

The Greater White-fronted Goose (*Anser albifrons*) in Maryland: Which types do we get?

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Abstract: The Greater White-fronted Goose (*Anser albifrons*) is a rare but increasing winter visitor to Maryland and surrounding states, usually occurring singly or in small groups. Although identification to subspecies is not necessarily easy, most recent records of this species pertain to the “Western” Greater White-fronted Goose (*A. a. gambelli*) rather than the “Greenland” Greater White-fronted Goose (*A. a. flavirostris*). This note reviews some of the main identification features of these two forms. It draws on time in the field in Ireland, Scotland, north Texas, and Indiana, which are part of the core wintering range of the two forms, as well as the examination of skins at The Natural History Museum at Tring, Hertfordshire, United Kingdom, and the Smithsonian Institution’s National Museum of Natural History, Washington, District of Columbia. Some examples from our area are presented with a summary of some of the main ways to separate the two forms. As always, leaving identification at the species level is acceptable and may be the best choice for many birds.

The Greater White-fronted Goose (*Anser albifrons*) is one of only two species of goose with a circum-Arctic breeding range, sharing this distinction with the Brant (*Branta bernicla*) (Delacour 1954). In North America, the Greater White-fronted Goose breeds in the Yukon-Kuskokwim Delta in Alaska and sparsely in the taiga zone, including Cook Inlet, and from far northern Alaska across Arctic Canada to the western shores of Hudson Bay. There is a gap in breeding distribution to the west coast of Greenland. The wintering grounds span California and western Mexico, the midcontinent of the United States down to northeastern Mexico and, in the case of the Greenland population, the northern and western British Isles (Banks 2011).

Banks (2011) lists five subspecies. They are: *A. a. elgasi*, or Tule Goose, by far the largest form which has a small population and restricted breeding and wintering ranges in Alaska and California respectively; *A. a. sponsa*, a small form breeding and wintering in the Pacific Flyway (western Alaska and California/Mexico respectively); *A. a. gambelli*, comprising all birds breeding in

northern and interior Alaska across to the Hudson Bay and wintering midcontinent, east of the Rockies, including south into Mexico; *A. a. flavirostris*, breeding in Greenland and wintering in the north and west British Isles; and nominate *A. a. albifrons*, which breeds and winters in Eurasia.

This treatment has been questioned. Reeber (2016) notes the clinal variation in *albifrons*, with East Asian birds closer to North American birds in appearance than those that winter in Western Europe, as well as variability in the appearance of *gambelli*. Wilson et al. (2018) found that the Tule and Greenland forms are genetically differentiated from other forms, supporting their subspecies status. Their work did not support *sponsa* being a separate subspecies from *gambelli*. Many researchers continue to combine *sponsa* and *gambelli* under the name *A. a. frontalis*. Banding recoveries (Wilson et al. 2018) however show limited interchange of birds between the Pacific and the Central and Mississippi Flyways (*sponsa* and *gambelli* respectively per Banks [2011]). For convenience we will in this paper continue to follow Banks (2011) and use *gambelli* to refer to these midcontinent birds, which are also known to birders through the name “Western” Greater White-fronted Goose from eBird.

The population of *gambelli* was estimated to be 2.6 million in 2016, increasing at around 5.2% annually over the period 1975–2014. *Flavirostris* has very localized breeding and wintering ranges and a much smaller population, estimated at only 18,800, having declined from around 30,000 in the 1990s (Fox and Leafloor 2018).

The Occurrence of the Greater White-fronted Goose in Maryland

The Greater White-fronted Goose remains a rare visitor to Maryland, chiefly from late October through early March, although records have been increasing. The first recorded occurrence in the area was of a bird shot on the Potomac River, exact location unknown, and procured in a market in Washington, District of Columbia (DC), on 1 March 1856 (MD/DCRC 2021a, USNM 2021). This bird (USNM 607220), possibly the first specimen from Maryland, is in the Smithsonian Institution’s National Museum of Natural History (USNM), Washington, DC. The only other record of a bird that century was of an immature male harvested in Grace’s Quarters, Baltimore County on 12 November 1892 (Kirkwood 1895, Hampe and Kolb 1947). The species remained exceptionally rare for much of the 20th century, with only a further nine records listed by the Maryland/District of Columbia Records Committee (MD/DCRC) through the end of 1969 (MD/DCRC 2021b). The MD/DCRC (2021b) lists 39 separate observations for the 1990s, an average per year of just under 4 per year, likely reflecting both an increase in occurrence and better observer coverage.

