

Identification and Variation of Winter Adult Kumlien's Gulls

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Long ago, William Brewster (1883) described "an apparently new gull from eastern North America," which he named *Larus kumlieni* – the "Lesser Glaucous-winged Gull." This taxon has since become known as Kumlien's Gull and is usually treated as a subspecies of Iceland Gull (*L. glaucoides*), e.g. by Godfrey (1986) and AOU (1998). The relationship of Kumlien's Gull and Iceland Gull to Thayer's Gull, however, remains contentious, with the latter taxon considered either a full species, *Larus thayeri* (e.g. AOU 1998, Howell and Elliott 2001) or a dark-winged subspecies of Iceland Gull (e.g. Salomonsen 1951, Macpherson 1961, Godfrey 1986, Weir *et al.* 2000). In this paper we use Iceland Gull only for nominate *glaucoides*, and use Kumlien's and Thayer's for *kumlieni* and *thayeri* types, respectively.

Zimmer (1991) provided a useful review of plumage variation in Kumlien's Gull, while more recently Garner and Mactavish (2001) discussed the identification of Kumlien's Gull and Thayer's Gull. These and other authors have commented on the highly variable appearance of Kumlien's Gull, which apparently spans the spectrum from white-winged birds (like Iceland Gulls) to dark-winged birds (like Thayer's Gulls). But just how variable are Kumlien's Gulls? And are there patterns to their variation? Howell and Elliott (2001) noted that "Kumlien's Gull cannot be defined satisfactorily until an attempt is made to define the characters of Thayer's Gull (and Iceland Gull)"; as a starting point, they described variation in adult Thayer's Gulls wintering in central California, USA. Here, we build upon that work by describing characters of, and quantifying variation in, adult Kumlien's Gulls wintering on the Avalon Peninsula in eastern Newfoundland, Canada.

Although identifying gull taxa away from the breeding grounds carries inherent implications of uncertainty, in this case the wintering grounds may be at least as well defined as the breeding grounds. That is, on the breeding grounds it appears that "we can't learn how much they [= Kumlien's and Thayer's] interbreed until we can distinguish them, but we can't distinguish them because they appear to interbreed" (Howell 1998). And, as pointed out by Garner and Mactavish (2001) and by Howell and Elliott (2001), researchers on the breeding grounds of these gulls have not critically defined the characters of what they called "Kumlien's" and "Thayer's."

Methods

Kumlien's Gulls winter mainly in the North Atlantic (AOU 1998), with large concentrations in the Gulf of St. Law-

rence and around Newfoundland, in eastern Canada. We assumed that birds wintering in Newfoundland could be called Kumlien's Gulls and quantified their variation before examining the data for patterns. Thayer's Gulls winter primarily along the Pacific coast of North America from southern British Columbia to California. Mactavish has lived with thousands of wintering Kumlien's Gulls for over 20 years. Howell has lived with hundreds of wintering Thayer's Gulls for over 10 years and, in February 2002, visited Newfoundland to study Kumlien's Gull. For this paper we quantified the plumage of over 400 adult Kumlien's Gulls studied at close range from early February to early March 2002 (Photo 1); our sample was unbiased, that is, we did not select for dark-winged or white-winged birds. We recorded data on the pattern and darkness of markings on primary 10 (P10, i.e. the outermost primary) inward through P5, and on eye



Photo 1. A flock of Kumlien's Gulls at St. John's. © Steve N. G. Howell, St. John's, Newfoundland, 2 February 2002.

colour, as well as noting general features of structure, bare-part colours, and overall tone of the upperparts relative to American Herring Gulls (*L. argentatus smithsonianus*) and "Canadian Glaucous Gulls" (*L. hyperboreus leucereetes*). We checked all birds for signs of immaturity (e.g. a brownish wash to the primary markings, relatively small white tips to P7-P9 and dark marks on the primary-coverts and tail) and restricted our wingtip analysis to 398 birds in at least their 4th winter (i.e. in 4th basic plumage and beyond). Under field conditions, such birds would be considered adults by most birders.

For wingtip pattern, the outer primaries were scored in terms of the extent of darker grey markings on the feathers (Plate 1). On some birds with a score of 1 the faint darker speckling was almost impossible to detect. Thus, some birds with a score of 0 may have had faintly darker areas that were overlooked; still, in terms of field identification these birds showed all-white wingtips. Because of the difficulty in viewing P5 (which, on resting birds, is usually covered by the tertials) and P10 (usually cloaked by P9) we were only able to obtain complete wingtip scores (P5 through P10) for 219 of 398 birds.

For the darkness of the grey pattern on the wingtip, we used six gradations from white to blackish grey, as follows: 0 – white (Kodak 0); 1 – pale grey, similar in shade to upperparts and primary bases (Estimated Kodak 3-4); 1.5 – medium-



Photo 2. Adult Kumlien's Gull with medium-grey wingtip markings, Stage 4 primary pattern (P5-P10 scores = 0-3-5-5-2-1), and eye score of 2.5 to 3.0. © Bruce Mactavish, St. John's, Newfoundland, 23 December 1999.

pale grey (Estimated Kodak 5-6); 2 – medium grey (Estimated Kodak 7-10); 2.5 – medium-dark grey (Estimated Kodak 11-13); 3 – blackish grey (Estimated Kodak 14-17). Values relative to the Kodak Grey Scale (catalogue number 152-7662; whereby 0 = white, 19 = black) were estimated by Howell, but should only be viewed as approximate, given the inherent difficulties related to ambient lighting, the angle at which the bird is standing, and observer perceptions under variable field conditions. For example, wingtips of score 2 can easily look darker (2.5 or even 3) in low light (such as late in the day) or with backlit reflection for

birds standing on ice. Photos of birds against ice and snow often tend to be underexposed and, thus, misrepresent wingtip shades.

For the sake of consistency, we used the same scores for eye colour as those of Howell and Elliott (2001): 0 – iris uniformly dark brown; 0.5 – iris overall medium brown; 1 – iris overall pale brown or honey coloured; 1.5 – greenish or yellowish, extensively mottled brown; 2 – pale greenish or yellowish, moderately marked with brown; 2.5 – pale greenish or yellowish with little or no brown mottling visible; 3 – apparently unmarked pale yellow (like an adult Herring Gull but typically slightly darker yellow).

