

HARLAN'S HAWK differs from RED-TAILED HAWK



harlani



Buteo jamaicensis calurus

William S. (Bill) Clark

HARLAN'S HAWK:

described as *Buteo harlani* by Audubon (1830), based on his Louisiana adult specimen.



Ornithological
Biography i:442-443.

Type specimen is in
the British Museum



TAXONOMIC HISTORY

1833-1891: Species: *B. harlani*

1891-1944: Subspecies of Red-tailed Hawk: *Buteo jamaicensis harlani*, but without taxonomic justification. AOU 1891.

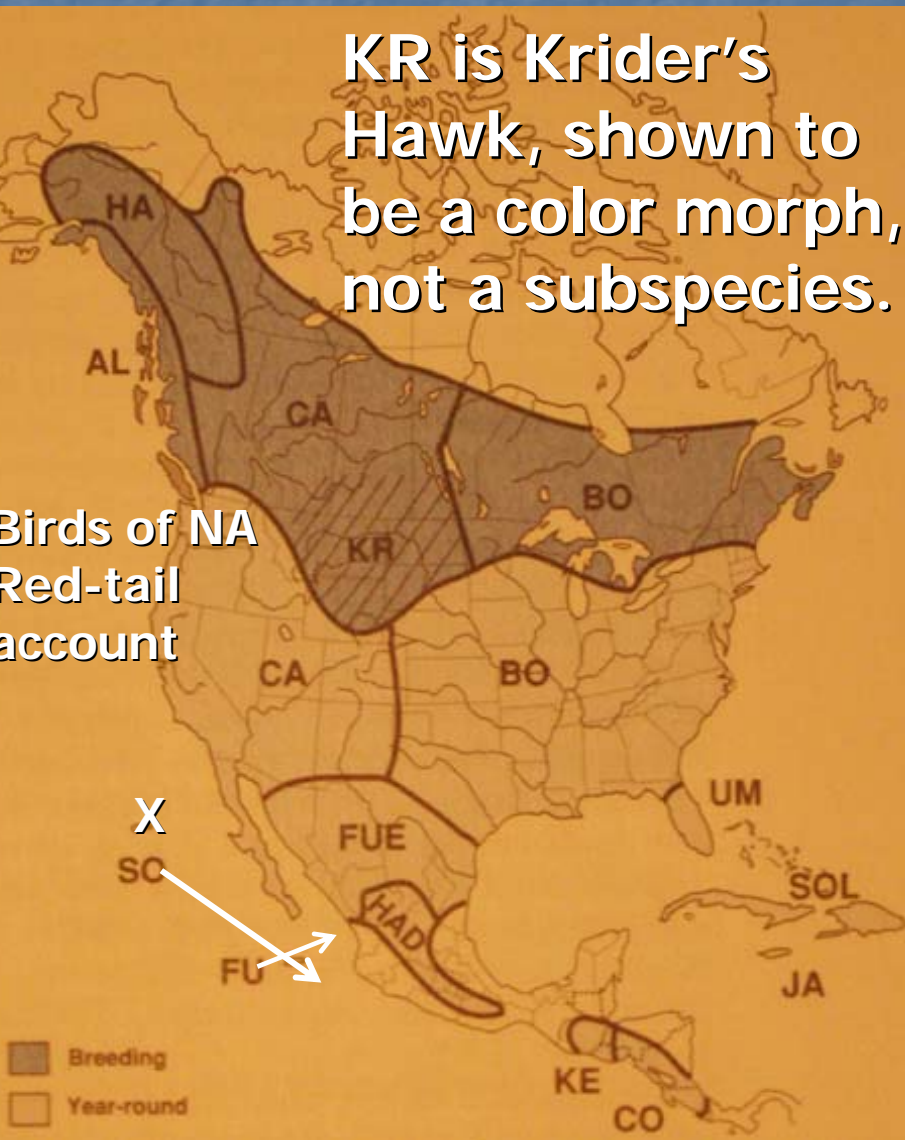
1944-1973: Species: *B. harlani*, : with justifications given for separation. AOU 1944.

1973 to present: Subspecies of Red-tailed Hawk: *Buteo jamaicensis harlani*, but without taxonomic justification. AOU 1973.

