

HARLAN'S HAWK differs from RED-TAILED HAWK, especially in plumages



British Columbia

harlani



British Columbia

Buteo jamaicensis calurus

William S. (Bill) Clark

Harlan's Hawk type specimen.



J. J. Audubon collected this adult in 1830 in Louisiana (USA) and described it as Harlan's Buzzard or Black Warrior - *Buteo harlani*

It is a dark morph, the common morph for this taxon.

British Museum of Natural History, Tring

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



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



Canadian Mus. of Nature U. of Michigan



B. j. jamaicensis



U. of British Columbia

B. j. alascensis



Peabody Museum

B. j. hadropus



Carnegie Mus. Nat. Hist. U. of British Columbia



B. j. umbrinus



U. of British Columbia



B. j. fumosus

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

***examined & photographed >2500 specimens in almost all major museums & many smaller.**

***measured bare tarsi of 510 specimens & live hawks 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.**

***took photos of > 300 adult Red-tailed Hawks of many subspecies.**

***captured and examined in hand > 350 hawks & collected hundreds of photos of these taxa.**

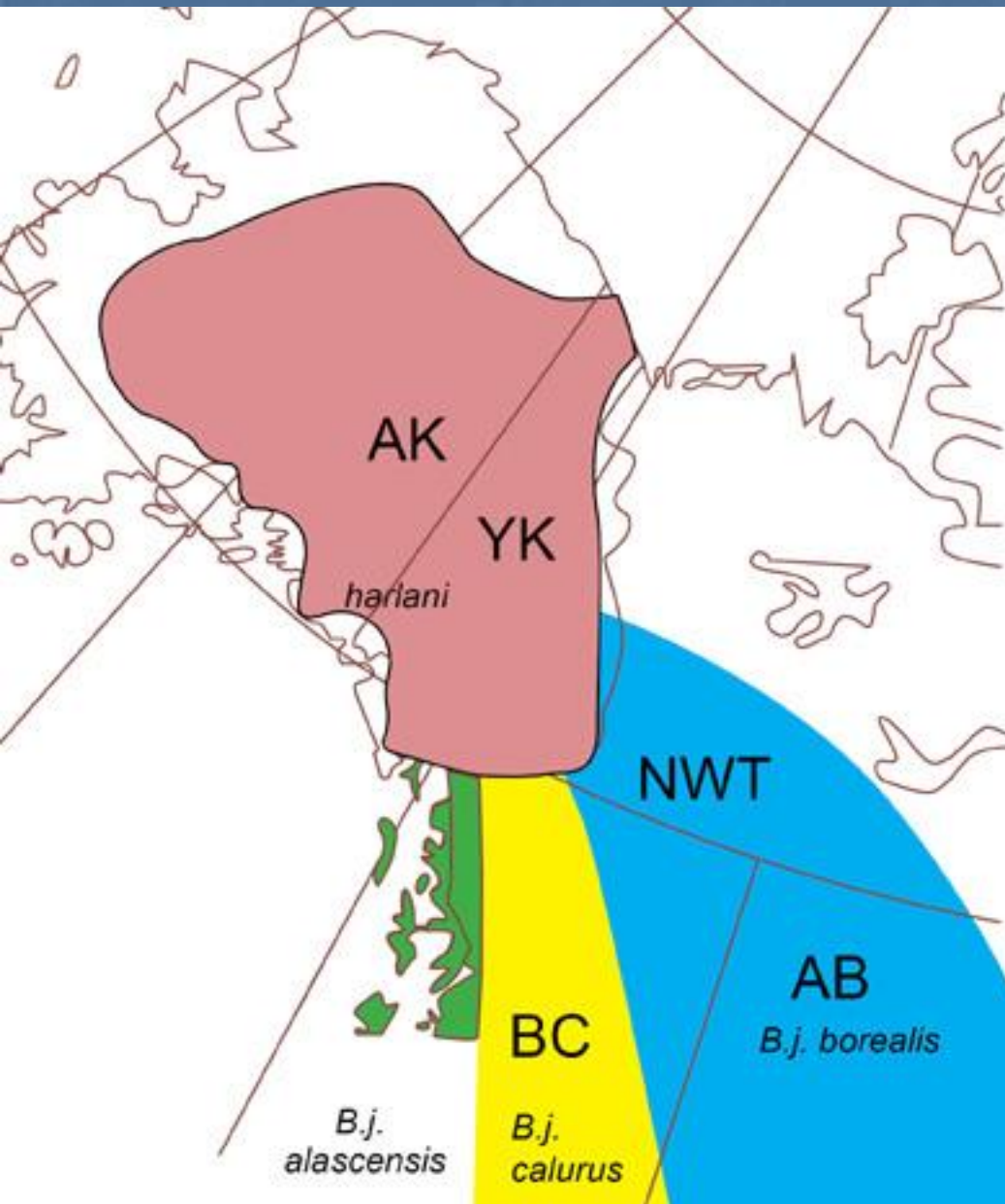
HYBRIDS

More than 25 museum specimens and many hawks in the wild have shown a mix of traits and are most likely hybrids between Harlan's and Red-tailed Hawks.



These hybrids are not considered in this discussion of plumage differences

Harlan's Hawk Range



Breed in Alaska, Yukon, & ne British Columbia & winter over much of North America.

Two color morphs, dark and light.

AOS considers Harlan's Hawk a subspecies of Red-tailed Hawk, *Buteo jamaicensis harlani*, but without justification

Clark (2018) Zootaxa advocates it as a species again.

Clark (2018) Taxonomic status of Harlan's Hawk *Buteo jamaicensis harlani* (Aves: Accipitriformes) Zootaxa concludes:

"It [Harlan's Hawk] should be considered a full species based on lack of justification for considering it a subspecies, and the many differences between it and *B. jamaicensis*, which are greater than differences between any two subspecies of diurnal raptor."



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

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

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

1. Frequency of color morphs;

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

Dark-morph Red-tailed Hawk

Occurs only *B. j. calurus*

Only 1-2% of *calurus* are dark-morph birds.
Contra *harlani*, in 85-90% are dark morph.

Dark-morph adult Red-tailed Hawks



Oregon



California

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



5%

Kevin
Smith

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. Juvenile rufous-morph Red-tails are similar to these juveniles, but adult rufous Red-tails differ greatly.

Differences in color morph frequencies:

Morph:	dark	rufous	interm.	light
<i>harlani</i>	85%		5%	10%
<i>calurus</i>	1-2%	4%		>95%
<i>borealis, abieticola, & alascensis</i>				100%

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

2. Adult plumages by color morph, especially in tail pattern and color;

Comparison of adult traits

	<i>harlani</i>	<i>calurus</i>
Head & body feathers	Blackish, white bases	Warm brown, dark bases
Forehead & crown	Streaked white	Unstreaked dark brown
Superciliary (light morph)	Wide	Absent
Malar (light morph):	Narrow	Wide
Throat	Whitish, dark on some dark morph	Usually dark
Body plumage	Adult like juvenile	Adult differs from juvenile
Breast (dark morph)	Variable*, white streaking	Uniformly dark
Breast & underwings (light morph)	White	Rufous-buff to creamy wash
Secondaries below	Often mottled or unmarked	Narrowly banded
Upper tails	Highly variable in color* and pattern	Trait
Under tails	White or whitish	Pink or pale rufous