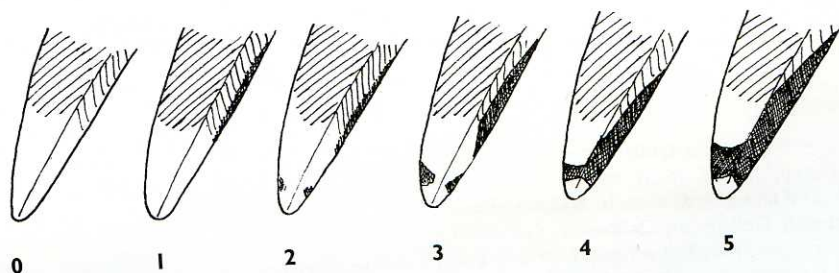


Plate 1. Examples of wingtip scoring criteria for dark markings on the outer primaries. 0: no visible darker grey markings relative to the grey basal and white distal portions of the feather; 1: darker grey markings restricted to the outer web or shaft area but with no dark subterminal marks; 2: grey markings include a partial subterminal "band" (<50% of the feather width); 3: grey markings include an incomplete subterminal band (50-99% of the feather width); 4: grey markings include a complete narrow subterminal band (< width of white primary tip); 5: grey markings include a complete broad subterminal band (≥ width of white primary tip). A band split only by a fine white shaft streak did not qualify as an incomplete band (e.g. P7-P8 in Photo 2).

Results and Discussion

First we describe, quantify, and discuss variation in the wingtip pattern, dorsal colouration, and eye colour of winter adult Kumlien's Gulls, and then discuss field identification of Kumlien's relative to similar taxa. In light of comparable studies on the range of variation in other populations of Kumlien's and Thayer's Gulls, our comments about field identification may need to be refined, but we offer them here with a view to helping resolve an identification conundrum. We did not attempt to sex the birds in our sample, but we did not detect any appreciable differences in wing-pattern or eye colour among larger (presumed male) and smaller (presumed female) birds.

Wingtip Pattern and Dorsal Colouration

Wingtip pattern is often an important character in gull identification, and in this regard an appreciation of variation within each taxon is critical. The effect of age (including that of so-called "adult" birds) should also be considered, as discussed by Howell and Elliott (2001). For example, on British Herring Gulls and Lesser Black-backed Gulls of a known age, the wingtip pattern can continue to change up to age seven or older (M. T. Elliott, in prep.). In general, more white and less black develops on the wingtip with greater age. Clearly this has a potentially important bearing on the characterisation of "diagnostic" wingtip patterns for different taxa, but how variation in Kumlien's Gull wingtip patterns could be age-related must await study of birds whose age is known.

The wingtips of perched adult Kumlien's Gulls typically (77% of N = 185) appear "medium grey" (estimated Kodak 7-10; type specimen = Kodak 7-8; Table 1; Photos 2-3). Such markings are obviously darker than the upperparts, but clearly paler than the blackish grey (Kodak 14.5-17; score = 3) typical of Thayer's Gull (Howell and Elliott 2001; Photo 4). A further 9% of birds had medium-pale (estimated Kodak 5-6) to medium-dark (estimated Kodak 11-13) wingtips (Photos 5-6), while 6% appeared all white (Kodak 0; Photo 7) and only 5% blackish grey (estimated Kodak 14-17; Photo 8).

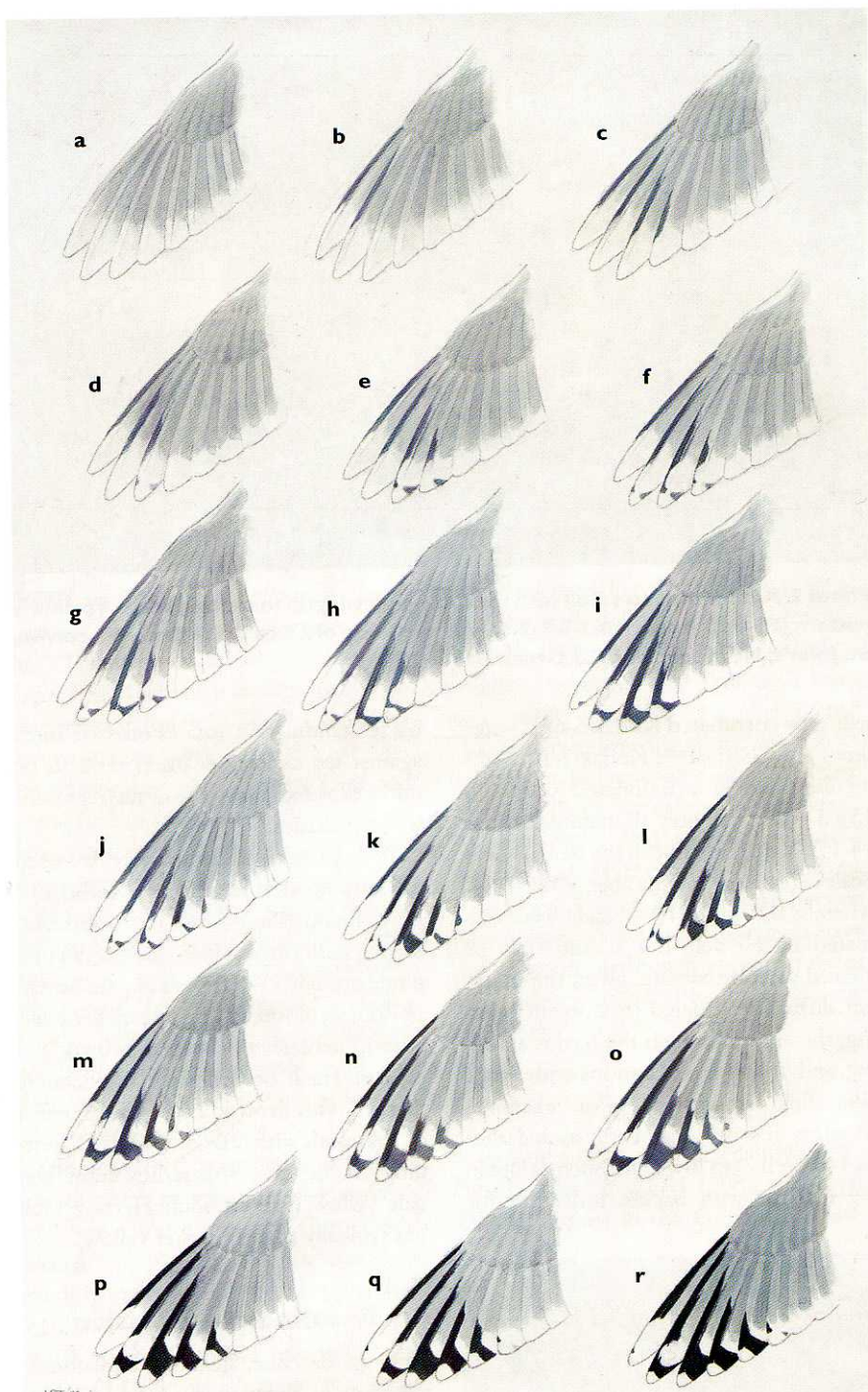


Plate 2. "Adult" primary patterns of presumed Kumlien's Gulls *Larus [glaucoides] kumlieni* (a-o), possible hybrid Kumlien's x Thayer's gulls (p-q) and an "average" Thayer's Gull for comparison (r). All wingtips taken from birds seen in Newfoundland, Canada, during February 2002, except for Thayer's Gull (from California, December 1999). Figures are arranged to show progressive development of wingtip patterns from all white to most extensively and darkly marked. Percentages in parentheses are relative frequency of Stages 0-6 (see text) in a sample of N = 345 birds.

