



Aging Barred Owls in Rehabilitation Settings

Glori Berry, B.A.
Avian Haven, Freedom, ME
Photography by Glori Berry

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Background on the Barred Owl

General Background

Barred owls (*Strix varia*) are territorial year-round residents that are usually found in mixed deciduous-coniferous woods. They have a broad geographic range that includes four subspecies, encompasses most of the eastern half of North America, and is currently spreading east to west across southern Canada and parts of the northern U.S.



Barred Owl in Freedom, Maine in its natural habitat.

Breeding Background

- Barred Owls lay one brood of 2–3 eggs a year in the spring, usually in a tree cavity.
- Nestlings are altricial—they hatch with a thin layer of down feathers and are completely reliant on their parents for care.



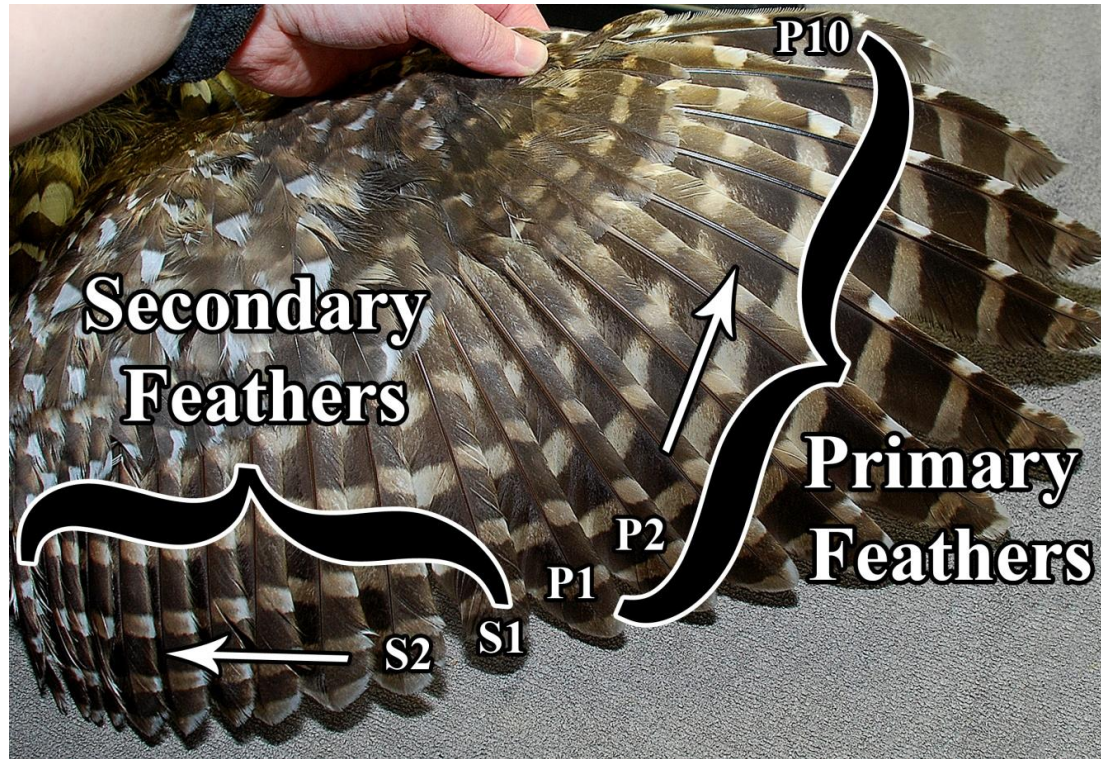
Nestling Barred Owls

- Young Barred Owls fledge at about 2 months of age, although they may leave the nest to climb on nearby branches a few weeks before fledging.
- Fledgling owls are fed by their parents for up to 4–5 months (until late summer/early fall) at which point they disperse to find their own territories.



The juvenile Barred Owl pictured in these three photos has “branched” and has even begun to make short flights in his enclosure despite the fact that his flight feathers are not yet fully grown.

Background on Feathers



- The primary and secondary feathers are the major flight feathers of the wings.
- Both the primary and secondary feathers are labeled starting from the middle of each wing and moving out.
- In Barred Owls, the secondary feathers include the 13 innermost flight feathers of each wing. The primary feathers include the 10 outermost flight feathers.

