

How to Age Golden Eagles

Techniques for Birds Observed in Flight

Hawk identification has advanced considerably in recent years. With the arrival of new field guides, new primary literature, and the internet, birders have many more raptor identification tools today than they did just ten years ago. Good general introductions to raptor identification, detailed accounts of all regular North American species, and a basic overview of the age and plumage terminologies that I employ in this article can be found in Clark and Wheeler (1997), Clark and Wheeler (2001), Wheeler (2003), and Liguori (in press). A discussion of methods for aging Bald Eagles—a problem that in many respects parallels the subject treated in this article—is provided by Clark (2001).

However, even with the most updated information, understanding some of the nuances of the flight identification of raptors comes only with field experience. Golden Eagles, which typically take five years to reach full adulthood, present problems to observers attempting to classify individual eagles to specific age classes. Distinguishing adults from non-adults, based solely on the presence or absence of white in the remiges (i.e., the flight feathers of the wing) or tail feathers may be simple, but the subtle transition that takes place from juvenile to adult makes it sometimes impossible to determine age class even with experience and excellent views.

In general, Golden Eagles are dark with a golden nape. Juvenile and immature birds have varying amounts of white in the tail and in the remiges, which are gradually replaced by darker feathers as birds near adulthood. Adults are completely dark with faint, gray mottling in the tail feathers and remiges. When seen well, the most reliable feature to use for aging Golden Eagles is the tail pattern, except on juveniles, for which the upperwing pattern is the most reliable feature.

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Juvenile and Basic I Birds

Juvenile Golden Eagles have white patches at the bases of the remiges that vary in size among individuals, from extensive to none at all (Fig. 1). The white patches in the wings may be divided by dark feathers—a pattern that can appear similar to molt. In contrast, older immature birds can have solid white patches in the wings; do not age Golden Eagles based on this trait alone. All juveniles have a white-based tail with a dark tip. The white in the tail can be extensive, covering almost the entire tail, or fairly restricted (Figs. 1 & 2). Basic I Golden Eagles (i.e., the plumage that follows juvenal plumage; birds 1–2 years of age) tend to retain most of their juvenile remiges and tail feath-



Fig. 1. Note the differences in size of the white areas in the wings and tail among **juvenile** Golden Eagles such as these. Grayish banding on the inner primaries (like that of adults) is evident on most juveniles. The white is extensive on the bird on the left and obvious at a distance. The bird on the right is in the first stages of molt. *Composite photograph.* Left and center birds: Goshute Mountains, Nevada; September 1999. Right bird: Wasatch Mountains, Utah; October 2002. © Jerry Liguori.

ers after their first molt—which takes place mostly from May to August—making them look extremely similar to juveniles (Fig. 3). The central (“deck”) tail feathers are sometimes the only tail feathers to be replaced by sub-adult feathers, which have a faint, gray band on the dark tip but which retain a broad, white base. Varying amounts of the upperwing coverts on Basic I Golden Eagles are replaced, forming a pale, mottled “bar” along the center of the upperwing (Fig. 4). Juveniles are the only birds to lack this trait, but fading on their upperwing coverts (usually by spring) can appear similar to the mottling on older birds. The faded upperwing of juveniles is broader than the upperwing “bar” of non-juveniles, and it lacks mottling.

On Basic I birds, Primary 1 (the innermost primary) and Secondary 1 (the outermost secondary) are typically the only remiges replaced by sub-adult feathers, of which the secondaries are slightly shorter and rounded at the tips (Basic I birds may have sub-adult Primaries 1–4). However, Secondary 1 does not appear shorter next to Primary 1, where the trailing edge of the wing tapers naturally. All sub-adult remiges show faint, gray banding identical to that of adult feathers, but some may have a white base. Most juvenile remiges lack the gray banding of older birds; however, the inner primaries of juveniles can have gray banding (Fig. 1). Therefore, assessing the presence of a sub-adult primary on Basic I birds based on feather pattern is not possible. The only way to discern juveniles from Basic I birds in flight is to note the presence or lack of mottling on the upperwing coverts, or the presence of molt (Figs. 3–5). A “gap” in the wing, due to shorter flight feathers still in the growth

process, denotes molt (Fig. 3). *Note: Any eagle that is actively molting, or that shows signs of previous molt during fall and winter, is not a juvenile. Watching birds in flight is very different from looking at photographs. Molt is often obvious in photographs, but it may be difficult to observe on birds in flight.*

Basic II and III

The tails of Basic II (2–3 years old) Golden Eagles are composed of sub-adult feathers, with some retained juvenal feathers, making the tails look juvenile-like in the field (Figs. 6 & 7). One or both deck feathers may be replaced with adult feathers (which are dark overall), causing the tail to look dark-centered. Basic II birds typically retain juvenile Secondaries 3, 4, 8, and 9, which project slightly beyond the trailing edge of the wing (Figs. 6 & 7). When extremely worn, these retained juvenile feathers may fall evenly with the remainder of the trailing edge of the wing, but this is a rare occurrence.