Figure a: Stage 0 (4%), unmarked white wingtip. Figures b-c: Stage 1 (9%), darker grey marks on the outer one to four primaries but no subterminal marks. Figures d-f: Stage 2 (11%), darker grey marks on the outer three to four primaries with subterminal marks on one to three primaries. Figures g-i: Stage 3 (12%), darker grey or more extensive grey marks on the outer four primaries with complete subterminal bands on one to three primaries. Figures j-m: Stage 4 (55%), darker grey or more extensive grey marks on the outer five primaries with complete subterminal bands on zero to three primaries. Figures n and p: Stage 5 (4%), darker grey or more extensive grey marks on the outer five primaries with complete subterminal bands on P6-P9. Figures o and q: Stage 6 (5%), darker grey or more extensive grey marks on the outer six primaries with complete subterminal bands on three to four primaries among P6-P9. Figure r: adult Thayer's Gull. © Martin T. Elliott.

Table 1. Wingtip darkness scores for 185 adult Kumlien's Gulls in Newfoundland (see Methods)

Wingtip score	0	1	1.5	2	2.5	3
N	12	5	5	142	11	10
%	6	3	3	77	6	5

In a sample of 190 birds, the inner-web and outer-web portions of the sub-terminal bands were not appreciably different in shade on 184 birds (97%), while on six (3%) the outer web appeared darker than the inner web by one category (cf. wingtip scores). Grey markings on the outer four to five primaries were overall similar in tone, perhaps with a tendency for markings on P7-P8 to average darker or at least more "solid", than those on P6 and P9.

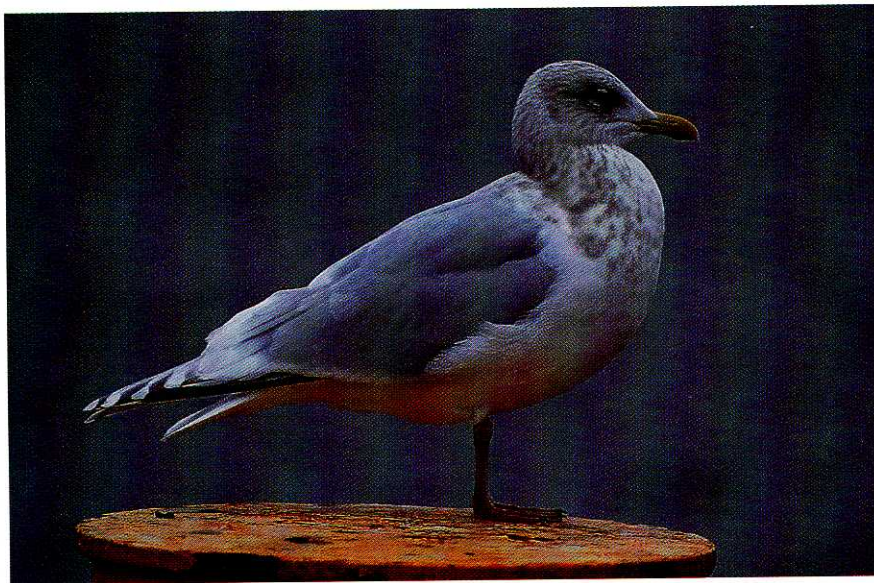


Photo 3. Adult Kumlien's Gull with medium-grey wingtip markings, Stage 5 primary pattern (P5-P10 scores = 0-4-5-5-4-1?), and eye score of 2.5 (shadowed). © Bruce Mactavish, St. John's, Newfoundland, 6 December 1993.

Primary pattern variation can be envisioned by starting with an unmarked wingtip (Stage 0; Plate 2, a) and building upon this (Table 2, Plate 2). Stage 1 (9% of N = 345 birds; Photos 9-12) is darker grey stripes on the basal to medial portions of the outer webs of one to four of P7-P10, but with no trace of dark subterminal bands (Plate 2, b-c); note the darker stripes can be difficult to see in the field (Photos 10-12). Stage 2 (11%) is darker grey stripes on the outer webs of three to four of the outermost four primaries (i.e. P8-P10 or P7-P10) with partial to incomplete subterminal bands on one to three primaries among P7-P9 (Plate 2, d-f; Photo 13). Stage 3 (12%) is darker grey or



Photo 4. Adult Thayer's Gulls with typical blackish-grey wingtip markings. Note the relatively long bill with a sloping hooked tip. © Steve N. G. Howell, Tomales Bay, California, 20 December 1997.



Photo 5. Adult Kumlien's Gull with medium-pale grey wingtip markings, Stage 4 primary pattern and eye score of 2.5 or 3. © Steve N. G. Howell, St. John's, Newfoundland, 4 February 2002.

more extensive grey on the outer webs of the outermost four primaries plus complete (mostly narrow) subterminal bands on one to three primaries among P7-P9 (Plate 2, g-i; Photo 14); only 12% of Stage 3 birds had complete subterminal bands on all three primaries, and the subterminal band was narrow on all 44% of Stage 3 birds with a complete band on only one primary.

The commonest pattern (and that of the type specimen of Kumlien's Gull) was Stage 4 (55%): darker grey or more extensive grey markings on the outer five primaries (P6-P10) with complete subterminal bands on zero to three feathers among P6-P9 (most commonly on two to three primaries; Plate 2, j-m; Photos 2, 5, 15-17). This was also the pattern considered typical of Kumlien's Gull by Grant (1986). Only 4% of Stage 4 birds

had no complete subterminal bands, 12% had complete subterminal bands on only one primary (95% on P8; Photo 15), 44% (and the type specimen) had complete subterminal bands on two feathers (88% on P7-P8; Photos 2, 5, 16) and 39% had complete subterminal bands on three feathers (97% on P7-P9; Photo 17).