*Including rufous

Red-tailed vs Harlan's Hawks

Light adults

Differ in

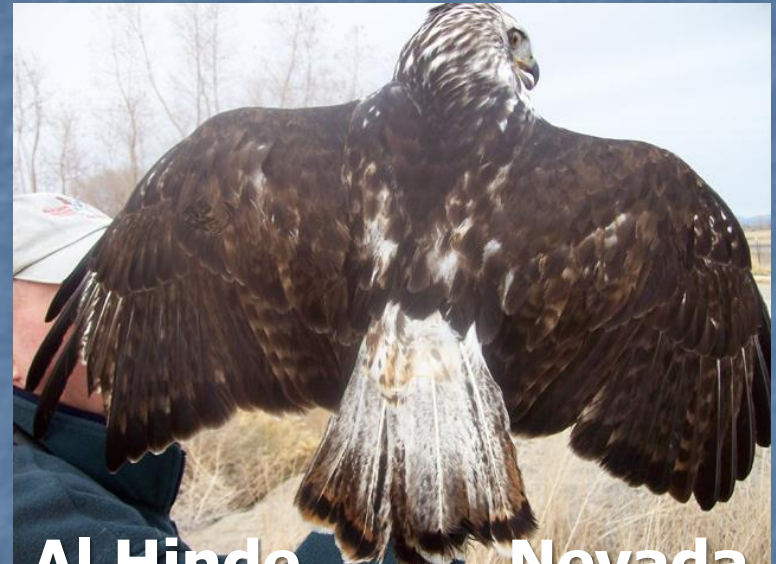


Texas



Head
Back
Tail

Face
Throat
Breast
Belly
Remiges



Al Hinde

Nevada



2. Adult plumages differ: light-morph



Kay Neumann SOAR

harlani

calurus

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*

Differences between *harlani* & *jamaicensis*



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.

Traits shared by *harlani* and *calurus*

Rufous in the tail and body

Wing shape

Dark patagial marks & belly bands

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

Dark-morph adult Harlan's Hawks are distinguishable

85% Harlan's



<2% Red-tailed

Oregon

Red-tail



Alaska



from adult dark-morph
Red-tailed Hawks.

Dark-morph adult Harlan's Hawks are distinguishable

85% of Harlan's are dark <2% 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

Alaska



9%

Red-tail



4%

Alaska



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

Oregon

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 some Harlan's adults, the white tufts at the base of the wings.

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/researchers/
uploads/155/harlanstails11-15.pdf](http://www.globalraptors.org/grin/researchers/uploads/155/harlanstails11-15.pdf)**

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 = 42)



Texas



Texas



Washington



Washington

Subterminal band only: n = 11

Faint narrow banding: n = 11

Partial narrow banding: n = 8

Completely banded: n = 12

None are like
all rufous
Harlan's tails



California



RoyalBC

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

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

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

Red-tailed Hawks' adult and juvenile body plumages differ

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

Washington



Adult

Light-morph

Washington



Juvenile

Adult and juvenile plumages of Red-tailed Hawks differ

Adult

Burke
Museum



B. j. calurus rufous morph



Juveniles



U of AZ

B. j. alascensis



U. Of British Columbia

Adult

Adult and juvenile plumages of Red-tailed Hawks differ

Dark morph



Arizona



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?

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 juvenile intermediate is similar to juvenile rufous Red-tails, whereas the adults of both differ.



Adult

Alaska

**5%
Aged by eye
color and
tail pattern.**

Juvenile



Oregon

Body plumage of intermediate adult and juvenile Harlan's are nearly alike, unlike adult & juvenile rufous Red-tailed Hawks.