Red-tailed Hawk subspecies and ranges

KR is Krider's Hawk, shown to be a color morph, not a subspecies.

Birds of NA
Red-tail
account



- HA *harlani*
- AL *alascensis*
- CA *calurus*
- BO *borealis*
- FUE *fuertesi*
- UM *umbrinus*
- HAD *hadropus*
- CO-KE *costaricensis*
- SOL *solitudinus*
- JA *jamaicensis*
- SO *socorroensis*
- FU *fumosus*

Plumage differences among the (other) 11 subspecies of *jamaicensis* are minor



Tails are much the same in all races



B. J. socorroensis is similar to *calurus*

Plumage differences among the (other) 11 subspecies of *jamaicensis* are minor



Canadian Mus. of Nature



U. of Michigan



U. of British Columbia

B. j. costaricensis

B. j. jamaicensis

B. j. alascensis



Peabody Museum



Carnegie Mus. Nat. Hist.



U. of British Columbia

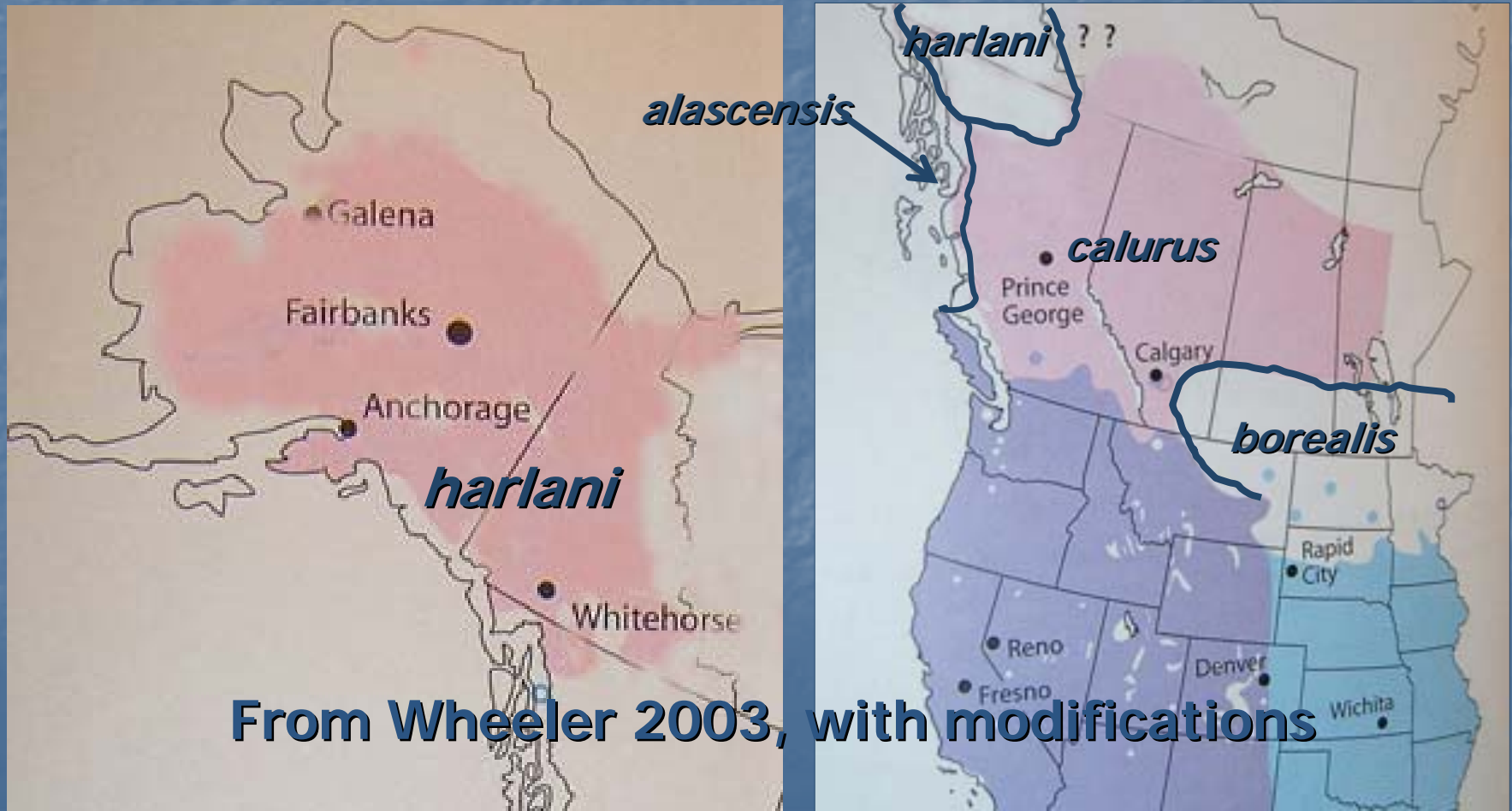
B. j. hadropus

B. j. umbrinus

B. j. fumosus

Breeding Ranges

Harlan's Hawks breed in Alaska, Yukon, nw BC, and the far north of NWT. The ranges of three (other) subspecies of Red-tails are shown.



From Wheeler 2003, with modifications

To better understand both Harlan's Hawks and Red-tailed Hawks, especially their plumages, I

*examined and photographed >2500 adult specimens in most major museums.

*measured bare tarsi of 453 specimens of these taxa taken in breeding season, either taken at the nest or during June-August.

*took photos of >500 migrating adult Harlan's Hawks in se Alaska for ten days each in April 2008 & 2010.

*captured and examined in hand > 300 hawks & collected hundreds of photos of these taxa.

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

1. Adult plumages 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.

1. Adult plumages differ: light-morph



Harlan's adults are black and white.

Red-tailed adults are rufous-brown and buffy.

ALL light-morph adult *calurus* differ from all light-morph adult *harlani*

HYBRIDS

More than 100 museum specimens and many hawks in the wild have shown a mix of traits and are most likely hybrids.



U. Of Michigan



These are not considered in this discussion of plumage differences

Differences between *harlani* and *calurus*



Adult Red-tails always show narrowly barred secondaries with a wide subterminal band. Adult Harlan's often show mottled, unbarred, or lightly barred secondaries, as well as wider & often irregularly marked subterminal band.

