

EXTREME VARIATION IN THE TAILS OF ADULT HARLAN'S HAWKS



William S. (Bill) Clark

Many adult Harlan's Hawks have tails somewhat similar to this one



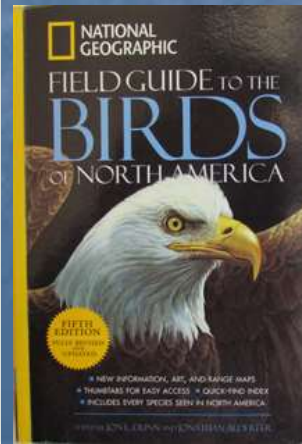
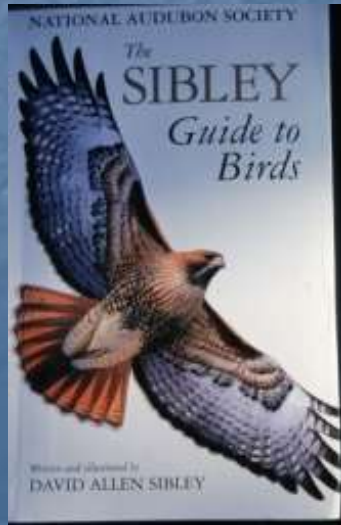
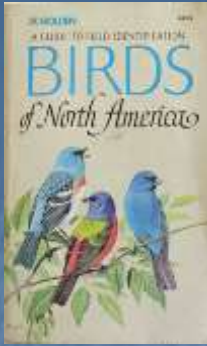
**Bob
Dittrick**

But many others have very different tails, both in color and in markings

ADULT HARLAN'S HAWK TAILS

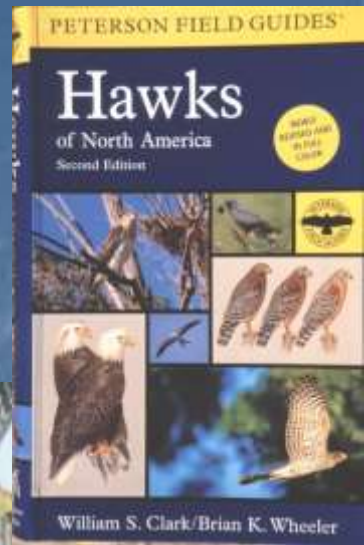
BIRD FIELD GUIDES show only a few of the many variations in tail patterns

They usually depict only gray tails



Even specialty raptor guides show only a few of the many variations in the tail pattern of adult Harlan's Hawks