**Kevin
Smith**

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

4. Extent of bare area on the tarsus.



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

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

harlani &

Rick Morse



Washington

Adult



Alberta

Juvenile



Washington

Juvenile
calurus
Adult



Washington



Adults

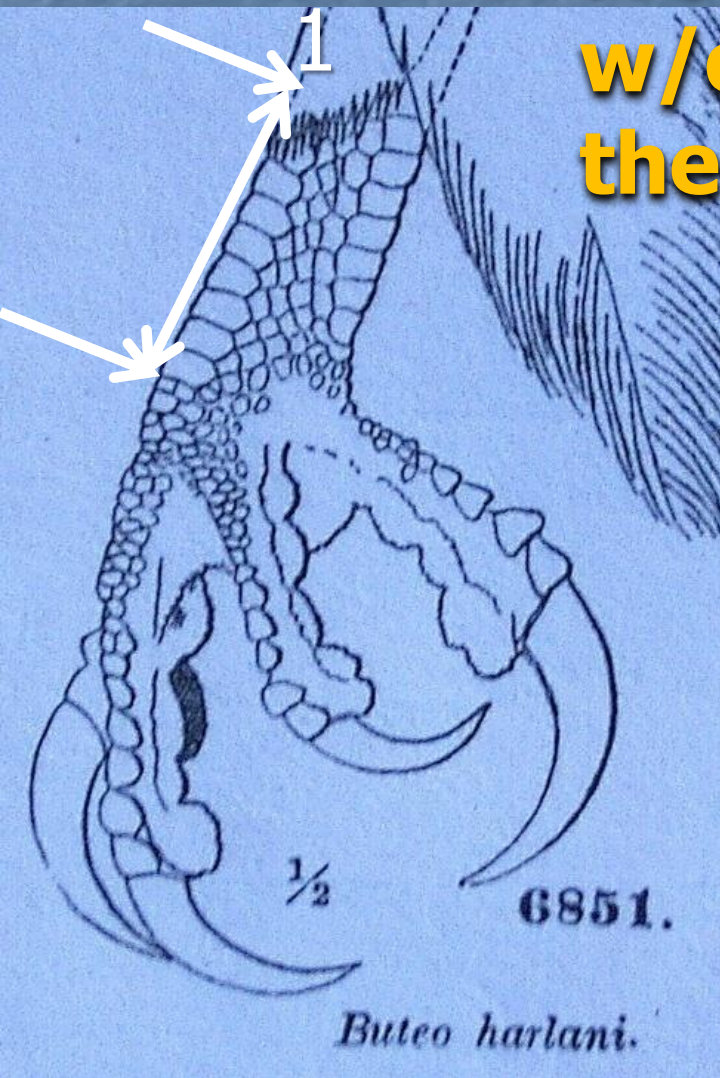


Juveniles



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

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 while breeding.

BARE TARSUS MEASUREMENT:

***harlani* (914): 32.0 mm**

Breeding season average:

***harlani* (94): 32.1 mm**

Breeding season averages:

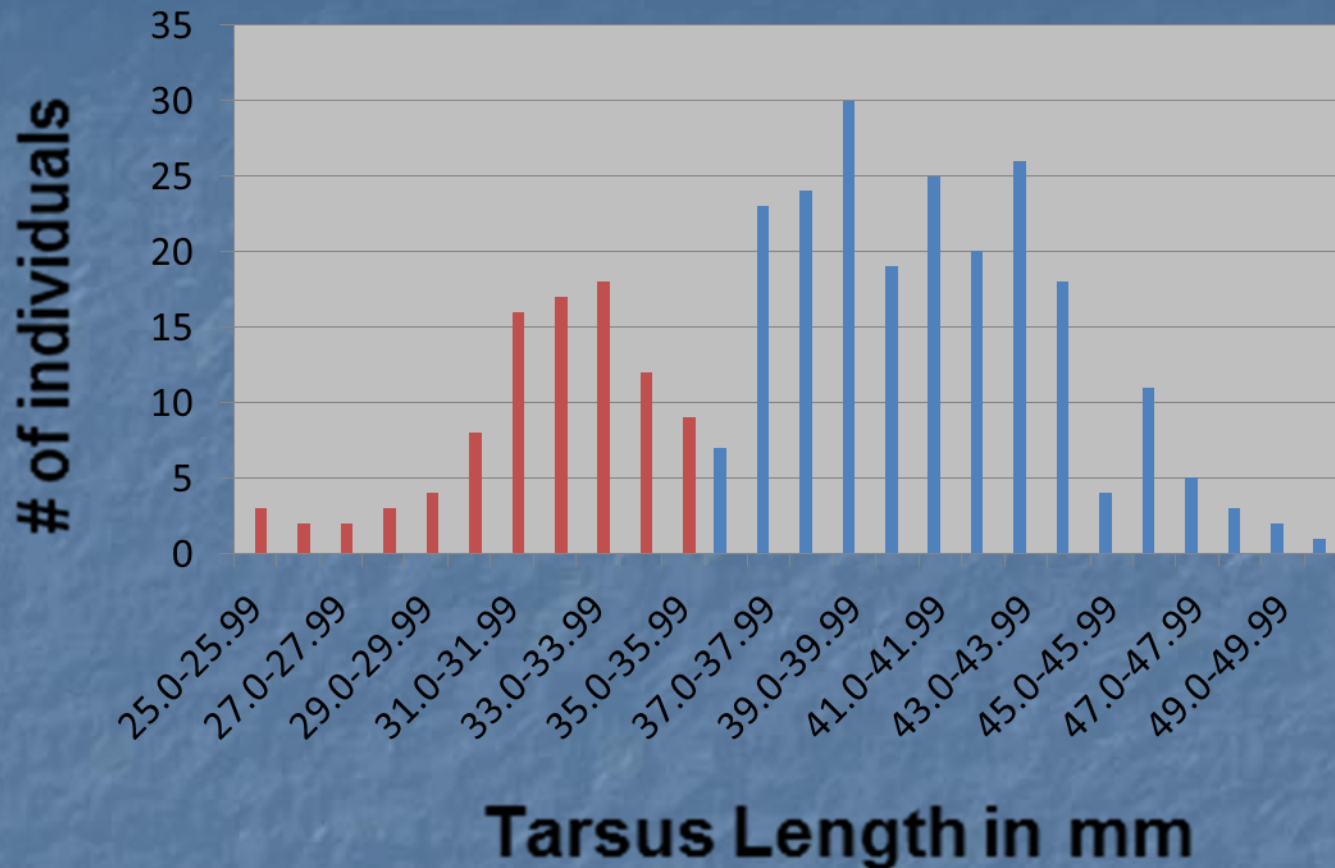
***calurus* (218): 41.4 mm**

***alascensis* (38): 37.4 mm**

***borealis* (135): 38.7 mm**

***fuertesi* (25): 41.8 mm**

Bare Tarsus Length



Orange: *harlani* n = 94

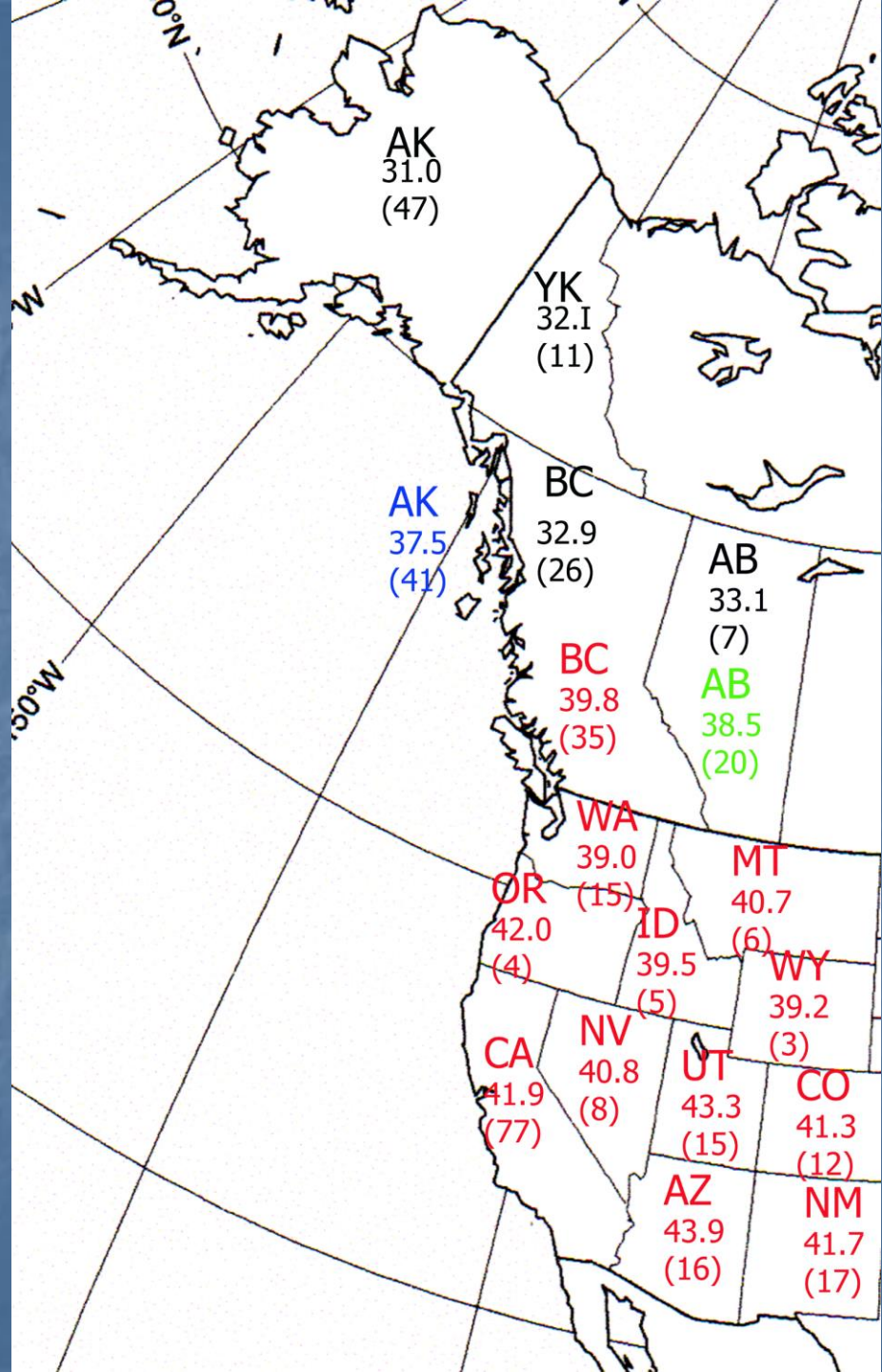
Blue: *calurus* n = 218

Breeding
season
only

Unfeathered tarsi
means by state and
province.

Numbers of
individuals measured
are in parentheses:

Black: *harlanii*;
Red, *B. j. calurus*;
Blue, *B. j. alascensis*;
Green, *B. j. borealis*.



5. Harlan's Hawks also differ from Red-tailed Hawks in some behaviors.

Flush distance

Upset behavior

Display flight

Harlan's Hawks have a, on average, a much greater flush distance, especially adults, compared to Red-tailed Hawks.



Usually one can approach much nearer to adult Red-tails than one can to adult Harlan's



When upset, adult *harlani* raise the feathers of the breast to form a more solid white patch, exposing the white feather bases.

Lowe 1968, Clark unpubl.).



Lowe (1968) described a unique display flight of adult males, unlike the typical undulating displays of Red-tail adults. He also saw Harlan's do that as well.



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

- 1. Frequency of color morphs;**
- 2. Adult plumage by color morph especially in tail pattern and color;**
- 3. Harlan's adult & juvenile plumages are almost alike; whereas those of Red-tails differ.**
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Plumage differences between *harlani* and *jamaicensis* are > between subspecies of any other raptor



Future work

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 advanced techniques to locate the genes that are causing differences in phenology and sequence and compare those areas and relate phenotypes and genotypes to get a clearer understanding of the taxonomic status of Harlan's Hawk

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Thanks