Molt in the Barred Owl



A progression of facial molt in the Barred Owl:
Top left: early nestling
Top middle: later nestling ("brancher")
Top right: fledgling
Bottom left: juvenile
Bottom middle: adult

- The first feathers of a Barred Owl are white natal down. However, these feathers are rapidly replaced with brown and buff colored juvenal plumage.
- By fall juvenile Barred Owls undergo a partial molt in which they replace their fluffy juvenal body plumage with feathers similar to those of an adult. They do NOT replace their flight feathers (primaries, secondaries, and rectrices (tail feathers)), however; these are retained until the following year.
- From this point on, Barred Owls typically undergo a partial molt between mid-summer and early winter each year in which they molt all of their body feathers and some flight feathers.

Right: This nestling has started to grow its first flight feathers. They are in the pin feather stage.

Far right: This individual has recently fledged. Its flight feathers have not grown to their full length yet.



- Typically the second molt includes P2–P3 and/or a chunk of outer primaries, usually starting with P4 or P5 and moving out toward the tip on both wings. These second-year birds may also molt a few of their innermost and outermost secondary feathers, as well as S5. The rectrices, in most cases, are likely molted every other year, and so are not normally molted for the first time until the third molt.
- The third molt commonly includes the flight feathers not molted in the second molt, but can include more or less. (Barred Owls, like other members of the genus, *Strix*, appear to have greater variability in molt patterns compared to other owl genera.)
- The primary and secondary feathers are usually molted in matched pairs (e.g. P5 from both the right and left wing), however, small discrepancies accumulate over the years so that older owls are more likely to have uneven patterns of molt.

Right: Detail of primary molt in the left wing of an adult Barred Owl





The two young Barred Owls (left and middle) show the typical fluffy looking body feathers of a juvenile bird. Note that the wing feathers of the juvenile in the middle look similar to those of the adult to the right—its surrogate parent.

Aging Barred Owls in Rehabilitation Settings

Reasons

- Basic age information is important in determining which birds need to be returned to their home territories in the fall and winter for release (adults that hatched before the current breeding season), and which birds do not need to be released where they were found, but instead could potentially fare better if released in suitable habitat without a resident pair already in attendance (dispersing owls that hatched during the most recent breeding season).
- Aging information can help in determining when/if to release a bird with an obvious handicap, such as a serious eye injury. (Dispersing birds may need a longer recovery time compared to adults with the same injuries, since they are less experienced hunters and are hunting in unknown territory.)
- Age determination may help rehabilitators decide which non-releasable birds are good candidates for placement.

Appropriate Age Class Distinctions for Barred Owls in Rehabilitation Settings

In most rehabilitation settings, it is appropriate to age post–fledging Barred Owls as:

- **Hatch year/second year (HY/SY):**

A juvenile owl that hatched in the most recent breeding season

(In the calendar year in which the owl hatched, the bird is labeled HY and as of the first of January, the same individual progresses to the next age category, SY.)

- **After hatch year/after second year (AHY/ASY):**

An adult bird that hatched before the most recent breeding season

(In the calendar year in which the most recent owls hatched, the bird was already an adult and is therefore labeled AHY and as of the first of January, the same individual progresses to the next age category, ASY.)

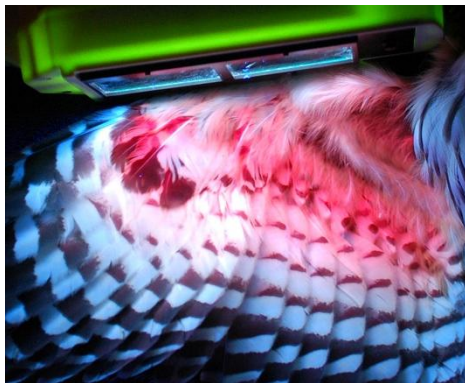
Problems with Aging Barred Owls in Rehabilitation

- When aging a bird, all available information (whether or not it is definitive) should be considered because there are *always* intermediate individuals and exceptions.
- It is recommended that information used for aging birds (typically involving investigating subtle differences in feather characteristics) be gathered immediately after a bird's capture so that any plumage damage incurred from being in a captive setting does not confound the resulting classification. This recommendation is plausible for banders, but one rarely practical for birds aged in a rehabilitation facility since the first priority in an intake exam is not aging the bird, and in most instances, the circumstances that brought the individual into the rehabilitation setting were not ideal for plumage preservation.
- Even under the best of circumstances, in late winter/early spring, plumage damage incurred by normal wear and tear can make subtle differences in feather characteristics harder to detect.
- Again, owls of the genus, *Strix*, appear to have greater variability in molt patterns compared to other owl genera.

