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**Photographic Guide  
for Aging Nestling**

**SWAINSON'S HAWKS**

**Daniel N. Gossett and Paul D. Makela  
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**Rara Avis Consultants  
Eaton, Colorado  
and  
United States Department of the Interior  
Bureau of Land Management  
Burley Field Office, Idaho**

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The general format and approach were adopted from nestling aging guides by Marc Moritch (1983a, b; 1985), for Prairie Falcons, Red-tailed Hawks, and Ferruginous Hawks respectively; and Gerald R. Griggs and Karen Steenhof (1993) for American Kestrels. Inspiration for a more useful Swainson's Hawk photographic guide for field use came from the dissertation of Richard Fitzner (1980).

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\* Current Addresses: Rara Avis Consultants  
Daniel N. and Stephanie L. Gossett  
458 Hickory Avenue  
Eaton, CO 80615

Paul D. Makela  
U.S. Bureau of Land Management  
Idaho State Office (ID-931)  
1387 S. Vinnell Way  
Boise, ID 83709-1657

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## INTRODUCTION

The purpose of this guide is to illustrate developmental stages of Swainson's Hawks (*Buteo swainsoni*) to assist researchers in timing nest visits for studies in growth, reproduction and nest productivity. The ability to accurately age nestlings is important for determining nest success (Mayfield 1975) and minimizing disturbance at critical nesting periods (Fyfe and Olendorff 1976).

This guide is based on observations of a single brood. A second nest was monitored with known aged young as well, but it was found that developmental rates varied, likely due to factors including nutrition and differences in habitat type. Caution is advised in aging chicks using this guide without consideration of these other factors including gender, nutrition, position in brood and brood size.

## METHODS

Two Swainson's Hawk nests were studied at several day intervals from hatching to near fledging, on nests that were found during routine raptor nest monitoring in southcentral Idaho. The chicks were photographed using 35-mm black and white and color film; measurements and descriptions of the chicks were documented during each visit. Nest visits were timed to minimize disturbance, and were made during moderate weather conditions to minimize environmental exposure. The observations ended when the young were 39-41 days old, near fledging age.

## RESULTS AND DISCUSSION

Nestlings remained downy until 9-10 days when primary tips began emerging. Rectrice tips began emerging at 13 days. From this period feather development made age classification more discernable. Observable developmental characteristics became more apparent as the young grew until 39-41 days when juvenile feathering was nearly complete.

Sibling aggression was observed between nestlings at 3 and 5 days old at both nests. Three young at these two nests were lost to apparent siblicide by day 20. Whether the siblicide was exacerbated by researcher disturbance, other disturbance, or lack of food from other causes was unclear. Active daily use of a pesticide applicator tractor and Lorsban (chlorpyrifos) pesticide storage occurred on private lands immediately adjacent to the second nest midway through the nesting cycle. Low nestling weights for both Swainson's and Ferruginous Hawks were also seen at a number of undisturbed nests this year. These low weights and some of the nestling losses may have been the result of poor prey availability due to drought conditions. Bechard (1983) reported high nestling mortality in SE Washington from starvation or "fratricide", citing a lack of food as the likely cause.



**5, 3, and 1 day old:** All are white downy, umbilicus is bare, posterior femur is bare. One day old cannot hold head up (lower right). Five day old (left) is 13 cm total length.



**7 and 11 days old:** Grey down with dark undertone. Seven day old (left) has bare umbilicus, no remiges or rectrices, total length is 13.5 cm. Eleven day old (right) has remiges emerging with neossoptile tips especially visible, no rectrices, total length is 14cm.



**9 and 13 days old:** Nine day old (left upper) is 14 cm long, has primary nubs emerging. Thirteen day old (lower right) is 18.5 cm long, is dark downy with light occiput, primary sheaths out, and rectrice nubs are emerging.





**14 and 18 days old:** Fourteen day old (upper) is 18 cm total length, grey-brown downy, egg tooth still present, primaries 1cm, rectrice nubs present. Eighteen day old (lower) is 22 cm total length, scapulars and primary coverts emerging, seventh primary is 3.5 cm. Both have white occiput.



**20 days old:** Grey-brown down, white occiput, primary feathers 5 cm, tail feathers 1.5-1.7 cm. scapular feathers 3.2 cm. Total length is 23.5 cm. Tarsus length is 6.0 cm.