HAWKS II



Harlan's Hawk adult —tail variations

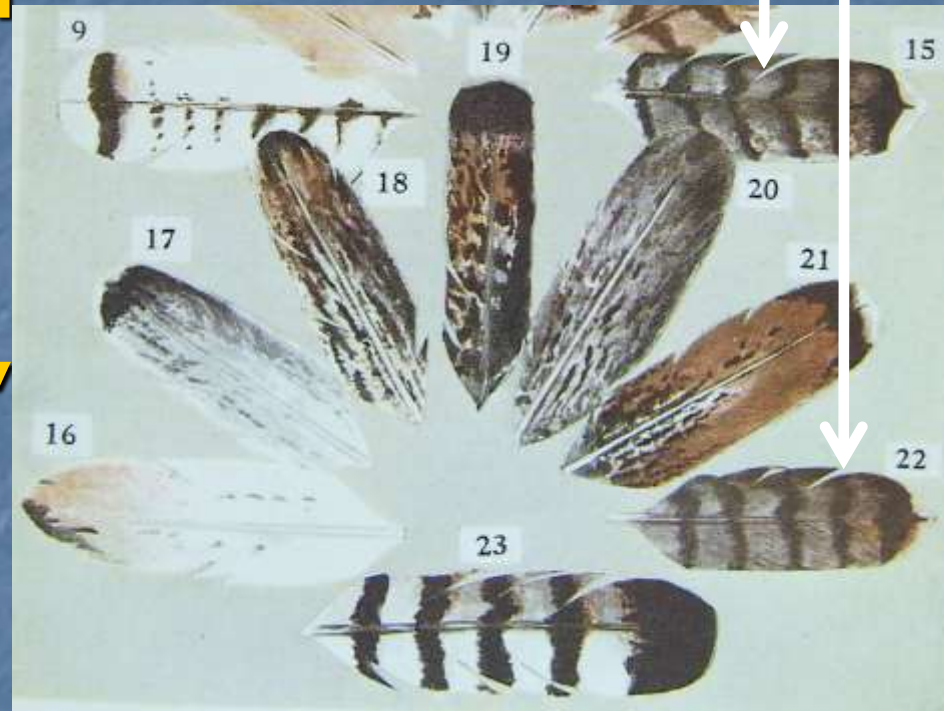


Peterson series: Hawks

ADULT HARLAN'S HAWK TAILS

Taverner (1927) showed a larger sample. Most are gray, from whitish-gray (9 & 16) to light (17) to darker gray (20), to mostly rufous (21), with a variable amount of mottling & grizzling.

15 & 22 are juvenile tails



Subterminal band can be narrow (9) to wide (23), dusky (20) to black (19), ill-defined (18), missing (16), or sharply defined (17).

Taverner, P. A. 1927. A study of Buteo borealis, the Red-tailed Hawk, and its varieties in Canada. Victoria Mem. Mus. Bull. No. 48 Biol. Series 13:1-25.

ADULT HARLAN'S HAWK TAILS

Few museum collections have enough adult specimens to show the large range of variation in their tails. (However, U of Mich. has > 100)
NOTE THAT NO TWO TAILS ARE EXACTLY ALIKE!

Royal Alberta
Museum



And that
many
show
some
rufous

U of Iowa



Photos of adult Harlan's Hawk tails of specimens used herein were taken in many of the museums listed in the next slide.

I thank the curators & collection managers for their help and for permission to use these valuable resources.

Photographers of tails of live hawks are noted throughout, except for mine.

Academy of Natural Sciences, Philadelphia; American Museum of Natural History; Arkansas State U; Bell Museum (U. of Minn); Boise State U bird collection; Burke Museum (U of WA); California Academy of Science; California State U Long Beach bird collection; Canadian Museum of Nature; Carnegie Museum of Natural History; Cincinnati Museum of Natural History; Conner Museum of Natural History (Wash. State U); Cowan Vertebrate Collection (U of BC); Delaware Museum of Natural History; Denver Museum of Nature & Science; Field Museum; Golden Gate Raptor Observatory; Heard museum of Natural History; LSU Museum of Natural Science: Ornithology; Monte L. Bean Museum (BYU); Museum of Comparative Zoology (Harvard); Museum of Natural History, U of Iowa; Museum of Southwestern Biology (U of NM); Museum of Vertebrate Zoology (U of CA); Museum of Wildlife & Fish Biology (UC Davis); Museum of Zoology, U of Mich.; National Fish & Wildlife Forensics Lab; Natural History Museum of LA County; Nebraska State Museum; North Carolina State Museum; North Dakota State U Bird collection; Peabody Museum (Yale); Philadelphia Academy of Natural Science; Philip L. Wright Zoological Museum (U of MT); Oklahoma State U; Sam Noble OK Museum of Natural History; Peregrine Fund; Royal Alberta Museum; Royal British Columbia Museum; Royal Ontario Museum; Royal Saskatchewan Museum; San Diego Natural History Museum; Slater Museum (U. of Puget Sound); TCWC collection, Texas A & M; UCLA – Dickey Bird and Mammal Collections; U of AK Museum; U of AB bird collection; U of AZ bird collection; U of CO Bird Collection; U of Kansas Natural History Museum; U of MO bird collection; U. S. National Museum; Utah Museum of Natural History; Western Foundation of Vertebrate Zoology; & Yukon College.

Extreme



Adult Harlan's Hawk.
Susan Sembrich, Artist
photo by © William S. Clark

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NOTE: Figures mentioned in the text and preceded by a "W" (i.e., Fig. W118-W122) appear in an expanded online version of this article: ehs.org/birding/v41n1p36ark1.pdf



Variation in the tails of Adult Harlan's Hawks

The distinctive "Harlan's" Hawk, currently classified as a subspecies (*Buteo harlanii*) of the widespread Red-tailed Hawk, shows extreme variation in the color and pattern of the tail. This article summarizes and presents extensive photographic documentation of variation in the tails of Harlan's Hawks.

