Comparison of Harlan's with Western & Eastern Red-tailed Hawks

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Overview

Among the most variably plumaged raptors in the world, the Red-tailed Hawk (*Buteo jamaicensis*) presents myriad identification challenges for birders. In the U.S. and Canada, there are as many as eight recognized subspecies (Preston and Beane 2009), each with its own degree of plumage variation. There is also overlap among the subspecies. Caution should be used when attempting to identify Red-tailed Hawks to subspecies based on plumage. A combination of traits, rather than a single field mark, often helps observers arrive at a conclusive identification.

Although many birds fit the classic descriptions given for subspecies in field guides (for example, Wheeler 2003), a few are impossible to categorize because they show characters of multiple subspecies (Liguori 2001). Little has been published regarding where the plumage of one subspecies ends and another begins. Also, there has been little documentation of individuals that fall outside the expected variation for a given subspecies. Plumage differences among subspecies are more obvious in adults than juveniles. Given current knowledge, some juveniles cannot be identified to subspecies in the field. Here, we focus on the "Harlan's" (*B. j. harlani*) Red-tailed Hawk (hereafter, Harlan's Hawk), emphasizing its plumages and overlap and possible intergradation with Eastern (*B. j. borealis*) and Western (*B. j. calurus*) Red-tailed Hawks.

Harlan's Plumages

Harlan's ranges from being almost completely whitish to black below, with a continuum of plumages in between (Wheeler 2003, Liguori 2005). Typical dark-morph birds are brown to blackish on the underbody, often with white mottling on the breast; they are similar to light-morph birds above. Typical light-morph birds are brownish above with minimal pale mottling on the scapulars; they are whitish below with dark patagials, bellybands, and wrist commas.

The extent to which Harlan's breeding range overlaps with other subspecies of the Red-tailed Hawk is not fully understood because most of Harlan's known breeding grounds are within remote areas of Alaska and western Canada. A study of nesting Harlan's by Mindell (1983) revealed much plumage variation, but it is unknown whether this variation is inherent within the Harlan's subspecies, or the result of intergradation with neighboring subspecies. Since a small proportion of Harlan's appears similar to Eastern or Western Red-tailed Hawks, these individuals are difficult or impossible to classify to subspecies in the field (Liguori 2004).

Likewise, some Eastern and Western Red-tailed Hawks can show characters that are historically thought of as indicative of Harlan's, especially in subtle variations of tail pattern. Birds showing plumage characteristics of multiple subspecies are expected under the 75% rule of subspecies diagnosability (Patten and Unitt 2002). Below we outline several characters typically associated with the identification of Harlan's Hawks, and we showcase areas where these overlap with other subspecies.

Dark-morph Harlan's Plumages

Based on our observational and photographic research over

Fig. 1a. Adult dark-morph **Harlan's Hawk** with substantial white on breast, underwings, belly, throat, and cheeks. *Utah; December. © Jerry Liguori.*

Fig. 1b. Adult dark-morph **Harlan's Hawk** with dark head and white-streaked throat, breast, and carpals; juvenile primaries 9 and 10 (banded throughout the tips) indicate that this is a second-year bird. *Utah; December. © Jerry Liguori.*

Fig. 1c. Adult dark-morph **Harlan's Hawk** with solid blackish body and underwing coverts, substantial white on breast and throat, and unbanded remiges. *Alaska; April. © Jerry Liguori.*

