Subspecies for Birders
A Brief Introduction

And why should I care?

What are subspecies?

Geographically defined aggregates of local populations which differ taxonomically from other such subdivisions of a species

-- Mayr 1963

What are subspecies?

A recognizably distinct population, or group of populations, that occupies a different geographic area from other populations of the same species; populations of a species that are distinguishable by one or more characteristics and are given subspecific names

-- Futuyma 2005

What are subspecies?

A taxonomic division of a species often distinguished by special phenotypic characters and by its origin or localization in a given geographic region.

--Strickberger 2000

What are subspecies?

A way of describing intraspecific geographic variation using nomenclature.* Geographic race.

-- Morlan 2016

****Needs a committee to decide.***

What subspecies are not:

Populations with unique genetic markers
Song types
Color morphs
Names without a type

What are Species?

Biological Species Concept (BSC)

‘Species are systems of populations: the gene exchange between these systems is limited or prevented by a reproductive isolating mechanism or perhaps by a combination of several such mechanisms.’

-- Dobzhansky (1937):

What are Species?

- ***Biological Species Concept (BSC)***
  - ***Evolutionary Species Concept (ESC)***
  - ***Recognition Species Concept (RSC)***
  - ***Cohesion Species Concept (CSC)***
  - ***Concordance Principles Concept (CPC)***
- ***Phylogenetic Species Concept (PSC)***
-

What are Species?

Comprehensive Biologic Species Concept (CBSC)

"An avian species is a system of populations representing an essentially monophyletic, genetically cohesive, and genealogically concordant lineage of individuals that share a common fertilization system through time and space, represent an independent evolutionary trajectory, and demonstrate essential but not necessarily complete reproductive isolation from other such systems."

-- Johnson et al. (1999)

What are Species?

Phylogenetic Species Concept (PSC)

"A monophyletic group composed of the 'smallest diagnosable cluster of individual organisms within which there is a parental pattern of ancestry and descent."

-- Cracraft (1983)

What are Species?

Phylogenetic Species Concept (PSC)

"Diagnostically distinct taxa with independent evolutionary histories."

-- Zink (2006)

What are Species?

Phylogenetic Species Concept (PSC)

"A monophyletic group composed of the 'smallest diagnosable cluster of individual organisms within which there is a parental pattern of ancestry and descent."

-- Cracraft (1983)

No subspecies allowed!!

BSC Problems

Allopatric populations are unknowable.

Doesn't apply to asexually reproducing organisms.

BSC Solutions – "Objective" scoring systems

Helbig et al. (2002) & Tobias et al. (2010)

[462 new non-Passerines: Hybrid Zone adds to the score]

"No known system can definitively identify which taxa deserve to be treated as species." -- Alan Knox 2014

What are Species?

A way of describing biological diversity using nomenclature.*

-- Morlan 2016

***Needs a committee to decide.**

What about hybrids?

TABLE 1

A CLASSIFICATION OF SOME HYBRIDIZING FORMS

Forms involved	Distribution	Interactions
Subspecies, or subspecies groups of polytypic species	contiguously or strictly allopatric	primary intergradation, or potentially capable of so doing
subspecies, or subspecies groups of polytypic species	strictly allopatric	hybridize in *hybrid zone* (or potentially capable of so doing)
– – – – – – – – – – TAXONOMIC SPECIES BORDER – – – – – – – – – –		
semispecies (allospecies)	basically allopatric, but some sympatry evident or possible	form *zone of overlap and hybridization* (or potentially capable of so doing); competition; reinforcement of isolating mechanisms
allospecies of a superspecies	basically allopatric; some or no sympatry	rare, inconsequential or no hybridization; effective isolating mechanisms, rarely breaking down; competition if sympatric
related, but not allospecific species	Sympatric or allopatric	rare or no hybridization; effective isolating mechanisms, very rarely breaking down; competition or not when sympatric

How different to they have to be?

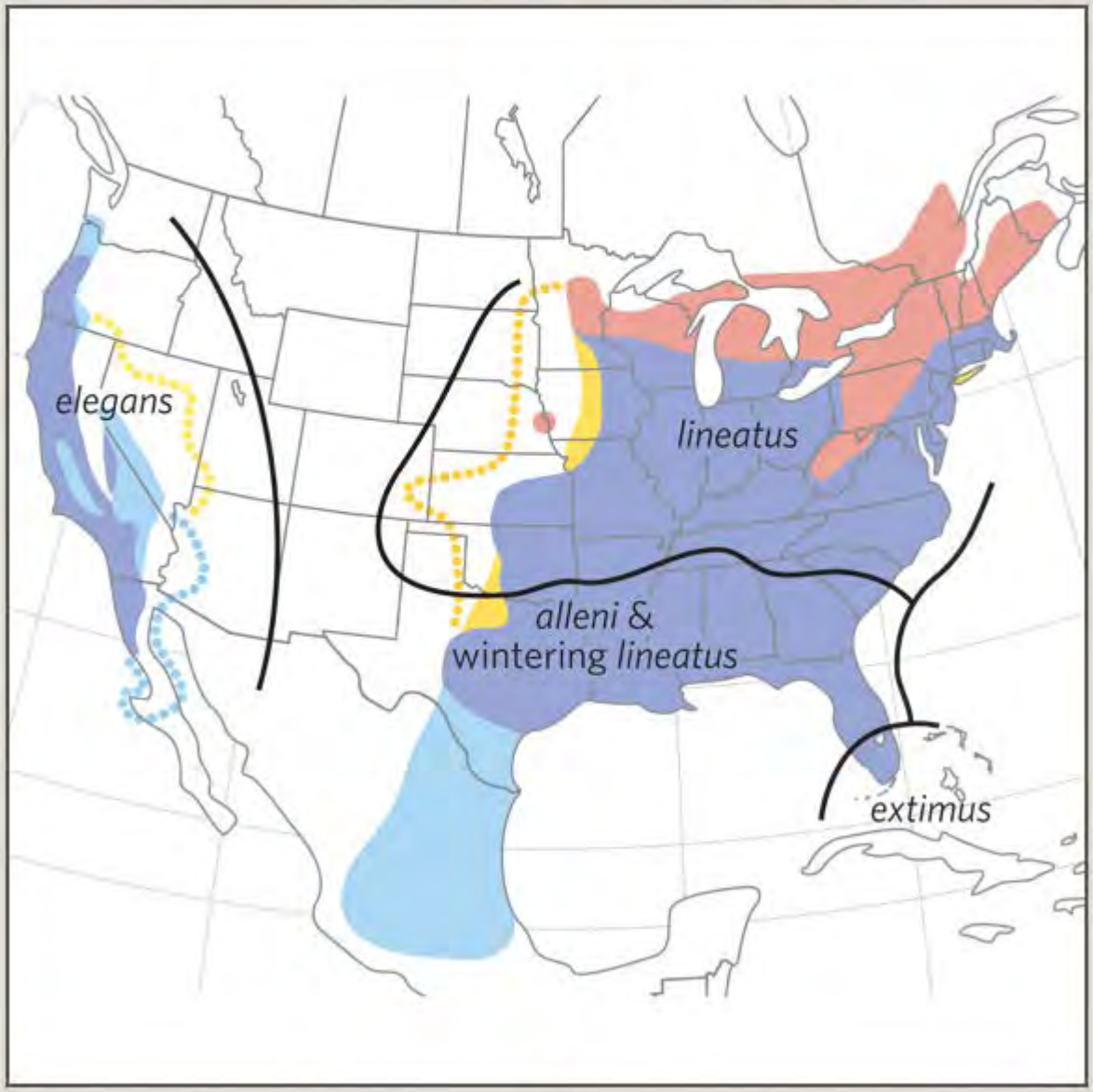
75% Rule (Amadon)

Clinal variation
Bergman's Rule
Allen's Rule
Gloger's Rule

Evolutionary Units?

Red-shouldered Hawk

DESCRIPTION | MAPS | SOUNDS




© 2007 Joseph Morlan

Red-shouldered Hawk (*Buteo lineatus extimus*)

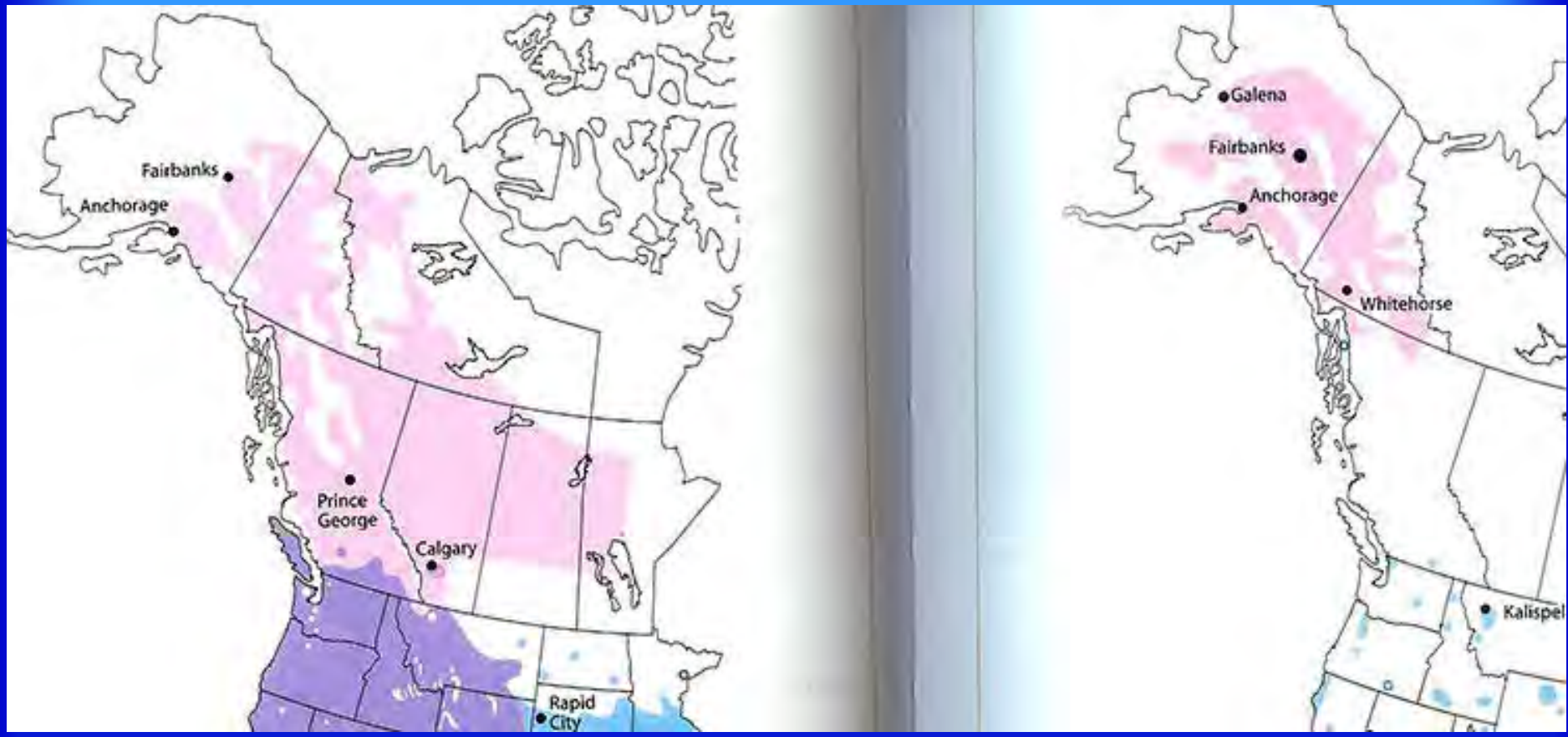
Nominate Red-shouldered Hawk from California