Adult Red-tailed Hawk (specifically *calurus*) traits



They have a rufous-buff wash on the underparts and under wing coverts. Most Red-tails are light morph.

They have brown heads with wide dark brown malars and dark throats. Heads lack white streaking. Secondaries always show narrow banding.

calurus traits

Adult tail: uniformly rufous with dark subterminal band, lacking mottling and irregular banding, with narrow dark bands in some adults. Little variation.

Warm brown body feathers have buffy bases. Never shows white streaks on breast or head.

Dark throats (*calurus* & *alascensis*).

Wide dark malar on adults.

Adult secondaries always regularly barred.

Juvenile tail: Dark bands narrow & regular. No dark spikes on tips.

harlani traits

Adult tail: Highly variable, often rufous. Usually mottled or with irregular wavy banding or both. Usually with indistinct dusky to crisp wide dark subterminal band. Often feathers in a tail have different patterns and colors.

Cold blackish body feathers have white bases, resulting usually in white streaks on breast, forehead, crown, & upperparts.

Adult secondaries are often unbarred.

Whitish throats on all but darkest birds.

Narrow dark malar on light adults.

Juvenile tail: Irregular, thick wavy bands. Dark spikes on tips.

Traits shared by *harlani* and *calurus*

Rufous in the tail and body

Wing shape

Dark patagial marks & belly bands

These are not useful in distinguishing
the two taxa and are not considered
calurus traits

Dark-morph adult Harlan's Hawks are distinguishable

85%



<1% Rare

Red-tail



from adult dark-morph
Red-tailed Hawks.

Dark-morph adult Harlan's Hawks are distinguishable

85% of Harlan's are dark < 1% of *calurus* are dark

LSU Museum of Natural Science



Harlan's below and dark Red-tail above

Dark adult Harlan's Hawks with rufous breasts are distinguishable



Under tails of Harlan's are white; those of Red-tails are pinkish.

from adult rufous-morph Red-tailed Hawks.

Liguori & Sullivan (2010) show and discuss many of these differences



Fig. 7a. Larry Hancock



Fig. 4b. Adam Hutchins



They show a new field mark for Harlan's Hawk adults, the white tufts at the base of the wings.