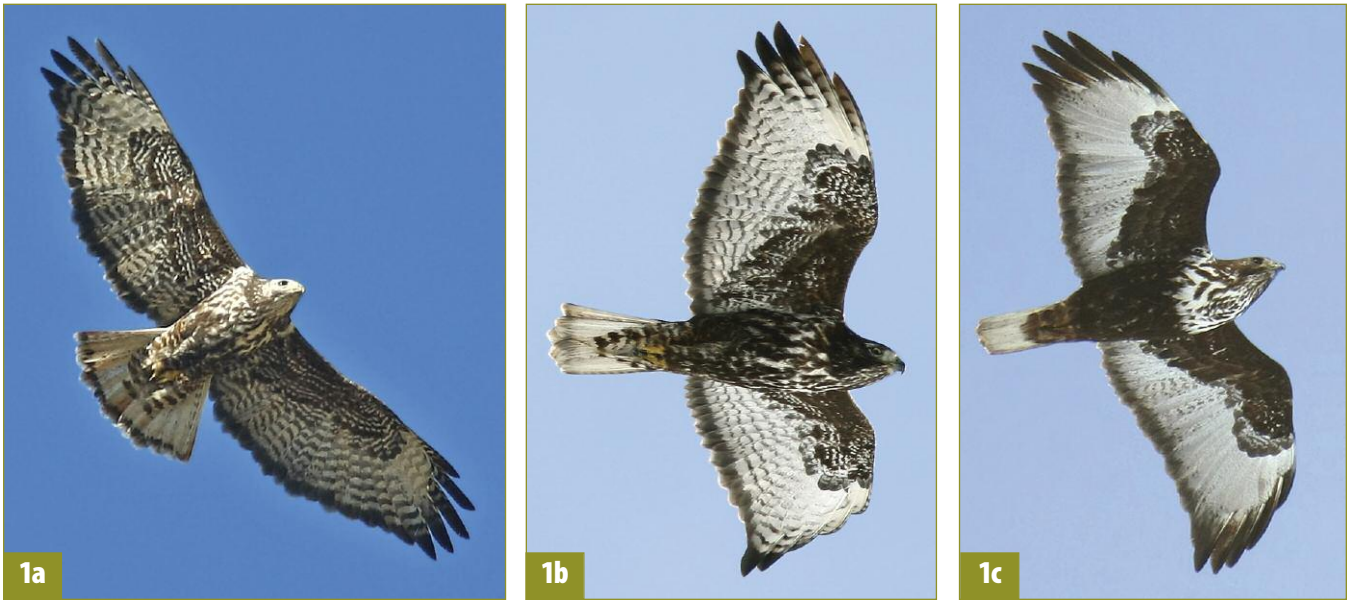

Fig. 2a. Adult dark-morph **Harlan's Hawk** with restricted white on breast, white throat, and unbanded primaries. *Utah; February. © Brian Sullivan.*

Fig. 2b. Adult dark-morph **Harlan's Hawk** showing minimal white on breast, with darkish throat; note banded tail. *Alaska; April. © Jerry Liguori.*

Fig. 2c. Adult dark-morph **Harlan's Hawk** showing uniformly streaked body and white throat. *Alaska; April. © Jerry Liguori.*

the past 12 years, roughly 88–92% of Harlan's Hawks can be considered dark-morph birds, being partly or wholly blackish or dark brownish on the underbody with varying amounts of white streaking on the breast (Figs. 1 and 2). Some individuals are entirely streaked on the underparts (Fig. 2c). Between 7–12% of adult dark-morph Harlan's are solidly dark on the underbody (Fig. 3), based on our research. Only these uniformly dark birds are considered dark-morph birds in most field guides (e.g., Wheeler 2003); however, we treat Harlan's with white streaking on the breast and mottled underwing coverts—sometimes referred to as intermediate-morph birds—as dark-morph birds, given that they appear mostly dark from below (Liguori 2004).

A few adult dark-morph Harlan's are rufous-brown underneath (Fig. 4a), and some have small white patches where the leading edge of the wings meets the body (Fig. 4b), a trait not shown by other dark buteos. The head is typically dark, but many birds with white on the breast have some white streaking on the head or white surrounding the eye. Dark-morph adults often show some white in the throat or a mostly white throat (especially birds with white on the breast), unlike adult dark-morph Westerns that typically, if not always, have dark throats (Fig. 4c). The undertail coverts of dark Harlan's are solid blackish to rufous, or with bold pale barring. The uppertail coverts of dark-morph birds are typically solidly dark or heavily barred; they may be reddish, particularly if the birds have red in the tail. Some dark-morph Harlan's can appear identical to Westerns in the field, and are impossible to identify unless the tail—particularly the upperside of the tail—is seen well (Fig. 4c).

