

Jerry Liguori • Salt Lake City, Utah • jerrylig@hotmail.com

Brian Sullivan • Carmel Valley, California • bls42@cornell.edu

Adult Male Northern Harriers

More Than Meets

Most birders quickly enough learn to identify Northern Harriers by their distinctive silhouette, manner of flying, white “rump,” and facial disk. Also, birders soon learn that Northern Harriers exhibit substantially more sexual dimorphism than most other North American raptors.

Of course, many of us want to go beyond just putting a name, and, in the case of harriers, a sex on a bird. If you are interested in trying to age male harriers, this article is for you. Even if you’ve never much thought of taking it a step further, why not give it a go? And if you’re already aware of the basic issues involving the aging of harriers, this article may surprise you!

With a better understanding of age variation in Northern Harriers, you may gain a new appreciation of these fascinating birds.

As any field guide will tell you, adult male Northern Harriers are distinctly marked and easily recognized, with their grayish upperparts and whitish underparts that contrast with bold, black-tipped secondaries and outer primaries. It is this striking plumage that makes them a favorite among birders. But harriers—male and female alike—show significant individual variation. Not all adult males show the “classic” plain, pearl-gray above and ghostly white below; many are washed dusky brownish above and rufous-brown on the breast and undertail coverts (Figs. 1–2). What is the cause of all this variation in adult males?

It has been reported that brown-backed adult male harriers are second-year individuals, whereas grayer birds (topside) are older males (see Clark and Wheeler 2001, Wheeler 2003, Dunne et al. 2012). Several vagrant Northern Harriers in Europe have been aged based on these criteria (Mullarney and Forsman 2011). But while a plumage progression

the Eye

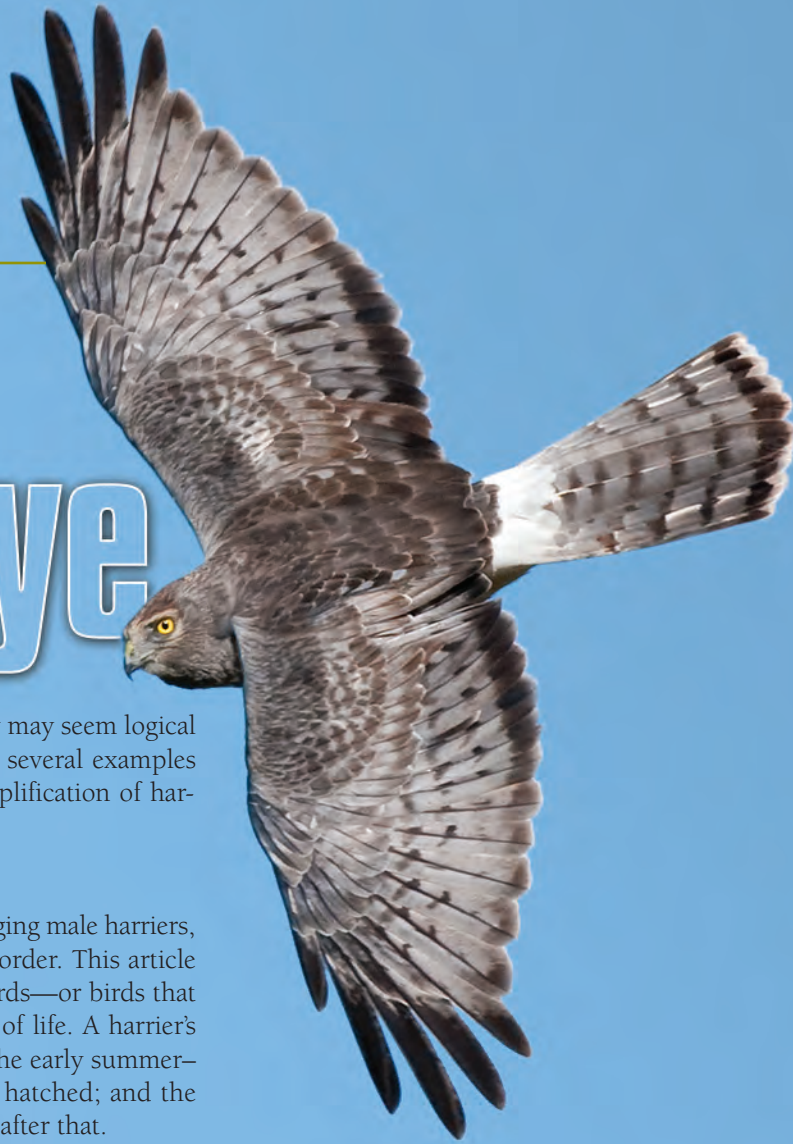
from gray-brown to uniform gray may seem logical for adult males, we here present several examples which show it to be an over-simplification of harrier plumage progression.