Although there have been fluctuations from year to year, the frequency of observations has increased in recent decades. In 2010, according to eBird (2021), 11 counties had observations of this species, totaling an estimated 20 birds, well above averages for the 1990s. There were likely over 30 different individuals across the state in 2018. The current high count for the state in eBird (2021) is of a flock of 57 seen on 23 November 2017 in Garrett County.

The increasing frequency of occurrence in Maryland comes as this species winters farther north and east in the midcontinent than before. I analyzed Christmas Bird Count data (Audubon 2021) over the period 1980–2015 for the states of Indiana and Illinois. Prior to 1995, the species was seldom recorded on these counts in either state, averaging 0.001 birds per party hour. From 1996–2010, the average increased to 0.15 and 3.3 per party hour in Indiana and Illinois respectively, with an even bigger increase over 2011–2015, to 2.97 and 12.23 per party hour in those two states. Data from eBird (2021) shows a similar pattern over time.

Which subspecies do we get in Maryland? The United States Geological Survey's Bird Banding Laboratory, Patuxent Wildlife Research Center, Laurel, Maryland, has one banding return for this species in Maryland, a *gambelli* banded in Saskatchewan, Canada, and harvested in Kent County by a hunter on 10 December 1989. Banks (2012) measured the specimen from 1856 (USNM 607220) and found it to have a culmen length outside the range of *flavirostris*, and similar in size to *elgasi*. Banding returns show that birds banded in Arctic Canada have been recovered in many states in eastern North America (including Virginia, Pennsylvania, and New York) with a smaller number of recoveries of birds banded in taiga habitats in interior Alaska (Marks and Fischer 2015). There are also four banding returns of *flavirostris* from the Atlantic Flyway, all from Canada, and one resighting of a bird in Pennsylvania that had been fitted with a neck collar in Wexford, Ireland.

For much of this century, the received wisdom in Maryland, including by the MD/DCRC, was that *flavirostris* was the expected form and *gambelli* far less likely to occur. Given that *flavirostris* is a scarce and recently declining form, the correct identification to subspecies is likely to be of value. However, there has been relatively little treatment of the main ways to separate these forms in the field, and an overreliance on perceived bill color, despite cautions (e.g., Kaufman 1994), has led to many incorrect or unsubstantiated records of *flavirostris* including many observations in Maryland.

The Identification of “Western” Greater White-fronted Goose, *A. a. gambelli*, and “Greenland” Greater White-fronted Goose, *A. a. flavirostris*

The challenge in separating these forms should not be underestimated. It is complicated both by variation in these forms, particularly *gambelli*, and because the usual situation is of a lone bird in a flock of another species, usually Canada Goose (*Branta canadensis*), rather than, for example, picking out a *gambelli* in a flock of *flavirostris*.

Overall Appearance

Typical *flavirostris* are dark, almost chocolate-brown and look darker and browner than the Canada Geese with which they may be seen (Figure 1). The overall dark appearance is reinforced by the dull and indistinct fringes on the upperparts and narrow, wavy, and often broken white flank lines. The rear flank patches are often solidly dark, due to narrower and darker fringes and the tail typically has a narrow white fringe. The head and neck are very dark, and there is reduced contrast between the face and the dark fringe to the white “front” on the face. The breast is dark as well, and on most birds is similar in tone to the neck and upper breast. The belly is grayish rather than whiteish and as a result the black markings on the belly do not strongly contrast with the background color of the belly.