Using Aging Techniques in Rehabilitation Settings

Background on Porphyrin Pigments

Owls utilize a family of pigments called porphyrins to color their plumage. In Barred Owl feathers, like the two birds shown below, these porphyrin pigments fluoresce a dark pinkish–red under an ultraviolet light when new, but are degraded by exposure to sunlight. An ultraviolet light source, in the form of a black light, can be shone on the undersides of the wings (an area with reduced exposure to sunlight), and the relative ages of the feathers compared in order to differentiate between HY/SY and AHY/ASY individuals, a technique previously used predominantly in Northern Saw–whet (*Aegolius acadicus*) and Barn Owls (*Tyto alba*).

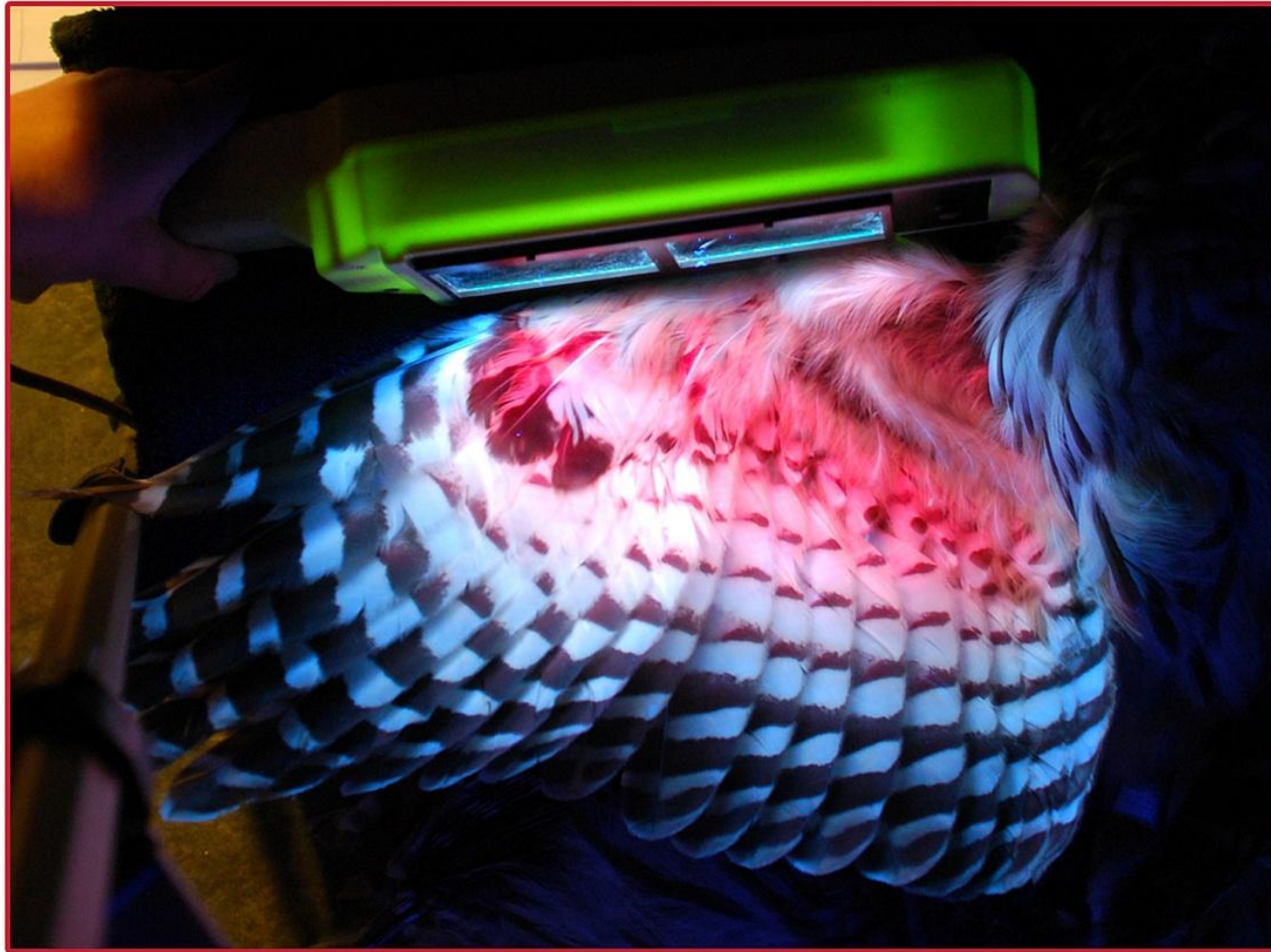


A black light was shone on the underside of the HY Barred Owl (left) and the AHY Barred Owl (right). In this situation the porphyrin pigments in the owls' feathers fluoresce dark pink.

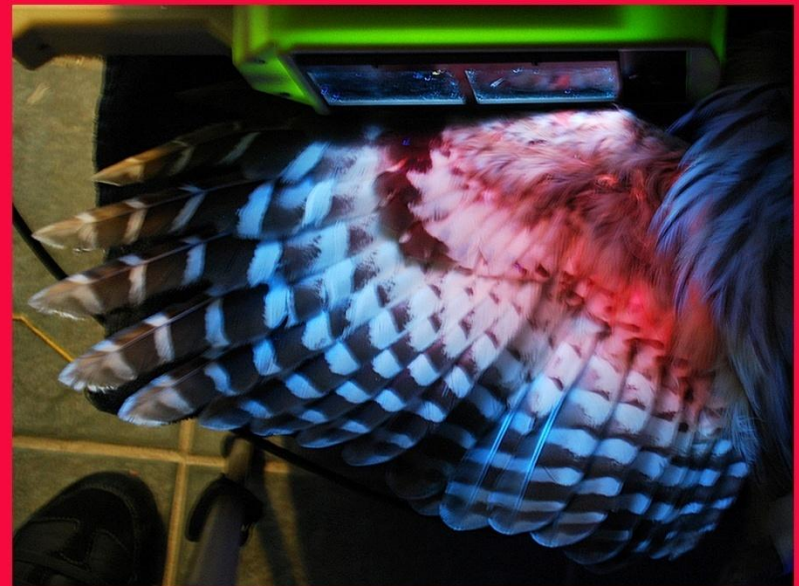
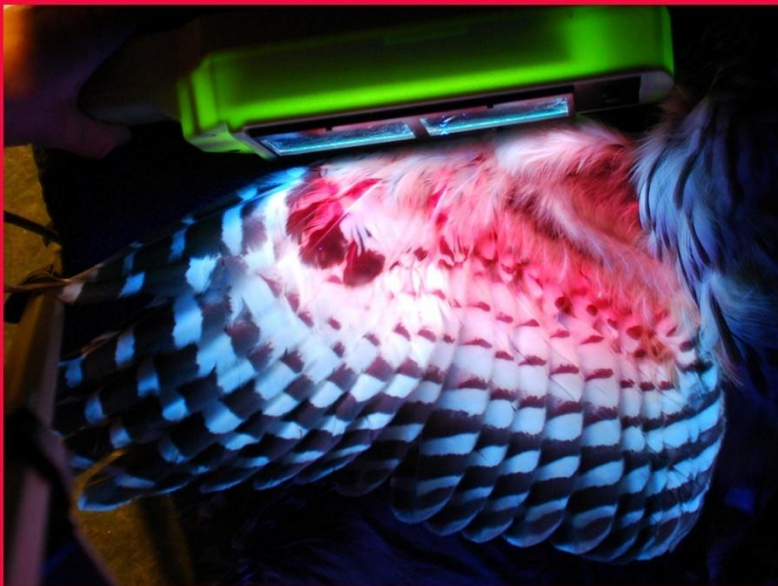


Age Classification Using Porphyrin Fluorescence

HY/SY Barred Owls:



HY/SY Barred Owls, like the one in the photo above, exhibit an even wash of reddish-pink fluorescence across the bases of the primary and secondary feathers, which extends into the underwing coverts.

