

A decade of Rusty Blackbird research: what we've learned so far



IRBWG

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Outline

- History of interest in Rusty Blackbird
- Rusty Blackbird basics
- What we have learned
- Goals for this workshop



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From *unknown*,
unloved blackbird to
poster child for
songbird declines and
boreal conservation

1995: obscurity

- Birds of North America (Avery 1995)
15 pages; grand total of TWO full papers on biology of Rusty Blackbird

Kennard 1920

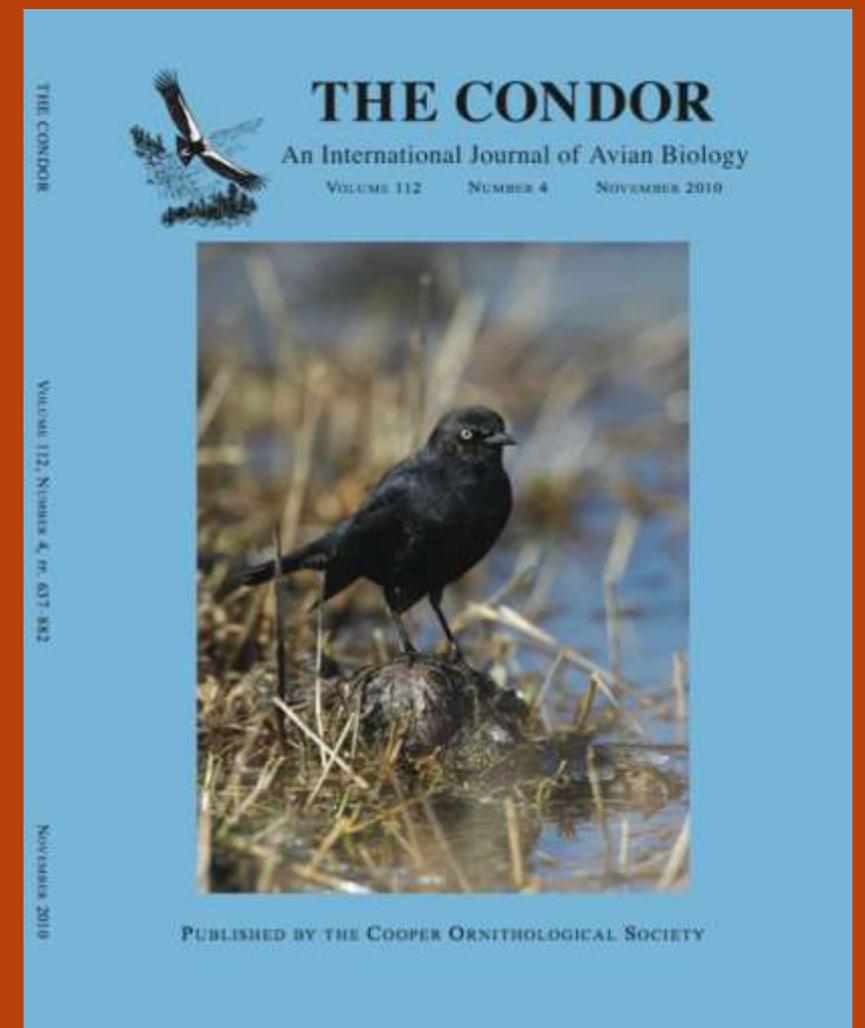
Ellison 1990



Photo: Cameron Eckert

2016: stardom

- 7 Masters theses
- 2 PhD dissertations
- 19 scientific papers
- website; popular articles
- “Special Concern” under
Canada’s SAR Act, 2006
- Removed from US Depredation Order, 2011

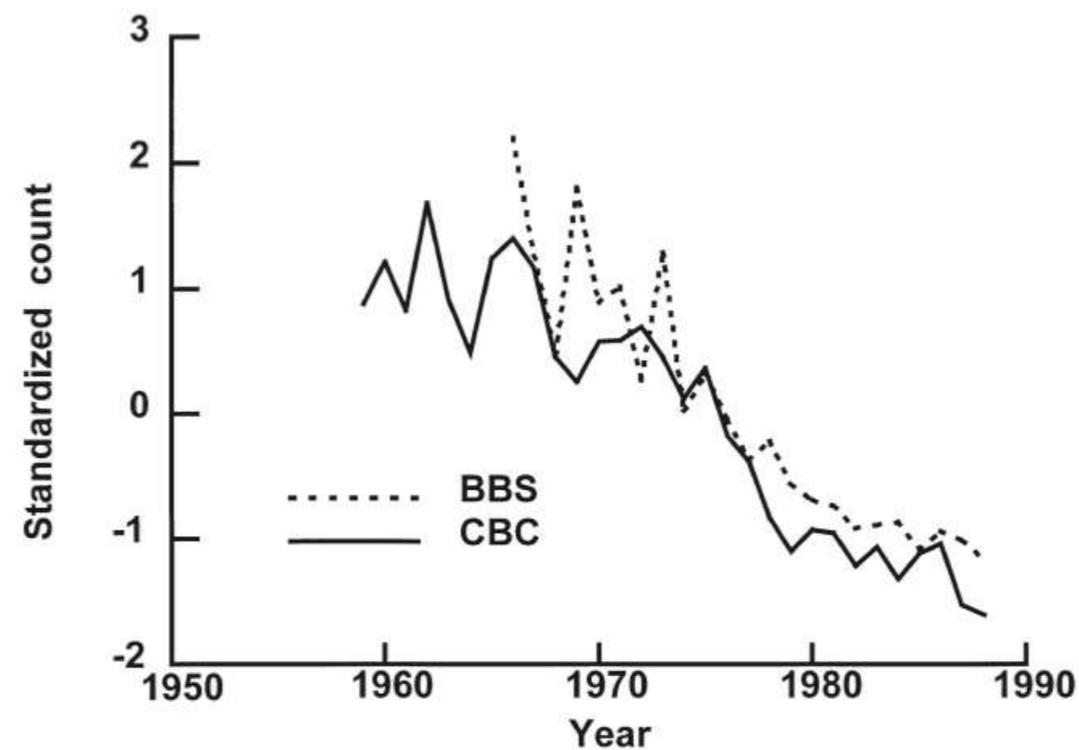


What happened?



On the Decline of the Rusty Blackbird and the Use of Ornithological Literature to Document Long-Term Population Trends

RUSSELL GREENBERG* AND SAM DROEGE†



Gathering momentum

- 2004: Alaska Rusty Blackbird Working Group (Matsuoka, Tessler, *et al.*)
- 2004: RUBL on PIF “Watch List”
- Alaska status report (Hannah 2005)
- 2005: International Rusty Blackbird Working Group (Greenberg *et al.*)
- Still only three research papers