On 21 September 1996 found dead along I5, 5.8 km north of Twin Cities Road, Sacramento County, California. -- Photos by Andrew Engilis

“Western” & Harlan’s Red-tailed Hawk

“Western” & Harlan’s Red-tailed Hawk

--From Wheeler 2003



Western ***Harlan’s***

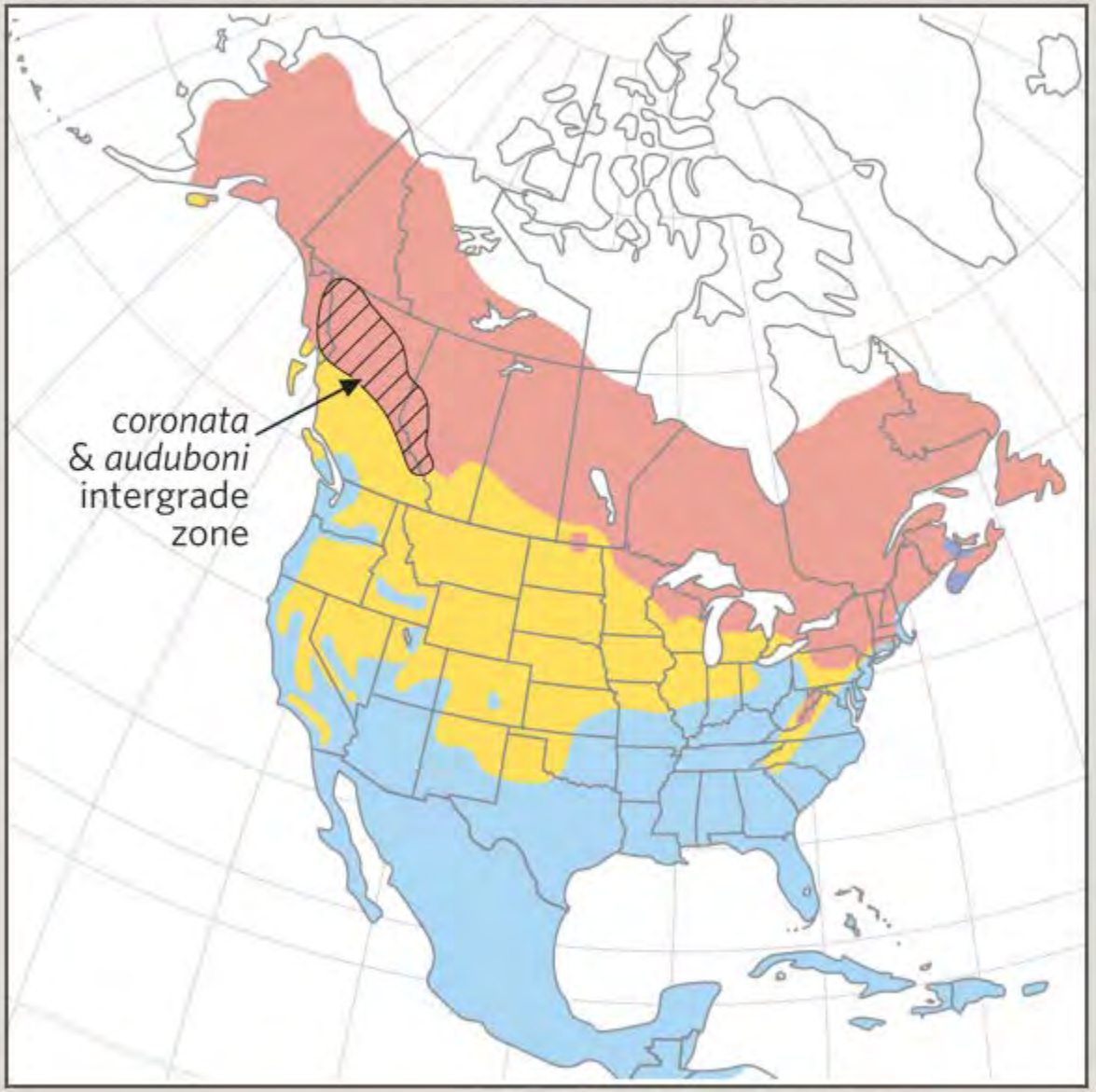
Red-tailed Hawk

DESCRIPTION | MAPS | SOUNDS

Myrtle & Audubon's Warblers

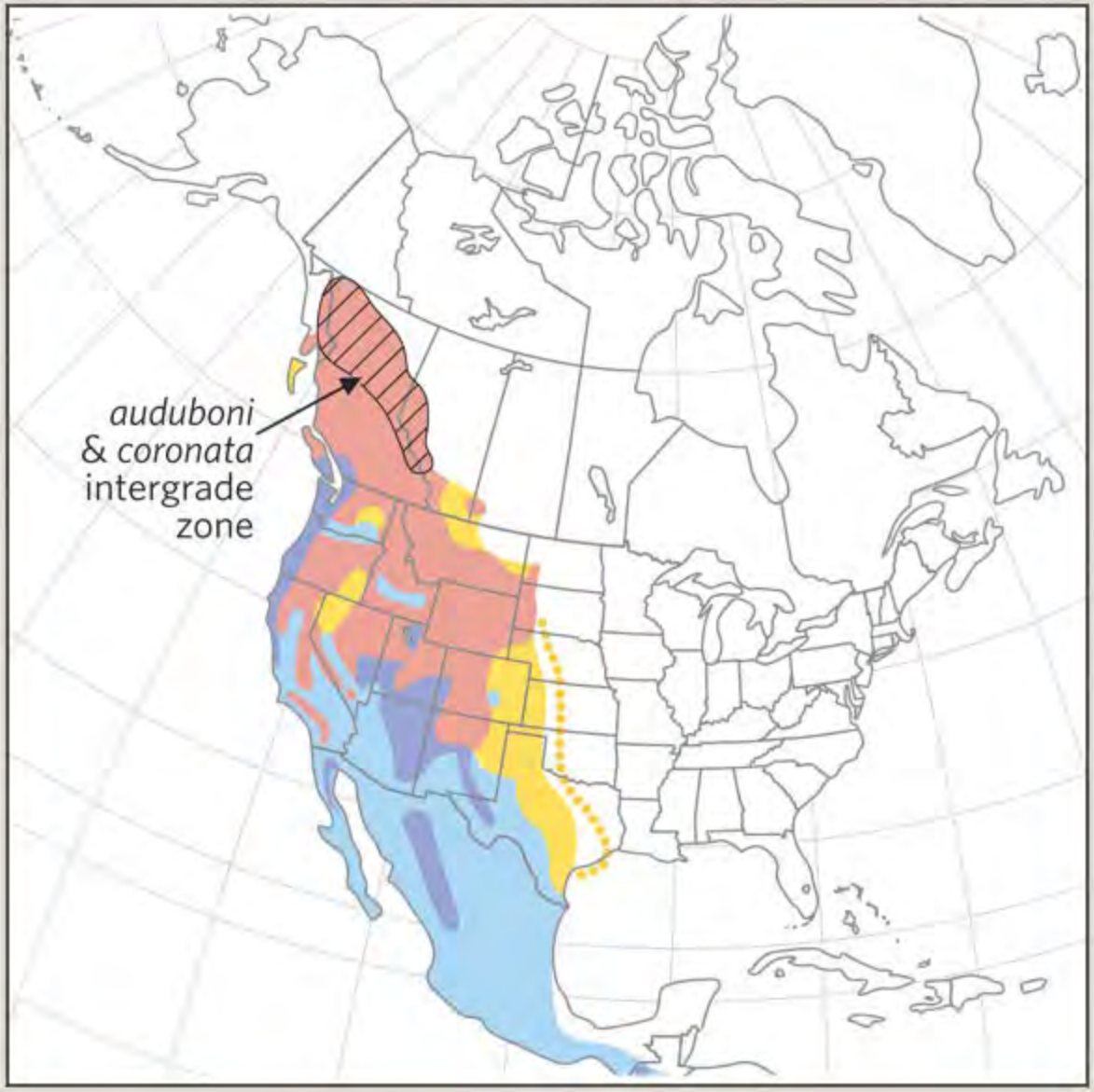
Yellow-rumped Warbler

DESCRIPTION | MAPS | SOUNDS



Yellow-rumped Warbler

DESCRIPTION | MAPS | SOUNDS



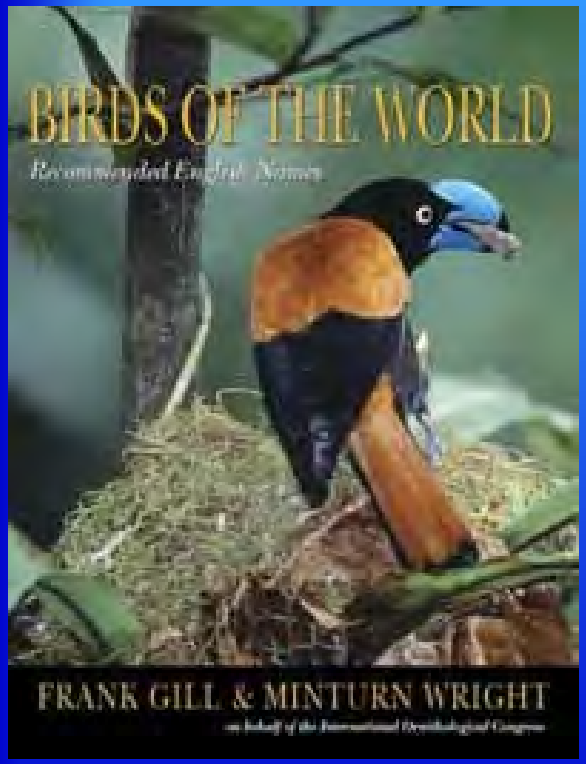
But IOC splits them!