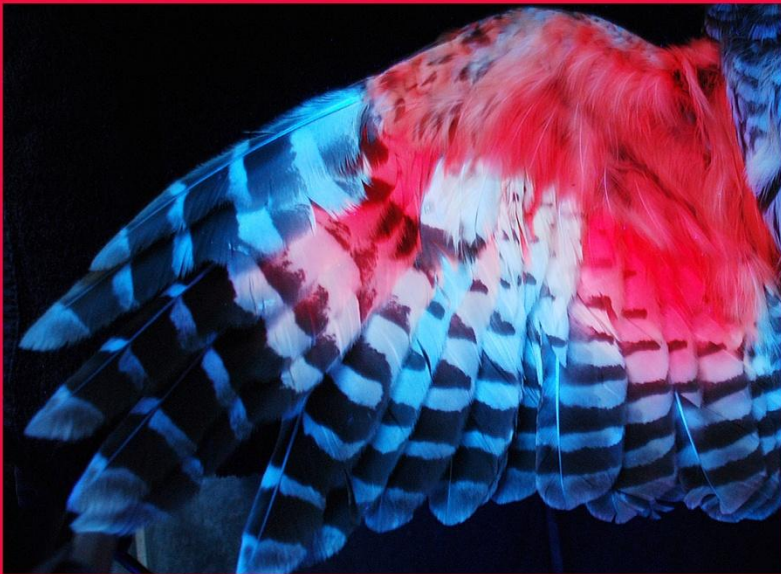
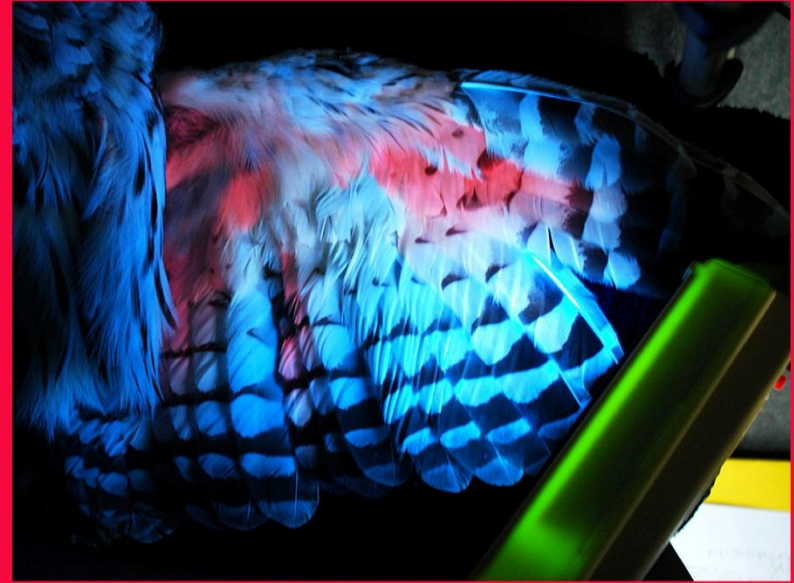


Porphyrin Fluorescence in four different HY/SY Barred Owls

AHY/ASY Barred Owls:



AHY/ASY Barred Owls that have undergone a partial molt, like the one in the photo above, exhibit an uneven wash of reddish-pink fluorescence; newer feathers appear redder and older feathers, whiter.



Porphyrin Fluorescence in four different AHY/ASY Barred Owls

Watch Out!

Due to the differential exposure to sunlight between the proximal and distal portions of the wings, a gradient from the darker red bases of the secondary feathers to the paler bases of the primary feathers could be present adding difficulty to the aging process.