John J. Audubon in 1831 described Harlan's Hawk and sent the type specimen to the British Museum. It has been alternatively considered a separate species, *Buteo harlanii* (from the 1830s to 1901, as well as from 1944 to 1973), and a subspecies of the Red-tailed Hawk, *B. jamaicensis harlanii* (from 1891 to 1994 and from 1973 to the present). Harlan's Hawk breeds in Alaska (except for the coastal southeast), the Yukon Territory, extreme northwestern British Columbia, and much of the Northwest Territories. Its winter range is large, including southwestern British Columbia and most of the western and central U.S., east to Illinois and Louisiana. Throughout the winter range, Harlan's Hawk occurs locally with and less commonly than various other subspecies of Red-tailed Hawk.

Overview of Variation in Harlan's Hawk
Tails of adult Harlan's Hawks are illustrated in various field guides as pale to medium gray with some dark mottling and a more-or-less well-defined darker subterminal band (e.g., Peterson 1980; Robbins et al. 1983; Schley 2000; Dunn and Alderfer 2006). Several of these guides include just one illustration. Specialty raptor guides (Whistler and Clark 1990; Clark and Wheel-



Adult Harlan's Hawk.
Tessa, Designer
photo by © William S. Clark



My article in *Birding*

ADULT HARLAN'S HAWK TAILS

All adult Harlan's whose tails are shown are pure *harlani* lacking any Red-tail traits (not hybrids)



Light-morph



Dark-morph



Mus. of Southwest Biology



Canadian Mus. Of Nature

All Harlan's whose tails are shown are pure *harlani* lacking any Red-tail traits (not hybrids). Dark adults (85%) are like this:



British Columbia

Blackish plumage with white bases, often usually forming white breast marks, one or more secondaries unbarred, whitish undertails, & other traits.

All Harlan's whose tails are shown are pure *harlani* lacking any *Red-tail* traits (not hybrids). Light adults (~ 10%) are like this:

Al Hinde



White throat & streaks on forehead. Often one or more secondaries unbarred or widely barred. Blackish markings on white underparts and under wing coverts

HARLAN'S HAWK differs from RED-TAILED HAWK

harlani

jamaicensis calurus



Washington



British Columbia

This presentation is on The Peregrine
Fund's Global Raptor Information
Network web site. See next slide for URL:

Harlan's Hawk differs from Red-Tailed Hawk, *Buteo jamaicensis calurus*, by:

1. Adult plumage by color morph especially in tail pattern and color;
2. Harlan's adult & juvenile plumages are almost alike; those of Red-tails differ;
3. Frequency of color morphs; &
4. Extent of bare area on the tarsus.

For a presentation explaining these differences, go to:

<http://www.globalraptors.org/grin/ResearcherResults.asp?resID=155>

And scroll down to 'Publications' and click on 'pdf' after 'Harlan's Hawk differs...'

Adult Red-taileds differ from Harlan's



Washington



California

Rufous morph



Dark morph

Dark brown plumage, dark throat & no streaks on forehead. Wide malar. Secondaries narrowly barred. Brown markings on buffy underparts and under wing coverts

RED-TAILED HAWKS

Tails of adult Red-tails vary little;
>99% are like one of the six below



RED-TAILED HAWKS

Many adults from British Columbia & Alberta have noticeably banded tails

All Beaty Museum - UBC



Possible Hybrid
with *harlani*

RED-TAILED HAWKS

Adults from se
Alaska and coastal
BC: *B. j. alasensis*



Beaty Museum
U. British
Columbia

Field
Museum



Here is the first sample showing variation in adult *harlani* tails. These tails show little rufous.