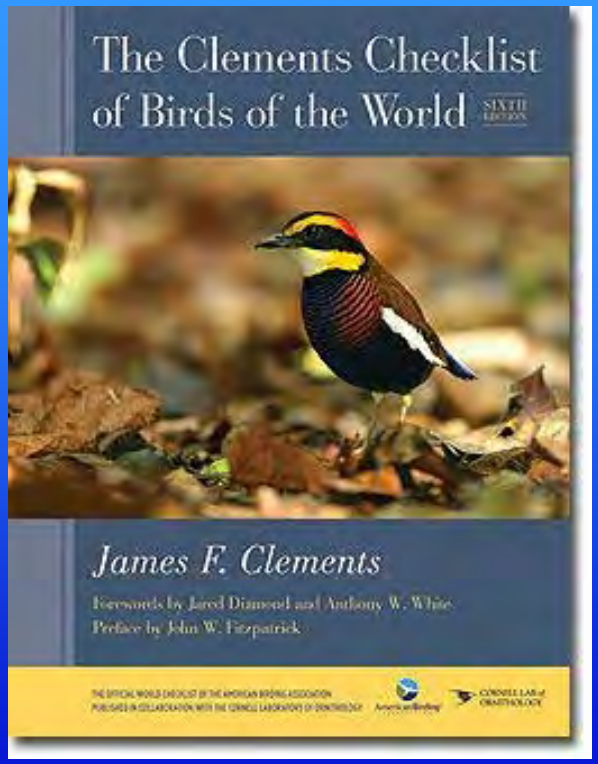
Setophaga coronata	Yellow-rumped Warbler	
Setophaga coronata coronata	Yellow-rumped Warbler (Myrtle)	N Alaska, Canada and n US;
Setophaga coronata audubonii	Yellow-rumped Warbler (Audubon's)	SW Canada and w US; winte
Setophaga coronata nigrifrons	Yellow-rumped Warbler (West Mexico)	Sierra Madre Occidental of w
Setophaga coronata goldmani	Yellow-rumped Warbler (Goldman's)	High mountains of s Chiapas

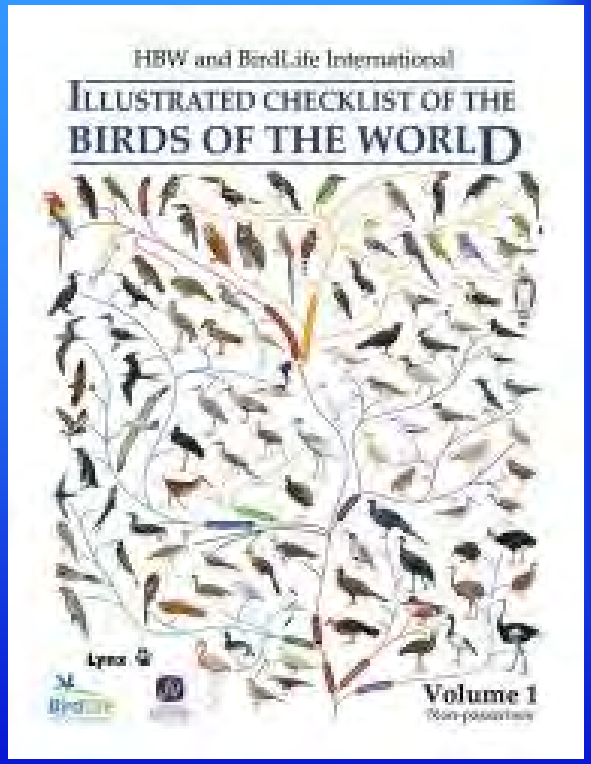
Myrtle Warbler	NA	c,e USA and Canada
Audubon's Warbler	NA, MA	n,w and nc Mexico
		n,w
		nc Mexico
Goldman's Warbler	MA	w Guatemala

Brelsford and Irwin (2009) demonstrate lack of free interbreeding between Audubon's and Myrtle Warblers in the narrow and stable hybrid zone; confirm validity of original split.

But IOC splits them!





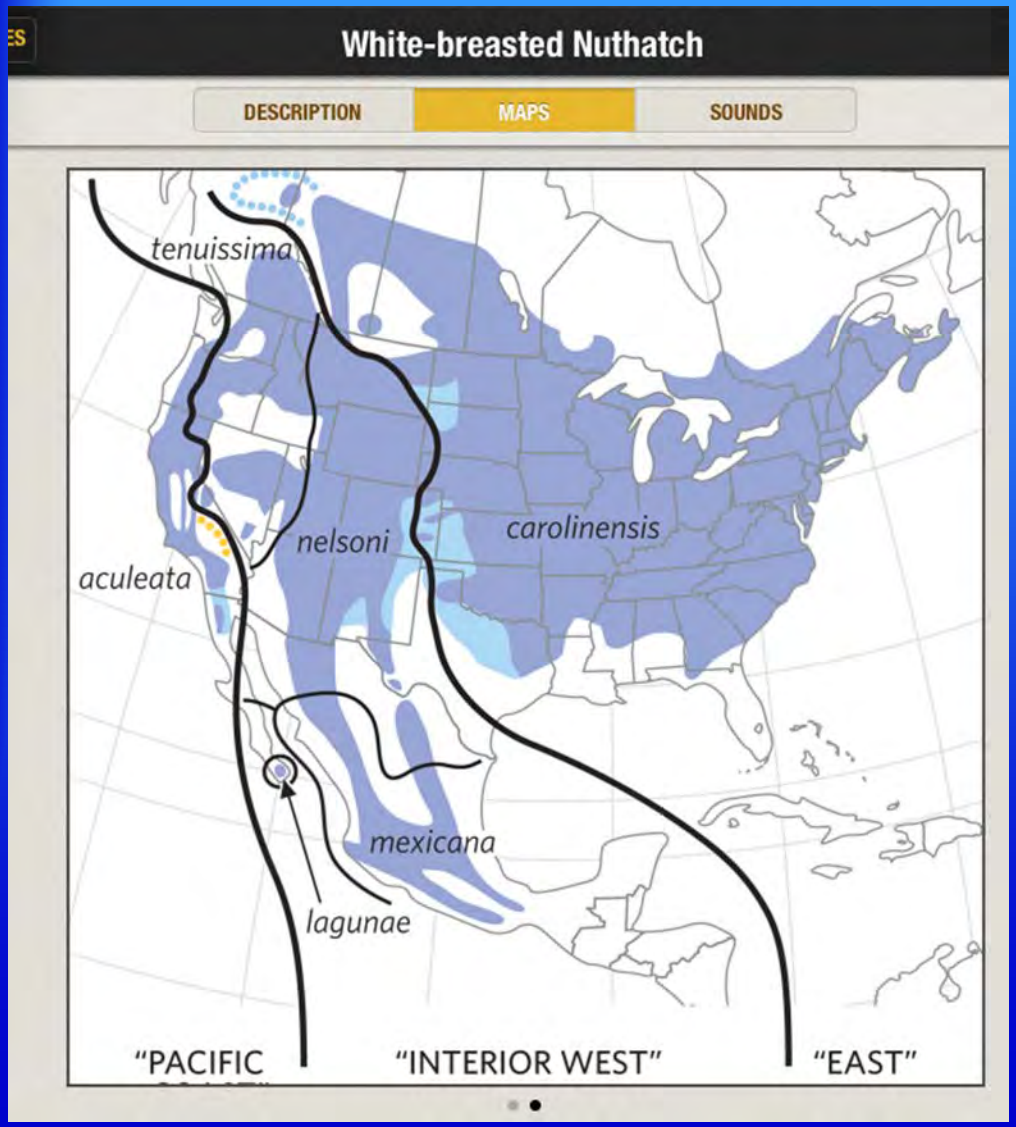


INCIPIENT SPECIATION DESPITE LITTLE ASSORTATIVE MATING: THE YELLOW-RUMPED WARBLER HYBRID ZONE

- ***Temporal stability and limited width of the hybrid zone.***
- ***Assortative mating is either very weak or absent.***
- ***Reproductive isolation is largely due to postmating barriers.***
- ***Despite extensive hybridization the two forms are distinct evolutionary groups…***