Gambelli is more variable in appearance than *flavirostris* reflecting its larger population and wide breeding range, with some approaching *flavirostris* in the color of the bill and darkness of the head (Figure 2). On average *gambelli* are paler and better marked birds overall. In contrast to *flavirostris*, the paler face shows more contrast with the black line at the base of the white “front,” the breast often shows a strong contrast to a darker head, the belly is paler and whiter, the fringes on the upperparts and rear flanks are paler and broader, the white flank line is typically thicker, and the tail has a broader white terminal tail band. Many *gambelli* have darker heads which show less contrast with the dark border to the white “front,” although still a greater contrast than most *flavirostris*. The width of the fringes on the upperparts and rear flanks also varies, being bold in some birds and narrower in others. However, on most birds a pale breast in contrast to the neck and a pale, whiteish belly is a good distinction from *flavirostris*. Some *gambelli* can be dark overall, but my experience is that they are a colder brown than *flavirostris* which is more chocolate colored.



Figure 1. “Greenland” Greater White-fronted Goose, *A. a. flavirostris*. County Wexford, Ireland, January 2017 © Clive Harris. These show the typical appearance of this form, overall dark, with narrow fringes on the upperparts, and a narrow and wavy flank line. Structure varies – the rear righthand bird has a blocky head and a thick neck whereas the two smaller birds in the middle, likely females, show smaller, rounder heads, and thinner necks.



Figure 2. “Western” Greater White-fronted Goose, *A. a. gambelli*. Vermillion County, Indiana, January 2020. © Clive Harris. This shows well the variation in *gambelli*, including in head and bill color, which in these birds varies from cold pale pink to pale orange. Many flocks of *gambelli*, even small ones, contain a range of bill colors. The birds in front show pale bellies with a strong contrast with the black barring.

In flight *flavirostris* have an overall dark appearance, with a narrow white terminal fringe on the tail and on the greater secondary coverts (Figure 3). *Gambelli* have slightly broader terminal white tail bands and slightly wider white tips to the greater secondary coverts. The width of the terminal white tail band is a useful feature although there is overlap. Some *flavirostris* have tail bands as broad as the *gambelli* pictured. For the latter form, the tail band can be wider than these birds, but rarely thinner.



Figure 3. Greater White-fronted Goose in flight. Top: Two *flavirostris*, an adult on the left and an immature to the right, County Wexford, Ireland, January 2017. **Bottom:** Two adult *gambelli*. Dallas County, Texas, December 2019. © Clive Harris.

Size and Structure

Sibley (2020) notes size and structural differences as being potentially helpful in separating the two forms. While *flavirostris* is a large subspecies, the available data suggests caution in using size as an important field mark for lone birds. Ely et al. (2005), the only study assessing morphometric variation in this species on the summering grounds, found that *flavirostris* was very similar in head, bill, and tarsus measurements to *gambelli* from Nunavut. *Flavirostris* were however found to be heavier, although male *gambelli* were approximately the same mass as female *flavirostris*. The study found overall that for both subspecies, males were on average about 5% bigger in linear measurements and 10% heavier than females. Banks (2012), examining specimens of birds collected on the wintering grounds, found that *flavirostris* were marginally larger than most *gambelli*, but smaller than some large specimens from the midcontinent wintering range, which suggests that perhaps the largest Greater White-fronted Geese that might be encountered in Maryland would not be *flavirostris*.

When seen in the field, *flavirostris* often appears as a bulky and thick-necked bird with a flat crown and a blocky head. However, some birds, presumably females, have thinner necks and more rounded heads. *Gambelli* tends to be thinner necked with a more rounded head, or with the crown peaked at the rear (Figure 4). In some birds this can be very pronounced. Some *gambelli*—presumably males—have larger heads and thicker necks. Structure is helpful but needs to be used as one of several factors in establishing the identification to subspecies.

Bill Color

Bill color can be somewhat helpful but must be used with caution and has probably been the most misused field characteristic (Kaufman 1994). In adult *flavirostris*, the bill varies from pale orange to brighter orange, often with a very slight contrast to the color of the feet (Figure 5). Some *flavirostris* can have pink bills, although this is rare. The bill color of *gambelli* varies from pale pink to pale orange, overlapping with *flavirostris*. In bright sunny conditions, the pale orange can look bright orange and the same color as the legs.