Fig. 3a. Adult dark-morph **Harlan's Hawk** with solid dark body and white throat. *Alaska; April. © Jerry Liguori.*

Fig. 3b. Adult dark-morph **Harlan's Hawk** showing uniform blackish underparts. *Utah; January. © Jerry Liguori.*

Fig. 3c. Adult dark-morph **Harlan's Hawk** with bulge on breast due to full crop; white bases of displaced feathers appear similar to white mottling typical of adults. *Alaska; April. © Jerry Liguori.*

Fig. 4a. A few adult dark-morph **Harlan's Hawks** show rufous-brown body plumage; however, it is unknown whether this is variation within Harlan's or if this is an intergrade characteristic. *Alaska; April. © Jerry Liguori.*

Fig. 4b. Dark-morph **Harlan's Hawk** can show white "shoulders," unlike other dark buteos. *Nevada; November. © Adam Hutchins.*

Fig. 4c. Uniformly dark **Western Red-tailed Hawks** (breeding individual shown here) are similar to Harlan's but almost always have fully red tails and dark throats. *Utah; June. © Jerry Liguori.*

Light-morph Harlan's Plumages

Based on our research, light-morph birds make up about 8–12% of all Harlan's. Adult light-morph Harlan's are typically snow-white below, often lacking the buffy or rufous tones shown by other subspecies (Fig. 5). In addition to the dark patagial bars and wrist commas, light-morph Harlan's typically show moderately to boldly marked bellybands, lightly marked underwing coverts, and white throats. The belly band is made up of fairly distinct "blobby" streaks. Leg feathers are unmarked or lightly barred.

The upperside of adult light-morph Harlan's is dark brown (some are quite grayish) and almost unmarked, with white (sometimes rufous) mottling that is often limited to the scapulars (Fig. 6a). Adult light-morph Harlan's typically show whitish or rufous uppertail coverts; this is especially true of birds with rufous in the tail. The head typically lacks the golden hue of other subspecies. It can be white or streaked with white on the crown, and the face almost always shows a white supercilium and white beneath the eyes; other subspecies can have a pale supercilium.

Light-morph Harlan's are most similar in appearance to Eastern Red-tailed Hawks, causing subspecific identification headaches. Adult Harlan's with lightly marked undersides and white throughout the crown and tail are particularly difficult to distinguish from "Krider's" (*B. j. kriderii*) Hawks, and some birds may be not assignable with certainty. However, there are average differences between these two populations of the Red-tailed Hawk that typically allow for identification. Krider's are buffy below rather than snow-white, and have stronger rufous tones and extensive mottling (which can be rufous) on the upperwing coverts (Fig. 6b). Both Krider's and Harlan's can have whitish tails with rufous tips, but Krider's does not have the extensive color, pattern variation, and mottling shown by Harlan's. Krider's also typically shows a fine, well-demarcated, dark subterminal band, whereas Harlan's usually has a smudgy mix of color at the tip and, if present at all, a wider and blurred subterminal band. Also, adult Harlan's do not show a completely red, unbanded tail like Easterns and some

Fig. 5a. Adult light-morph **Harlan's Hawk** with snow-white body, "blobby" belly markings, white throat and supercilium, and lightly marked underwing coverts. *Utah; October. © Jerry Liguori.*

Fig. 5b. Adult light-morph **Harlan's Hawk** similar to bird in Fig. 5a, but with unbanded primaries. *Alaska; April. © Jerry Liguori.*

Fig. 5c. Some adult **Harlan's Hawks** lack bands on all the flight feathers; note whitish tail with reddish tip. *Alaska; April. © Jerry Liguori.*

Fig. 5d. Some adult **Harlan's Hawks** show buffy leggings and underwing coverts. *Alaska; April. © Jerry Liguori.*