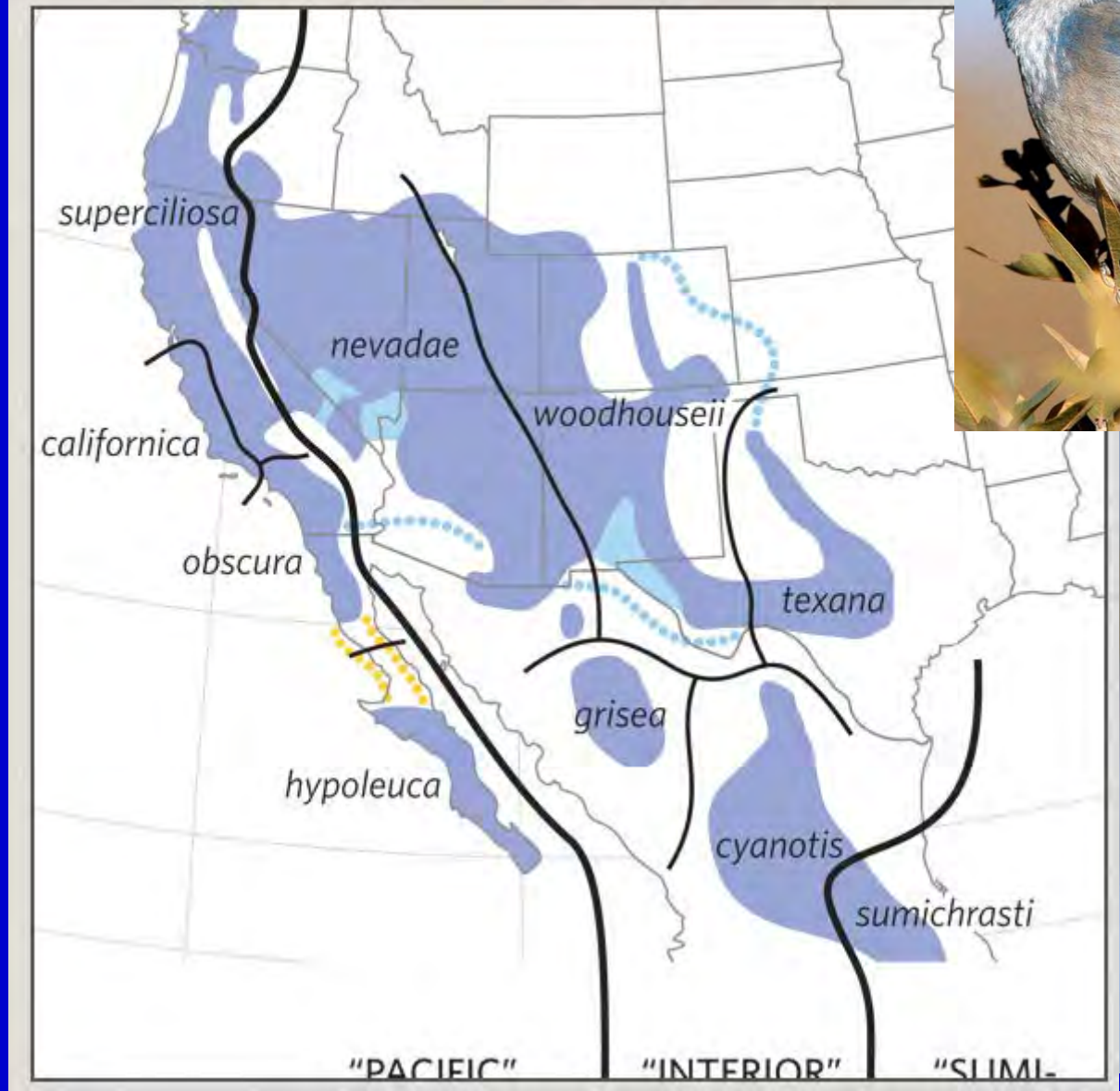
– Evolution 2009

Popular Subspecies:



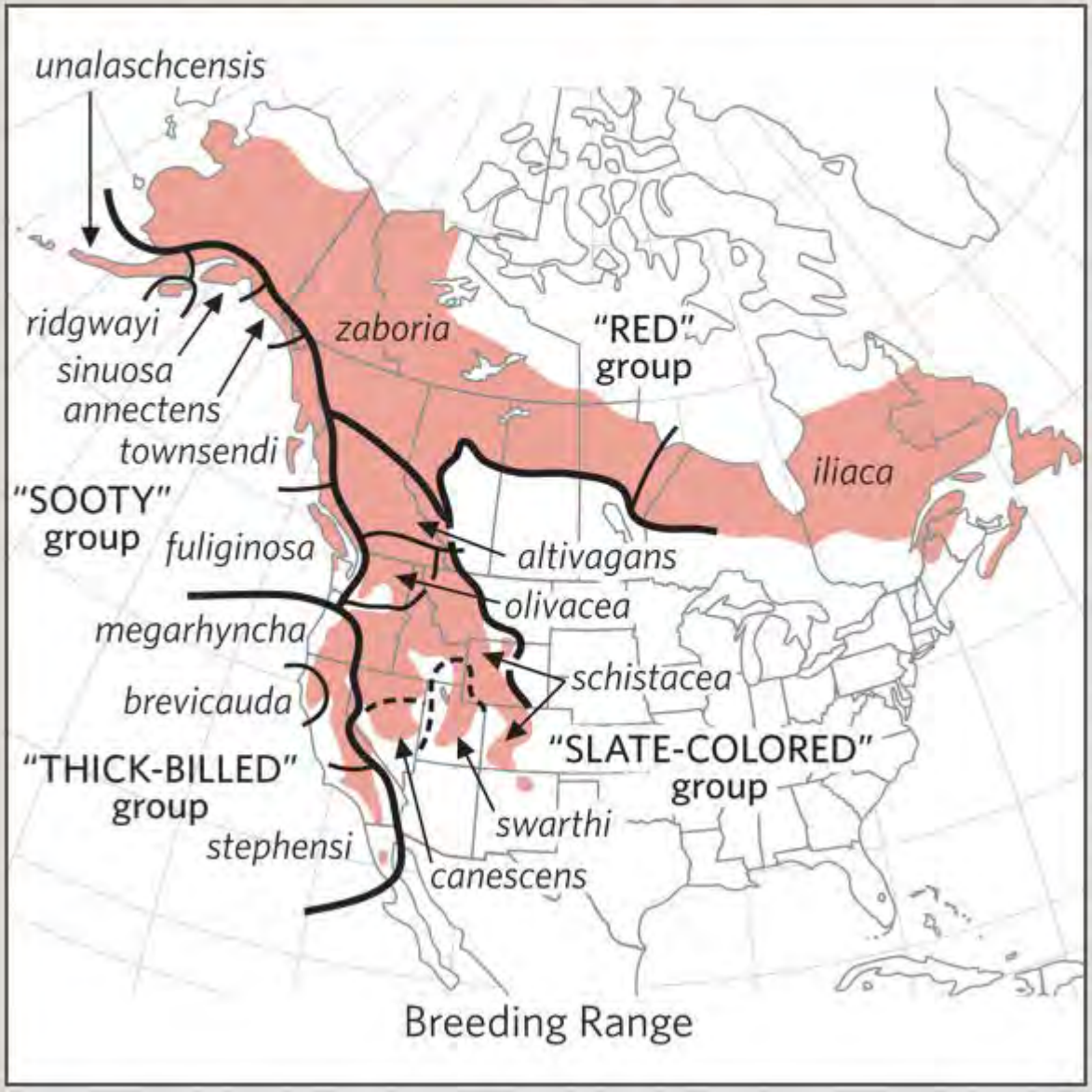
Western Scrub-Jay

DESCRIPTION | MAPS | SOUNDS



Fox Sparrow

DESCRIPTION | MAPS | SOUNDS

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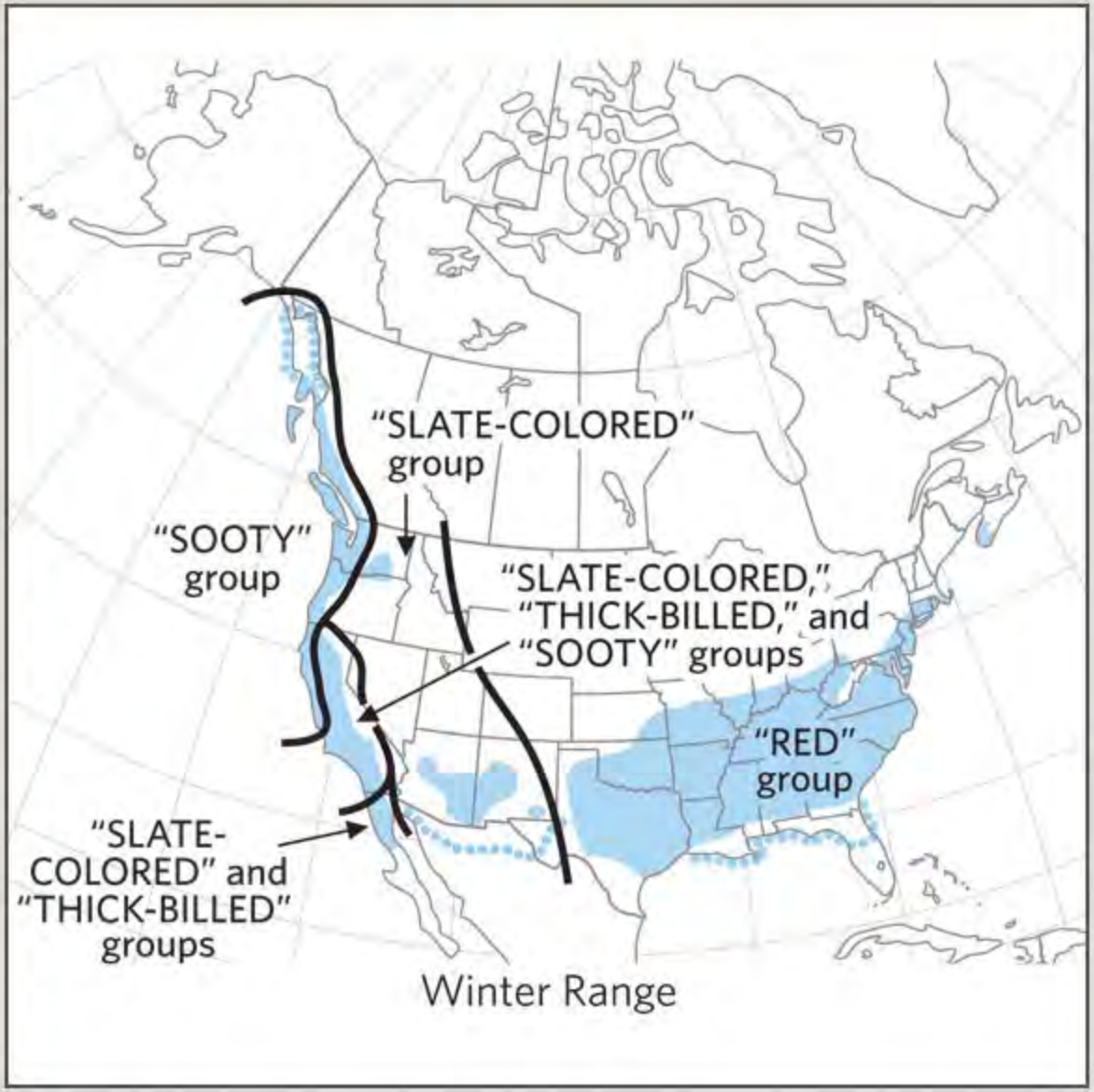
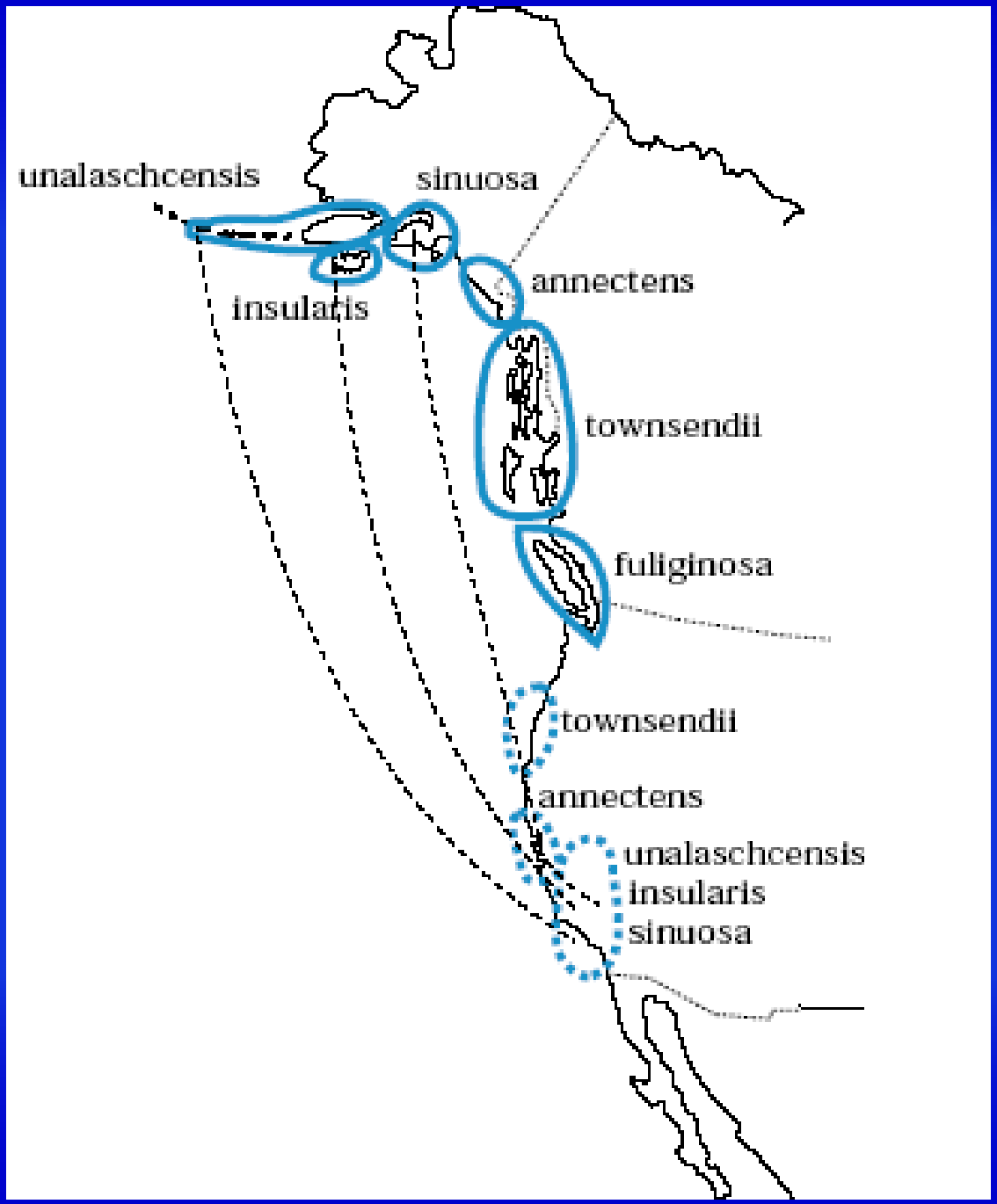
Fox Sparrow

DESCRIPTION | MAPS | SOUNDS




unalaschcensis
sinuosa
annectens
insularis
townsendii
fuliginosa
townsendii
annectens
unalaschcensis
insularis
sinuosa


© 2004 Martin Meyers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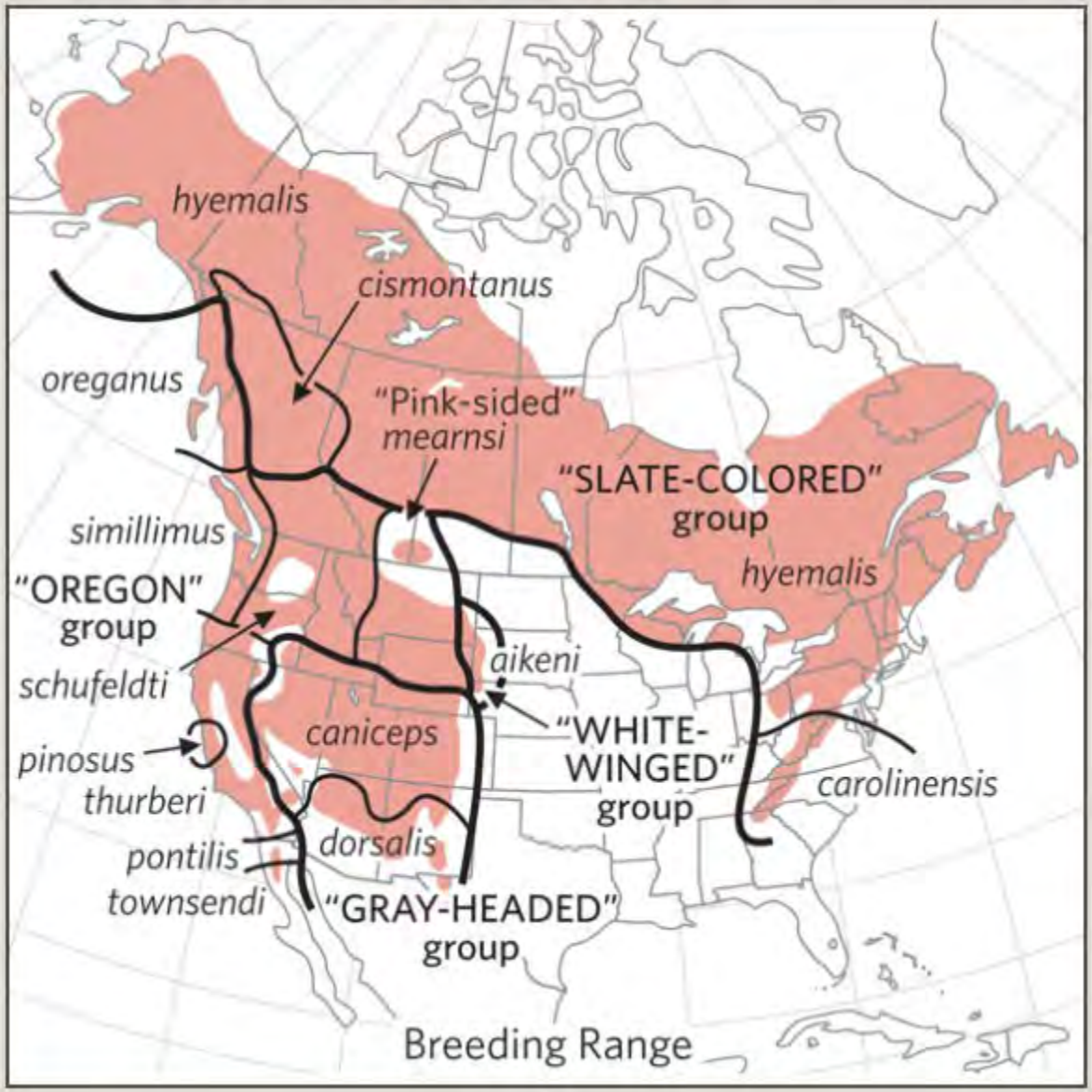
Dark-eyed Junco