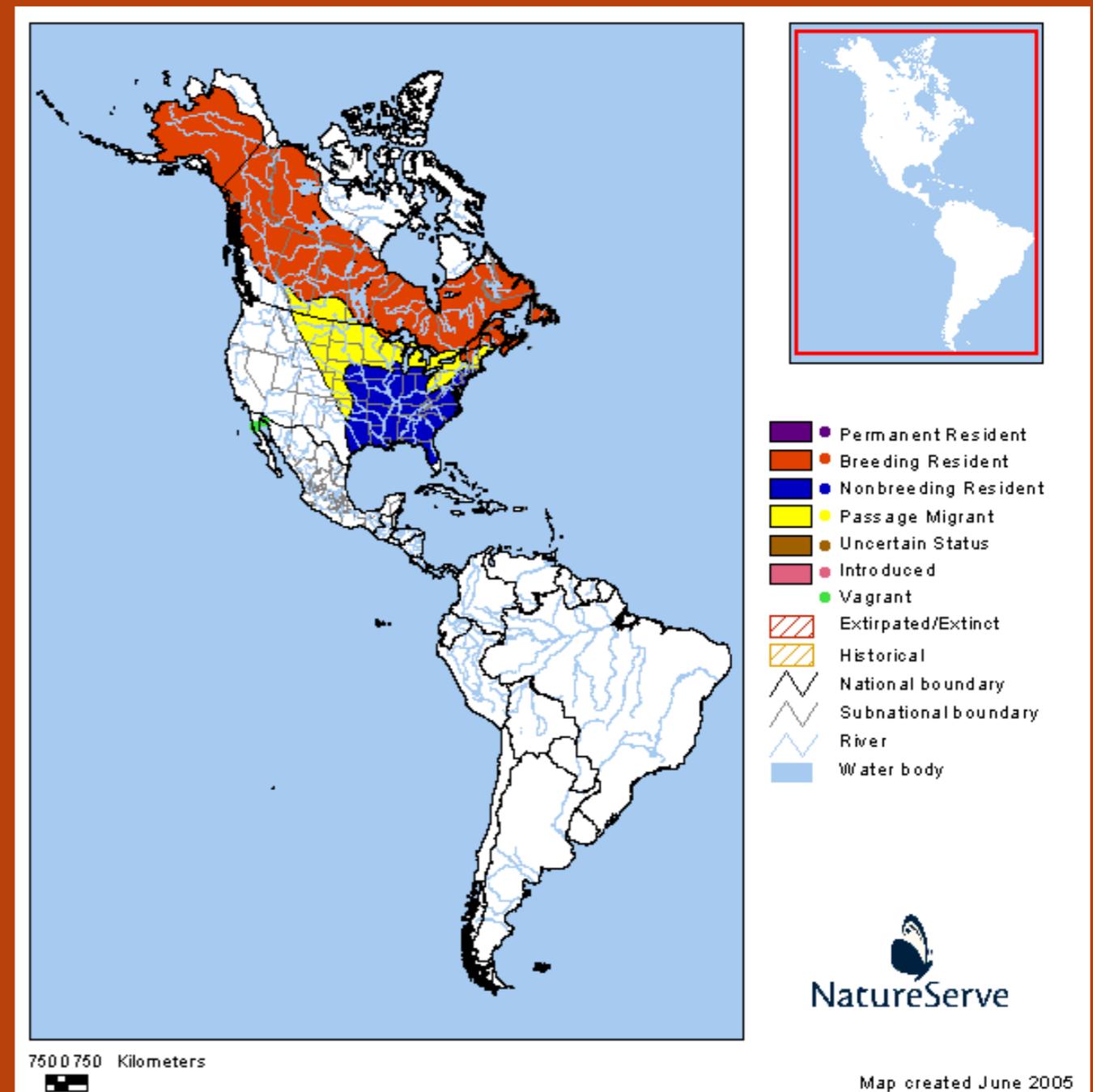
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Rusty Blackbird: a North American endemic

- Entire range is within North America
- Breeding range matches distribution of Boreal Forest



Formerly abundant



“They blacken the fields and cloud the air. The bare trees on which they alight are foliated by them. Their incessant jingling songs drown the music of the Meadow