis of his original description, but there also can be no question that the specimens in the Berlin Museum purporting to be his types are not the types at all." However, on the basis of color differences between a small series of European birds and those from North America available to him, Todd separated the smaller American birds from *A. a. albifrons* of Europe. For the American birds Todd suggested the use of the name *Anser frontalis* of Baird (in Baird, Cassin, & Lawrence, 1858). Thus, again, *A. a. gambelli* was recognized for large birds that winter in northern California and supposedly breed in the eastern arctic, with no support from type specimens, and the name *A. a. frontalis*, originally considered larger than the synonymous *gambelli* by Baird, was applied to the smaller birds throughout North America. With the addition of *A. a. flavirostris* as a vagrant in eastern North America, this was essentially the treatment of the AOU (1957).

Dement'ev & Gladkov (1952:341) recognized only two subspecies of Greater White-fronted Goose, *A. a. albifrons* breeding from the east coast of Greenland across arctic Eurasia and northern North America to the Mackenzie River basin, and *A. a. gambelli* from the Mackenzie Basin across eastern North America to the west coast of Greenland. The race *albifrons* was distinguished by its smaller size, "which gradually increases from west to east."

Delacour (1954) was the first to extend the breeding range of *frontalis* from western North America to Siberia, probably as far westward as the Kolyma River; the range of nominate *albifrons* was thus restricted to western Eurasia. Delacour stated (p. 103): "We have personally ascertained that the birds from Far Eastern Asia (Kichiga, Anadyr, Japan) are identical with the West American sub-species *frontalis*. The boundaries between *frontalis* and *albifrons* in Central Siberia remain to be ascertained" The basis for this ascertainment is not given but seems to have been their appearance, particularly in captivity. Delacour stated (p. 107): "Differences between *frontalis* and *albifrons* may not be very apparent when skins are examined; but they are striking in living birds, as the varying proportions of the neck and bill stand out." Further, "They look different enough for American game breeders and dealers to have long distinguished between the two sub-species, while ornithologists persisted in considering them identical." Most later authors have followed Delacour in extending the range of *frontalis* across eastern Eurasia. Meyer de Schauensee (1984) listed both *frontalis* and *albifrons* as wintering in China.

The concept that there are three, rather than two, populations in North America was first set forth by Delacour & Ripley (1975), who separated wintering large birds from the mid-west from those of California. They restricted the winter

range of *gambelli* to east of the Rocky Mountains and proposed the name *A. a. elgasi* for the Tule Goose of the Sacramento Valley. The breeding range of *gambelli* was still presumed to be in eastern Alaska and northwestern Canada, where various workers (e.g., Elgas 1970) had reported large geese. Delacour and Ripley assumed the unknown breeding range of *elgasi* to be the taiga zone south of the tundra in Alaska. These authors followed Delacour (1954) for the ranges of *frontalis*, *albifrons*, and *flavirostris*, and this treatment was followed by Johnsgard (1979).

Bellrose (1980) was the first to report the discovery of apparent Tule Geese breeding in the Cook Inlet area of southern Alaska. He continued to use the name *gambelli* but he indicated that the birds of northeastern Alaska and Yukon probably represented a different subspecies. Timm et al. (1982) confirmed that the Cook Inlet breeding birds were the same as the Sacramento Valley wintering birds but continued to use the name *gambelli*; they did not discuss the taxonomy of birds elsewhere in Alaska.

Ely & Dzubin (1994) recognized two subspecies breeding in North America. The larger, darker Tule Goose, which they continued to call *A. a. gambelli* (although mentioning the name *elgasi*), was restricted to the Cook Inlet area of Alaska. The race *A. a. frontalis* was given a range from western Alaska across Canada, and in eastern Asia as postulated by Delacour (1954). This range encompassed that ascribed to the larger interior form by Delacour & Ripley (1975). Ely & Dzubin (1994) noted that there had been no Nearctic band recoveries in Siberia, nor Palearctic recoveries in North America.

Mooij (2000) and Mooij & Zöckler (2000) greatly reduced the breeding range attributed to *A. a. frontalis* by Delacour (1954) and others by recognizing a separation between Eurasian and North

American populations. These authors continued taxonomically (see beyond) to separate the western nominate *albifrons*, with a breeding range east to the Khatanga River in Russia, from eastern Asian birds from the Khatanga to the Bering Strait, a range larger than Delacour had included with *frontalis*. Brazil (2009) continued to use the name *frontalis* for the geese in eastern Asia, although acknowledging that a different name had been used for them.