DESCRIPTION | MAPS | SOUNDS

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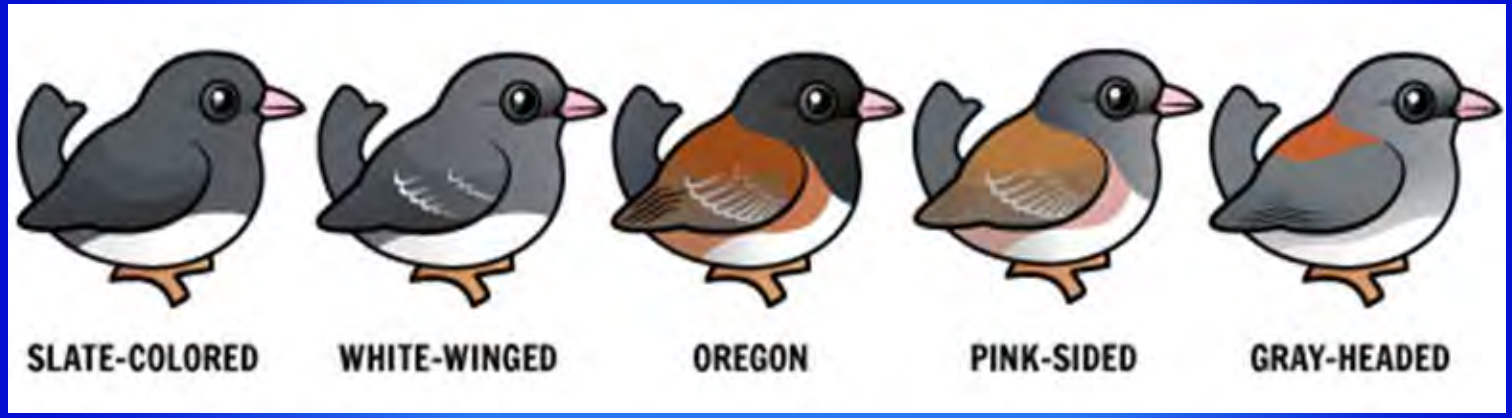
Junco Subspecies Groups

from Birdorable.com



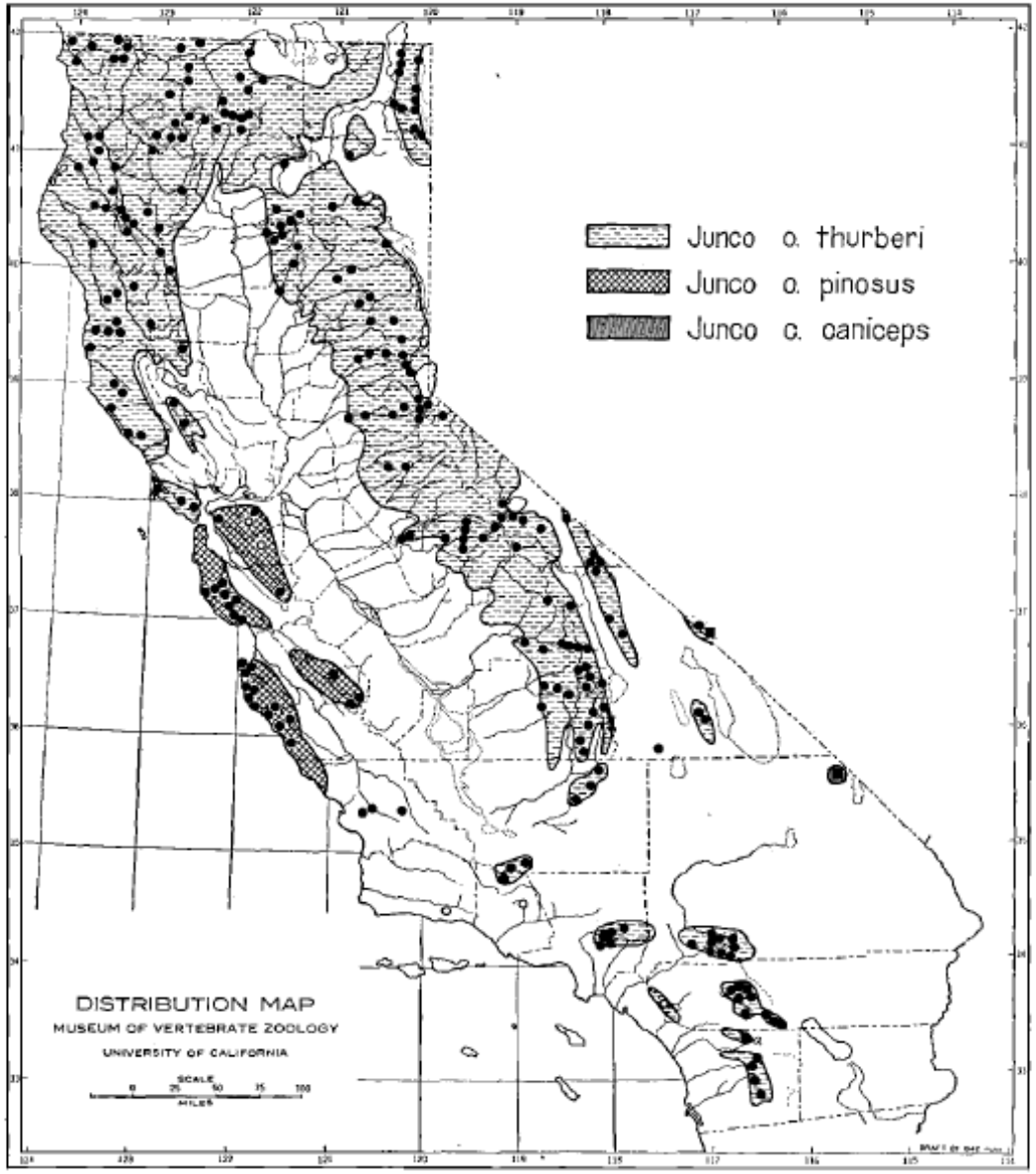
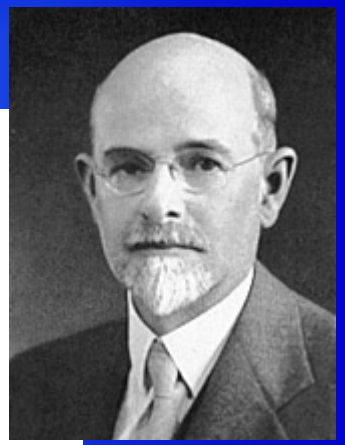
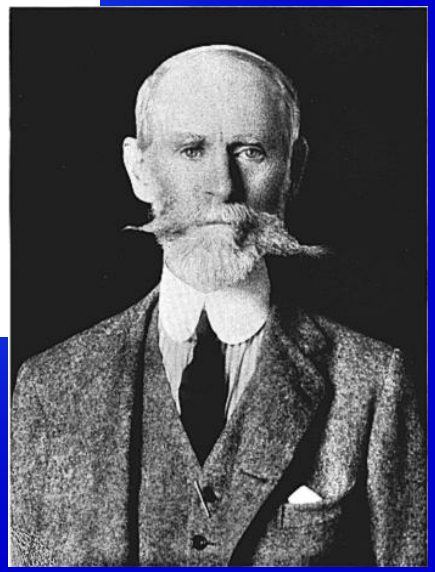


Fig. 53. Distribution of juncos in California in the breeding season. Dots indicate localities from which Oregon Juncos, *Junco oreganus*, have been examined; circles, localities reported in the literature. Squares mark stations for *J. c. caniceps*.

Grinnell on Dwight's Review of the Juncos (1918)

One point that Dr. Dwight brings up in connection with his discussion of the race of *Junco oreganus* deserves special consideration. At a single locality within the range of *J. o. thurberi* he finds some breeding specimens which would on color alone be better referred to *J. o. oregonus* and *J. o. couesi* and he contends that if we are naming the *birds* and not the locality, these specimens should bear the names of these races rather than that of the race to which the vast majority of the individuals at that locality belong. Here our author is disregarding everything but color. It is a foregone conclusion that all the breeding birds at this locality belong to the same stock and should bear the same name with a comment if need be on aberrant characters. They are simply evidence of that intergradation of the three forms which shows them to be subspecies. This intergradation may be found in the area where the breeding ranges join, in which case it is manifest in a majority of the individuals, or it may be found in a large