Larks and produce dreamy, far-away-effect, as of myriads of distant sleigh bells.”

E.E. Thompson (1891)
Birds of Manitoba

Boreal Breeding Grounds



Winter: Bottomland Hardwood Forest



An unusual blackbird

- Ecologically sensitive songbird of forest wetlands
- Not a major crop pest
- Invertebrate diet
- Ecological specialist

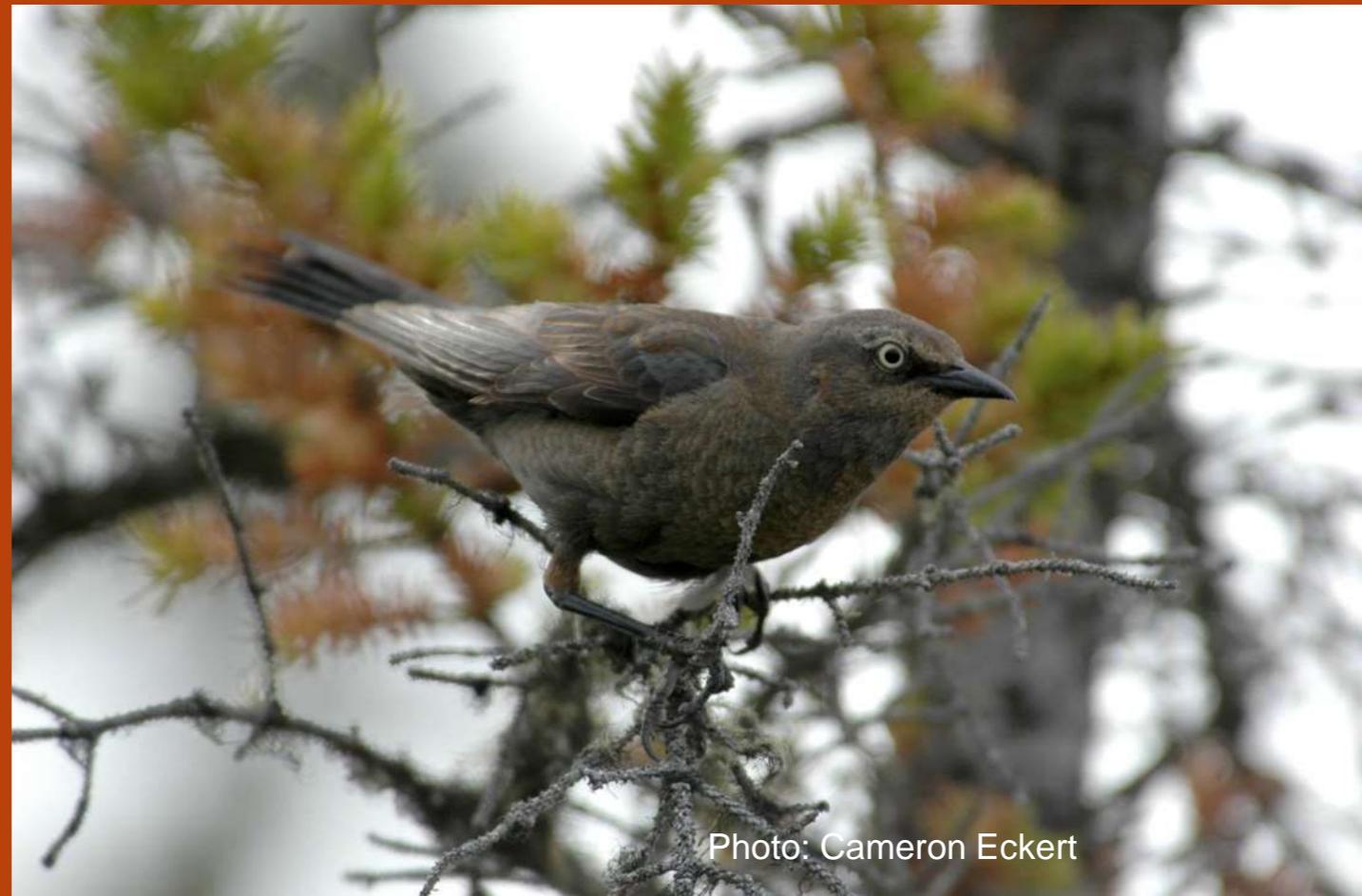
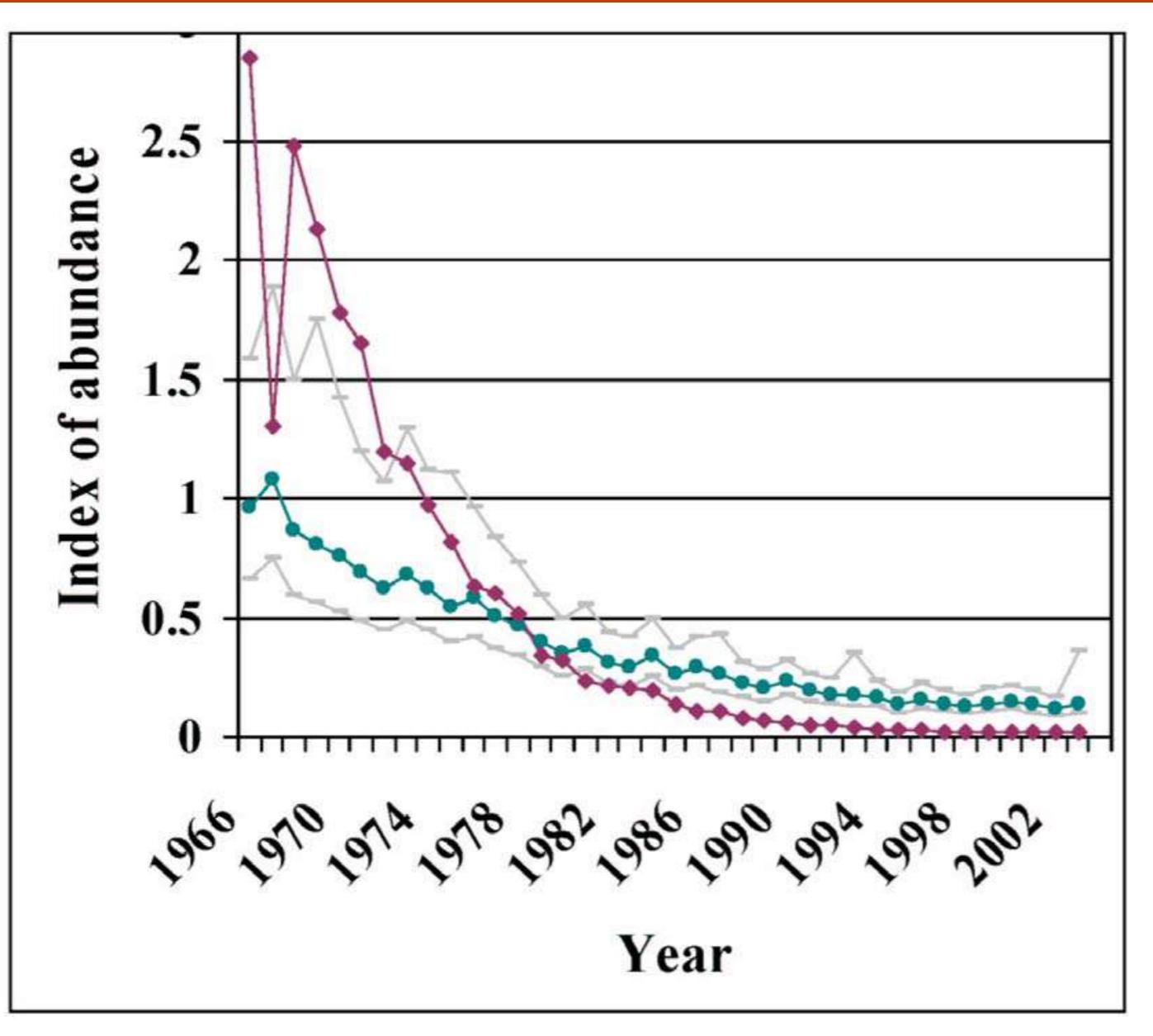


