WINTERING RED-TAILED HAWK (*BUTEO JAMAICENSIS*) SUBSPECIES IN THE MISSISSIPPI ALLUVIAL VALLEY

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Every winter, the Mississippi Alluvial Valley (MAV) hosts thousands of Red-tailed Hawks (*Buteo jamaicensis*; National Audubon Society 2010). These individuals originate from a widespread geographic expanse that includes the breeding ranges of several subspecies. These subspecies include Eastern (*B. j. borealis*), Western (*B. j. calurus*), Northern (*B. j. abieticola*), Krider's (*B. j. kriderii*), and Harlan's (*B. j. harlani*) Red-tailed Hawks. It is important to note that not all experts agree on which subspecies should be designated as such. In this article we follow the American Ornithologists' Union 1957 Check-list of North American Birds (American Ornithologists' Union 1957), as it was the last to include subspecies. One exception is the Northern Red-tailed Hawk, which was described in 1950 (Todd 1950), but not included in the 1957 Check-list. This article describes some of the plumage diversity we observed from these subspecies in the MAV during the 2011-2017 winter seasons. Further, we emphasize the difficulties of determining subspecies in the field due to overlapping field marks and the limited information on subspecies' wintering ranges.

For Red-tailed Hawk subspecies identification, consider that subspecies markings fall within a broad spectrum of plumage characters (e.g., abdominal band coverage, light vs. dark plumage, etc.). The plumage descriptions below note differences in the major body regions where one should focus attention when parsing out Red-tailed Hawk subspecies. Upperparts refer to the dorsal body, wings, and crown while underparts include the abdomen,

underwings, and throat. Many of the plumage characters we mention often cannot be easily observed in the field; thus many individuals cannot be identified to subspecies. Additionally, many intergrades occur from interbreeding among subspecies and their respective color morphs, making subspecies identification problematic. However, adherence to referencing key field marks listed in the following descriptions may help birders elucidate origins of the many individuals that comprise one of the MAV's most ubiquitous birds.

SUBSPECIES AND ASSOCIATED COLOR MORPHS

Eastern Red-tailed Hawk

The most common subspecies encountered is the Eastern Red-tailed Hawk. Eastern Red-tailed Hawks are present year-round in the MAV, and they have a large breeding range throughout eastern North America. This subspecies exhibits a high degree of variability in its markings and coloration, but has only a single color morph (Dunne et al. 2012). Both immature and adult upperparts tend to be pale brown with some whitish spotting (averaging whiter on immatures), and underparts are usually characterized by unmarked white throats, a clean white upper breast with a dark brown abdominal band, and dark patagial bars (Dunne et al. 2012). Immature Eastern Red-tailed Hawks exhibit light to heavy abdominal markings, lighter-colored primary feathers that create translucent "panels", and a brownish-gray and black banded tail (Figure 1); while adults usually have moderate abdominal markings and the characteristic clean red tail with a thin black sub-terminal band (Figure 2; Dunne et al. 2012).

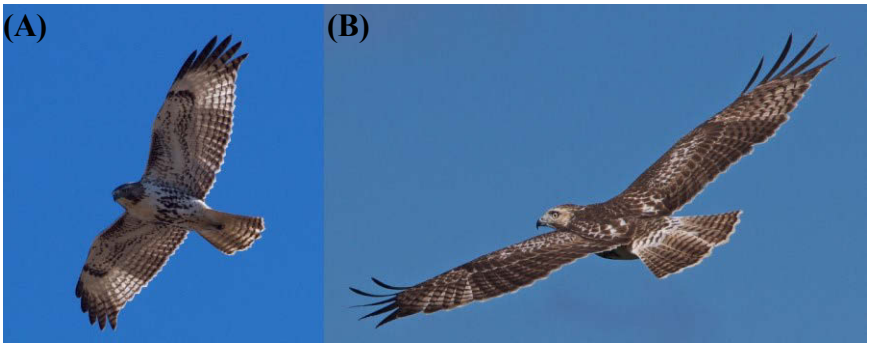

Figure 1. Immature Eastern Red-tailed Hawks, Tunica County, Mississippi, 2017. Underparts (A) show heavy abdominal streaking and pale inner primaries. Upperparts (B) show a brownish-gray tail with many dark bands.