Common Poorwill – Berkeley Meadows - 22 October 2013 – Jerry Ting

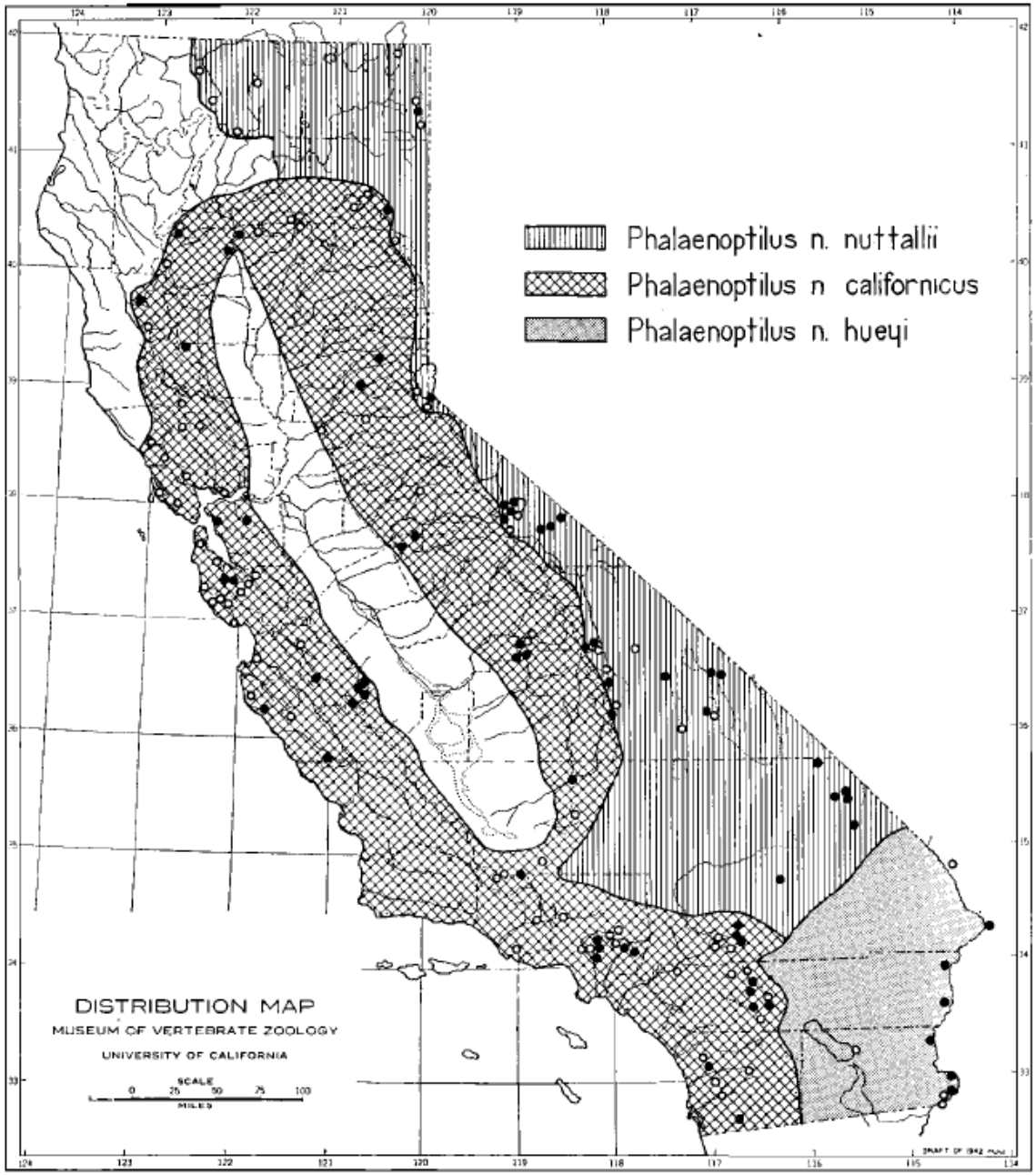


Fig. 12. Distribution in the breeding season of the subspecies of Poor-will, *Phalaenoptilus nuttallii*, in California. Dots mark stations from which breeding birds have been examined; circles, localities reported in the literature.

californicus
Leaf Litter

nuttallii
Granite

Photos by
Phil Unitt

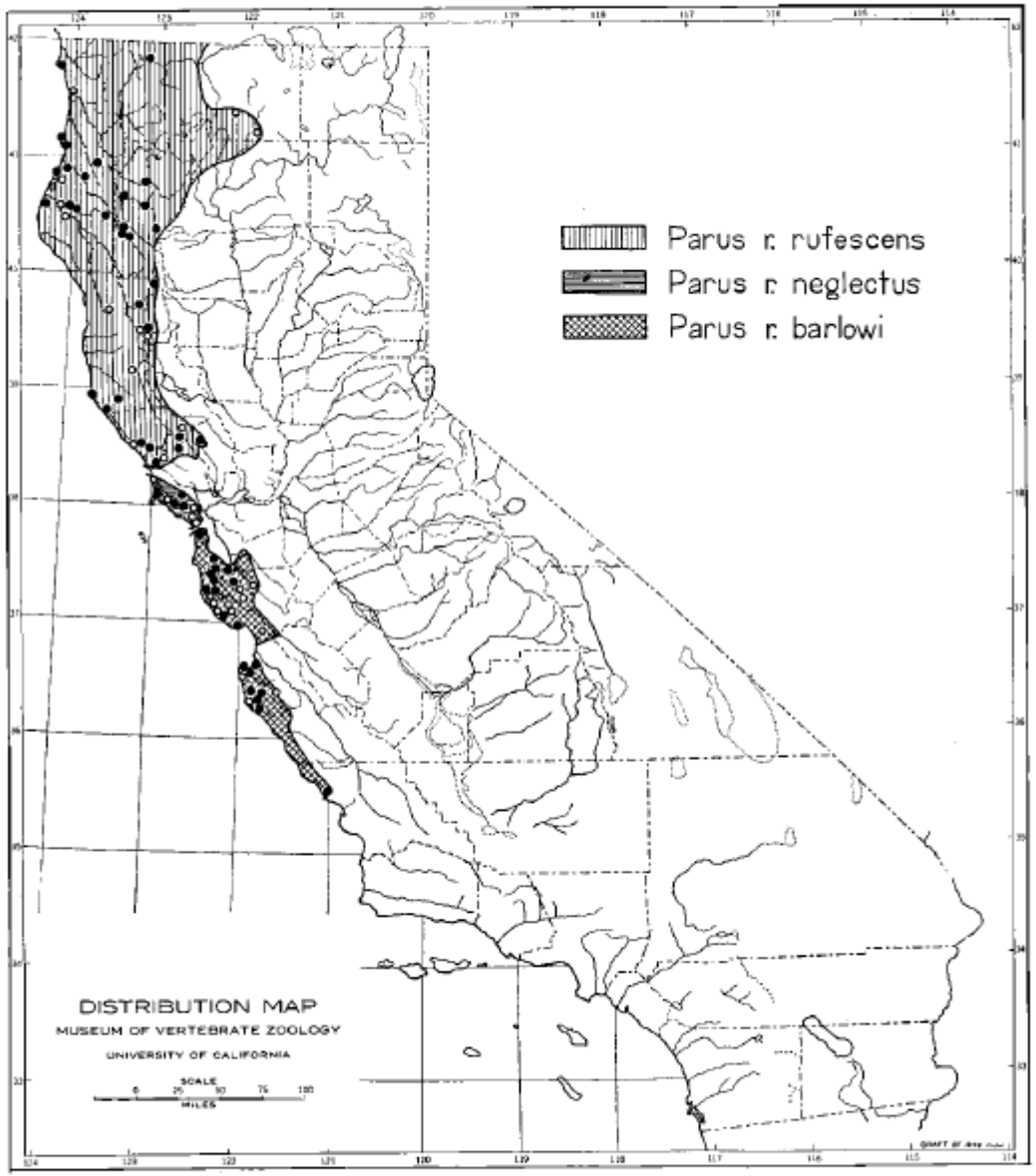
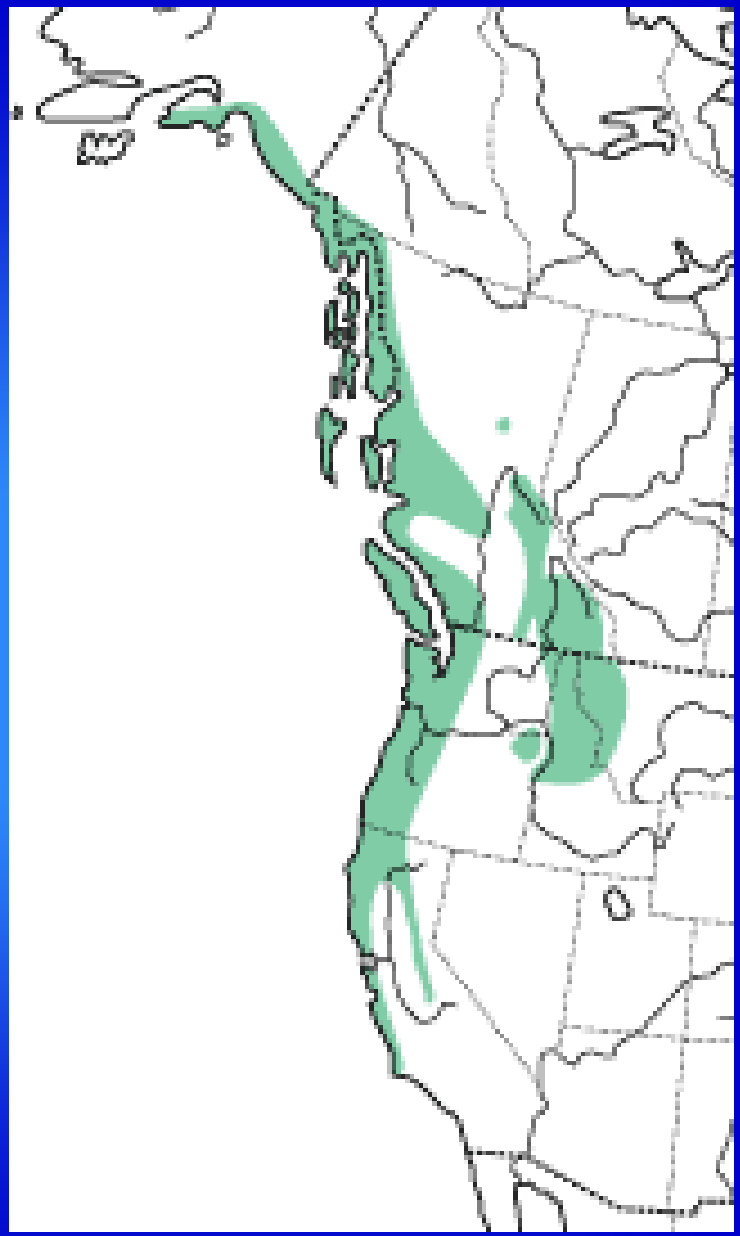
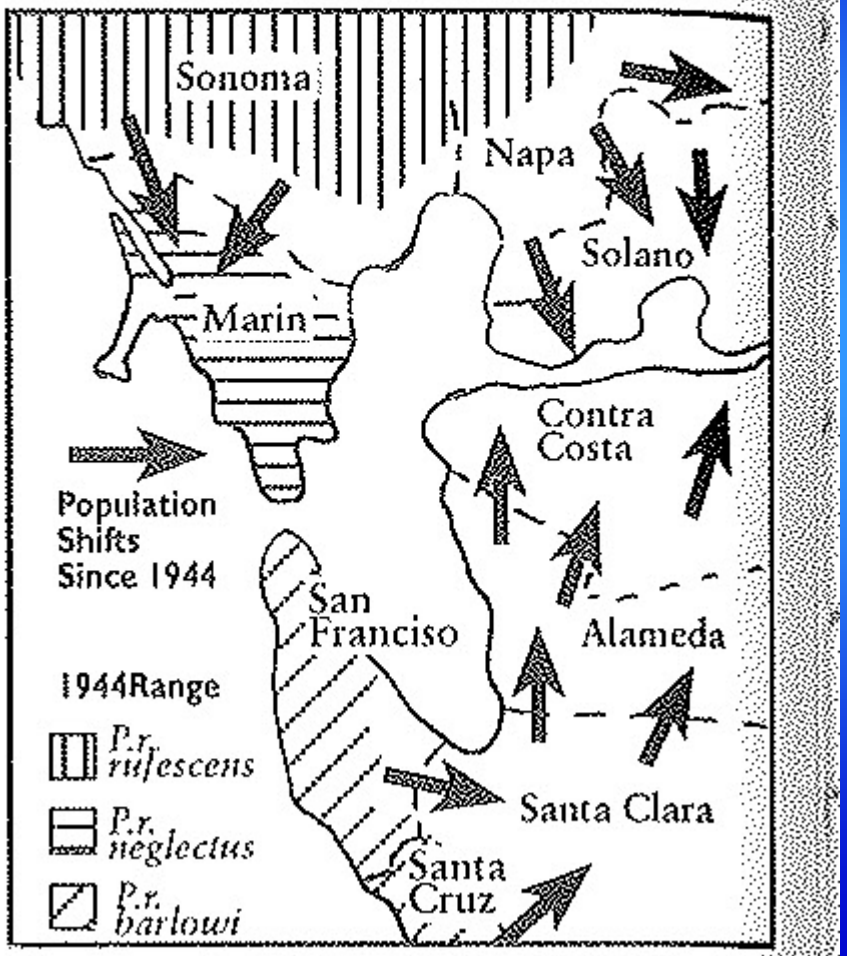


Fig. 25. Distribution of the subspecies of Chestnut-backed Chickadee, *Parus rufescens*, in California. Dots indicate localities from which specimens have been examined, exclusive of vagrants; circles, localities reported in the literature.