Systematics

Ely et al. (2005) studied morphological variation (size) of Greater White-fronted Geese on their nesting grounds, and with consideration of other factors have provided a basis for dividing the species into subspecies. Briefly summarized, they found a clinal increase in size from west to east across Eurasia, a similarity of size of eastern Asian birds and those of the west coast of Alaska, without any indication of interchange of individuals between these areas, and little variation in samples from interior Alaska and across northern Canada. Birds that breed in the Cook Inlet area of Alaska are by far the largest of the species. Birds from western coastal Alaska migrate and winter separately from those of interior Alaska and Canada. Birds from Greenland do not differ much in size from most Canadian birds, but that population is browner and much more heavily marked ventrally, especially in first year birds, than any other (Dalgety & Scott 1948, pers. obs.). That information, along with the allocation of type specimens to wintering populations and knowledge of migratory behavior, permits the recognition of five subspecies, as follows.

Anser albifrons albifrons (Scopoli, 1769)

Type.—There is no extant type specimen of the species *Branta albifrons* Scopoli, 1769, and thus of the nominate

subspecies, but the type locality is presumed to be northern Italy (Peters 1931, Hellmayr & Conover 1948). Todd (1950) restricted the type locality to Italy, and there is no reason to believe that the name is based on anything other than “typical” European wintering birds.

Distribution.—Breeds in northern Eurasia from northern Finland (rarely) east to northeastern Siberia, and winters in European countries and southern Asia (China, Korea, Japan, occasionally to India and Pakistan).

Comments.—Eurasian birds increase in size clinally from west to east (Alphéraky 1905, Dement'ev & Gladkov 1952, Ely et al. 2005). The population of eastern Eurasia was distinguished from the western nominate form by Mooij (2000:386) and Mooij & Zöckler (2000:101) on the basis of its somewhat larger size. Those authors used the subspecific name *A. a. albicans* “according to Gmelin 1788, quoted by Alphéraky (1904).” Gmelin (1788:416) listed the name *albicans* only in reference to “*Branta albifrons Scop.*,” of which it is clearly a synonym, and gave no indication, at any rate, that it would apply to birds of eastern Asia. The name is mentioned by Alphéraky (1905:42) only in the extensive synonymy of the species *Anser albifrons* as “*Anas albicans* (errore), Gmelin” which is as it was cited by Salvadori (1895:92). It is clearly not an available name (ICZN 1999) and cannot be applied to any population of *Anser albifrons*. Delacour (1954), and those who followed him, also divided the Eurasian population into two, but with different boundaries, referring the eastern birds to the North American *A. a. frontalis*.

Anser albifrons flavirostris Dalgety & Scott, 1948

Holotype.—British Museum (Natural History) (now the Natural History Museum) 1954.62.1, adult male, obtained by C. T. Dalgety, 26 Nov 1947 at North Slob, County Wexford, Ireland. This

specimen is completely typical of birds that winter in Ireland and Scotland and agrees in size and coloration with breeding birds taken in Greenland, as has been understood from the time of the description of the subspecies.

Distribution.—Breeds in western Greenland. Winters primarily in Ireland and Scotland, occasionally to eastern North America.

Anser albifrons elgasi Delacour & Ripley, 1975

Holotype.—U.S. National Museum of Natural History 481341, adult male, Sacramento National Wildlife Refuge, California, collected 20 Dec 1964, by S. R. Wilbur (not Sacramento, California, 20 Dec 1967 as stated in the original description). This specimen agrees in size and coloration with the single specimen available that originated from the Cook Inlet of Alaska, and the name applies to that breeding population. This has previously been shown by the capture in Redoubt Bay, Cook Inlet, of birds marked in winter as Tule Geese (Timm et al. 1982).

Distribution.—Breeds in the Cook Inlet area of southern Alaska. Winters in northern California, in the Sacramento Valley and around the head of Suisun Bay, Solano County.

Comments.—Wintering birds of this population, first distinguished by Swarth & Bryant (1917), long went by the name *A. a. gambelli*.

Anser albifrons gambelli Hartlaub, 1852

Lectotype.—Zoological Museum Berlin, no. 17430, collected by F. Deppe, Alvarado [Veracruz, Mexico], January, 1828.

Distribution.—Breeds in interior and northern Alaska and across arctic Canada to the Hudson Bay region. Winters in mid-continent United States and north-eastern Mexico, occasionally farther

south, at least formerly to Veracruz and Belize.

Comments.—*Anser gambelli* Hartlaub, 1852 was based on three wintering specimens, two supposedly from Texas and one from southern North America. The identity, provenance, and status of these specimens have led to much confusion in the application of the name. Hartlaub (1852) provided no catalog numbers or information other than the vague localities that identified the specimens. The next to comment on these specimens was Kuroda (1929:173), who wrote: "Last year (1928), through the courtesy of Dr. Stresemann, of the Zoological Museum, Berlin, I was shown in that institution three mounted birds which are said to have been Hartlaub's specimens. As no particular one had heretofore been selected as the type of *Anser gambelli*, Dr. Stresemann in my presence so designated one of the three (Zool. Mus. Berlin Coll. no. 17430)." This constitutes the designation of a lectotype (ICZN 1999, Art. 74.5). Kuroda gave the locality and date of this specimen as "Alvarado, Texas" and "Jan., 1828." The specimen, however, was collected by F. Deppe and is from Alvarado, Veracruz, Mexico, probably taken in January, 1825; the date on the original label "is very difficult to read" (S. Frahnert pers. comm., 14 Oct 2010). The locality of this specimen clearly places it in the Central Flyway wintering population. Kuroda (1929) accepted this designation of a type even though he doubted that the specimens shown to him were actually those seen by Hartlaub (1852), because of a discrepancy between Hartlaub's and his own measurements. The placement of the locality Alvarado in Texas rather than in Veracruz, Mexico, where Deppe was known to have been at the time of collection (Stresemann 1954), is inexplicable.