Photo: Cameron Eckert

The Population Decline



Breeding Bird Survey
Christmas Bird Count

Niven *et al.* 2004

What caused the decline?

Initial hypotheses:

- Habitat loss on the wintering grounds
- Habitat change on the breeding grounds
- Blackbird control
- Mercury toxicity
- Climate Change



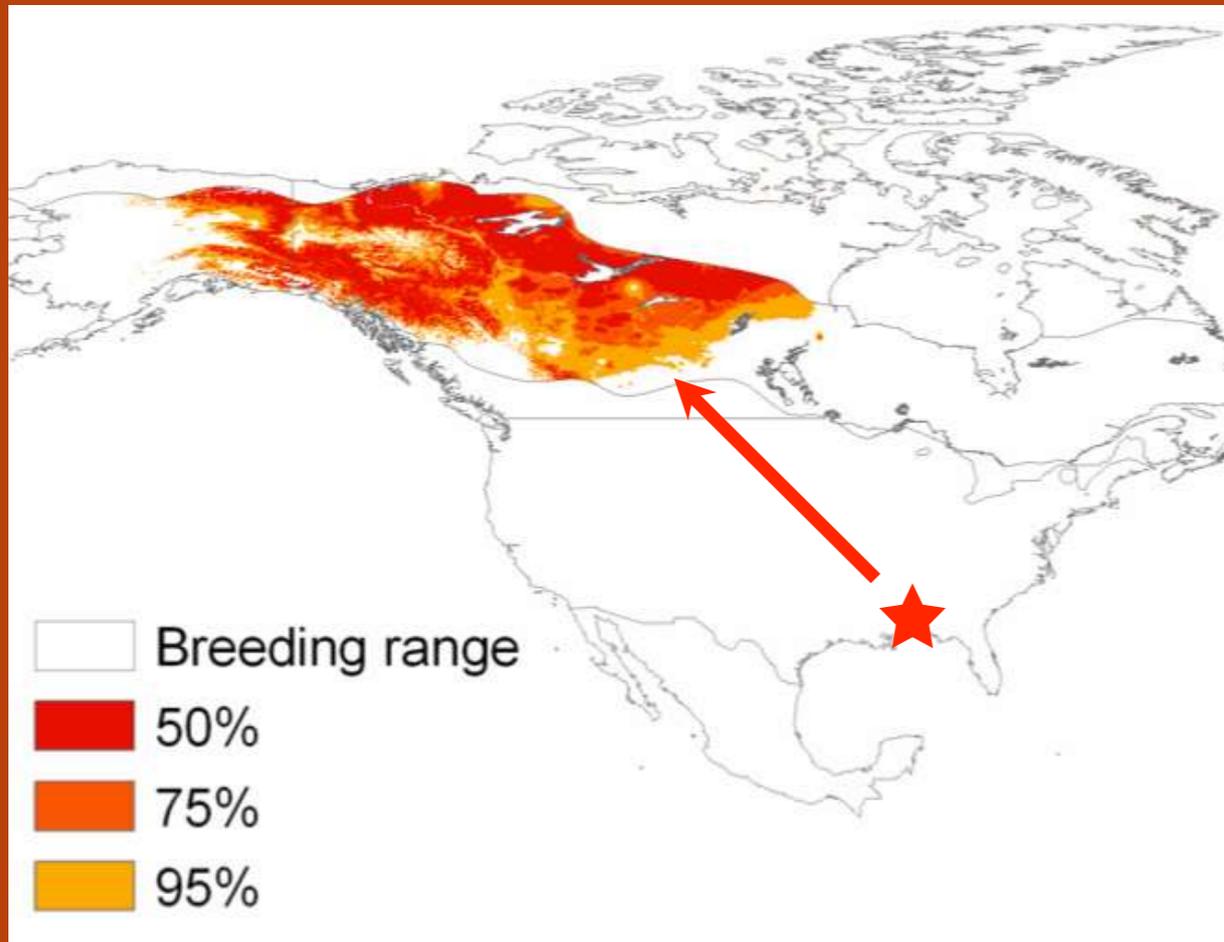
Photo: Cameron Eckert

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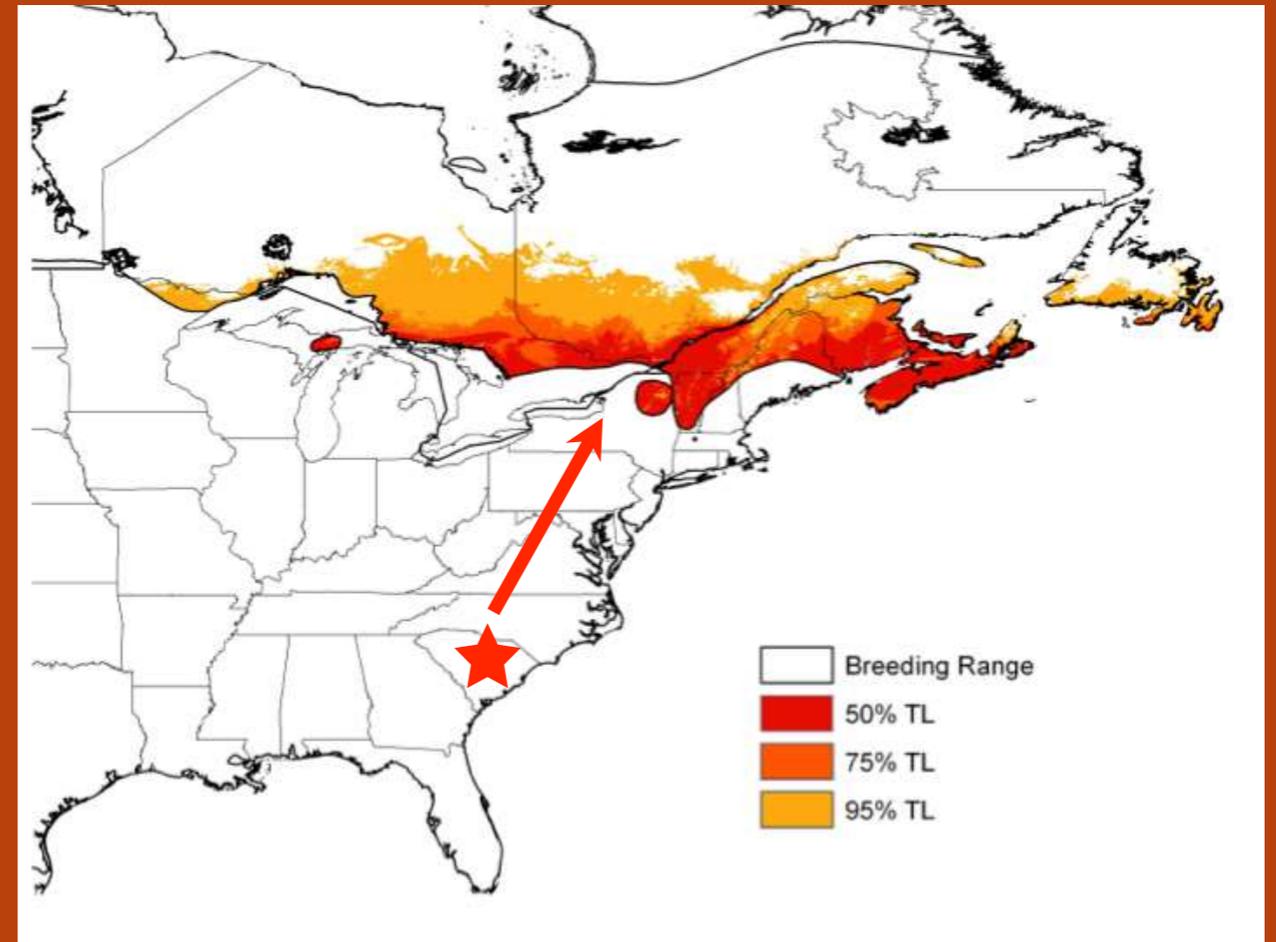
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Population Connectivity



Mississippi samples



South Carolina samples

Hydrogen isotope signatures from feather samples showed an east/west divide (feathers grown on breeding grounds)

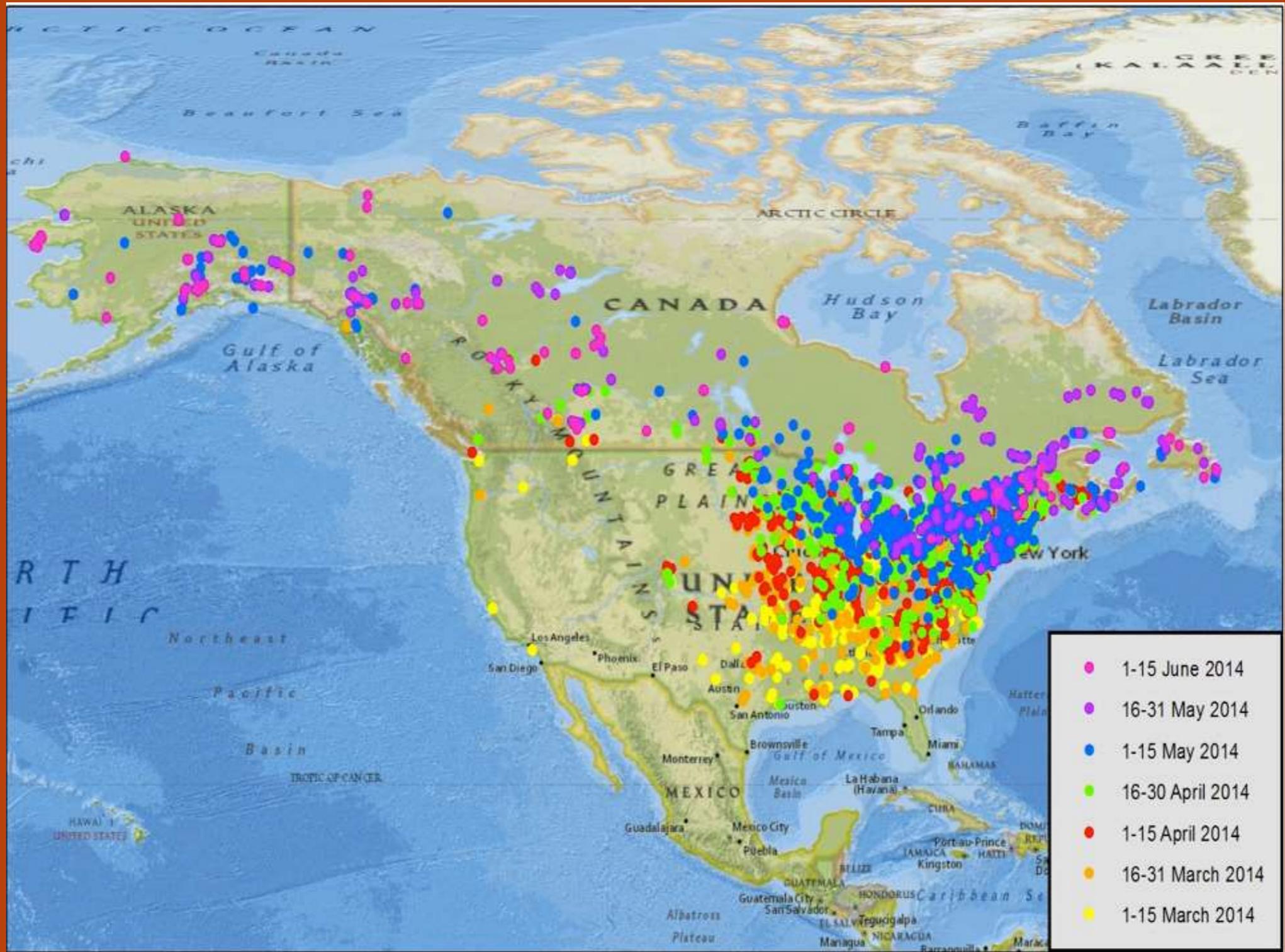
Hobson, Greenberg *et al.* 2010, *Condor*