**25 days old:** Brown woolly appearance, white occiput. Scapulars two-toned, breast- two brown single strips, legs downy. Primaries 9.4 cm, tail 4.6 cm. Head-auriculars- slight brown feathers visible. Total length (ToL) is 29 cm. Tarsus length is 6.5 cm.



**27 days old:** Dorsal surface 50% feathered, wide scapular stripes, wing coverts showing through down. Seventh primary length is 11.4 cm, tail length is 5.7 cm, tail coverts 2.5 cm. Head has pin feathers within down, small brown auriculars. Total length is 29.5 cm. Tarsus length is 6.6 cm.



**27 days old:** Ventral surface-- Belly has two feathered flank stripes (by researcher's right thumb), two barely visible belly stripes, half-dollar size bare umbilicus. Downy legs. Note small auriculars on head.



**29 days old:** Dorsal surfaces mostly feathered (60%) with down on back. Wing-- Seventh primary 137 mm., tail length 69 mm, tail coverts 38 mm. Head has white occiput, pin feathers on crown and occiput 3 mm., auriculars 8 mm, tan/brown. Total length is 32 cm.





**29 days old:** Head mostly grey downy with white occiput, pin feathers 3 mm. Small feathers-- Auriculars 8mm, tan/brown. Feathered belly stripes, bare umbilicus, one-half dollar size.



**32 days old:** Dorsal-- Wing well feathered, seventh primary 14.7 cm. 2.5 cm downy stripe on back. Tail length 8.6 cm, coverts 4.2 cm. Head-- Auriculars almost eye size, pin feathers out 25% on crown. Total length is 33 cm.





**32 days old:** Ventral-- Abdomen and breast-two feather tracts 2.5 cm wide, two axillary (flank) strips feathered about 2.5 cm wide. Legs are downy with brown speckled feathering. Light brown undertail coverts.



**34 days old:** Dorsal surface appears totally feathered with small downy patches each side of middle. Seventh primary 16.6 cm long, tail length is 9.7 cm. Head-30-40% of crown feathered, auriculars eye size. Total length is 36 cm, tarsus length is 7 cm.



**34 days old:** Ventral surface is 50% feathered, legs are mottled with about 30% feathering.



**37 days old:** Dorsal surface appears totally feathered. Seventh primary is 17.3 cm., tail length is 11.5 cm. Tail coverts 6.5 cm. Crown is 60-70% feathered, auriculars are larger than eye size. Total length is 38 cm, tarsus length is 7.2 cm.





**37 days old:** Ventral surface-- Breast is about 70% feathered, legs are mottled-about 60-70% feathered.



**39 days old:** Ventral breast and abdomen have downy center, legs are about 75% feathered. Downy ring appearance around eye on side of head.





**39 days old:** Dorsal-- Well feathered with wing coverts and scapulars. Seventh primary is 20.7 cm., tail length is 12.4 cm. Total length is 39.5 cm., tarsus length 7.2 cm.



**41 days old:** Ventral surface is mostly feathered with central downy patch. Head is about 90% feathered, auriculars about twice the eye size. Legs are mostly feathered.



**41 days old:** Dorsal surface well feathered, downy patch behind cere. Tail length is 13.7 cm.

## **Glossary\***

Auriculars - Feathers covering the ear opening and the area immediately adjacent.

Cere - The fleshy portion above the beak, where the nares or nostrils are located.

Coverts - Collectively refers to all feathers of the wing and tail above the remiges and rectrices.

Dorsal - Refers to the back side of the bird.

Flank - Side of the body under and below the wing.

Neossoptile - Natal down that remains attached to newly erupted juvenile feathers.

Occiput - The back of the head.

Primaries - The long feathers on the distal wing segment. The 7<sup>th</sup> primary is the 4<sup>th</sup> from the wing tip.

Rectrices - Tail feathers.

Remiges - Collective term for primaries and secondary flight feathers.

Scapulars - A group of feathers on the shoulder, along the side of the back when wings are folded.

Secondaries - Long feathers on the middle wing segment.

Sheath - Keratin material on newly developed juvenile feathers- “pin feathers”.

Siblicide -Fratricide - aggression between young in nest resulting in death.

Ventral - Anterior or front of bird.

\* Source: Pettingill 1970.

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