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Donna Dittman, Michel Gosselin, Jim Lish, Ildiko Szabo, Walter Wehtje, & Chris Witt.

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.

Museums visited

Academy of Natural Sciences, Philadelphia; American Museum of Natural History; Arkansas State U; Beaty Biodiversity Museum, U. British Columbia; 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; Cleveland Museum of Natural History; Cincinnati Museum of Natural History; Conner Museum, Wash. State U; Delaware Museum of Natural History; Denver Museum of Nature & Science; Field Museum; Golden Gate Bird Obs; Heard Natural History Museum; Houston Museum of Natural Science; LSU Museum of Natural Science: Ornithology; Michigan State U; Milwaukee Public Museum; Monte L. Bean Museum (BYU); Museum of Natural History, U of Iowa; Museum of Southwestern Biology (U of NM); Vertebrate Zoology.

Museums visited (Cont.)

Museum of Vertebrate Zoology (U of CA); Museum of Wildlife & Fish Biology (UC Davis); Museum of Zoology, U of Mich; Natural History Museum of LA County; Nebraska State Museum; Oklahoma State U; Noble OK Museum, U of Okla.; North Dakota State U; Ohio State U; Over Museum, SD; Peregrine Fund; Perot Museum of Natural History; Royal Alberta Museum; Royal British Columbia Museum; Royal Ontario Museum; Royal Saskatchewan Museum; San Diego Natural History Museum; Santa Barbara Natural History Museum; Slater Museum (U. of Puget Sound); South Dakota State U; Tulane U; WFSD 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 Museum of Natural History; U of Kansas Natural History Museum; U of MO bird collection; U of NE State Museum; U of WI; U. S. National Museum; Utah Museum of Natural History; Western Foundation of Vertebrate Zoology; Wright Zoological Museum, U. of Mont; Yale Peabody Museum; Yukon Parks.

THANKS FOR YOUR ATTENTION

Washington



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