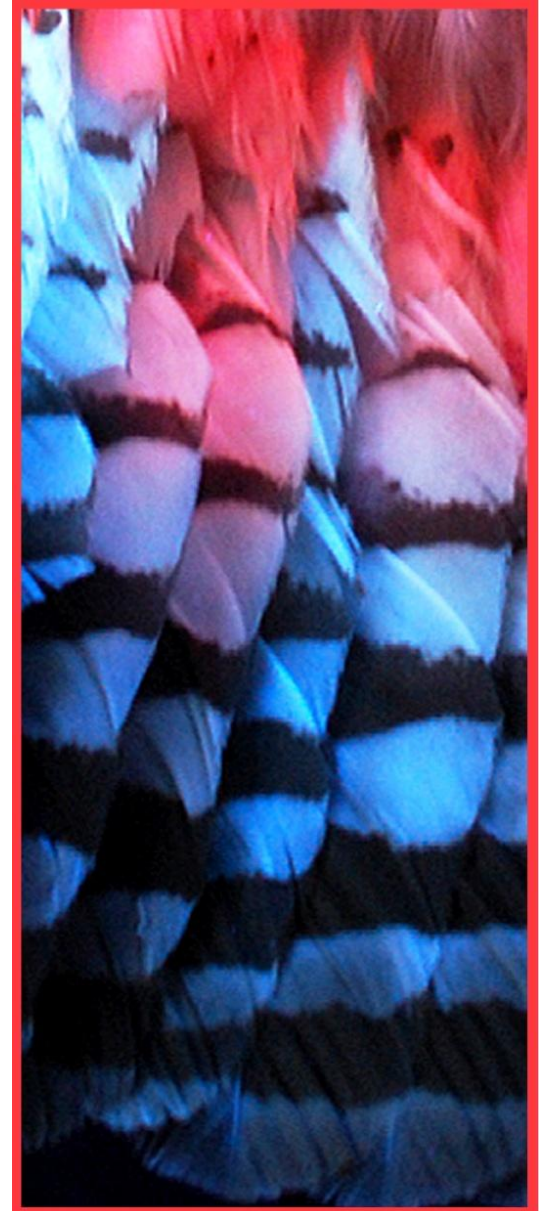
Notice that the proximal feathers of the HY/SY Barred Owl (right) appear to be darker than those toward the wing tip. However, when the outer primaries are lifted (inset), their bases still fluoresce.



What to look for:

HY/SY (right): Adjacent feathers always look similar.

AHY/ASY (far right): Some adjacent feathers look similar, others show a stark contrast.



Advantages of the Porphyrin Fluorescence Aging Technique

- Feather damage from captivity or general seasonal wear and tear does not appear to affect the results (other than reducing the brightness of the fluorescence).
- The method is simple and easy to use in a rehabilitation setting (just remember to protect birds' eyes by covering them).

Biggest Pitfall

Care should be taken if this method is used exclusively.

- Data comparing the fluorescence of juvenal flight feathers with those of adult owls having undergone a *complete molt* are needed. *If* it is possible to differentiate between these two categories using the porphyrin fluorescence method, then Barred Owls could be accurately and quickly aged using *only* this method.
- Therefore it is recommended that porphyrin fluorescence be used *in conjunction* with some flight feather characteristics for best results, especially in the southern parts of the Barred Owls' range.

Age Classification Using Feather Characteristics

This method of aging consists of using evidence such as:

HY/SY

- Narrow, pointed primary feathers
- White V at the tip of the primary feathers
- Pale bars are thinner and more numerous on the flight feathers
- Narrow tail rectrices
- Large white terminal bar on the rectrices
- No evidence of more than one generation of flight feathers based on a lack of color and length contrasts between adjacent feathers.

AHY/ASY

- Wider, squared off primary feathers
- Smudged pale tips on the primary feathers
- Pale bars are thicker and less numerous on the flight feathers
- Wide rectrices
- Large smudged terminal bar on rectrices
- Evidence of more than one generation of flight feathers based on color and length contrasts between adjacent feathers.

Comparing Age Classes Using Feather Characteristics



HY/SY (left): Note how narrow and pointed this primary nine feather (P9 – the second to outermost wing feather) looks and how its pale tip makes a white V.

AHY/ASY (right): Note how wide and squared off this primary nine feather (P9 – the second to outermost wing feather) looks and how its pale tip is a light brown color, not white.



HY/SY (left): Note how the pale bars are thinner and more numerous on the rectrices of this owl. Also note how narrow these feathers are.