Here are more examples of extreme variation in adult *harlani* tails



Yet more

CSU-LB



KU



ROM



OU



Iowa



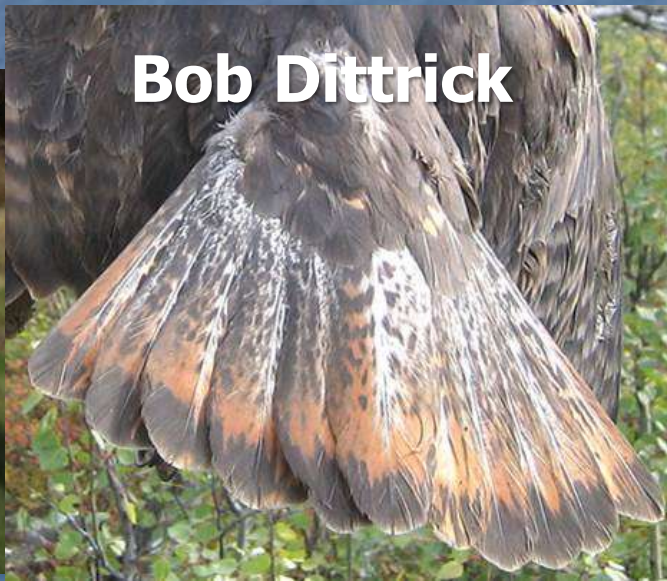
USNM



UMich



& more



& more

Umich



MCZ



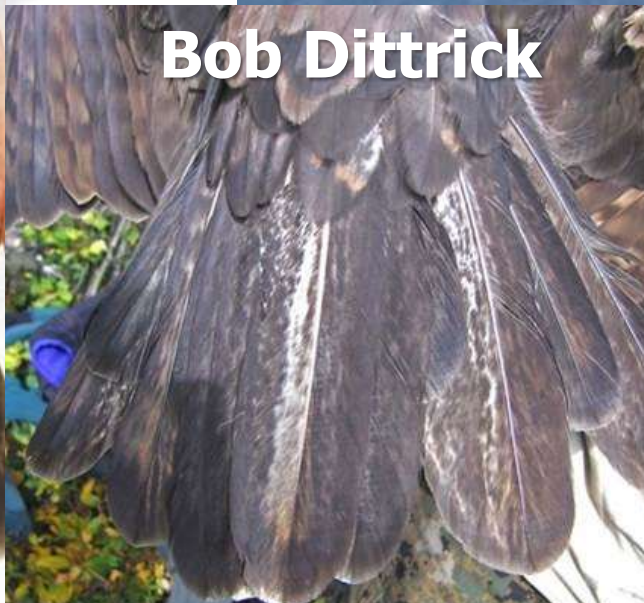
MCZ



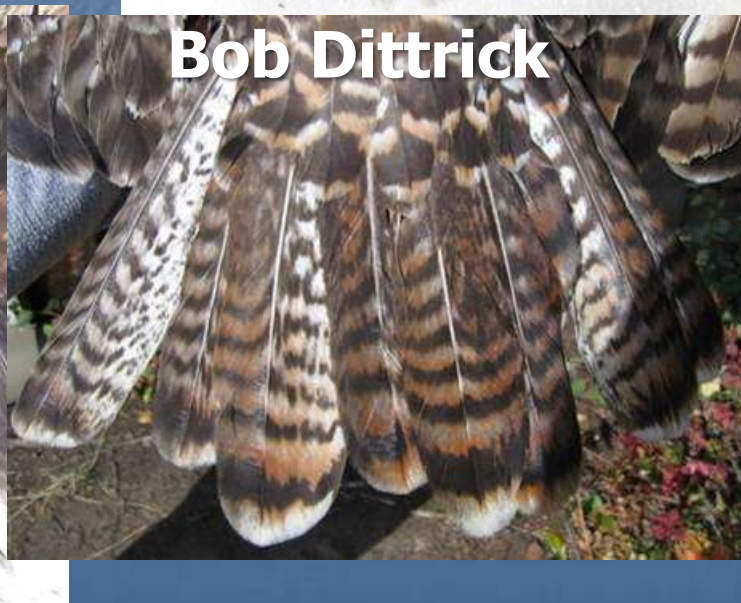
MCZ



Bob Dittrick



Bob Dittrick



& even more



Even more

CAS



ROM



UMich



Burke



Umich



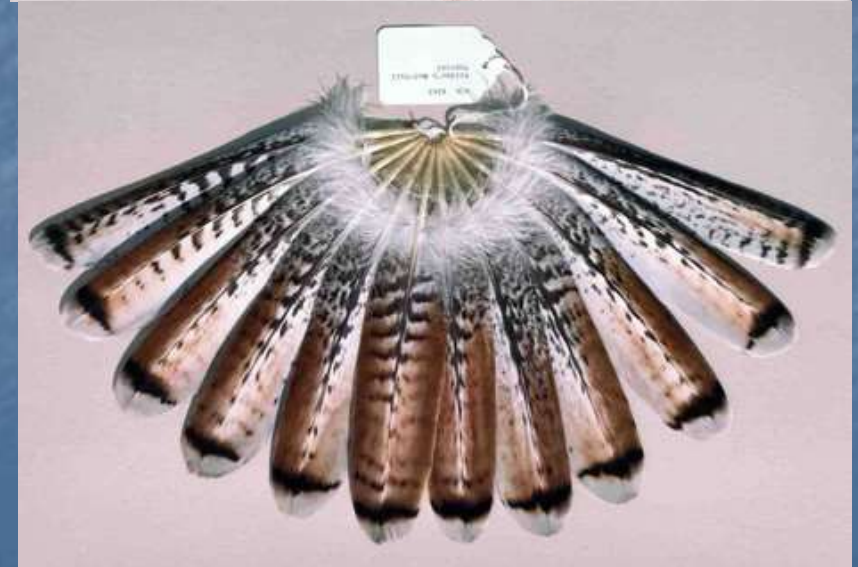
UNeb



Finally...



Spread Harlan's Hawks adult tails courtesy of Bill Voelker



% rufous in the tails of 554 adult Harlan's



None or <10% **254** **46%**



10-50% **158** **28%**



>50% **143** **26%**

Oberholser 1974

The Birdlife of Texas

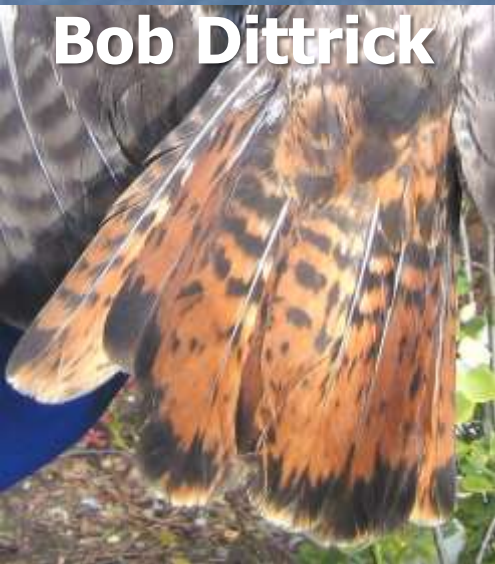
'Over the years much ink and paper have been used in attempts to show exactly how many reddish freckles a Harlan's can have on its tail without being a Redtail.'