Adult Harlan's tails can either be gray or can have some rufous & vary a lot



Adult Red-tails always have all rufous tails with a narrow dark subterminal band and sometimes other narrow bands



The rufous in some *harlani* tails could be due to ancestry or to breeding with *jamaicensis*

ADULT HARLAN'S HAWK TAILS

Few museum collections have enough adult specimens to show the variation

Field
Museum



Royal
Alberta
Museum



And many tails
show some
rufous

My article in *Birding*



Extreme

Adult Harlan's Hawk
Yukon Territory, June
photo by © William S. Clark

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NOTE: Figures mentioned in the text and preceded by a 'W' (i.e., Figs. W18-W22) appear in an expanded online version of the article: aba.org/birding/v41n1p136w1.pdf

Extreme Variation in the Tails of Adult Harlan's Hawks

The distinctive "Harlan's" Hawk, currently classified as a subspecies (*Buteo harlani*) 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.

Adult Harlan's Hawk
Texas, December
photo by © William S. Clark

Hawk's

January 2009

John J. Audubon in 1831 described Harlan's Hawk and sent the type specimen to the British Museum. It has been alternately considered a separate species, *Buteo harlani* (from the 1830s to 1891, as well as from 1944 to 1973), and a subspecies of the Red-tailed Hawk, *B. jamaicensis harlani* (from 1891 to 1944 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; Sibley 2000; Dunn and Alderfer 2006). Several of these guides include just one illustration. Specialty raptor guides (Wheeler and Clark 1999; Clark and Wheel-

My presentation: **EXTREME VARIATION IN ADULT HARLAN'S HAWKS' TAILS**



Available on The Peregrine Fund web site GRIN.

Go to: <http://www.globalraptors.org/grin/ResearcherResults.asp?lresID=155>

And scroll down to 'Publications', then click on 'pdf' after 'Extreme tail variation...'

UNDERSIDES OF ADULT TAILS DIFFER

harlani

harlani

calurus



calurus

Western Foundation of Vert. Zoology

Harlan's are white, and Red-tails are pinkish.

Dark-morph adult Red-tailed Hawks tails (n = 26)



- Subterminal band only: n = 5
- Faint narrow banding: n = 9
- Partial narrow banding: n = 9
- Narrow banding: n = 3

None are like
all rufous
Harlan's tails



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

2. Harlan's adult & juvenile plumages are nearly alike; adult and juvenile plumages of Red-tails differ;

Harlan's adults would seem to have evolved juvenile-like plumages.

Adult and juvenile body plumages of Red-tailed Hawks differ

Adult

Juvenile



Light-morph

Adults: dark rufous-brown above & a buffy to rufous wash & barring below

Juveniles: dark brown with white bases above and white with cold brown marks below

Adult and juvenile plumages of Red-tailed Hawks differ

Adult

Burke
Museum



B. j. calurus rufous morph



Juveniles



U of AZ

U. Of British Columbia



B. j. alascensis



Adult



Adult and juvenile plumages of Red-tailed Hawks differ

Dark morph



Adult



Juvenile

Adults have dark brown under wing coverts & breasts, dark feather bases.

Juveniles show white or rufous streaks due to white feather bases.

Adult Harlan's are almost the same as juveniles in body plumage

Royal
Ontario
Museum



Two of the above are adults and two are juveniles, but which are which?

Adult Harlan's are almost the same as juveniles in body plumage

Royal
Ontario
Museum



Adult Harlan's are almost the same as juveniles in body plumage

Adult light

Royal Saskatchewan Museum



University of Alaska Museum



Juvenile light

Harlan's have an intermediate morph not shown by adult Red-tailed Hawks



Adult

5%

Aged by eye color and tail pattern.



Juvenile

Overall blackish but streaked white below, always a white throat. Adult & juvenile body plumages almost the same.

Kevin
Smith

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

3. Frequency of color morphs;

Results are based on > 500 photos of adult *harlani* taken in Alaska and on > 500 *calurus* adult specimens in museums and in hand.

Only four of the Red-tailed Hawk subspecies have a dark color morph: *calurus*, *hadropus*, *costaricensis*, & *socorrensis*.

And only a small fraction of individuals of these subspecies are dark-morph birds. Contra *harlani*, in which the vast majority are dark morph.



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



Feathering extends farther down the legs in *harlani*, compared to *calurus*, with almost no overlap.