Figure 4. “Western” Greater White-fronted Goose *A. a. gambelli*. Dallas County, Texas, December 2019. © Clive Harris. The birds in the front at left and right have larger heads with a flatter crown, and thicker necks than the other birds in the photo. All birds have fairly broad white flank stripes, white and prominent scapular fringes, and quite broad white terminal edges to the tail. Note the variation in bill color, with some birds showing little contrast with the feet.



Figure 5. Greater White-fronted Goose. **Left:** The bird has a pale pinkish-orange bill with strong contrast to the feet. It is otherwise a typical *flavirostris*, showing dark overall coloration including the belly, narrow and broken flank stripe, and dull and narrow fringes on the upperparts. County Wexford, Ireland, January 2017. **Right:** Some *gambelli* can show bright orange bills in strong sunlight. Vermillion County, Indiana, January 2020. © Clive Harris.

Bill Shape

Bill shape can be one of the most useful field characteristics for some birds (Millington 2008) (Figure 6). *Gambelli* can have a distinctive bill shape of a concave culmen with a long thin parallel distal end to the bill. This is a bill shape not seen in *flavirostris* and is diagnostic. Many *gambelli* do not show this, though they may show a subtly concave bill shape. The bill shape in *flavirostris* is also variable. In many birds, it looks heavy and wedge-shaped and in some, the upper culmen seems to have a slight convex bulge. The slight bulge at the tip of the lower mandible is often larger and more prominent than is the case on *gambelli*. Others have longer-looking bills but they lack the concave shape seen in many *gambelli* and the thin, parallel-edged distal end. In terms of overall length, Ely et al. (2005) found that populations of *gambelli* from the Northwest Territories and western Nunavut averaged longer in culmen length than *flavirostris*, though there was overlap and the differences were not large, and males had longer bills than females. Length of the bill therefore is not a useful distinction.

Extent of Black Markings on the Underparts

Flocks of *flavirostris* often contain birds with very extensive black barring on the breast and belly but many *flavirostris* have limited markings and some *gambelli* can have extensive black underneath. Probably more helpful is the extent of black markings in the rear belly and towards the vent (Sibley 2020). I examined skins of *flavirostris* at The Natural History Museum at Tring (NHMT), Hertfordshire, United Kingdom, and skins of *gambelli* at the USNM and categorized them into three groups based on the extension of the black markings relative to the end of the dark flank marks. As can be seen in Table 1, in nearly all *flavirostris*, the black markings extend to at least level with the end of the dark flank marks, and in nearly half of skins examined, well past it. In *gambelli* almost half the skins had black markings end short of the end of the dark flank marks. However, it is worth noting this is not diagnostic. Some *gambelli* have black markings well into the white vent, and some *flavirostris* do not.

Table 1. Assessment of the extent of black markings on underparts.

| Extent of black markings | <i>A. a. flavirostris</i> | | <i>A. a. gambelli</i> | |
|---|---------------------------|------------|-----------------------|------------|
| | Number | Percentage | Number | Percentage |
| Ends short of the end of dark flank marks | 4 | 8% | 11 | 48% |
| Ends level with the end of dark flank marks | 25 | 47% | 8 | 35% |
| Ends past the end of dark flank marks | 24 | 45% | 4 | 17% |
| Total | 53 | 100% | 23 | 100% |



Figure 6. Comparison of bill shapes. Left: *A. a. flavirostris*, NHMT. **Right:** *A. a. gambelli*, **top:** NHMT; **row 2:** USNM 299571, male, Old Crow River, Yukon, Canada, 4 July 1926 (USNM 2021); **row 3:** NHMT; **bottom:** USNM 88973, male, Point Barrow, Alaska, 30 May 1882 (USNM 2021). © Clive Harris.