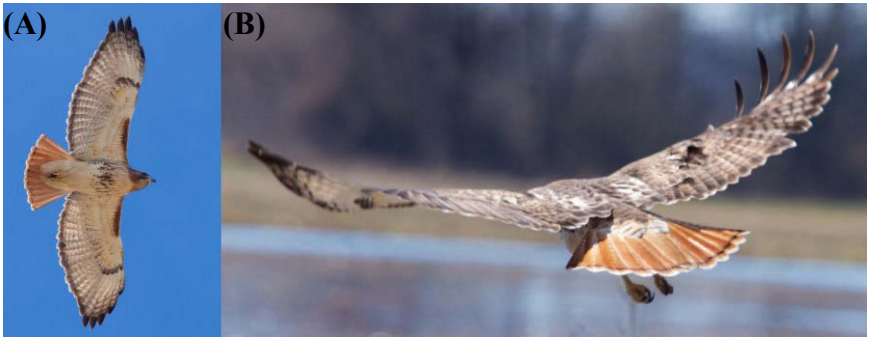

Figure 2. Adult Eastern Red-tailed Hawks, Panola County, Mississippi, 2017. Underparts (A) show moderate abdominal streaking and an atypically dark throat. Upperparts (B) have whitish spotting and a characteristic red tail with a relatively thin black sub-terminal band.

Western Red-tailed Hawk

Western Red-tailed Hawks breed mostly west of the Rocky Mountains (Preston and Beane 2009), and are likely the rarest

visitors to the MAV during winter (Brian Sullivan personal communication). Their prevalence may be misrepresented due to the near resemblance of plumage characteristics among light Western Red-tailed Hawks and heavily marked Eastern and Northern Red-tailed Hawks. However, most Western Red-tailed Hawks exhibit a thinly banded tail with a thick black sub-terminal band and rufous uppertail coverts (Lish and Voelker 1986, Liguori and Sullivan 2014).

Western Red-tailed Hawks exhibit polymorphism that is expressed in three unique plumages: light, dark, and rufous/ intermediate (Liguori 2004). *Light*: Light-morphs show darker-brown upperparts with limited white spotting (compared to Eastern Red-tailed Hawks). The underparts tend to show an overall rufous wash throughout, and have heavy streaking on the abdominal band and underwings. The throat is usually dark. *Dark*: Dark-morphs show all dark plumage on the upper- and underparts. Sometimes, faint rufous tones are suffused throughout the upper breast. *Rufous/intermediate*: Rufous/intermediate-morphs resemble dark-morphs, with dark upperparts and mostly dark underparts; however, they usually also exhibit distinct rufous coloration on the upper breast (Liguori 2004).

Northern Red-tailed Hawk

Northern Red-tailed Hawks breed predominately in Canada (Dickerman and Parkes 1987), and are a more recent discovery to our region, likely having been overlooked as heavily marked Eastern or Western Red-tailed Hawks. Their body underparts exhibit a rufous tinge overall with a dark throat, an upper breast area usually characterized by brownish drip-like markings, and a heavy abdominal band often described as being "blobby" (Figures 3, 4; Liguori and Sullivan 2014). Their underwing may be characterized by dark patagials and other dark-rufous markings

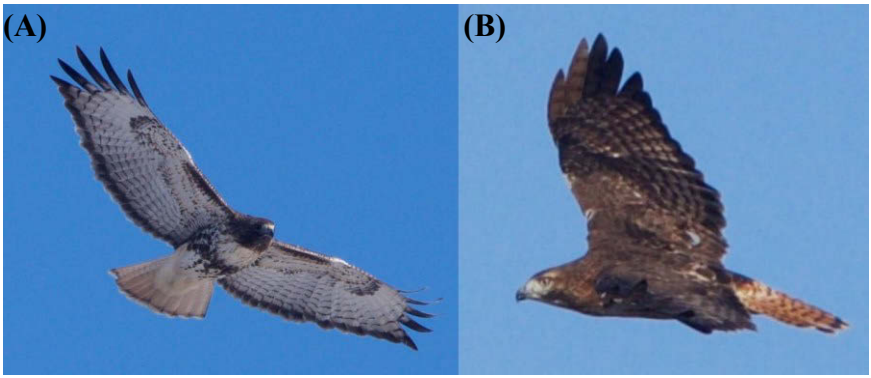

Figure 3. Adult Northern Red-tailed Hawks, Tunica County, Mississippi, 2017. Underparts (A) with heavy abdominal markings, dark throat, and drip-like rufous markings on the upper breast. Upperparts (B) are mostly brownish averaging slightly darker than Eastern Red-tailed Hawks. Note banded tail with thick sub-terminal band.