More extensively patterned wingtips were uncommon. Stage 5 (4%) is darker grey or more extensive grey markings on the outermost five primaries (P6-P10) with complete subterminal bands on P6-P9 (three to four primaries with wide bands; Plate 2, n, p; Photos 3, 6, 18). Stage 6 (5%) is darker grey or more extensive grey markings on the outer six primaries, with complete subterminal



Photo 6. Adult Kumlien's Gull with medium-dark grey wingtip markings, Stage 5 primary pattern (P5-P10 scores = 0-4-5-5-5-1?) and eye score of 2.0. © Steve N. G. Howell, St. John's, Newfoundland, 4 February 2002.

bands on three to four feathers among P6-P9 (two to four primaries with wide bands; Plate 2, o, q; Photos 19-21).

Table 2. Wingtip pattern variation of adult Kumlien's Gulls in Newfoundland (N = 345 birds). See text and Plate 2 for details of patterns represented by Stages 0-6.

Stage	0	1	2	3	4	5	6
N	14	31	39	41	190	13	17
%	4	9	11	12	55	4	5

Of 345 birds, only 14 (4%) had no visible darkening on the outer webs of the outer primaries (Stage 0 = "white-winged"), although seeing darker markings in the field can be virtually impossible (see Photos 10-12). The overall appearance (structure, dorsal tone, etc.) of



Photo 7. Adult Kumlien's Gull with apparently all-white wingtips (Stage 0 primary pattern, but cf. Photos 10-12) and eye score close to 3.0. © Steve N. G. Howell, St. John's, Newfoundland, 4 February 2002.



Photo 8. Adult Kumlien's Gull or hybrid Thayer's Gull x Kumlien's Gull (standing behind first-year Herring Gull) with blackish-grey wingtip markings and Stage 5 or 6 primary pattern (P5-P10 scores = ?-5-5-5-5-3). © Steve N. G. Howell, St. John's, Newfoundland, 3 February 2002.

these birds was typical of other Kumlien's Gulls. Six of these 14 had unmarked pale eyes like Iceland Gull (score of 3); one had an eye score of 1.5 and seven had an eye score of 2.5. If the pale-eyed and white-winged birds were Iceland Gulls they made up only 1-2% of the Newfoundland wintering population.

We saw only one bird with a complete grey subterminal band on P10, and only one other bird had a P10 score of 3. Seventeen of 345 birds (5%) showed dark subterminal markings on P5 but never a complete subterminal band, although this does occur on Kumlien's Gull, albeit rarely (Photo 19). Of these 17 birds, two showed characters of fourth-years; on at least six others (apparently adults) the P5 markings were paler than those on P6-P9.

and the birds overall looked typical of Kumlien's Gull. Thus, Kumlien's Gull can show dusky subterminal markings on P5 (*contra* Zimmer 1991).

The identity of birds with the darkest and most extensively marked wingtips is problematic. They were certainly atypical of Kumlien's Gull, as defined by our study. Are these simply dark-winged Kumlien's Gulls or could they be hybrid with Thayer's Gull? We are unable to answer this question satisfactorily, but the presence of hybrid Kumlien's x Thayer's gulls in Newfoundland would not be surprising because: a) they are gulls, in which hybridisation is quite frequent; and b) these taxa are reported to interbreed (e.g. Snell 1989).



Photo 9. Adult Kumlien's Gull with medium-grey wingtip markings, Stage I primary pattern (P5-P10 scores = 0-0-0-1-1-1) and eye score of 1.5. © Steve N. G. Howell, St. John's, Newfoundland, 4 February 2002.

Additional characters noted on a few of these dark-winged birds suggest that at least some were hybrids (including back-crosses) with Thayer's Gull. Two birds with a P5 pattern score of 2 had overall dark primary markings (score = 3; Plate 3, p) and eye scores of 2-2.5. One of these birds (eye = 2.5) had a relatively long bill and its upperparts were slightly darker than the surrounding Kumlien's Gulls. This bird could be claimed as a Thayer's Gull, but to Howell it did not look quite

Photo 11. Adult Kumlien's Gull with Stage I primary pattern: slightly darker grey can be discerned on the outer webs of P9-P10, but in the field this bird looked "white-winged." Photo 12 shows the same bird in different lighting, when the darker grey stripes are more noticeable. © Steve N. G. Howell, St. John's, Newfoundland, 4 February 2002.



Photo 10. Adult Kumlien's Gull showing apparent Stage 0 primary pattern, and eye score of 2.5. Close-range telescope scrutiny of this bird revealed a smear of darker grey peppering either side of the shaft of P9 and P10 (Stage I), but under most field conditions it looked "white-winged." Also see Photos 11-12. © Bruce Mactavish, St. John's, Newfoundland, 29 November 1996.



Photo 12. Adult Kumlien's Gull with Stage I primary pattern. See Photo 11 of the same bird. © Steve N. G. Howell, St. John's, Newfoundland, 4 February 2002.



Photo 13. Adult Kumlien's Gull with Stage 2 primary pattern (P5-P10 scores = 0-0-2-3-3-1) and eye score of 3.0. Note the relatively bright yellow bill. © Steve N. G. Howell, St. John's, Newfoundland, 5 February 2002.



Photo 14. Adult Kumlien's Gull with Stage 3 primary pattern (P5-P10 scores = 0-0-3-4-2-1). © Bruce Mactavish, St. John's, Newfoundland, 13 January 1993.

Mactavish may also be hybrid/backcross Thayer's x Kumlien's gulls (e.g. Photos 20-21).

Six other birds (all Stage 4) in our sample also had a wingtip darkness score of 3, but in other respects were not noticeably different from surrounding Kumlien's Gulls. However, in the well-studied Western Gull (*L. occidentalis*) x Glaucous-winged Gull (*L. glaucescens*) hybrid zone in western North America, mantle and wingtip darkness are "among the best discriminators of hybrids" (Bell 1996). Thus, it could be that all the birds in our sample with a wingtip darkness score of 3 (and perhaps some with a score of 2.5) represented introgression with Thayer's Gull. Such birds amounted to about 10% of the Newfoundland wintering population, but, as well as including some possible extreme

Kumlien's Gulls, this total could involve an unknown number of back-crosses. Birds showing two or more character traits suggestive of Thayer's Gull (large bill, head shape, long wings, darker upperparts, darker wingtips) comprised only 1-2% of our sample. In California, Howell and Elliott (2001) noted about 2% of birds with possible Thayer's x Iceland or Thayer's x Kumlien's characters. This all suggests that modern-day interbreeding between Thayer's and other taxa is limited – or that the hybrids winter elsewhere.