Fig. 6a. Adult light-morph **Harlan's Hawk** with minimal underwing markings, white streaking on head, and white tail with dark, smudged tip. Pale mottling on upperside is limited to scapulars. *Utah; March. © Jerry Liguori.*

Fig. 6b. Adult **Krider's Hawk** (breeding female here) can appear similar to Harlan's, but Krider's lacks markings to belly and underwing coverts, and has buffy tones underneath, banding on the remiges, rufous patagials and nape, and pale mottling on the upperwings. *North Dakota; July. © Jerry Liguori.*

Krider's. Adult Krider's typically have banded remiges, whereas Harlan's often lack banding on the remiges. (The remiges are the flight feathers of the wing.) Adult Western Red-tailed Hawks rarely, if ever, approach the overall paleness of Krider's or Harlan's, and do not show a whitish tail or head. Even lightly marked Westerns often have broad patagial markings and dark throats.

Tail Pattern

The unique tail pattern of Harlan's has been noted from the earliest days of North American ornithology, and remains the best indicator of Harlan's ancestry. The tail pattern of adult Harlan's varies greatly between individuals and is often notably different from other subspecies of the Red-tailed Hawk. Adult Harlan's can have gray, white, brown, black, red, or a mix of these colors throughout their tail (Figs. 7a and 7b). The most frequent tail type on adult Harlan's is marbled grayish or whitish with a dark or reddish tip. Some adult dark Harlan's have black-and-white banded tails (Fig. 2b) or an overall blackish tail (Fig. 7c), although these tail types are uncommon and have only been seen on dark-morph individuals. Another feature indicative of Harlan's is longitudinal blackish spotting and/or mottling on the tail. The tail tip of Harlan's often has a dark subterminal band like other subspecies, but varies by being broad, smudgy, indistinct, or missing altogether. Dark bands may be on all or just a few tail feathers and may be incomplete but linear. The tail bands of adults are difficult to see from below in the field, but can be noticed up close, just as on Westerns. Be aware that some juvenile Harlan's can have adult-like tail patterns, and that even blackish tails on adults can appear whitish from below.

Although these features are indicative of Harlan's, Western

Fig. 7a. Adult light-morph **Harlan's Hawk** with reddish and grayish mottled tail and smudgy dark subterminal band. *Oklahoma; January. © Larry Hancock.*

Fig. 7b. Adult light-morph **Harlan's Hawk** with white, gray, and black mottling on tail. *Utah; March. © Jerry Liguori.*

Fig. 7c. Adult dark-morph **Harlan's Hawk** with blackish tail; note unmarked upperparts. *Utah; December. © Jerry Liguori.*

Fig. 8a. Second-year dark-morph **Western Red-tailed Hawk** showing brownish body and patagials, rufous breast and underwing coverts, dark throat, dark tips on juvenile primaries 9 and 10, and fully banded reddish tail. *Utah; August. © Jerry Liguori.*

Fig. 8b. Adult dark-morph **Western Red-tailed Hawk** (breeding male) showing brownish body with slightly paler breast, plus dark throat. *Utah; May. © Jerry Liguori.*

Fig. 8c. Western Red-tailed Hawk (same bird as in Fig. 8b), showing reddish tail with wavy dark bands, whitish highlights, and a neatly defined subterminal band similar to some Harlan's. *Utah; May. © Jerry Liguori.*

and Eastern subspecies rarely show longitudinal markings, as well as white, brown, or gray coloration intermixed with the typically red tail. These gray or white areas are often restricted to the base of the tail, but can appear throughout the inner webs of the rectrices (Figs. 8–10). Some adult Harlan's show an almost completely reddish tail with faint grayish, blackish, or whitish mottling at the base, appearing similar to other subspecies of the Red-tailed Hawk in the field, but it is unknown whether this is a result of introgression. It has been postulated that individuals with more than 10% red in the tail represent intergrades (Mindell 1983). However, Clark (2009) illustrated "pure" Harlan's having wholly reddish tails with dark bands. Unfortunately, only the tails of these birds were shown, making it impossible to confirm the subspecies on some. Because some plumage overlap occurs among subspecies with regard to tail pattern, it is not realistic to assume that any Red-tailed Hawk showing slight Harlan's tail characteristics is a "pure" Harlan's.