The Chestnut-backed Chickadee subspecies in Marin County could soon be absorbed in a merger with arrivals from the north.



Marin Chickadee P. r. neglectus


© Caroline Lambert 2014

Cristo's Line - 1976

Pygmy Nuthatch

S. p. pygmaea

S. p. melanotis

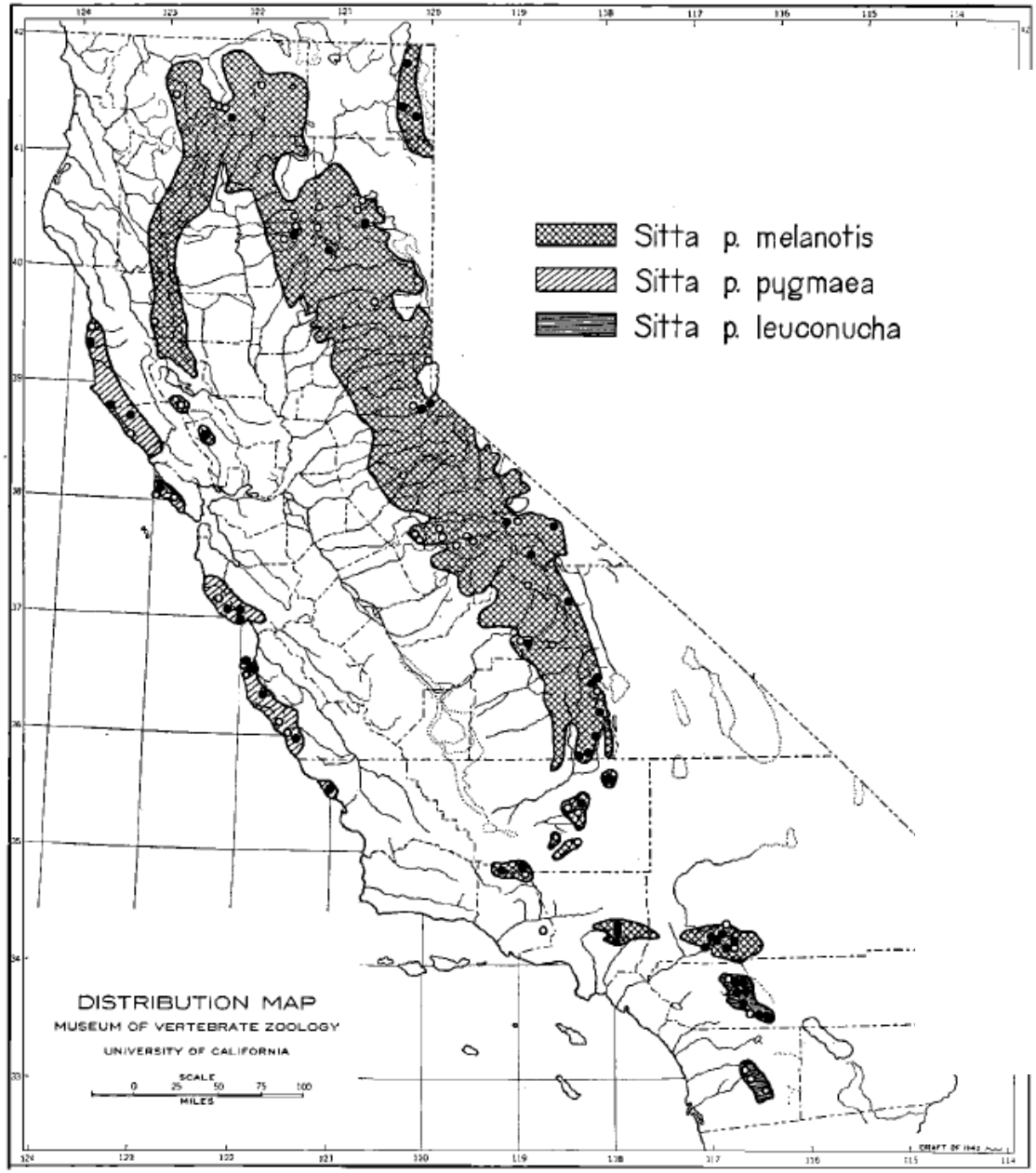
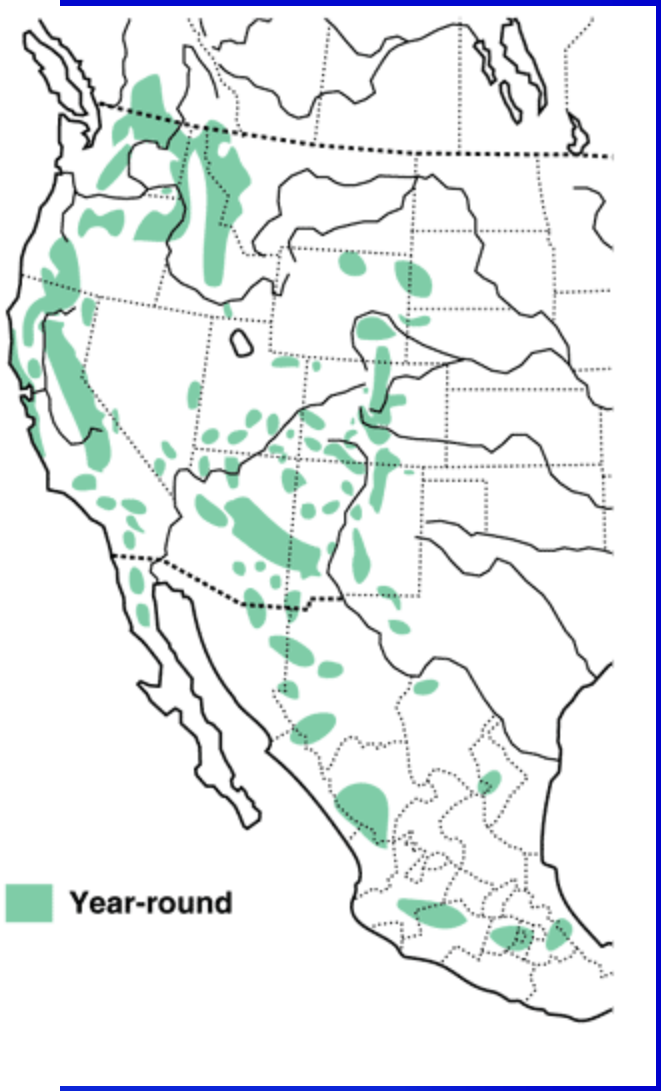
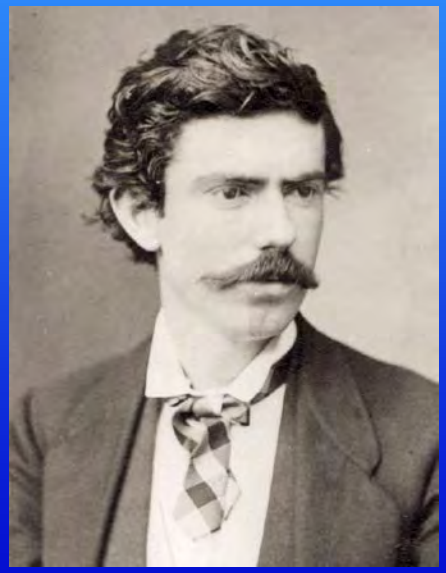


Fig. 29. Distribution of the subspecies of Pigmy Nuthatch, *Sitta pygmaea*, in California. Dots indicate localities from which specimens have been examined; circles, localities reported in the literature.

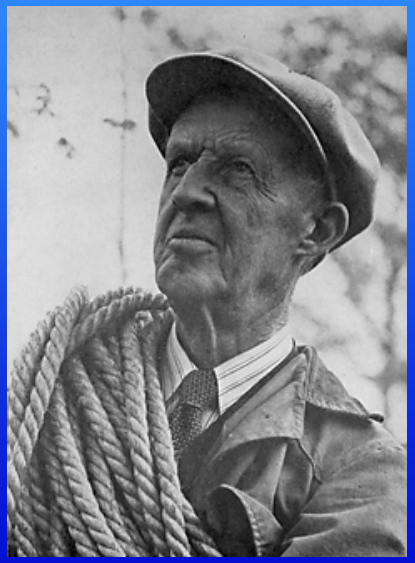


Where can I find subspecies descriptions?

Modern Field Guides (National Geographic, Sibley)
BNA online $25 per year
Bent's Life Histories
Rare/Old books like Ridgway & Dawson



Ridgway



Bent

Where can I find subspecies descriptions?

And now "Facebook"

Illustrations by Mathew Dodder

Why should I care?

It helps identify species.
I might look more carefully.
It helps clarify migrations routes.
I might get a new tick.

The End

http://fog.ccsf.edu/jmorlan