The upperparts of Kumlien's Gull are pale blue-grey, closer in tone to an American Herring Gull (which is slightly darker than Kumlien's) than to a Canadian Glaucous Gull (which is paler; Photo 22). Kumlien's upperparts appeared fairly consistent in tone among large numbers of

adults. In one flock of 400 adult Kumlien's, we noted two white-winged birds with noticeably (albeit slightly) paler and greyer (less bluish) upperparts. In structure these birds were typical of other Kumlien's Gulls. They could have been Iceland Gulls, intergrade Kumlien's x Iceland, or perhaps simply the pale extreme of Kumlien's. In a sample of 345 adults for which we recorded wingtip data, only two birds had slightly but distinctly darker grey upperparts than the surrounding Kumlien's Gulls. Both of these birds showed other characters (larger bill, dark wingtip markings etc.) that suggest interbreeding with Thayer's Gull (see above). Still, it appears that most Kumlien's Gulls do not vary much in the tone of their upperparts (which is Kodak 3.5-4.5; type specimen = Kodak 4).



Photo 15. Adult Kumlien's Gull with Stage 4 primary pattern (P5-P10 scores = 0-3-3-5-4-1) and eye score of 3.0. Note the small and relatively blunt bill, suggesting a female. © Steve N. G. Howell, St. John's, Newfoundland, 4 February 2002.



Photo 16. Adult Kumlien's Gull with Stage 4 primary pattern (P5-P10 scores differ slightly between wings: right wing = 0-2-4-5-4-1, left wing = 0-3-4-5-3-1). © Steve N. G. Howell, St. John's, Newfoundland, 4 February 2002.



Photo 17. Adult Kumlien's Gull with Stage 4 primary pattern (P5-P10 scores = 0-3-4-5-5-2). © Bruce Mactavish, St. John's, Newfoundland, January 1997.



Photo 18. Adult Kumlien's Gull with Stage 5 primary pattern (P5-P10 scores = 0-4-5-5-5-2). © Bruce Mactavish, St. John's, Newfoundland, 13 January 1993.

To summarise, the wingtip pattern of adult Kumlien's Gulls wintering in Newfoundland was variable, but 78% of birds (N = 345) had Stage 2 to Stage 4 wingtip patterns (Table 2, Plate 2) and 85% (N = 185) had medium-pale to medium-dark wingtip markings (Table 1). These can be viewed as typical Kumlien's Gulls. At most only about 1-2% of the Newfoundland wintering birds show the characters of Iceland Gull, while another 1-2% or more could be hybrids (including backcrosses) with Thayer's Gull.

Eye Colour

We recorded eye colour on 393 adult Kumlien's Gulls (Table 3) and compared the percentages of each score with a sample of 283 adult Thayer's Gulls (Howell and Elliott 2001; Table 4). The modal eye score for Kumlien's Gull was 2.5 (mean 2.44) and for Thayer's Gull 1.5 (mean 1.47), agreeing with the general wisdom that Kumlien's is relatively "pale eyed" and Thayer's "dark-eyed." However, darker-eyed Kumlien's Gulls than those in our sample do occur (pers. obs. Photo 23), and pale-eyed Thayer's are not rare (Photo 24; and see Photos 4-5 of Howell and Elliott 2001). Hence, eye colour is unreliable for identifying an individual bird.

Table 3. Iris colour variation in 393 adult Kumlien's Gulls in Newfoundland (see Methods)

Eye score	0	0.5	1	1.5	2	2.5	3
N	-	-	6	15	71	226	75

Table 4. Iris colour variation (see Methods) by percentage in adult Kumlien's Gulls from Newfoundland (N = 393) and in adult Thayer's Gulls from California (N = 283)

Eye score	0	0.5	1	1.5	2	2.5	3
Kumlien's (%)	-	-	2	4	18	57	19
Thayer's (%)	2	12	22	26	17	15	4

Separation from Similar Species and Hybrids

The only serious field identification difficulties with adult Kumlien's Gull are its separation from Iceland Gull and Thayer's Gull. However, the possibility of hybrid combinations of other species

should always be considered, particularly for vagrant individuals (e.g. some claims of Kumlien's Gull from California pertain to hybrid Glaucous-winged x Herring gulls; Howell, pers. obs.). In such cases, concentrate on size and structural characters – Kumlien's is a relatively "cute" and small-billed large gull, unlike many hybrids of larger and bigger-billed species.

Glaucous Gull x Herring Gull hybrids

These two species hybridise in north-western North America (Spear 1987), Iceland (Ingolfsson 1970, 1987, but cf. Snell 1991b), and eastern Canada



Photo 19. Adult Kumlien's Gull with Stage 6 primary pattern (P5-P10 scores = 4-4-5-5-5-2). Found dead at St John's. © Bruce Mactavish, St John's, Newfoundland, March 1999.



(Mactavish pers. obs.). Although the range of plumage variation for this hybrid combination remains to be determined, some presumed hybrid Glaucous x Herring hybrids resemble Kumlien's Gull in wingtip pattern, wingtip tone and upperpart tone (pers. obs.). Despite potential plumage similarities these hybrids differ from Kumlien's in their larger size, orbital ring colour (from orange-yellow to reddish orange) and their longer and heavier bills – which should be obvious, especially with other species for comparison.



Photos 20-21. Adult Kumlien's/Thayer's Gull with Stage 6 primary pattern (P5-P10 scores = 2-4-5-5-5-4) and eye score of 0.5. This bird was also shown by Garner and Mactavish (2001) and Howell and Elliott (2001; Photo 8). It resembles Thayer's Gull much more than Kumlien's Gull, e.g. in primary pattern (complete dark subterminal band on P10, continuous dark outer web of P9) and darkness, its relatively long and hook-tipped bill and dark eyes. The tone of its upperparts appeared similar to an American Herring Gull and not slightly darker (as in Thayer's), but ambient lighting can affect this perception, and in sunlight Thayer's upperparts look the same as those of American Herring Gull (Howell, pers. obs.). Its P9 and P10 may not be quite fully grown, but the near-complete moult is relatively early for Thayer's Gulls wintering on the Pacific coast (Garner and Mactavish 2001). However, moult timing is highly variable within gull taxa and is an unreliable identification character (Howell 2001). This bird may be a hybrid (back-cross?) Thayer's x Kumlien's gull, as suggested by Howell and Elliott (2001), but the possibility of it being a Thayer's Gull is difficult to rule out. © Bruce Mactavish, St. John's, Newfoundland, 10 November 1998.