Figure 4. Adult Northern Red-tailed Hawk, Panola County, Mississippi, 2017. Underparts (A) show extremely heavy abdominal markings and rufous leg markings. Upperparts (B) are mostly dark brown with pale rufous uppertail coverts. Note banded tail with thick sub-terminal band.

(Figures 3, 4; Liguori and Sullivan 2014). On their upperparts, Northern Red-tailed Hawks show rufous uppertail coverts, and

average slightly darker than Eastern Red-tailed Hawks (Figures 3, 4; Liguori and Sullivan 2014). Their tails have thick sub-terminal bands, and many individuals have tails with widely spaced bands (versus narrowly spaced bands in Western Red-tailed Hawks; Figure 4).

Differentiating Northern from Western Red-tailed Hawks is sometimes challenging. Northern Red-tailed Hawks' heavily marked underparts can make them difficult to distinguish from light-morph Western Red-tailed Hawks; indeed, the identification to subspecies between the two may be impossible some of the time (Liguori and Sullivan 2014). Moreover, it is possible that dark-morph Red-tailed Hawks in the East that were previously presumed Western Red-tailed Hawks were actually part of a yet to be described color morph of Northern Red-tailed Hawk (Iron 2012, Jerry Liguori personal communication). The main premise of the argument is that the wintering location of these dark-morph birds aligns better with a Northern Red-tailed Hawk lineage. Other potential traits of dark-morph Northern Red-tailed Hawks include white spotting on the underwing coverts and axillaries, heavily patterned undertail coverts, and a diffuse rufous wash in the upper breast (Ruddy 2017). Some of these confounding individuals have been observed in the MAV (Figure 5), and hopefully future research will bear out any potential polymorphism.

Krider's Red-tailed Hawk

Krider's Red-tailed Hawks are visitors from the Northern Great Plains region. They exhibit a large degree of plumage variation, but tend to show very light coloration overall (Liguori and Sullivan 2010a). Specifically, adults and immatures are characterized by a light crown, limited markings on their abdomen, and a very light base of the tail (Figures 6, 7; Liguori and Sullivan 2010a). Immature Krider's Red-tailed Hawks will also show very

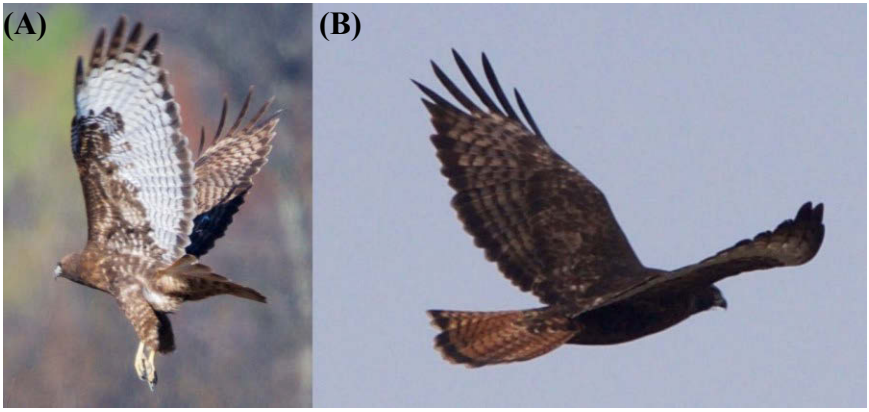

Figure 5. Possible adult Northern Red-tailed Hawk dark-morph (otherwise Western Red-tailed Hawk), Tunica County, Mississippi, 2017. Underparts (A) show white spotting on the axillaries and light rufous wash on the breast. Upperparts (B) are more dark brown and less white. Note banded tail with thick sub-terminal band.

pale primary panels on the under- and upperparts and a densely banded tail (Figure 6; Liguori and Sullivan 2010a).

Krider's Red-tailed Hawks are confounding. Although many consider them to be monomorphic, others believe they are a color morph of Eastern Red-tailed Hawks (Pittaway 1993). To add to the confusion, Krider's and Eastern Red-tailed Hawks interbreed where their ranges overlap thus producing intergrades that exhibit no clear ancestry (Figures 8, 9; Liguori and Sullivan 2010a).