Immature Birds

Immature birds are harder to separate. In both *gambelli* and *flavirostris*, many immatures have developed a small white front by January through the preformative molt, although this is smaller and more ragged than in adults. Other pointers to age them as immatures are the rounded shape of the juvenile wing coverts as well as the messier looking flanks where the new formative feathers look much darker compared to the retained juvenile belly. Many immature *gambelli* show bright orange bills well into midwinter, although the number of immatures with pink bills is about the same in my experience. *Flavirostris* have bright orange bills; I am not aware of immatures of this form with pink bills. Immature *flavirostris* are, like adults, overall dark with dull and indistinct fringes on the upperparts, a narrow, wavy, and often broken white flank line, and a narrow white terminal tail band. Darker formative flank feathers contrast with the paler juvenile belly feathers. Like adults, immature *flavirostris* usually have grey bellies, but occasionally some have paler bellies. Both show a broad dark crown and dark hind neck. Structural differences can be used with caution, though immatures may not have developed an adult bill shape in early winter.

Summary and the Status of *A. a. gambelli* and *A. a. flavirostris* in Maryland

As noted above, the separation of these two forms might not be straightforward (summarized in Table 2) and can require good documentation. My assessment is that there are few well-documented examples of *flavirostris* in Maryland, and that most recent birds are clearly *gambelli* (Figures 7, 8, 9, and 10). The relative numbers of these two forms in our area might have changed over time. The population of *gambelli*, along with most other Arctic geese, is expanding, as noted earlier, and over the recent past there have been increases in Ross's and Cackling Geese observations in Maryland, as well. In contrast, *flavirostris* populations were 50% higher in the 1990s than they are now (Fox and Leafloor 2018).

In contrast, there are quite a few observations on eBird of typical *flavirostris* from coastal New York and New England. Perhaps not coincidentally, this matches the wintering grounds of the Canada Geese that breed in Greenland. Stroud et al. (2018) demonstrate that the interior Canada Geese that breed in central west Greenland have a winter distribution largely centered on Massachusetts, Connecticut, and especially Long Island, New York. There are some records of this population from Delaware and Maryland (Figure 11), but these two states see a much larger number of recoveries of interior Canada Geese from Northern Quebec, which migrate over western New York and Vermont to reach our area.

Table 2. Summary of field characteristics separating “Greenland” Greater White-fronted Goose (*Anser albifrons flavirostris*) and “Western” Greater White-fronted Goose (*A. a. gambelli*).

| Characteristic | <i>A. a. flavirostris</i> | <i>A. a. gambelli</i> |
|------------------------------|---|--|
| Overall appearance | <ul style="list-style-type: none"> • Overall dark and uniform, chocolate-brown with dull and indistinct fringes on upperparts and narrow, wavy, and often broken white flank lines • Rear flank patches often solidly dark • Tail typically with a narrow white fringe • Head and neck dark with reduced contrast between the face and the dark fringe to the white “front” • Breast dark and similar in tone to the neck and upper breast • Belly grayish. | <ul style="list-style-type: none"> • More variable than <i>flavirostris</i>, particularly on color of head and neck which can be darker on some birds and show strong contrast with the lower breast and belly • Face shows stronger contrast to dark fringe at base of white “front” • Fringes on upperparts and flank patches paler and broader than <i>flavirostris</i> • White flank and terminal band to tail variable, quite broad in many • Lower breast pale gray • Belly can be very pale in many birds |
| Size and structure | <ul style="list-style-type: none"> • Often appears bulky and thick-necked with flat crown and blocky head • Some birds, presumably ♀s, have thinner necks and more rounded heads • No difference in linear measurements with <i>gambelli</i> • Main differences sex-related: males average 5% larger, 10% heavier than females • Averages heavier than <i>gambelli</i>. | <ul style="list-style-type: none"> • Tend to be thinner necked, strikingly on some birds with more rounded head, or with crown peaked at rear; in some birds, can be very pronounced • Some have larger, more rectangular heads and thicker necks. • No difference in linear measurements with <i>flavirostris</i> • Main differences sex-related: males average 5% larger, 10% heavier than females |
| Bill color | <ul style="list-style-type: none"> • Pale orange to orange • No to little contrast with legs • Rarely, can have a pink bill. | <ul style="list-style-type: none"> • Pale pink to pale orange • Can appear bright orange in strong sunlight • Can appear same color as legs |
| Bill shape | <ul style="list-style-type: none"> • Typically, wedge-shaped • Some can look quite thick-billed • Some have slight convex shape to upper mandible • Size variable due to individual and sex-related differences | <ul style="list-style-type: none"> • Variable, often looks thinner • Often with concave shape to upper mandible, some with distinctive narrow, parallel-edged distal half of bill, this combination not shown by <i>flavirostris</i> • Size variable due to individual and sex-related differences |
| Black markings on underparts | <ul style="list-style-type: none"> • Black markings extend to at least end of the dark flank marks, and in many well past it; helpful but not diagnostic as some <i>flavirostris</i> have black markings short of the end of the dark flank marks • Some have very extensive and almost solid black barring underneath, more frequent than in <i>gambelli</i> but the majority of <i>flavirostris</i> do not show this. | <ul style="list-style-type: none"> • Many have black markings ending short of the end of the dark flank marks. Though helpful this is not diagnostic as a minority have black markings well into the white vent and past the end of the dark flank markings. |