Basic III (3–4 years old) Golden Eagles typically show an equal mix of dark (adult feathers) and white (sub-adult feathers) patches in the tail, with the dark occurring in the center and at each end of the tail. This “split-tailed” appearance is difficult to observe from below. Observing the top of the tail is often necessary to age Basic III Golden Eagles (Fig. 8). However, when their tails are folded, Basic III birds may appear much like sub-adult birds. Basic III birds have a complete set of adult remiges but, in rare cases, may retain a few juvenile secondaries. When this occurs, Basic II and Basic III birds are usually impossible to differentiate in flight (Fig. 9).



Fig. 2. The white in the tail of this **juvenile** Golden Eagle is somewhat inconspicuous and limited to the inner one-third of the tail; this bird also lacks white in the wings. The absence of a tawny “bar” along the upperwing and the fact that it is not molting confirm its age as juvenile. *Jackpot, Nevada; September 2002. © Jerry Liguori.*



Fig. 3. With a tail composed of almost all juvenile feathers, this **Basic I** Golden Eagle looks extremely juvenile-like. Note the “gap” in the wing due to the growth of Primary 1; the sub-adult “deck” feathers are difficult to see. This bird would be difficult to age at any fair distance. *Goshute Mountains, Nevada; September 2001. © Jerry Liguori.*

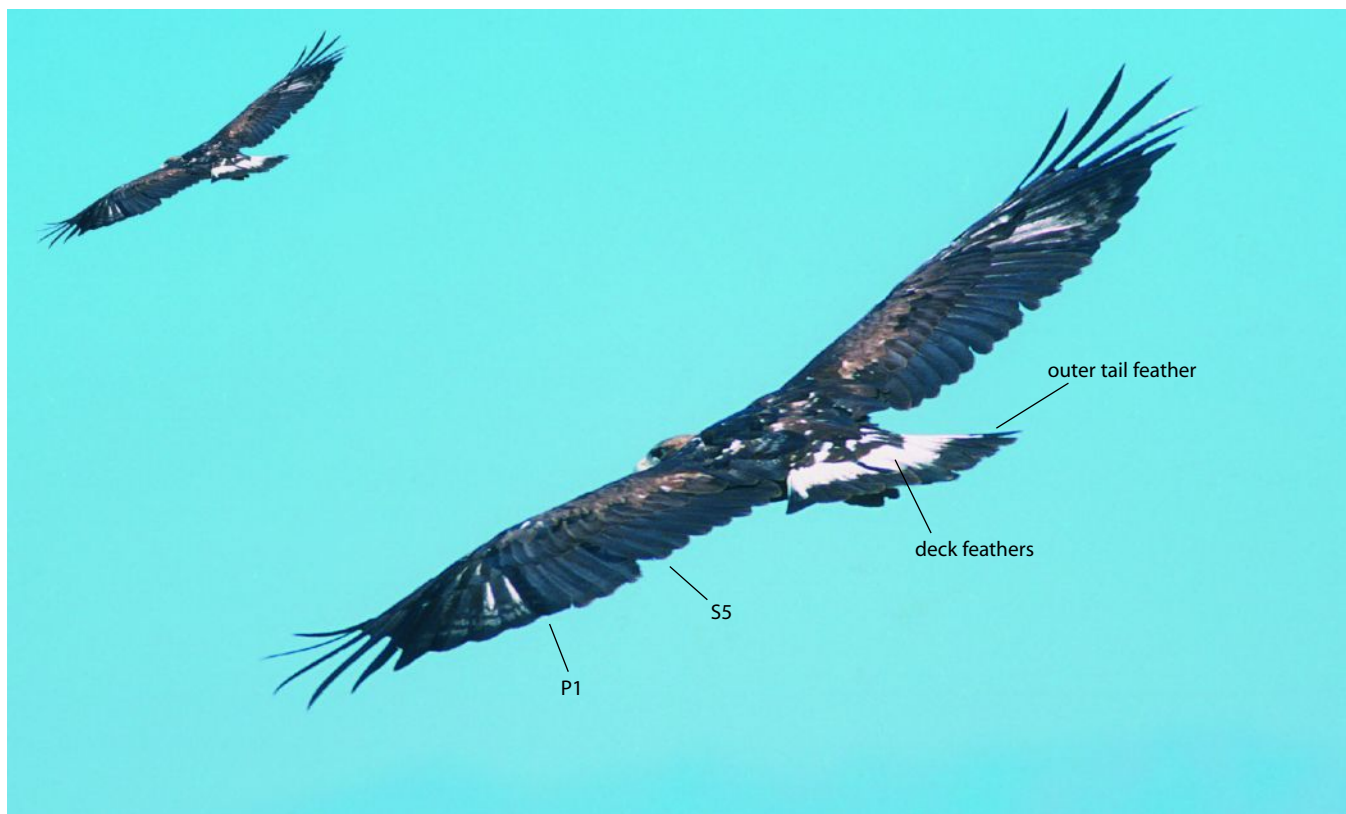


Fig. 4. The mottling to the upperwing is somewhat obvious on this **Basic I** Golden Eagle; however, at a distance (inset) the overall plumage looks similar to that of a juvenile. The deck and outer tail feathers, along with Primary 1 and Secondary 5 (visible on left wing), are sub-adult but difficult to see. *Composite photograph. Wasatch Mountains, Utah; October 2002. © Jerry Liguori.*