Current Distribution: Blitz

BLITZ

- Citizen science to locate hotspots
- Locations consistently used by large flocks
- Winter Blitz 2009-2011
- Spring Blitz 2014-2016





Spring Blitz locations (Scarl 2014)

Breeding Biology

- Low densities, large home range
- Using multiple wetlands
- Single pairs or loose colonies
- Productivity generally good
- Productivity higher in Alaska than New England, usually (some low years)

Breeding Habitat

- Shallow water/puddles important
- Uses multiple wetlands
- Nests in small conifers, or shrubs
- Odonates important in diet



Breeding Habitat Loss and Change

- Conversion to agriculture in southern boreal
- Flooding of reservoirs for hydro dams
- Peat extraction
- Oil and Gas development
- Timber harvest (ecological trap?)
- Drying of wetlands/melting permafrost
- Range retractions in south

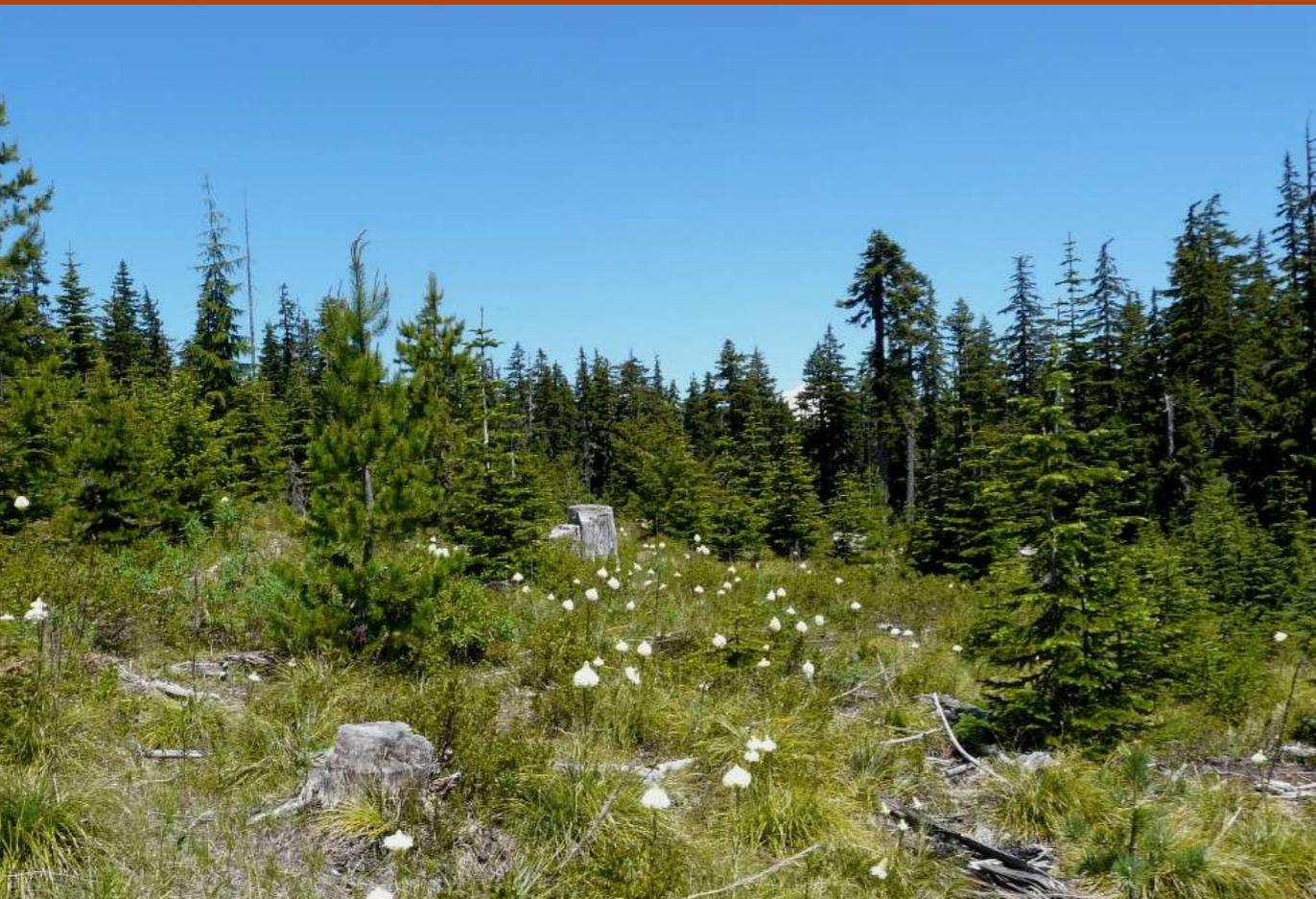
Habitat loss in boreal Canada



Human-related disturbances within Canada's Boreal forest (Canadian Boreal Initiative / Boreal Songbird Initiative)

Forestry Practices

- Regenerating clear cuts structurally similar to wetlands
- Evidence these act as “ecological sinks”



Climate Change

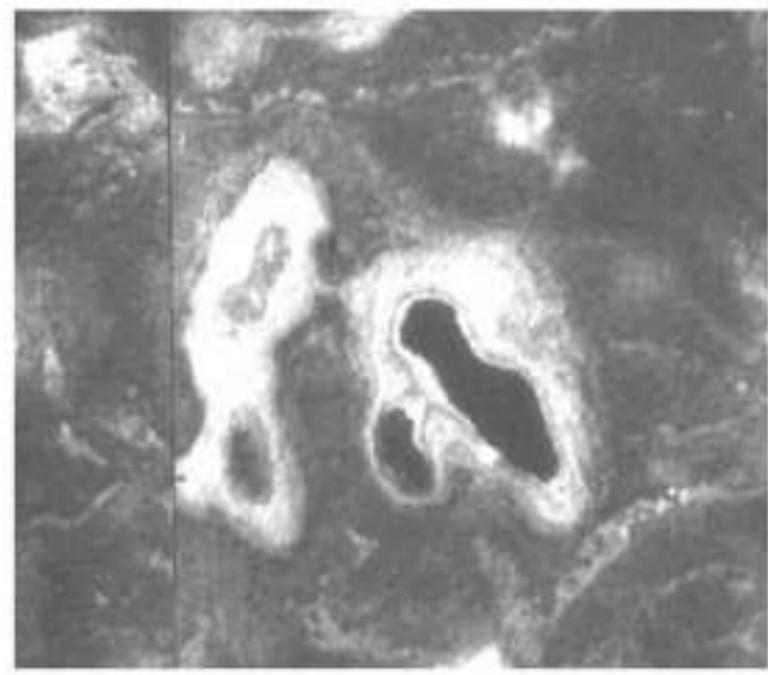
- Melting permafrost → Drying wetlands
 - Habitat loss
 - Changes in invertebrate abundance/community
- Flooding of nests
- More storms, late spring snow
- Earlier season → timing mismatch with aquatic invertebrate prey?