Terminology

Before getting into the details of aging male harriers, a few definitions of terms are in order. This article focuses heavily on *second-year* birds—or birds that are roughly in their second year of life. A harrier's second year generally begins in the early summer—early fall in the year after it was hatched; and the second year ends about one year after that.

Most literature describing Northern Harrier plumages defines a “sub-adult” male as having some combination of, or all of, the following traits: brownish upperwing coverts, a brownish head and/or auriculars, a rufous-streaked breast, and rufous undertail coverts (see Clark and Wheeler 2001, Wheeler 2003). Typically, such birds have been reported to be second-year birds. In contrast, older males have been assumed to be grayer on top and whiter below; this plumage is reported to be acquired at the beginning of the harrier's third year of life. Our article refers to these as *after-second-year* birds.

The progression of plumages described above is a reasonable assumption because several other raptor



This Northern Harrier is a classic adult male—a “gray ghost.” Presumably, all adult males look more or less like this one. Right? In this surprising article, raptor ID experts Jerry Liguori and Brian Sullivan show that adult males are far more variable than we had imagined. Once again, we are reminded that even the “easiest” birds can challenge our assumptions and notions about field identification. Galveston County, Texas; October 2009. Photo by © Alan Murphy.



Fig. 1. Adult male Northern Harriers. These three birds are second-year or older, but otherwise impossible to age. They vary substantially in plumage. *Left:* Note the grayish head but a fair amount of rufous on the breast and undertail coverts. *Center:* Note the gray head but the brown face and rufous on the breast. *Right:* Note the extensive rufous on the undersides, plus the gray head with a brown face. *Wasatch Mountains, Utah; October. Photo by © Jerry Liguori.*

species show sub-adult plumages that appear intermediate between typical juvenile (brownish above, rufous below for juvenile male harriers) and typical adult plumages. A familiar example for birders in western North America is the Swainson's Hawk, in which a "sub-adult" appears intermediate between the juvenile and adult plumages.

However, our research, based mainly on close examination of patterns of feather retention on live birds (see "Aging Harriers," below), has revealed that this is not always the case. Brownish adult males can be older than two years (Fig. 3), yet some second-year males can be pale gray above and clean white below (Figs. 4–6). We certainly acknowledge the

existence of many second-year males that are very brownish on top and heavily marked rufous below. It is unknown whether none, some, or all these individuals turn grayer with time or remain brownish throughout their lives. Regardless, our key finding is that it is spurious to distinguish between subadult and adult male Northern Harriers. There is only one post-juvenile plumage: a highly variable adult plumage.

Aging Harriers

This identification problem is complicated for several reasons. First, harriers are often hard to approach in the field. Obtaining close-up, detailed photos that permit the study



Fig. 2. Adult male Northern Harriers. As in Fig. 1, these two "grayer" variants are second-year or older, but otherwise impossible to age. They vary slightly in plumage. *Left two images (same bird):* Note the gray head and face, and the clean white undersides with very limited rufous markings. The back is brown; the rest of the upperparts are gray. *Right two images (a different bird):* Note the gray head and face, plus the clean white undersides. The upperparts are pale gray with a darker gray back. *Farmington Bay, Utah; December. Photo by © Jerry Liguori.*



Fig. 3. Adult male Northern Harrier. This individual is a known breeding and winter resident that has been tracked over time, and is at least four years old. Note the grayish-brown head and back with a brown face, but white undersides with limited rufous markings. *Antelope Island, Utah; October. Photo by © Jerry Liguori.*

of plumage specifics, plumage progression, and molt patterns can be difficult.

Second is the problem of interpreting molt. Although many large raptors undergo incomplete annual molts (that is to say, they don't replace all their feathers), most Northern Harriers *do* indeed undergo a complete molt each year (Liguori 2011). This is perhaps due to the amount of time they spend on the ground, where they

experience much feather wear. Most second-year harriers do not have retained juvenile feathers—unlike many larger raptors, which tend to have conspicuous retained juvenile feathers. Unlike many large raptors, it is usually impossible to determine through molt whether a harrier is a second-year bird vs. an older bird. In rare cases, harriers do retain a few juvenile feathers (both body feathers and flight feathers). Such individuals can be safely aged



Fig. 4. Second-year male Northern Harrier. Note the grayish overall appearance with white undersides, limited rufous on the underbody, and the grayish-brown face. This individual is aged as a second-year because of the retained juvenile underwing coverts (inset). *Braddock Bay, New York; April. Photo by © Jerry Liguori.*

as being in their second year; three such individuals are diagnosed here (Figs. 4–6).