Flight Feathers

Some Harlan's have distinctive remiges, which are unmarked or mottled grayish below with a wide black terminal band (Figs. 1a, 5c, and 6a). Although the majority of Harlan's show

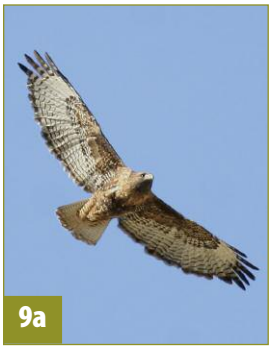

Fig. 9a. Adult dark-morph **Western Red-tailed Hawk** (breeding female) showing golden head, rufous breast and underwings, and reddish tail. *Utah; May. © Jerry Liguori.*

Fig. 9b. Western Red-tailed Hawk (same bird as in Fig. 9a), showing whitish highlights throughout reddish tail similar to some Harlan's. *Utah; May. © Jerry Liguori.*

Fig. 9c. Adult light-morph **Western Red-tailed Hawk** (breeding female) showing golden head, rufous upperwing coverts, and reddish tail with multiple dark bands, neatly defined subterminal band, and whitish and grayish tones similar to some Harlan's. *Utah; May. © Jerry Liguori.*

Fig. 10a. Second-year dark-morph **Western Red-tailed Hawk** (identified as a Harlan's in *Birding*, January 2009, pp. 30–36) with brown body, rufous breast and underwings, and juvenile primaries 8–10 (note unbanded tips) and secondaries 3, 4, 7, 8, and 9. *Nevada; September. © Jerry Liguori.*

Fig. 10b. Western Red-tailed Hawk (same bird as in Fig. 10a), showing red tail with black bands, a neatly defined subterminal band, and whitish (inner webs) and grayish (outer webs) highlights. *Nevada; September. © Jerry Liguori.*

Fig. 10c. Adult light-morph **Western Red-tailed Hawk** with rufous tones throughout, dark throat, golden nape, and banded remiges. *Nevada; September. © Kara Donohue.*

Fig. 10d. Western Red-tailed Hawk (same bird as in Fig. 10c), showing reddish tail with a well-defined, narrow subterminal band and grayish at the base similar to some adult Harlan's. *Nevada; September. © Kara Donohue.*

some mottling in the secondaries or primaries, many individuals show dark banding like all other subspecies of Red-tailed Hawks (Figs. 2 and 3). Some adults have a mix of banded and unmarked remiges in seemingly random order (Figs. 2a, 5b, and 5d). Dark birds are less likely to have unmarked remiges throughout the entire wings, more often showing a mix of banded and mottled feathers. It is extremely rare for individuals of other subspecies to show unmarked and/or mottled remiges. Many Harlan's in their first adult plumage retain juvenile outer primaries, which are almost always banded to the tips (Fig. 1b). Other subspecies—especially Eastern—show this mark at times, but it is rarely shown on Westerns, which typically show solid tips (Figs. 8a and 10a).