AHY/ASY (right): Note how the pale bars are thicker and less numerous on the rectrices of this owl. Also note how wide these feathers are.

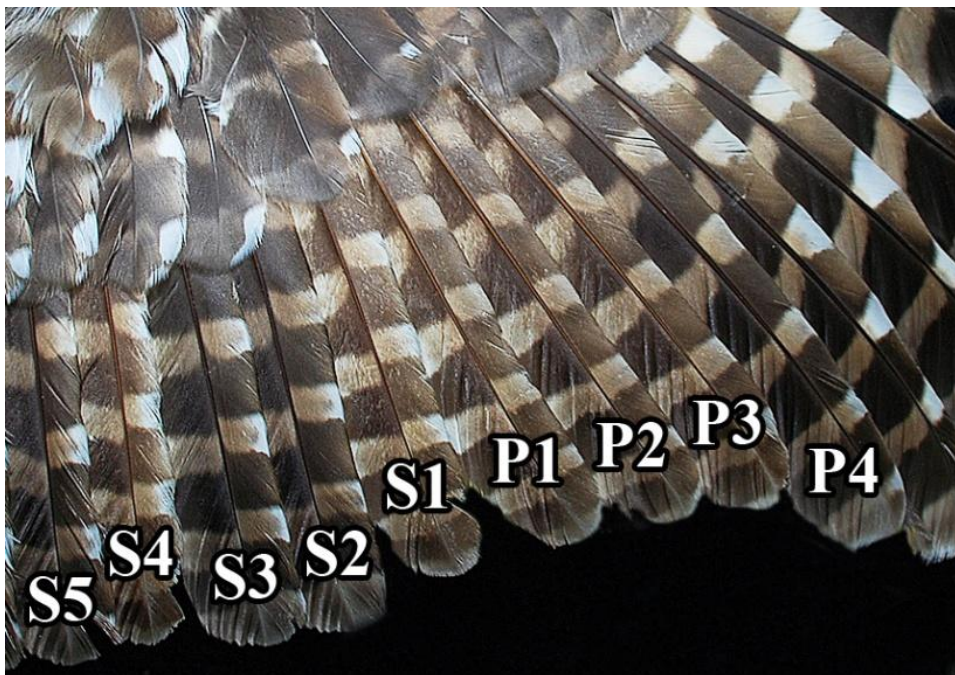


HY/SY (left): Note the large white terminal bar on these tail feathers. The inset shows these terminal bars more clearly.

AHY/ASY (right): Note the large smudged terminal bar on these tail feathers. The inset shows the smudging on these terminal bars more clearly.



HY/SY (left): Note the lack of color and length contrasts between the flight feathers suggesting that these feathers are all from a single generation.



AHY/ASY (left): Note the evidence of more than one generation of flight feathers based on both color and length contrasts. S4, S1, and P1–P3 are all retained juvenal feathers and are shorter and duller looking, while the other feathers pictured here are newer, darker adult feathers.



A Closer Look at Feather Contrasts: Note that length contrasts are not helpful in identifying this bird as an AHY/ASY Barred Owl since the older feathers are also adult feathers. The darker feathers are newer feathers, however, so *color* contrasts are helpful in identifying this individual.

Final Recommendations

It is important to remember that the coloring, as well as the amount of wear and tear exhibited by individual birds, can vary. Variation can occur based on genetic make-up, amount of exposure to sun, hatching date, successful or unsuccessful breeding attempts, health, territory quality, and resource availability, to name a few. When using feather characteristics to age birds there will be situations in which birds can be aged easily because they exhibit several clear indicators, but there will also be situations in which the white tips of a HY/SY bird have worn away or an AHY/ASY bird has faced less-than-ideal conditions and has incurred an unusual amount of sun exposure or feather wear and tear. Due to this natural variation, it is recommended that some flight feather characteristics be used *in conjunction* with porphyrin fluorescence for the most accurate and reliable results. Using this combination of techniques will allow rehabilitators to facilitate the future well-being of the Barred Owl by determining appropriate release sites and times for birds of different ages, as well as allowing rehabilitators to determine which non-releasable birds are the best candidates for placement.



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