Anser frontalis Baird, 1858, lectotype ANSP 6055, Fort Thorn, New Mexico (Stone 1899) is a synonym. Baird (in Baird, Cassin, & Lawrence, 1858) named

Anser frontalis on the basis of two USNM specimens, one from the Selkirk Settlement (Manitoba, Canada) and one from Fort Thorn, New Mexico. The bird from Fort Thorn, now in the Academy of Natural Sciences of Philadelphia, number 6055, was designated as the type (=lectotype, ICZN 1999, Art. 74.5) by Cassin and so listed by Stone (1899). Measurements that Baird (1858:762) gave for *frontalis* were larger (except for length) than those he gave for *gambelli*. It is probable that the Fort Thorn bird, an unsexed immature first-year individual, was a stray from a population migrating to winter in Texas, and the name must be considered a synonym of *A. a. gambelli* as presently understood, as it was shortly after its publication (Coues 1874, Baird et al. 1884, Ridgway 1895, Salvadori 1895).

The name *gambelli* was long wrongly applied to large birds wintering in northern California, by authors following Swarth & Bryant (1917).

Anser albifrons sponsa, new subspecies

Holotype.—U.S. National Museum of Natural History 380325, adult male, Hooper Bay, Alaska, collected 11 May 1942 by C. E. Gillham.

Diagnosis.—Similar to *A. a. gambelli* of interior and northern Alaska but averages smaller. Similar to *A. a. elgasi* of the Cook Inlet area of Alaska but smaller in all dimensions.

Measurements of holotype.—Wing chord 391 mm; culmen length 50.4 mm; bill depth 22.3 mm; bill width 23.0 mm.

Distribution.—Breeds in western Alaska, in the Yukon-Kuskokwim Delta area and in the Bristol Bay lowlands (Orthmeyer et al. 1995). Winters in California and western Mexico.

Comments.—The populations of the west coast of Alaska, that have come to be called *A. a. frontalis*, cannot bear that name, which is a synonym of *A. a. gambelli*. Orthmeyer et al. (1995) and Ely & Takekawa (1996) have shown that

the birds from the Yukon-Kuskokwim Delta region of Alaska differ from those of Bristol Bay in time of fall migration and wintering area, but slightly differing wintering birds cannot be related to breeding grounds and there is insufficient breeding material available to verify morphological differences between the sub-populations.

Etymology.—This form is named in honor of my late wife, Gladys C. Banks, who assisted me throughout most of the long years of my study of variation in wintering white-fronted geese, and in other work. The name *sponsa* is a noun in apposition.

A Matter of Spelling

The spelling of the name of one taxon of Greater White-fronted Goose has been a matter of contention almost since its first publication. In 1852, Hartlaub established the name *Anser gambelli* to distinguish North American birds from *Anser albifrons* of Europe. Baird (in Baird, Cassin & Lawrence, 1858) used the spelling *gambeli*, either as a deliberate emendation or, less likely, a lapsus. Coues (1882) supposed that the name was in reference to William Gambel, an American ornithologist who worked extensively in the west before his early demise (Stone 1910), and used the emended name *gambeli*, which was then used in the first three editions of the American Ornithologists' Union Check-list of North American Birds. That Check-list later returned to the spelling *gambelli* (AOU 1931, 1957) and that spelling is used by most, but not all, modern authors. The International Code of Zoological Nomenclature (ICZN 1999), Article 32, states that the original spelling of a name used in the work in which the name was established is the "correct original spelling" and must be used unless there is, in the original publication itself, clear evidence of an inadvertent error. As McAtee (1944)

pointed out, there is no internal evidence in Hartlaub's (1852) paper to support Coues's (1882) assertion, and that thus would require a mandatory emendation. It is clear that the name must be spelled *gambelli*, and that spelling is used throughout this paper. This is in contradiction to the advice that I gave Ely & Dzubin (1994), for which I apologize.

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My long study of variation in wintering white-fronted geese began while I was with the U.S. Fish and Wildlife Service (Banks 1983) and continued after transfer to the U.S. Geological Survey and retirement. S. Frahnert provided information about specimens in the Zoological Museum, Berlin. I appreciate the frequent communication with C. R. Ely and assistance that he has provided over the past several years. Ely and N. Woodman provided comments on an earlier manuscript of which this is a part; Woodman and R. Reynolds commented on this version.

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