Intergrades

Interbreeding between Harlan's and Western Red-tailed Hawks has been reported previously, based on both observations and specimens from Alaska (Gabrielson and Lincoln 1959, Kessel and Springer 1966, Gibson and Kessel 1997). However, we were unable to confirm that these historical reports are correct. We have photographically documented typical Western and Eastern Red-tailed Hawks well within the breeding range of Harlan's at Gunsight Mountain in central Alaska during spring migration <aba.org/birding/v42n2p5w1.pdf>, but it is impossible to know, absent extensive study of the breeding grounds, whether Harlan's actually breeds with other subspecies of Red-tailed Hawks. We have not seen photographic evidence of a typical light-morph Western breeding with a typical Harlan's, but we have documented two dark-morph Western-like birds (individuals that might be intergrades) breeding with Harlan's. The most likely examples of dark-morph Harlan's intergrades are (a) adults with rufous breasts and mostly reddish tails or tails with Western-like banding and (b) Western-type birds with whitish flecking on the breast (Fig. 11). The most likely light-morph Harlan's intergrades are adults with buffy and rufous tones underneath, combined with Harlan's-like tails (Figs. 12a and 12b), or adults that are whitish underneath with Eastern- or Western-like tails (Figs. 12c and 12d). Since certain traits are visible only at close range or in-hand, a great number of intergrades may go undetected. Whether Harlan's with rufous tones on the breast or throughout the body are actually variants of "pure" Harlan's or have Western or Eastern ancestry is unknown at this time.

Conclusions

Much is yet to be learned about plumage variation and overlap in Red-tailed Hawk subspecies. As more birds are studied and photographed, the issue should become better clarified. However, since Red-tailed Hawks seen during migration and/or winter are difficult to classify to subspecies with certainty, good photographs of breeding birds are critical for making assumptions about the geographic variation within the species. A concerted effort to better understand the breeding biology of Red-tailed Hawks in Alaska and western Canada is needed. We encourage birders to contribute to an online gallery <http://tiny.cc/h2c4C> of photos of breeding Red-tailed Hawks.

Acknowledgments

We thank Nick Anich, Aaron Barna, Ryan Brady, Jamie Cameron, Kara Donohue, Cody Fields, Sarah Frey, Cecily Fritz, Paul Fritz,

Fig. 11a. Adult dark-morph **Harlan's Hawk** with brown body, rufous breast with minimal white streaking, and dark throat. Juvenile primaries 9 and 10 are unbanded. It is impossible to be sure this isn't a Western × Harlan's intergrade. *Alaska; April. © Jerry Liguori.*

Fig. 11b. Harlan's Hawk (same bird as in Fig. 11a), showing that the tail, when spread, is pale with a reddish tip and multiple dark bands. *Alaska; April. © Jerry Liguori.*

Fig. 11c. Typical adult dark-morph **Western Red-tailed Hawk** (breeding female) except for white streaking on the breast and throat, which is very rare on Westerns and a possible indication of Harlan's ancestry. *Utah; May. © Jerry Liguori.*

Fig. 11d. Western Red-tailed Hawk (same bird as in Fig. 11c), showing fully red tail with faint narrow bands and neatly defined subterminal band. *Utah; May. © Jerry Liguori.*

Larry Hancock, Al Hinde, Steve Howell, Adam Hutchins, Sherry Liguori, Jim Lish, Matt Mills, Daryll Myhr, Jeremy Russell, Deneb Sandack, Bill Schmoker, Christie VanCleve, Brian Wheeler, Stephen Wilson, and Chris Wood for their assistance.

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Fig. 12a. Adult light-morph **Red-tailed Hawk** (subspecies undetermined) with whitish body, distinct brown belly markings, buffy leggings and underwing coverts, white on throat, and white supercilium. *Utah; November. © Jerry Liguori.*

Fig. 12b. Red-tailed Hawk (same bird as in Fig. 12a), showing reddish tail with minimal white at base and a neatly defined subterminal band. This bird may represent a Harlan's × Eastern intergrade, but it is impossible to be sure. *Utah; November. © Jerry Liguori.*

Fig. 12c. Adult light-morph **Red-tailed Hawk** (subspecies undetermined) with dark head, heavily marked breast and belly, and rufous tones throughout. *Alaska; September. © Bob Dittrick.*

Fig. 12d. Red-tailed Hawk (same bird as in Fig. 12c), showing reddish tail with narrow bands, a well-defined subterminal band, and prominent white highlights on the inner webs. This bird may represent a Harlan's × Western intergrade, but it is impossible to be sure. *Alaska; September. © Bob Dittrick.*