Shrinking wetlands 1950-2000 (Riordan et al. 2006)



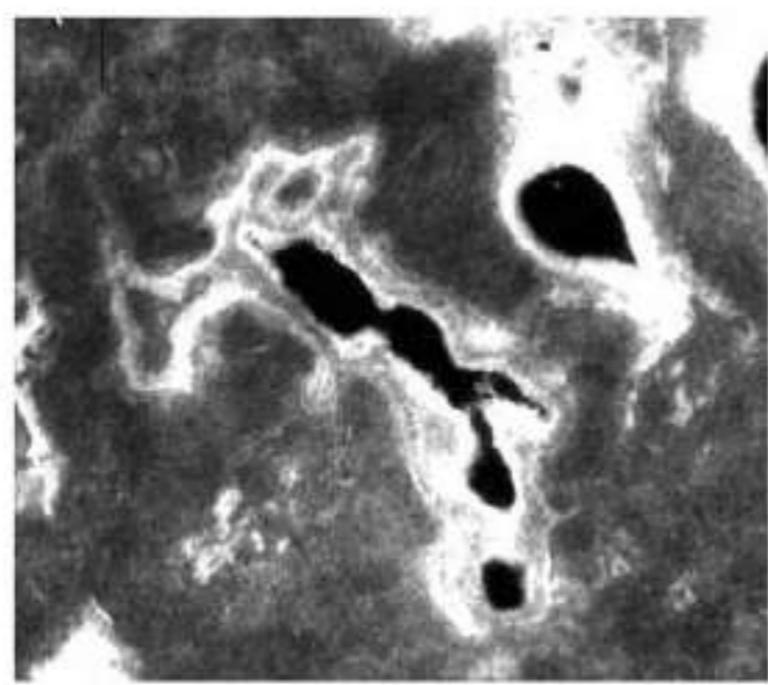
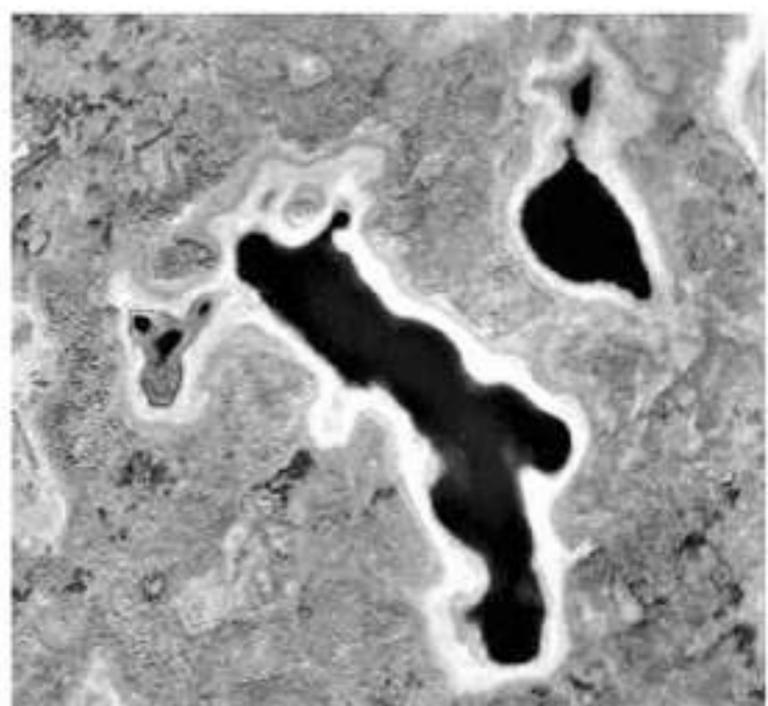
1950s