Examples of variation in rufous adult *harlani* tails; none are like adult tails of *Buteo jamaicensis*. (1 of 2)



Examples of variation in rufous adult *harlani* tails; none are like adult tails of *Buteo jamaicensis*. (2 of 2)

Bob Dittrick



CMN



UAlberta



Umich



Montana



RoyalBC



Rufous adult *harlani* tails often show wide dark banding on the base, narrowing toward the tip; some show dark mottling and speckling as well. Bands often do not extend to subterminal band, with an unbanded area above it.



Remember that almost all adult tails of Red-tailed Hawk look like these:



Always uniform rufous base and a variable amount of narrow dark bands

Jim Lish prepared this composite using two of Bill Voelker's pics

Red-tail adult

Harlan's adult



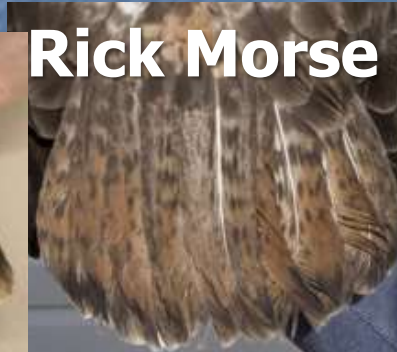
Harlan's on the right shows wider and wavier banding, thicker at base.