Figure 7. “Western” Greater White-fronted Goose, *A. a. gambelli*. St. Mary’s County, Maryland, January 2017, © Clive Harris. The concave bill with a very thin, extended tip is diagnostic for *gambelli*. Also note the pale breast and belly, broad flank line, and white and well-defined fringes on the upperparts.



Figure 8. “Western” Greater White-fronted Goose, *A. a. gambelli*. Frederick County, Maryland, November 2014, © Clive Harris. Although identified at the time by many birders as *flavirostris*, likely because of bill color, this bird has a pale head that strongly contrasts with the black border to the white front, broad white flank line, very pale belly, well-defined white fringes on the upperparts and no black spotting into the white vent. Every field mark points to *gambelli* and none point to *flavirostris*.



Figure 9. “Western” Greater White-fronted Goose, *A. a. gambelli*. Howard County, Maryland, January 2018, © Clive Harris. Some birds are easier to identify. This bird shows a very pale pink bill with an extended and thin outer third, and the face is relatively pale, showing good contrast with the black border to the white “front”. The flank line is broad and solid and the terminal white tip to the tail is quite broad as well.



Figure 10. “Western” Greater White-fronted Geese, *A. a. gambelli*. Prince George’s County, Maryland, January 2017, © Clive Harris. This group of geese have pale breasts and bellies that contrast with the darker head and neck and broad flank stripes. As is typical with *gambelli*, this group contains a range of bill colors, with the second from left having a pale pink bill.



Figure 11. Greater White-fronted Geese, *A. albifrons*. Howard County, Maryland, November 2016, © Clive Harris. The bird on the right is dark and rich brown color, has a distinctly orange bill, dull fringes on the upperparts and a thin and wavy white flank line. Overall, this fits *flavirostris*. The bird on the left has a smaller head and thinner neck. While these structural differences could be due to it being a female, it also has a pinkish-orange bill, paler plumage with more contrasting black line at the base of white front, a broader flank line, and more distinct and paler fringes on the upperparts. It is possibly a *gambelli*, although I did not identify it to subspecies.

As can be seen from the above, there is variability in the characteristics of both *gambelli* and *flavirostris* and overlap in many of these. In birds that can be seen well, a range of field marks should be used including bill color and shape, color and width of fringes on the upperparts, width of the flank line and white terminal tail band, and the color of the lower breast and belly. Caution is needed in trying to identify lone birds to subspecies and leaving at the species level may be appropriate for many birds. The possible impact of lighting conditions on field marks should be considered, particularly so when reviewing photographs.

There are several records of *flavirostris* for Maryland in eBird which are clearly not this form, and many others where it is difficult to be sure. Birders are encouraged to reassess records of Greater White-fronted Goose identified to subspecies and where possible, to thoroughly document suspected *flavirostris*.