Glaucous Gull x Glaucous-winged Gull hybrids

These two species hybridise in north-western North America (Swarth 1934, Strang 1977). The field characters of this hybrid combination are poorly known,

but adults show wingtip patterns variably intermediate between the parent taxa (Strang 1977). Thus, some birds might resemble Kumlien's Gull in wingtip pattern (and upperpart tone). Given the parent species, however, this hybrid combination should differ noticeably from Kumlien's Gull in its larger size and longer and heavier bill; this is certainly true of a few presumed Glaucous x Glaucous-winged hybrids seen wintering in California (Howell, pers. obs.).



Photo 22. Comparison of upperpart tones of adult gulls: left-to-right adult an American Herring Gull, a Kumlien's Gull, and a Canadian Glaucous Gull (with Great Black-backed Gulls *L. marinus* at rear). © Steve N. G. Howell, St. John's, Newfoundland, 2 February 2002.

Glaucous-winged Gull x American Herring Gull hybrids

These two taxa hybridise extensively in northwestern North America and the resultant offspring can apparently show any combination of parental characters (Patten 1980; Howell, pers. obs.). The plumage of this hybrid combination can quite closely resemble that of Kumlien's Gulls with extensively dark-marked primaries. But the extent of dark in the



Photo 23. Dark-eyed adult Kumlien's Gull with eye score of 0.5. © Bruce Mactavish, St. John's, Newfoundland, November 1997.



Photo 24. Adult Thayer's Gulls. Note bill shape, eye colour variation and blackish wingtips. © Steve N. G. Howell, Tomales Bay, California, 31 December 1999.

wingtips is typically more extensive than shown by Kumlien's Gull, and these hybrids should be slightly darker grey above than Kumlien's Gull. In addition, hybrids differ from Kumlien's in their larger size and bigger and heavier bills (but some appear very similar to Thayer's). Most adults of this hybrid combination are identifiable in the field, given observer experience and the presence of other gulls for comparison. Their larger and longer bills, larger overall size and bulkier structure should preclude confusion with the smaller and shorter-billed Kumlien's Gull, but some duplicate Thayer's so closely that they can be passed off as that taxon (Howell and Corben 2000, Howell and Elliott 2001).

Glaucous-winged Gull x Western Gull hybrids

These two taxa and their hybrids all interbreed extensively in western North America and the resultant offspring can show almost any combination of parental characters (Bell 1996, 1997; Howell, pers. obs.). While the wingtip pattern of this intergrade combination can resemble Thayer's Gull closely (e.g. Howell and Elliott 2001), the extent of dark in the wingtips is typically more extensive than shown by Kumlien's Gull. These hybrids are also darker grey above than Kumlien's Gull, as well as being larger and bulkier with notably stouter bills (with a more swollen gonyx). Other features to separate this hybrid combination

from Kumlien's Gull include orbital ring colour (often including some yellowish; a Western Gull trait), and bill colour (often flesh-coloured basally with a dark subterminal band, a Glaucous-winged trait).

Iceland Gull

Until an attempt is made to quantify variation in adult Iceland Gulls (of presumed pure stock) we can say little about the separation of Kumlien's and Iceland Gulls. Weir *et al.* (1995) concluded that winter specimens of Iceland and Kumlien's types of known sex but unknown origin could not be separated by measurements, and they relied on the wingtip pattern to distinguish between the two taxa. The conventional wisdom is that adult Iceland Gulls have pure white wingtips that lack any of the darker grey marks shown by Kumlien's Gull (Dwight 1925, Grant 1986). In addition, adult Iceland Gulls have pale eyes while the eye colour in Kumlien's Gull is variable (Grant 1986; Table 3). Another character to note is the grey tone of the upperparts which, based on five summer specimens of Iceland Gulls from Greenland, is often noticeably paler (mainly Kodak 3-3.5) and less bluish than Kumlien's (Howell pers. obs.). Will Russell (pers. comm.) also noted the consistently white wingtips and pale upperparts of Iceland Gulls in Greenland during August 1998: of 300 adult Iceland Gulls, 297 were similar in upperpart tone to adjacent Glaucous

Gulls with 3 birds slightly darker (cf. Photo 22). Orbital ring colour is another feature to check, although this likely varies seasonally (Macpherson 1961).

Because of the potential for winter range overlap of Iceland and Kumlien's (e.g. Weir *et al.* 1995), studying known breeding birds in Greenland seems the only sure way to quantify any variation that may occur in "pure" Iceland Gulls – but note the occasional recent breeding in Greenland of apparent Kumlien's Gulls (Boertmann 2001).

Thayer's Gull

As noted by Howell and Elliott (2001), the problem here can be summed up by the question: "At what point do Thayer's become reliably separable from Kumlien's?" And if Thayer's and Kumlien's interbreed freely (as has been reported; see Snell 1989) then it follows that some birds should be intermediate in terms of structure, plumage colour, and wingtip pattern. Based on experience of many Thayer's in California and Kumlien's in Newfoundland, Howell has seen few problematic birds – and those of uncertain identity may have been hybrids. In addition to details discussed by Howell and Elliott (2001), which we do not repeat here, we offer the following comments that relate to our field experience with large numbers of both taxa.

As viewed under field conditions, typical Thayer's averages larger, longer



Photo 25. Slightly underexposed photo of adult Kumlien's Gull on snow, with apparently blackish wingtips looking similar in tone to Thayer's Gull. In fact, this bird's wingtips were medium-grey, similar to Photo 3. © Steve N. G. Howell, St. John's, Newfoundland, 4 February 2002.

winged and longer billed than Kumlien's. The steeper forehead and more rounded nape of Kumlien's often create a gentler countenance suggestive of Mew Gull (*Larus brachyrhynchus*), whereas adult Thayer's tend to have a lower, more sloping forehead and more squared nape suggesting Herring Gull. Note, though, how environmental conditions may affect these perceptions. In cold Newfoundland conditions birds may puff-out head feathers that might be sleeked down in California, and this could accentuate the small-billed appearance of Kumlien's. In Kumlien's the wingtip projection beyond the tail is often relatively shorter than on Thayer's, with P10 usually slightly shorter than or equal to P9 (but projecting slightly on some birds, perhaps mainly females). On Thayer's the wingtip is longer with P10 often noticeably longer than P9 (but slightly shorter on some birds, more often so on males than females). Such differences may reflect different migration distances between species and sexes. Bill length (as noted by Howell and Elliott 2001) and to some extent bill shape can be helpful: Kumlien's Gull bills average both shorter and blunter than those of Thayer's (small bills perhaps reflecting Kumlien's more northerly and colder wintering grounds) and often lack the sloping hook-tipped effect typically shown by Thayer's. The culmen decurvature of Kumlien's typically starts distal to the gonydeal angle, whereas the more gradual decurvature of Thayer's

culmen typically starts above the gonydeal angle and closer to the nostril than on Kumlien's. There is overlap in bill shape but the shorter and blunter-tipped bill typical of many Kumlien's Gulls (e.g. Photos 2, 5, 7, 15) is distinct from the longer, more hook-tipped bill of many Thayer's Gulls (Photos 4, 24). And the larger (presumed male) Kumlien's with more hook-tipped bills often have

shorter-looking wings than Thayer's Gulls.