1970s

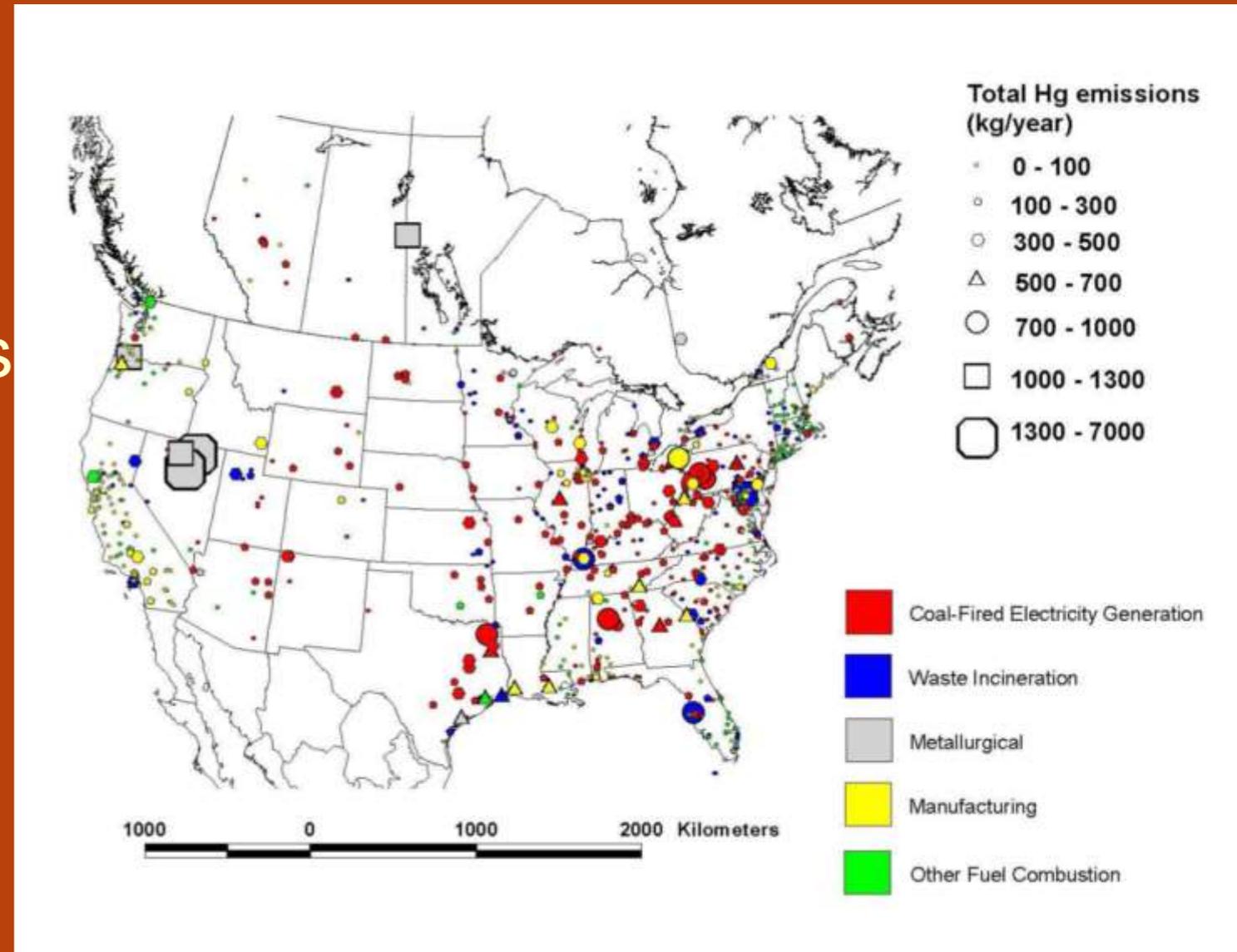


2000

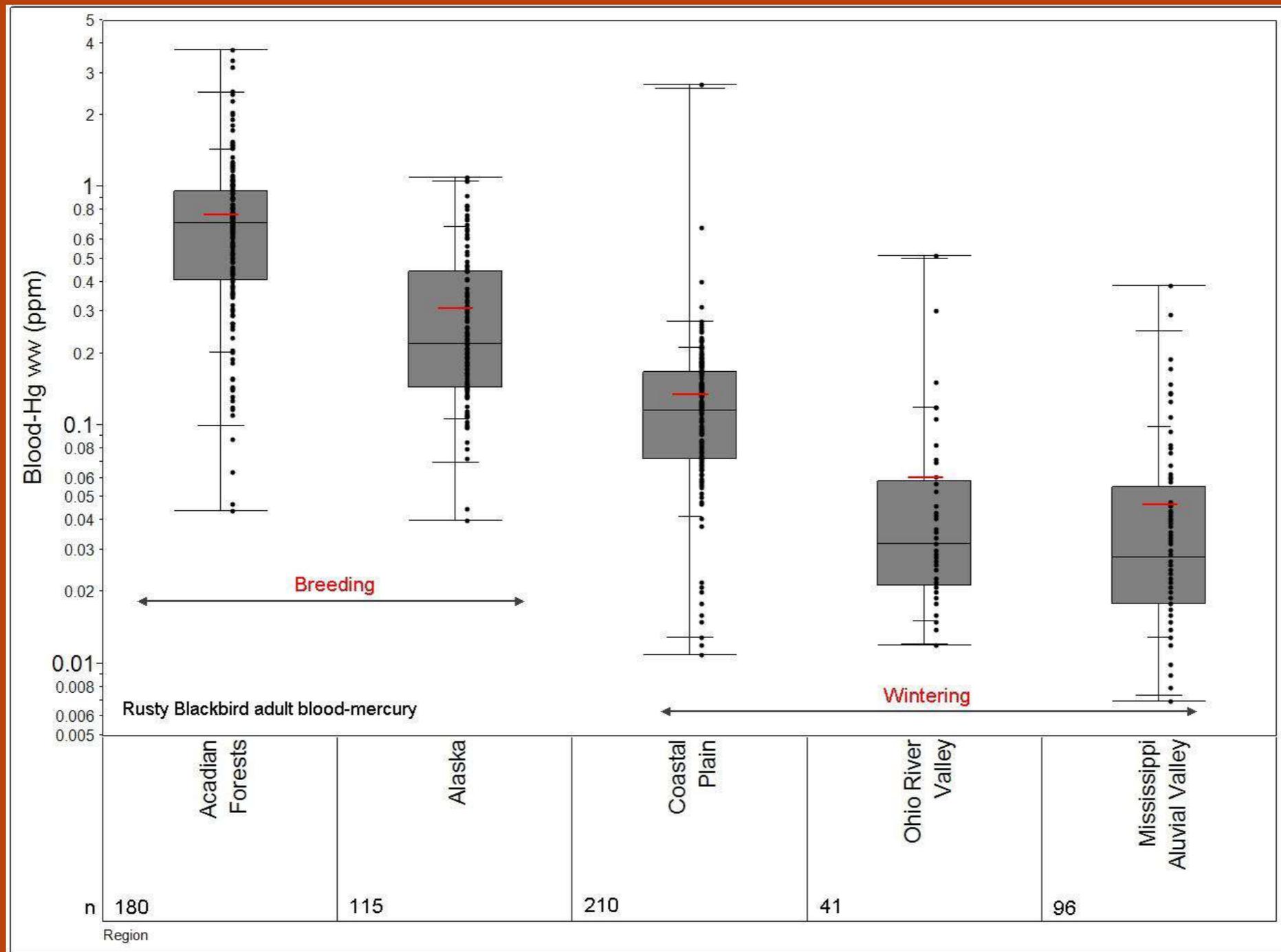


Mercury toxicity

- Issue in eastern part of range
- Accumulated by animals high in the food chain
- Fish-eaters
- Aquatic invert-eaters
- Highest levels in Rusties: in summer; east



Evers 2006



Blood Mercury concentrations in RUBL (Edmonds et al. 2010)

- High in northeast U.S., high summer

Competition with other blackbirds

- Other blackbird species expanding
- Aided by expansion of roads and development into northern part of breeding range

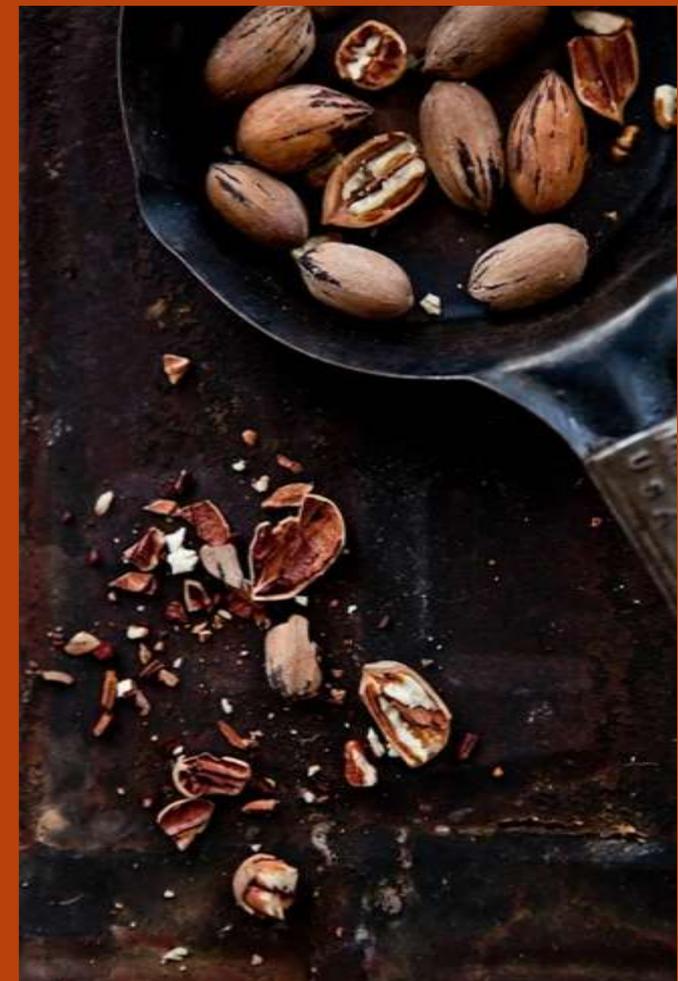


Winter Distribution

- Changes annually with weather (Hamel *et al.*)
- Segregation of ages and sexes (Mettke-Hofmann *et al.*)
- Difficult to establish long-term study sites
- Difficult to radio-track and recapture birds