Harlan's Red-tailed Hawk

Harlan's Red-tailed Hawks come to the MAV in the winter from their breeding range of Alaska through western Canada. In adults, the primary characteristic to distinguish Harlan's Red-tailed Hawks from other subspecies is mottling in the flight feathers and

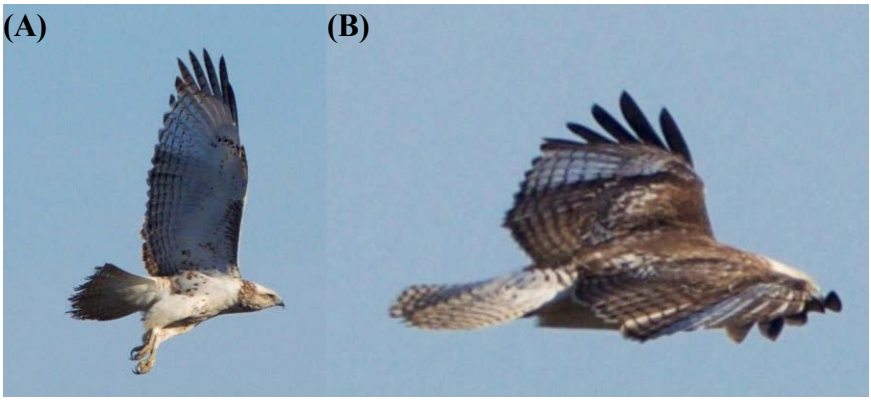

Figure 6. Immature Krider's Red-tailed Hawk, Tunica County, Mississippi, 2017. Underparts (A) with limited markings and pale inner primaries. Upperparts (B) are paler than Eastern Red-tailed Hawks. Note pale crown and pale tail with many fine bands.

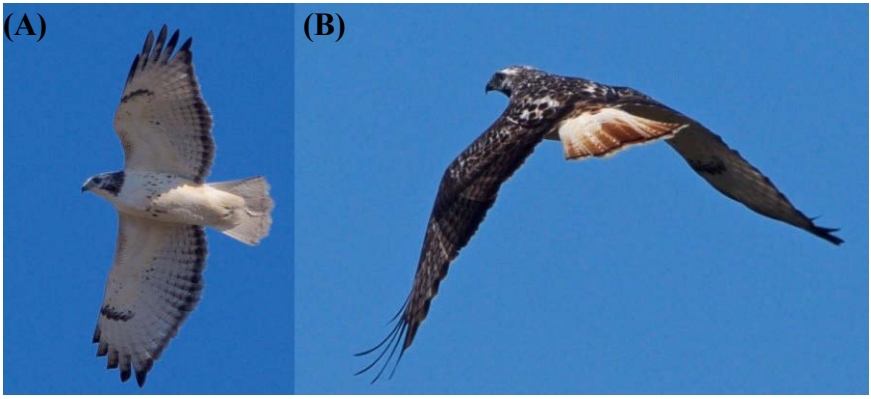

Figure 7. Adult Krider's Red-tailed Hawk, Tunica County, Mississippi, 2017. Note pale crown, faint patagial bars, and limited markings to the underparts (A), especially the abdominal band. Upperparts (B) show whitish mottling and a very pale base to the tail.

Figure 8. Possible immature Eastern x Krider's or Eastern x Harlan's Red-tailed Hawk, Leflore County, Mississippi, 2016. Bird shows intermediate features such as a densely banded tail and an abnormally light face.

Figure 9. Possible adult Eastern x Krider's Red-tailed Hawk, Tunica County, Mississippi, 2017. Bird shows the light tail of a Krider's Red-tailed Hawk and the dark crown of an Eastern Red-tailed Hawk.

tail. Mottling in the primary and secondary feathers can obscure any banding that normally occurs on other Red-tailed Hawk subspecies (Liguori and Sullivan 2010b). Most tails are a mottled