Importantly, harriers showing retained adult feathers within a set of new adult feathers are also safely aged as being after their second year, meaning they are older adults (Fig. 7). Other opportunities for aging harriers involve birds with leg bands, or, in rare cases, known individuals that have been monitored over time on the breeding grounds (Fig. 3).

Variant Ratios in the Population

In our combined 50 years of experience studying raptors, most of the adult male (second-year and older) Northern Harriers we have observed throughout North America are browner-backed variants, whereas the pearl-gray males are much less common. Head, face, and underpart coloration varies widely, and it is likely that any combination of fea-

variably marked rufous below is an indication that, after the juvenile plumage, male harrier plumage variation is not as strongly related to age as we had thought. We have seen no evidence to suggest that browner or grayer types are more or less frequent in certain regions of North America, but a critical examination of breeding birds is needed to determine whether this variation could be linked to geography.

Conclusion

It could well be that some male Northern Harriers become grayer above and whiter below as they reach “old age,” but determining this plumage progression would require rigorous studies of known individuals over time. Our research shows that, in at least some conclusively aged second-year males, the plumage appears identical to what has been associated with older males in the past. Taking



Fig. 5. Second-year male Northern Harrier. Note the grayish plumage overall, including the face; note also the white undersides with very limited rufous underneath. This individual is aged as a second-year because of its retained juvenile underwing coverts, its retained juvenile primaries 7–10 and secondaries 3, 4, and 7–9, and its “collar.” Second-year birds normally do not retain juvenile flight feathers, which usually makes aging them impossible. In this somewhat unusual case, though, the retained juvenile feathers clearly age this bird. *Farmington Bay, Utah; January. Photo by © Jerry Liguori.*

tures can be seen on any given individual. While we have not quantified our observations or scored birds to determine the exact ratios of these features, our observations strongly suggest that very clean gray and white birds are less common.

For long-lived birds such as raptors, one would expect to see large proportions of older adults and juveniles, and a much smaller proportion of second-year birds. This pattern is well known to gull enthusiasts, who see relatively high numbers of adults and juveniles relative to second-year and third-year individuals. The fact that so many birds are washed brownish above and

this new information into consideration, it seems the only accurate way to age a second-year male Northern Harrier is by observing retained juvenile feathers. But as we have noted, retention of juvenile feathers is rare in this species.

The published literature provides the foundation upon which we continue to build current knowledge. But in some cases, previous logical assumptions may prove to be wrong. As we continue to learn more about raptors, we are challenging those old assumptions. Further study of known-age birds through the use of color banding or other means is needed to conclusively document harrier plumage progression over time.



Fig. 6. Second-year male Northern Harriers.

Left: Note the grayish head, including the face, combined with the white undersides with very limited rufous on the breast. This bird has been aged by its retained juvenile wing pit feathers, primary 10, and secondaries 4 and 7–9. *Cape May Point, New Jersey; September. Photo by © Tony Leukering.*

Right: Note the white undersides with the brownish head, combined with rufous on the breast and undertail coverts. This bird has been aged by its retained juvenile wing pit feathers, primary 10, and inner secondaries. *Wasatch Mountains, Utah; September. Photo by © Jerry Liguori.*

Although these two birds are the same age, the bird at left looks more like the traditional description of an “older” adult male, with its cleaner white underparts and gray head and face.

Acknowledgments

We thank Vic Berardi, Sophie DeBeukelaer, Pete Gustas, Larry Hancock, Tony Leukering, Sherry Liguori, Jim Lish, Mia McPherson, Michael O’Brien, Bryce Robinson, and Shyloh Robinson for comments and discussion.

Literature Cited

Clark, W. S. and B. K. Wheeler. 2001. *A Field Guide to Hawks of North America*, second edition. Houghton Mifflin, Boston.

Dunne, P., D. Sibley, and C. Sutton. 2012. *Hawks in Flight*, second edition. Houghton Mifflin Harcourt, Boston.

Liguori, J. 2011. *Hawks at a Distance: Identification of Migrant Raptors*. Princeton University Press, Princeton.

Mullarney, K. and D. Forsman. 2011. Identification of Northern Harriers and vagrants in Ireland, Norfolk, and Durham. *Birding World* 23(12):509–523.

Wheeler, B. K. 2003. *Raptors of Western North America*. Princeton University Press, Princeton.



Fig. 7. After-second-year male Northern Harrier. Note the white undersides with limited rufous markings, the grayish upperparts with a dark gray back including retained brown (faded) adult feathers, and retained adult primaries 8–10. *Cape May Point, New Jersey; September. Photo by © Jerry Liguori.*