Besides structure, Kumlien's Gulls average paler eyed than Thayer's, but there is almost complete overlap in this feature (Table 4). Howell also noted subtle average differences in bill and orbital-ring colours between Kumlien's and Thayer's at the same season, and using the same optics, but there was enough overlap so that differences are unlikely to be useful for a single bird. In February 2002, the bills of many Kumlien's Gulls were relatively yellow overall (e.g. Photos 2-3, 9, 13, 25; but cf. Photo 5) lacking the distinctly paler greenish or fleshy base typical of Thayer's at this time (Photos 4, 24). In addition, the typical orbital ring colour of winter Thayer's in central California is raspberry-pink. Some Kumlien's Gulls showed a more reddish or orange-red orbital ring than this, but others had pink orbital rings like Thayer's (Photo 23). Macpherson (1961) discussed potential seasonal differences in orbital ring colour of both taxa, being redder in breeding birds, paler and more pinkish in post-breeding birds. The bare-part colour differences noted by Howell may simply reflect a more advanced hormonal state in some Kumlien's Gulls with respect to the season.

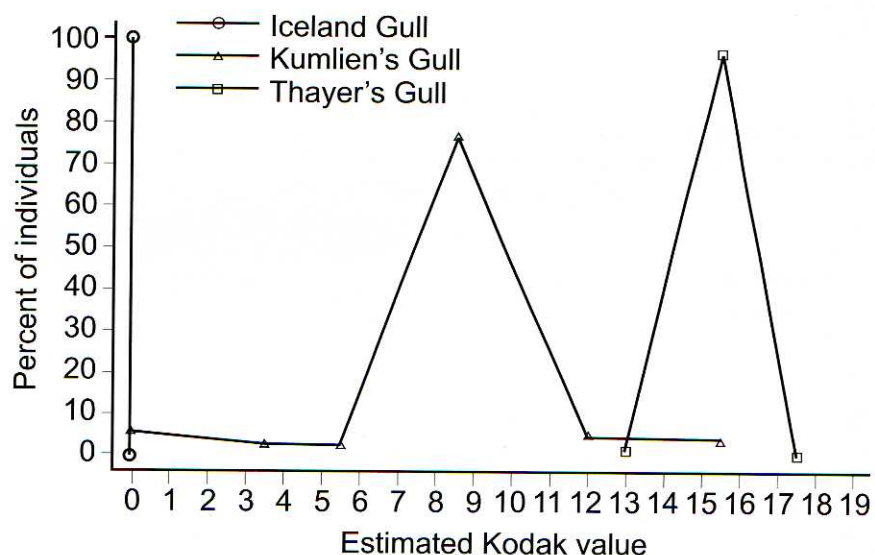
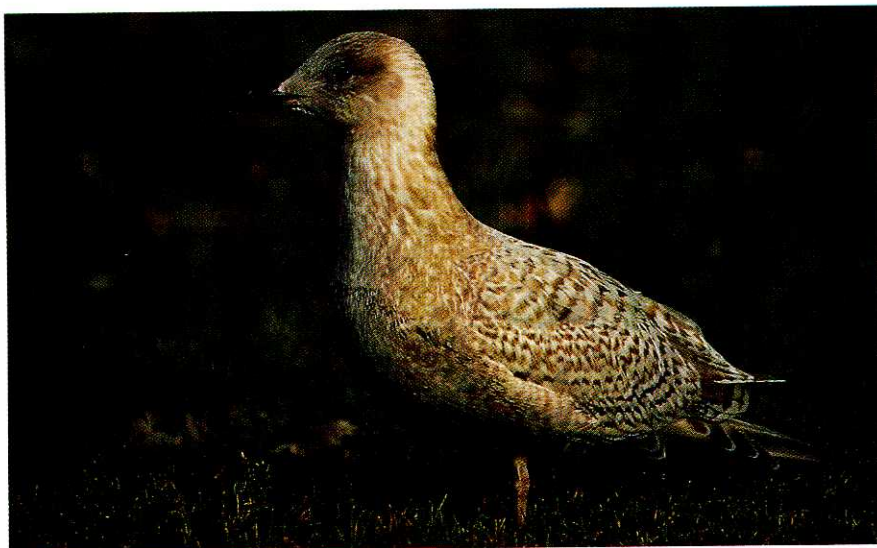


Figure 1. Percentage of field-estimated wingtip darkness values for presumed adult Kumlien's Gulls (N = 185, this study), and presumed adult Thayer's Gulls (n = 176, Howell and Elliott 2001), compared to Iceland Gull. Kodak 0 = white, Kodak 19 = black. Values plotted here are the means of wingtip darkness scores (see Methods): for example, a wingtip score of 2 (estimated Kodak 7-10) is shown as Kodak 8.5. Simply using this one character, 94% of Kumlien's are separable from Iceland Gull, and 98% of Thayer's are separable from 95% of Kumlien's (cf. Patten and Unitt 2002). The limited overlap in scores between Kumlien's and Thayer's may reflect hybridisation and possibly individual variation.



In terms of plumage, Kumlien's Gulls are slightly paler above than an American Herring Gull while Thayer's Gulls are slightly darker; such differences can be discerned under good lighting conditions and this may be one of the best identification clues, with the exception of possible hybrids. Wingtip patterns of Thayer's Gull were detailed by Howell and Elliott (2001) and we have discussed variation in Kumlien's Gull wingtip pattern above. Kumlien's typically have obviously paler grey and less extensive wingtip markings than Thayer's – thus, separating most birds is not a problem. But a few Kumlien's types we saw in Newfoundland (5% of $N = 185$) appeared as dark-winged as Thayer's. Some of these may have been hybrids (as discussed above), and an additional problem in judging wingtip darkness is the effect of viewing Kumlien's Gulls against snow and ice, which often make wingtips look darker than they are. This effect is often compounded by photographs (e.g. Photo 25) which may be responsible for a perception among birders that Kumlien's often look as dark winged as Thayer's, when in life most are distinctly paler winged.