4. Extent of bare area on the tarsus.

I noted a difference in the length of bare area on the front of the tarsi between:

harlani &
Adult Juvenile



Juvenile
calurus
Adult



Rick Morse



harlani

Adults



calurus

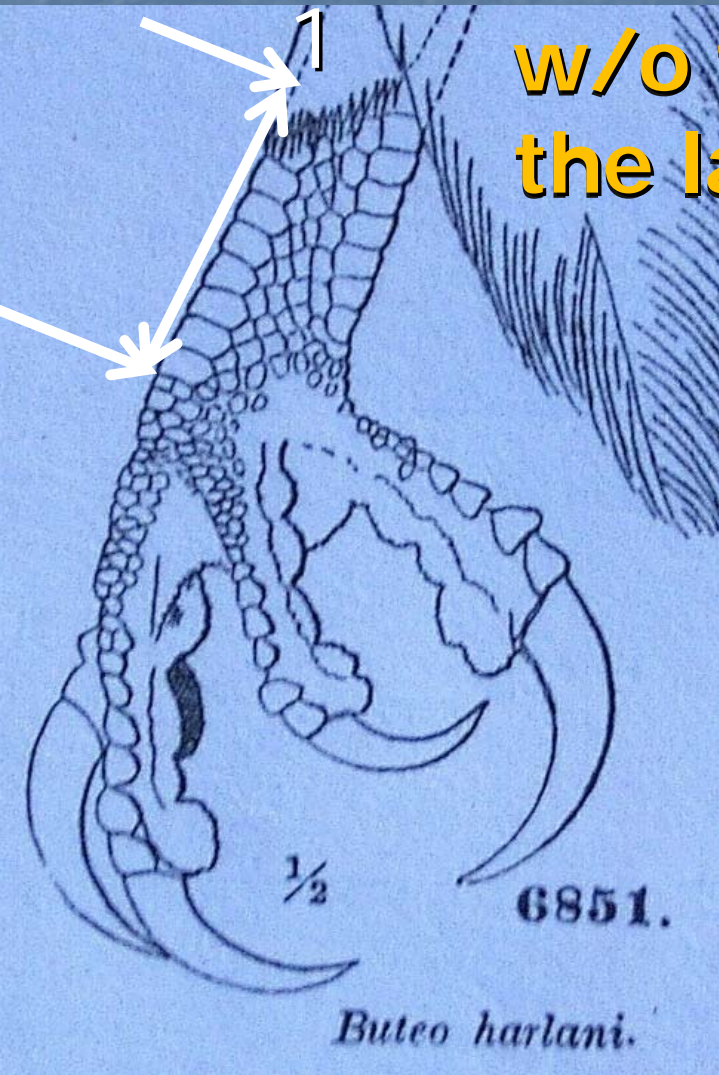


Juveniles



I measured the bare area on the front of the tarsus of all taxa of *jamaicensis*

From the top of the first scute w/o feathers to the bottom of the last large scute



Breeding season

Defined as June through August, especially in Alaska and Canada, or taken on the nest in April or May.

BARE TARSUS MEASUREMENTS:

Breeding season mean:

harlani (90): 32.1 mm

All *harlani* (881): 32.0 mm

Breeding season means:

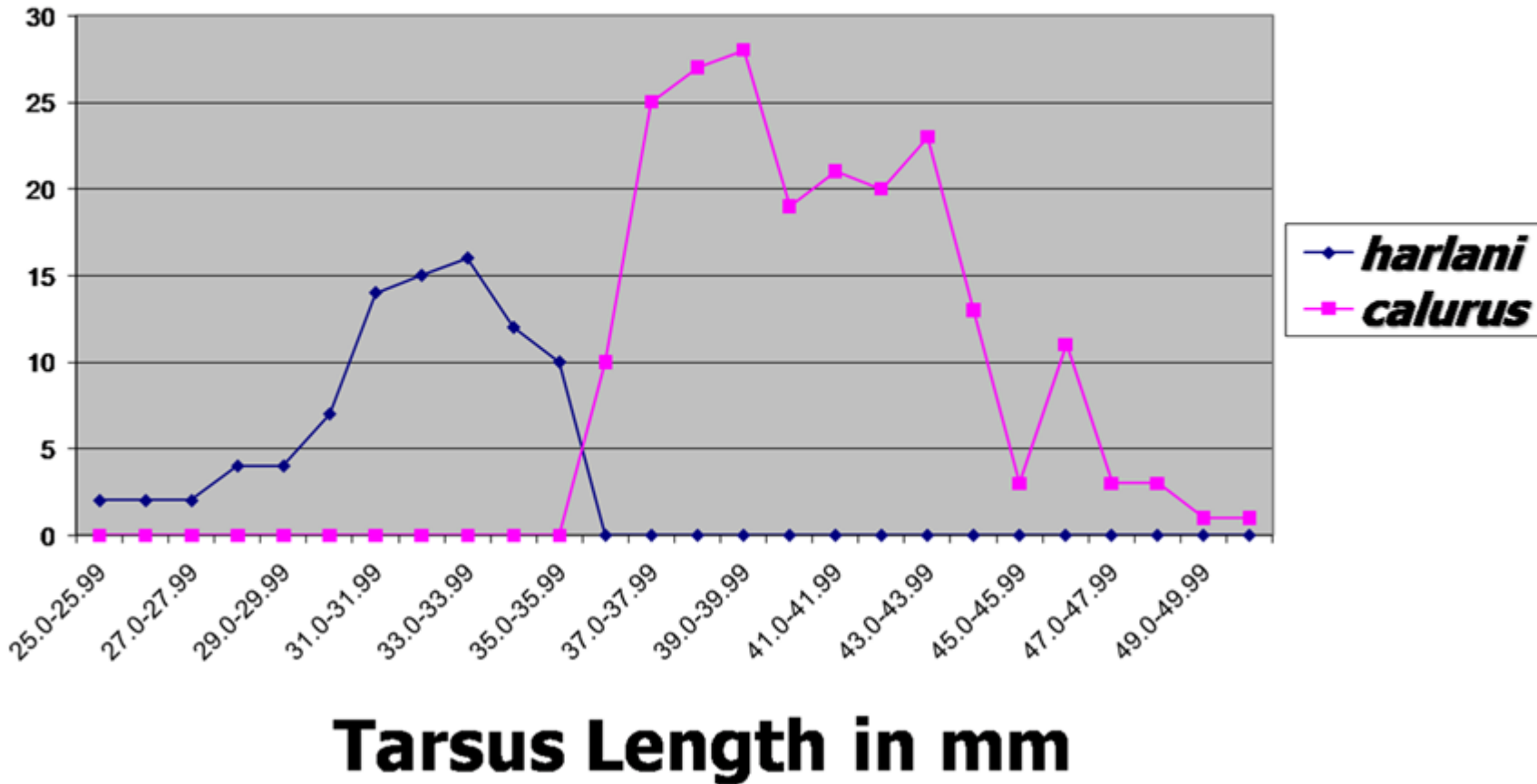
calurus (218): 41.0 mm

alascensis (20): 38.1 mm

borealis (125): 38.7 mm

TARSUS LENGTH

of individuals

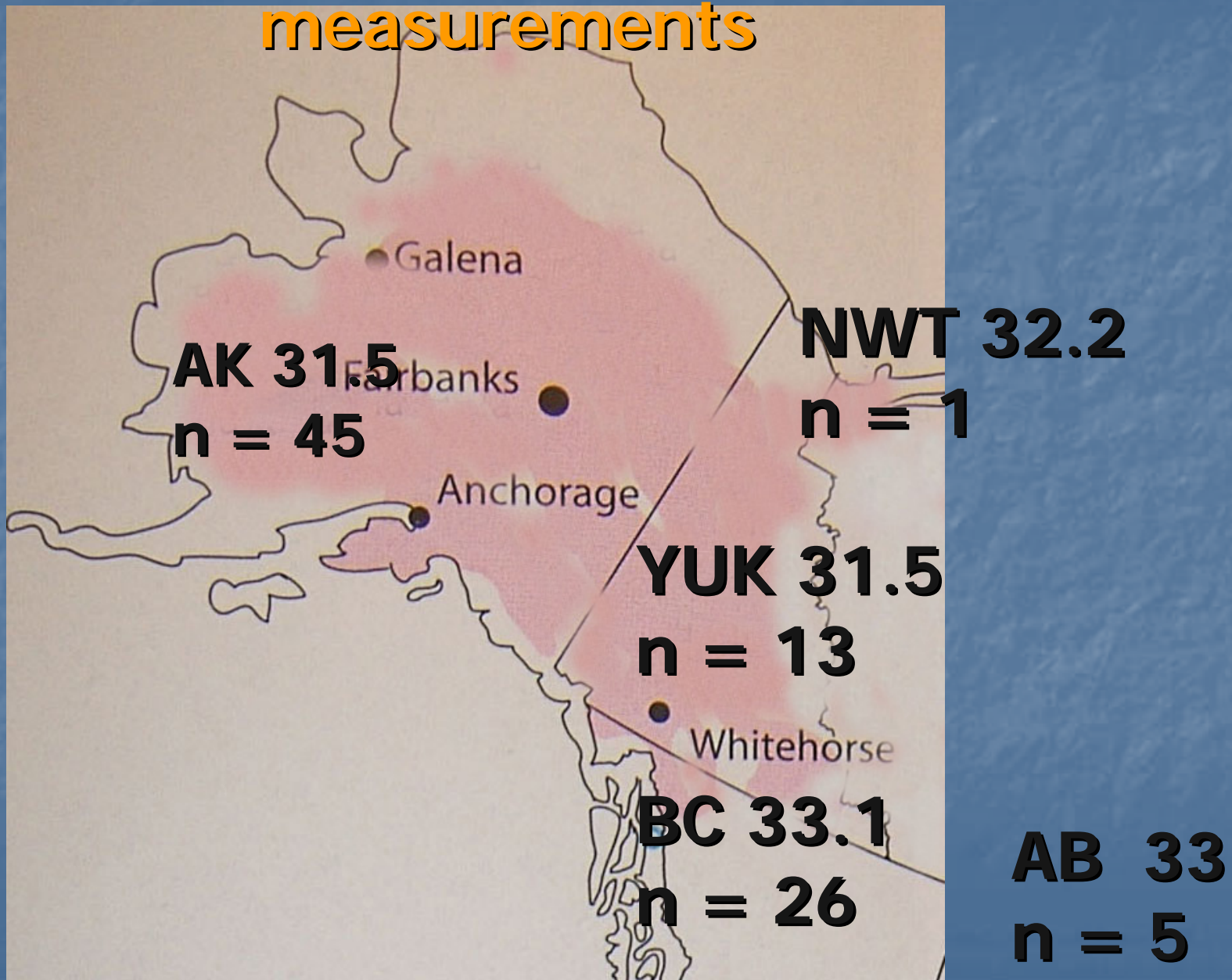


Dark blue: *harlani* n = 88

Pink: *calurus* n = 208

Breeding
season
only

Harlan's Hawk breeding season measurements

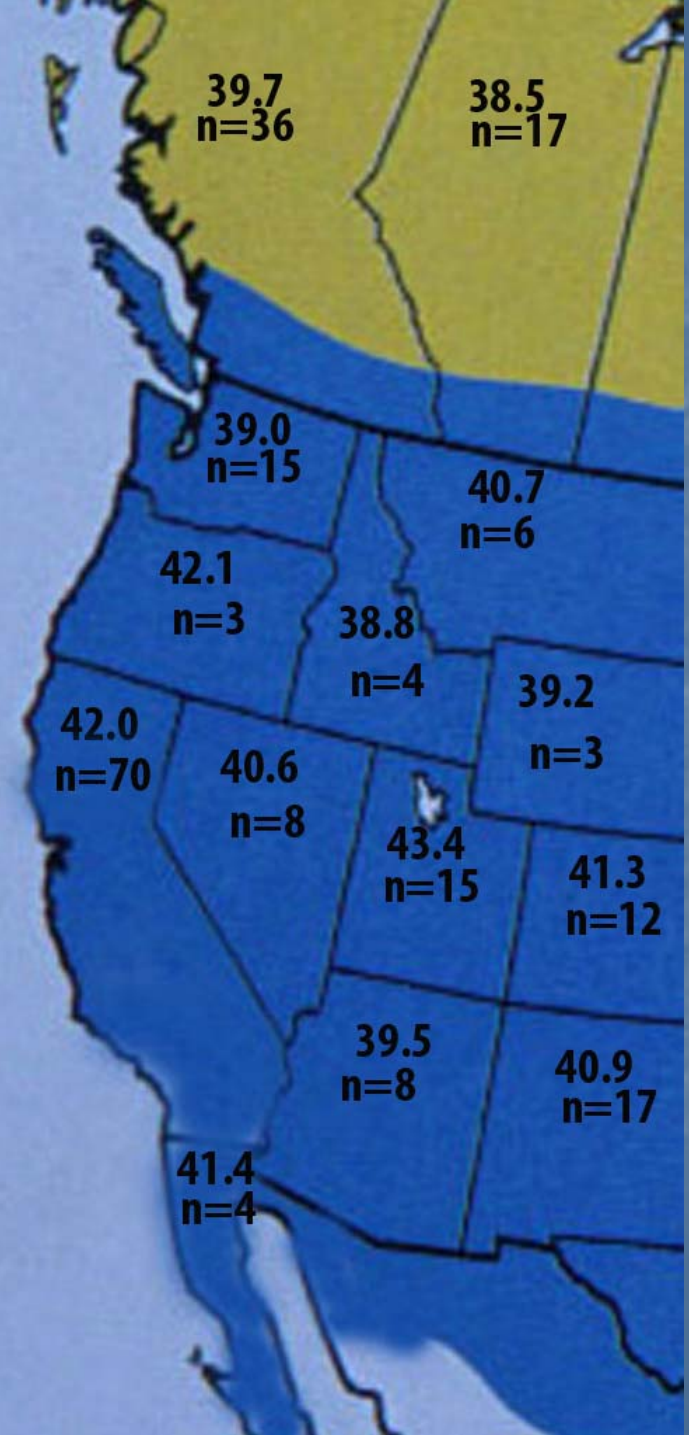


**Bare tarsus
measurements for
calurus by Province &
State with sample
sizes**

**Not clinal with
latitude**

**Little difference
between sexes**

**All taken from breeding
season specimens or
live hawks in summer**



Summary: 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.

Plumage differences between *harlani* and *jamaicensis* are > between subspecies of

harlani

any raptor

calurus



The future

More field work in western Canada and Alaska during the breeding season is needed to get a clearer understanding of the *harlani* breeding there and their relationship to Red-tailed Hawks.