Sub-adult and Adult

Sub-adults that are 4–5 years old, along with birds immediately prior to full adulthood, almost always possess a complete set of adult remiges. This gives the underside of the wings a two-toned appearance, with the grayish flight feathers contrasting with the darker underwing coverts (like those of the Turkey Vulture). The two-toned appearance to the underwing is most visible when illuminated by snow cover, sand, or pale underbrush. Under these conditions, the flight feathers may appear almost whitish, making the dark trailing edge to the wing more apparent. Basic II and Basic III Golden Eagles may also show this two-toned underwing.

Observing the retained sub-adult tail feathers (the next-to-outermost feather, and at times a few others) on sub-adult Golden Eagles is typically the only way to distinguish them from adults. The pale bases of the sub-adult tail feathers are apparent only from the underside when the tail is spread (Fig. 10). When the tail is folded, the adult outer tail feathers overlap the adjacent sub-adult feathers (the undertail coverts may also conceal the base of the tail feathers). For this reason, it is often difficult to age Golden Eagles gliding overhead with their tails folded. It is thus often necessary to view the topside of the tail to age sub-adult Golden Eagles (Fig. 11).

Adult flight and tail feathers have white bases, but these white patches are restricted to the extreme base of each



Fig. 5. Juvenile Golden Eagles, such as this one, are the only age class that lacks the tawny “bar” along the upperwing coverts. *Goshute Mountains, Nevada; October 2002.* © Chris Neri.

feather and are not visible under normal circumstances. During spring and summer, when Golden Eagles molt their underwing coverts, exposing white areas in the wing linings, adults may appear to have white patches in the wings (Fig. 12). Birds in active molt may look ragged due to missing or partially grown flight and tail feathers and can consequently be difficult to age. Note that the pale banding on the dorsal side of the tail may also appear whitish in the glare of the sun. The tawny undertail coverts on all Golden Eagles may look extremely pale at times, but never white.

Conclusion

Identifying raptors in the field can be tricky, but since Golden Eagles of all ages can appear similar in the field, particular caution should be used when classifying them by age. This article is meant to point out some of the difficulties of aging Golden Eagles in flight. Many of the birds I have tallied on migration, especially birds gliding overhead, were deemed “unknown age” because of this difficulty.



Fig. 6. This **Basic II** Golden Eagle has mostly sub-adult rectrices and remiges with a few retained (faded) juvenile feathers. Even though Basic II birds are over two years of age, their tails can appear juvenile-like in the field. Note the tawny “bar” along the upperwing. *Goshute Mountains, Nevada; October 2001.* © Jerry Liguori.



Fig. 7. **Basic II** Golden Eagles are difficult to age from below. Note the white-based sub-adult tail feathers; and retained juvenile Secondary 4 (faded) is unusually worn and is equal in length with the trailing edge of the wing. *Cheyenne, Wyoming; October 1999.* © Sherry Liguori.



Fig. 9. This Golden Eagle appears dark overall like an adult. However, the few retained juvenile (longer) secondaries make this bird either a **Basic II** or **Basic III**. The sequence of molt, especially the retained (faded) Primary 10, makes this bird most likely a **Basic II**. The non-adult tail feathers on this bird are obscured; without the retained juvenile secondaries, this bird would be impossible to positively age in flight. *Sandia Mountains, New Mexico; April 1998.* © Jerry Liguori.



Fig. 8. The tails of most **Basic III** Golden Eagles have equal amounts of sub-adult and adult tail feathers, making the birds appear "split-tailed". *Goshute Mountains, Nevada; October 2002.* © Sarah Frey.



Fig. 10. **Sub-adult** Golden Eagles can be aged from below only when the tail is spread. Note the next-to-outermost sub-adult tail feathers (with white bases) on this bird. *Tooele, Utah; November 2003.* © Jerry Liguori.



Fig. 11. Distinguishing sub-adult from adult Golden Eagles in flight is often extremely difficult. The white bases to the next-to-outermost tail feathers on this **sub-adult** bird are hard to see. *Sandia Mountains, New Mexico. March 1998.* © Jerry Liguori.



Fig. 12. Adult Golden Eagles have a complete set of adult remiges and tail feathers (dark with faint, grayish banding). Adults can show white in the underwing linings in spring and summer due to the loss of underwing coverts during molt. *Salt Lake City, Utah; May 2002.* © Jerry Liguori.

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