We have little to add to the discussion of wingtip pattern differences between Thayer's and "dark-winged Kumlien's" proposed by Howell and Elliott (2001). We note, though, that problem birds may never be identified satisfactorily (see Photos 20-21). Birders wishing for black-and-white answers to every gull identification should recognise, and accept, the grey zone of uncertainty inherent in this group of birds.



Photos 26-27. Unidentified juvenile *Larus* sp. Overall similar to a Thayer's Gull, but at the pale and boldly-chequered end of the spectrum for a bird at this latitude and season, and with a relatively short bill and no dark secondary bar. Relatively dark winged and coarsely patterned for a juvenile Kumlien's Gull. Could this be a Thayer's Gull x Iceland Gull hybrid? © Steve N. G. Howell, Petaluma, California, 24 December 1998.

Taxonomy

Howell and Elliott (2001) recently discussed the taxonomy of Thayer's, Kumlien's and Iceland Gulls. They concluded that Thayer's Gull and Iceland Gull should be considered separate species, but were unsure of the status of Kumlien's Gull, which is usually treated as a subspecies of Iceland Gull (e.g. Godfrey 1986, AOU 1998). Patten and Unitt (2002) noted that many named subspecies are invalid and recommended critical application of the subspecies concept, such that at least 75% of a population should lie outside 99% of the range of other populations for a given defining character or set of characters (as proposed by Amadon 1949). Simply using wingtip pigmentation (Table 1), 94% of Kumlien's Gulls in our sample ($N = 185$) are distinguishable from all Iceland Gulls (Figure 1); when eye colour is added as a character, the separation is about 98%. This supports the distinctness of Kumlien's and Iceland, at least pending evaluation of variation in the latter.

Kumlien's Gulls (and Iceland Gulls) in the field look quite different from Thayer's Gulls in overall structure (head shape, bill size and shape etc. see above) and wingtip pattern, and these two taxa are best treated as separate species. Their specific distinctness might also be supported by differences in winter ecology, with Kumlien's (and Iceland) being more

pelagic, Thayer's more coastal (Weir *et al.* 1995; pers. obs.). And when variation in wingtip patterns and other characters is examined, the percentage of potential Thayer's x Iceland/Kumlien's hybrids in California and Kumlien's x Thayer's hybrids in Newfoundland is small (Howell and Elliott 2001, this study). For example, such birds are much less numerous than hybrids among other North American gull taxa: in central California up to 50% of the wintering Western Gulls and Glaucous-winged Gulls at a site can show hybrid characters, while up to 12% of migrant Glaucous-winged Gulls and Herring Gulls can show hybrid characters (Howell, unpubl. data).

Whether Kumlien's Gull deserves full species rank or is treated as a subspecies of Iceland Gull is a question that remains to be answered satisfactorily. In this regard we reiterate a question raised by Howell and Elliott (2001): are there two types of so-called "Kumlien's Gulls"? First, there is the taxon breeding mainly on Baffin Island and which we presumably studied in winter in Newfoundland – the conventional Kumlien's Gull. Second, could there be interbreeding between Iceland Gulls and Thayer's Gulls to the north of the range of Kumlien's Gull – which produces hybrids that resemble Kumlien's? Such birds could explain pale-winged "Thayer's Gulls" on Ellesmere Island, some 1400 km north of the known breeding range of Kumlien's (Godfrey 1986, Pittaway 1999). Pale-

winged specimens attributed to Thayer's Gulls (e.g. Figure 63 of Godfrey 1986) were identified as Thayer's by virtue of measurements and grey tone of the upperparts (R. Pittaway, *in litt.*). That such birds could be Thayer's x Iceland hybrids also seems a possibility, but where do these birds winter, and how common are they? Note that if wingtip details in Figure 63 of Godfrey (1986) are shown accurately, the pale-winged "Thayer's" do not look like Kumlien's Gulls in Newfoundland. If they inherit the migration traits of Thayer's, such birds could account for some California sightings of pale first-year birds that resemble neither typical Thayer's Gulls nor Newfoundland Kumlien's Gulls (Howell, pers. obs.; Photos 26-27). Summer conditions (e.g. the extent of ice cover) in the High Arctic vary greatly from year to year and R. Pittaway (*in litt.*) suggests that birds in some colonies do not breed every year or could move to other colonies to breed – which might cause interbreeding between taxa. Of interest is that the two accepted California records of Iceland Gull (*sensu* AOU 1998) are white-winged birds that look like nominate Iceland rather than Kumlien's (Erickson and Hamilton 2001). Could they and hybrid Thayer's x Iceland gulls be reaching the North American Pacific coast from the Canadian High Arctic or northwest Greenland?

Answers to these questions and conjectures await careful studies on the breeding grounds. In this regard, the east coast of Baffin Island, where Thayer's and Kumlien's may be sympatric and hybridise, seems an obvious area to investigate. Although breeding populations in eastern Baffin Island were allegedly studied by Smith (1966), that study was questioned by Sutton (1968) and shown by Snell (1989, 1991a) to have been fabricated to an unknown degree. But, as noted by Garner and Mactavish (2001), Snell (1989) oversimplified his separation of *thayeri* and *kumlieni* types nesting on Baffin Island, so critical studies of nesting birds are still needed. Pending such studies, we hope the provisional identification criteria presented here and by Howell and Elliott (2001) provoke thoughts about this subject.

Summary

We quantify and summarise variation in adult presumed Kumlien's Gulls wintering

in Newfoundland. Although Kumlien's Gulls are quite variable in wingtip pattern, about 90-95% are of a broad type that is obviously distinct from both Thayer's Gull and Iceland Gull. Fully white-winged and pale-eyed birds (possibly Iceland Gulls) comprise only 1-2% of the wintering population, while the darkest-winged birds (including possible hybrids with Thayer's Gull) comprise about 5%. We believe that Thayer's Gull is a species distinct from Kumlien's and Iceland Gulls, but what is Kumlien's Gull? Is it a race of Iceland Gull, or even a distinct species? And are there two types of "Kumlien's Gull"? We acknowledge the provisional nature of our conclusions and encourage critical study of other populations, preferably on the breeding grounds.

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