DNA researchers should sample these taxa across western Canada & Alaska and then use SNPS to locate the genes that are causing differences in phenology and sequence those areas and compare and relate phenotypes and genotypes to get a clearer understanding of the taxonomic status of Harlan's Hawk

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Sue Heath prepared the Excel graph of bare tarsus measurements.

Thanks also to many photographers, especially Buzz Hull, Rick Morse, Kay Neumann, & Kevin Smith; many raptor banders; & some raptor rehabilitators for sharing photos & information.

Thanks

I thank with great enthusiasm the many curators and collection managers for permission to look at and study their bird specimens and for their freely given help.

Theirs is a most valuable and important resource for bird study.

A list of the museum collections sampled is on the next slide.

Academy of Natural Sciences, Philadelphia; Arkansas State U; Bell Museum (U of Minn); Boise State U; Burke Museum (U of WA); California Academy of Science; California State U Long Beach; Canadian Museum of Nature; Carnegie Museum of Natural History; Conner Museum (WA State U); Cowan Vertebrate Collection (U of BC); Delaware Museum of Natural History; Denver Museum of Nature & Science; Douglas Co. OR Natural History Museum; Field Museum; Golden Gate Raptor Observatory; Heard Natural History Museum; LSU Museum of Natural Science: Ornithology; Michigan State U; Milwaukee Public Museum; Monte L. Bean Museum (BYU); Museum of Comp. 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; Oklahoma State U; Philip L. Wright Zoological Museum (U of MT); Sam Noble OK Museum of Natural History; The 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); WFSD collection, Texas A & M; UCLA – Dickey Bird and Mammal Collections; U of AK Museum; U of AB; U of AZ; U of CO Museum of Natural History; U of Kansas Natural History Museum; U of MO; U of Victoria; U. of Wis.; U. S. National Museum; Utah Museum of Natural History; and Western Foundation of Vertebrate Zoology.

THANKS FOR YOUR ATTENTION



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