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LITERATURE CITED

- Audubon. 2021. Audubon Christmas Bird Count. Available at: <https://netapp.audubon.org/CBCObservation/Historical/ResultsByCount.aspx>. Accessed 16 September 2020.
- Banks, R.C. 2011. Taxonomy of Greater White-fronted Geese (Aves: Anatidae). *Proceedings of the Biological Survey of Washington* 124(3):226–233.
- Banks, R.C. 2012. Geographic Variation in Wintering Greater White-fronted Geese. *Western Birds* 43(4):201–219.
- Delacour, J. 1954. *The Waterfowl of the World*, Volume 1. Country Life Limited, London, U.K. 284 pp.
- eBird. 2021. eBird. Available at: <https://ebird.org/home>. Accessed 16 September 2020.
- Ely, C.R., A.D. Fox, R.T. Alisauskas, A. Andreev, R.G. Bromley, A.G. Degtyarev, B. Ebbinge, E.N. Gurtovaya, R. Kerbes, A.V. Kondratyev, I. Kostin, A.V. Krechmar, K.E. Litvin, Y. Miyabayashi, J.H. Mooij, R.M. Oates, D.L. Orthmeyer, Y. Sabano, S.G. Simpson, D.V. Solovieva, M.A. Spindler, Ye.V. Syroechkovsky, J.Y. Takekawa, and A. Walsh. 2005. Circumpolar variation in morphological characteristics of Greater White-fronted Geese *Anser albifrons*. *Bird Study* 52(2):104–119.
- Fox, A.D., and J.O. Leafloor (Editors). 2018. *A Global Audit of the Status and Trends of Arctic and Northern Hemisphere Goose Populations*. Conservation of Arctic Flora and Fauna International Secretariat, Akureyri, Iceland. 31 pp.
- Hampe, I.E., and H. Kolb, H. 1947. *A Preliminary List of the birds of Maryland and the District of Columbia*. The Natural History Society of Maryland, Baltimore, MD. 80 pp.
- Kaufman, K. 1994. Greenland White-fronted Geese: Over-reported? *Birding* 36(6):380–382.

- Kirkwood, F.C. 1895. A list of the birds of Maryland. *Transactions of the Maryland Academy of Science* 1(New Series):241–382.
- Marks, D.K., and J.B. Fischer. 2015. Midcontinent Greater White-fronted Geese in Alaska: Annual Summary of Monitoring and Research, 2014. USFWS-Migratory Bird Management, Waterfowl Survey Program, Anchorage, AK. Available at: https://www.fws.gov/r7/mbsp/mbm/waterfowl/surveys/pdf/ak_gwfg_projects.pdf. Accessed 16 September 2020.
- MD/DCRC (Maryland/District of Columbia Records Committee). 2021a. MD/DCRC Database Abridged Version, District of Columbia, 29 January 2021. Available at: <https://mdbirds.org/wp-content/uploads/dc-records-database.pdf>. Accessed 24 February 2021.
- MD/DCRC (Maryland/District of Columbia Records Committee). 2021b. MD/DCRC Database Abridged Version, Maryland, 29 January 2021. Available at: <https://mdbirds.org/wp-content/uploads/md-records-database.pdf>. Accessed 24 February 2021.
- Reeber, S. 2016. *Waterfowl of North America, Europe, and Asia*. Princeton University Press, Princeton, NJ. 656 pp.
- Sibley, D. 2020. Identification tips for Greenland Greater White-fronted Goose. Sibley Guides. Available at: <https://www.sibleyguides.com/2008/11/identification-tips-for-greenland-greater-white-fronted-goose/>. Accessed 16 September 2020.
- Stroud, D.A., R. Cromie, O. Crowe, B. Denny, R.A. Stroud, H. Thomas, N. Tierney, A. Walsh, and A.D. Fox. 2018. Annual movements of Interior Canada Geese *Branta canadensis interior* marked in Greenland, revealed by recoveries and re-sightings during 1992–2018, *Wildfowl* 68:70–83.
- USNM (United States National Museum). 2021. Search the Division of Birds Collections, Smithsonian National Museum of Natural History. Available at: <https://collections.nmnh.si.edu/search/birds/>. Accessed 24 February 2021.
- Wilson, R.E., C.R. Ely, and S.L. Talbot. 2018. Flyway structure in the circumpolar Greater White-fronted Goose. *Ecology and Evolution* 8(16):8490–8507.