Rufous adult *harlani* tails often show areas of other colors, usually white or gray.

Subterminal band is often wide & irregular in width and pattern, absent on some feathers or parts of feathers.



Rufous Harlan's tails are variable & many have dark bands wider at the base, often with a gap in banding above the wide & irregular subterminal



A few adult Red-tail specimens (out of > 1000) have *harlani*-like tail markings

All four were otherwise pure adult Red-tails.

Is this due to gene flow with *harlani*? Or chance odd expressions of ancestral *Buteo* traits?

PA



CA



Umich



CAR



MICH

FL

Juvenile dark Harlan's tails are distinctive & variable 1



Texas



Texas



BELL



UBC



Al Hinde



BYU



CAR



KU

Dark bands are wide & often wavy. 'Spike' on last band often forms hourglass. Pale bands are often whitish. Sometimes shows with spots on tips.

Juvenile dark Harlan's tails are distinctive & variable 2



Dark bands are wide & often wavy. 'Spike' on last band often forms hourglass. Pale bands are often whitish. Sometimes shows with spots on tips.

Tails of dark juveniles sometimes show pale spots on the tips

Jim Lish



**New adult
rufous feathers
in dark-morph
juvenile tail**

**This tail is clearly
that of a juvenile
Harlan's Hawk.
No juvie Red-
tailed Hawk has a
tail like this.**



USNM

**New adult rufous
feathers in Cody Fields
intermediate-
morph juvenile tail**



**This tail is clearly that of a juvenile
Harlan's Hawk. No juvie Red-tailed Hawk
has a tail like this.**

**New adult
rufous feather
in dark-morph
juvenile tail**

**This juvenile
Harlan's Hawk
has started molt
into adult
plumage**

**No juvie Red-
tailed Hawk
looks like this**



NWT Oct.

Doug Tate

Rufous in the tails of adult Harlan's Hawks might be the result of interbreeding with Red-tailed Hawks, which is happening, especially in areas of western Canada.

Some adjacent breeding Red-tails show tails that show grey, wide irregular banding, mottling, grizzling, & other *harlani* traits.

HARLAN'S HAWKS ARE & HAVE BEEN BREEDING WITHIN THE RED-TAILED HAWK RANGE IN WESTERN CANADA

For a presentation explaining the extent of overlap in breeding, go to:

<http://www.globalraptors.org/grin/ResearcherResults.asp?IresID=155>

And scroll down to 'Publications' and click on 'pdf' after 'Harlan's Hawk are & have been...'

Pattern and color can also vary among feathers in some adult tails 1



Pattern and color can also vary among feathers in some adult tails 2



Pattern and color can also vary in individual tail feathers





Dark and light-morph adults can have similar tails

Royal Saskatchewan Museum

Tail of Audubon's *harlani* type specimen. Tail is medium gray with a hint of rufous and some wavy banding on some feathers.

I have not found a similar tail on more than six hundred other adult Harlan's Hawks.



Some juvenile Harlan's Hawks have adult-like tails



Adult *harlani* have distinctive tails that almost always differ from those of *Buteo jamaicensis*.

These vary greatly in color from white to pale gray to dark gray to rufous or some mix of the above, with characteristic dark mottling, irregular barring, and a vague dusky to crisp dark subterminal band.

No two tails seem to appear exactly the same; even feathers differ.

In summary, tails of adult Harlan's Hawks show a large range of variation; those of Red-tailed Hawks are much more alike, with little variation.

Tail variation is a trait of *harlani*

Why and how do they show such variety in their tails?

Thanks to Bill Voelker for permission to use his spread tails.

Thanks also to Ryan Brady, Bob Dittrick, Cody Fields, Al Hinde, Buzz Hull, Jim Lish, Rick Morse, Betsy Rosencrans, Ted Swem, Doug Tate, Step Wilson, and many other photographers for the use of their photos.

Thanks again to the curators and collection managers at many museums for permission to look at and study their valuable skin collections.

THANKS FOR YOUR ATTENTION



Thanks also to The Peregrine Fund (especially Lloyd Kiff & Travis Rosenberry) for making this presentation available on their Global Raptor Information Network (GRIN) web site