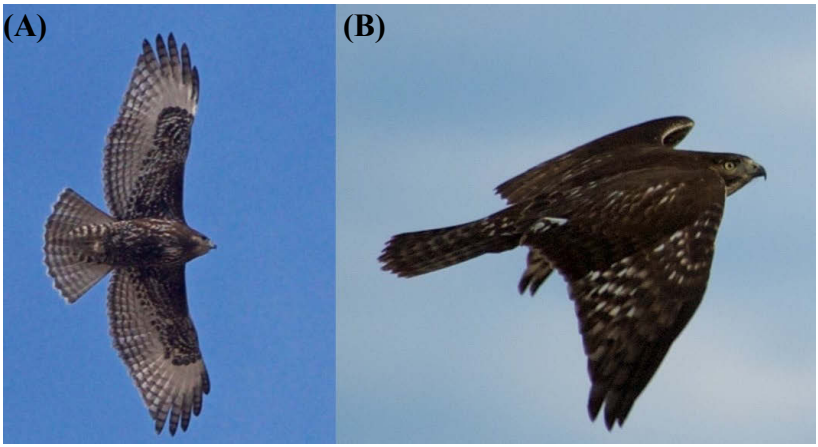

Figure 10. Immature Harlan's Red-tailed Hawk dark-morphs, Panola County, Mississippi, 2017 (A) and West Carroll Parish, Louisiana, 2011 (B). Underparts (A) mostly brownish-black with whitish mottling on the upper breast and throat. Upperparts (B) mostly brownish-black with some whitish spotting. Note the black-and-brown striped tail pattern.

grayish color in adults and black-and-brown banded in immatures; however, tail coloration can be extremely variable, ranging from red to almost white (Clark 2009).

Harlan's Red-tailed Hawks are polymorphic with dark and light color morphs (Dunne et al. 2012). *Dark*: Dark-morphs exhibit primarily brownish-blackish underparts, with the upper breast usually marked with varying amounts of white streaking (Figures 10, 11; Liguori and Sullivan 2010b). The upperparts are brownish-black in adults and immatures, but immatures also have some white spotting (Figures 10, 11; Liguori and Sullivan 2010b). Care should be taken when trying to distinguish between dark-morph Western and dark-morph Harlan's Red-tailed Hawks as they are superficially similar. *Light*: Light-morphs are similar to Eastern Red-tailed Hawks, with dark upperparts, pure white underparts,

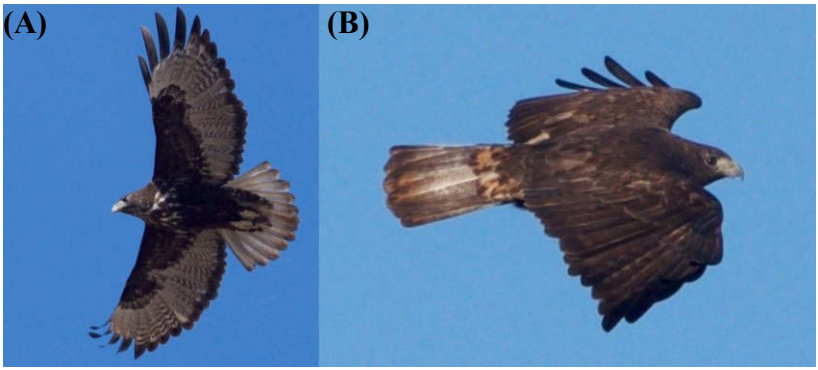

Figure 11. Adult Harlan's Red-tailed Hawk dark-morph, Tunica County, Mississippi, 2017. Underparts (A) similar to immature but with mottled primary and secondary feathers. Upperparts (B) mostly brownish-black with mottled tail.

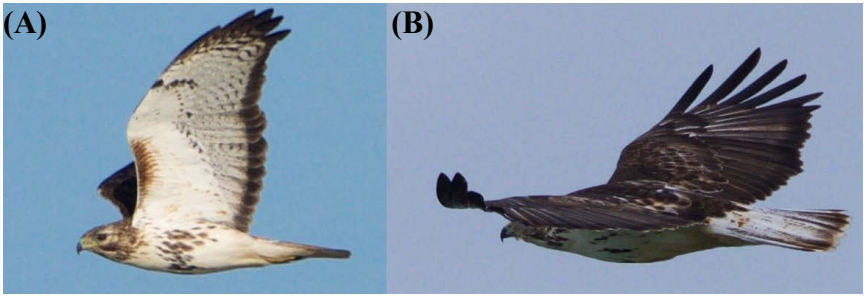

Figure 12. Adult Harlan's Red-tailed Hawk light-morphs, Tunica and Leflore counties, Mississippi, 2017. Note blackish "blobby" abdominal band, pure white underparts (A), and mottling on the primary and secondary feathers. Upperparts (B) are brownish-black with a mottled tail.

and "blobby" abdominal band (Figure 12; Liguori and Sullivan 2010b); however, the upperparts tend to average darker, and the abdominal band appears more "blobby" (Figure 12; Liguori and Sullivan 2010b).

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