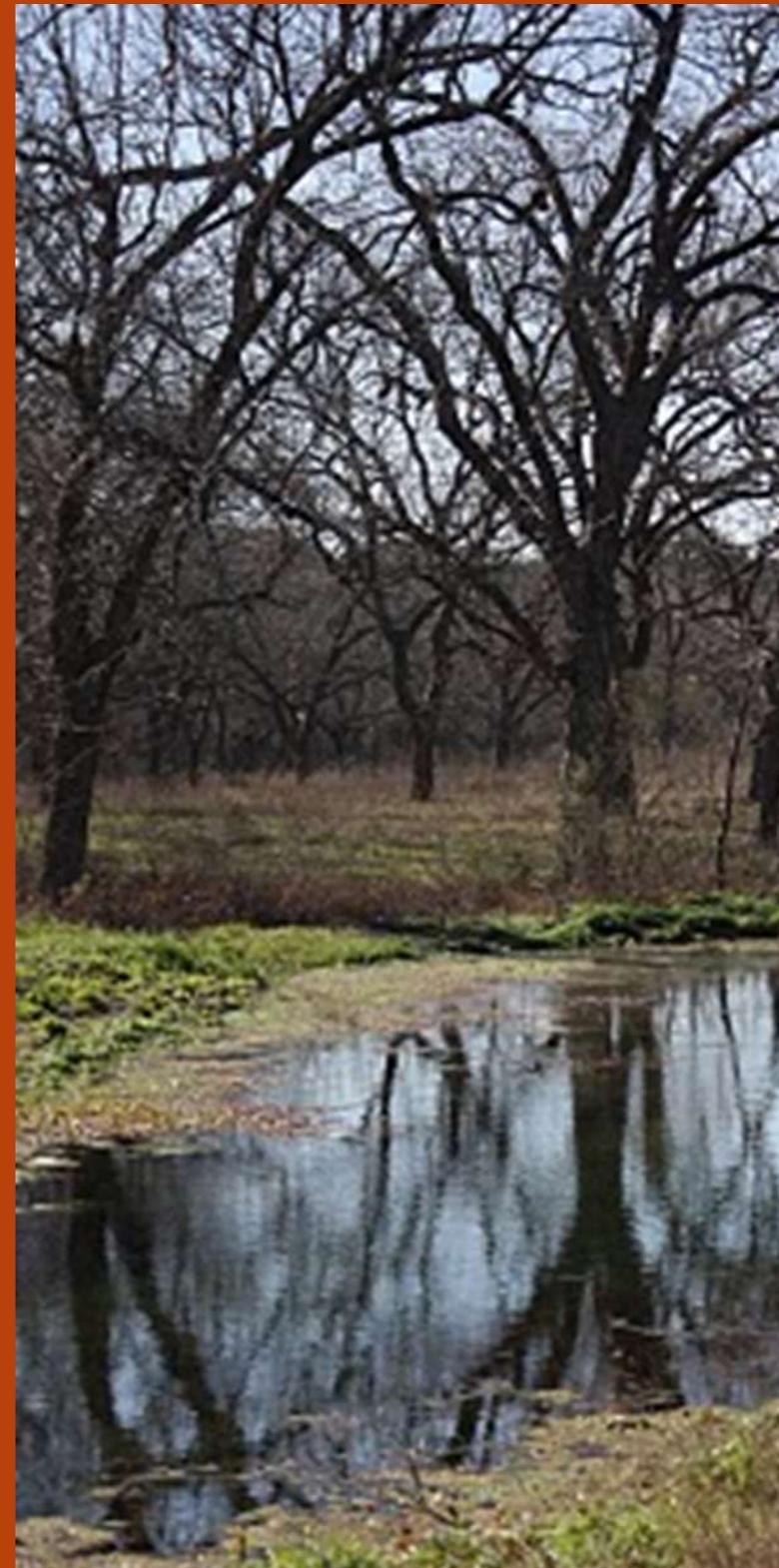
Winter Ecology

- Omnivorous: invertebrates, pecans, acorns, waste grain
- Forages for inverts at edges of shallow water
- Water freezes → inverts unavailable
- Pecans and acorns must be crushed
- Habitat needed for foraging AND night roosts
- Roosts up to 11 miles from foraging sites



Winter Habitat

- Hardwood forest with shallow open water and small-seeded oaks
- Forest fragments along creeks
- Pecan orchards
- Disturbed areas with wet ground
- Suburban yards
- Segregation of foraging habitat by age, sex
- Roosts in fields with low veg; or in trees



Winter Habitat Loss/Change

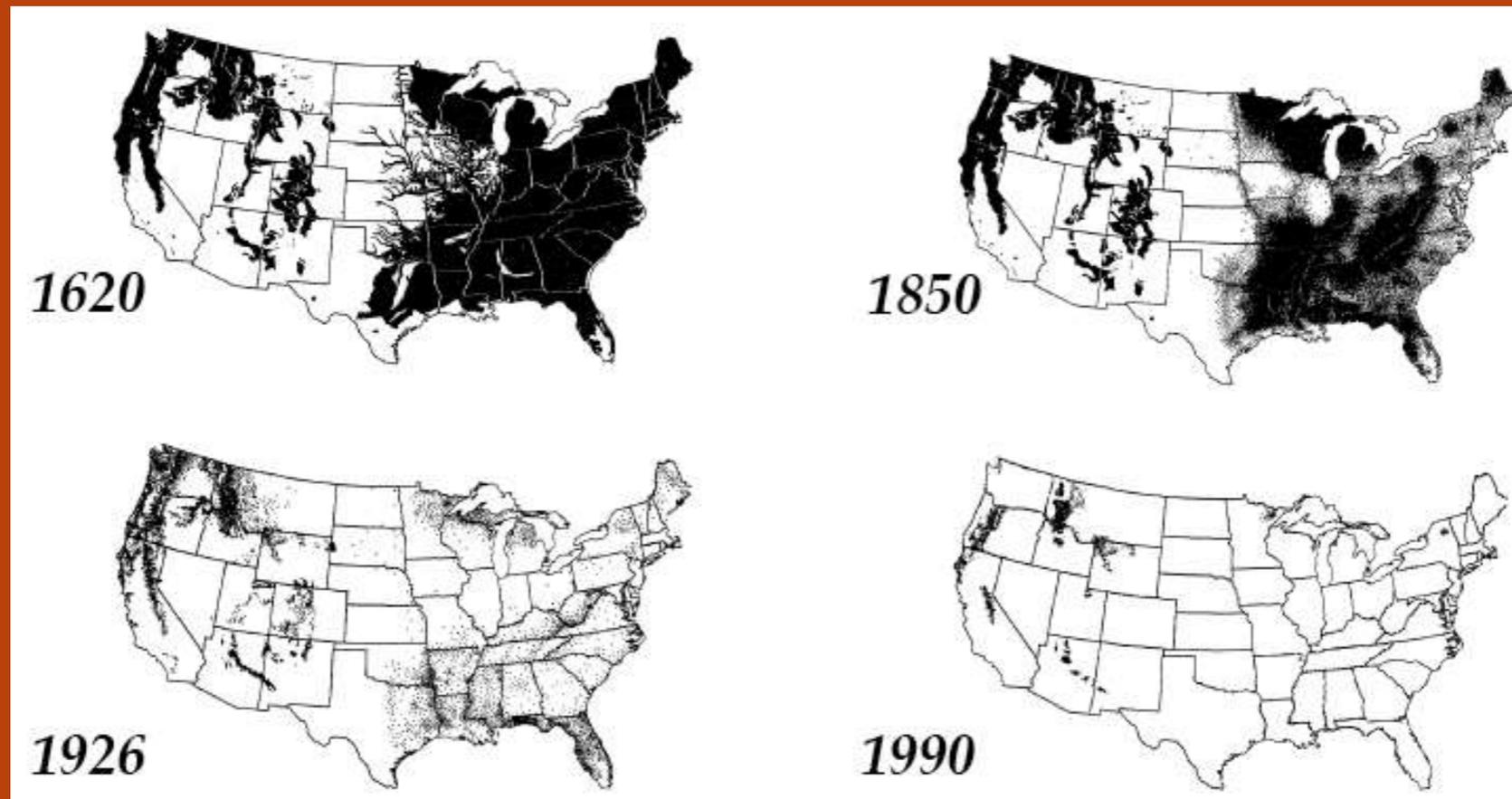
- Large losses of forest, wetland since before BBS and CBC
- Drier forest converted first, wetter forest in 2nd half of 20th century
- 1970s, 1980s High soybean prices → forest cleared
- 1990s, 2000s Pecan groves removed for biofuel (corn)
- Reforestation/afforestation programs



Habitat loss: wintering ground

Forest loss an obvious suspect in declines

- does the timing fit?



Old Growth Forest in U.S., 1620 to 1990

- Hardwood forest loss began before documented RUBL decline
- But flooded forests not the first targeted
- Conversion of wet forest ramped up in 1970s with high soybean prices

Blackbird Control

- Major control program in 1960s, 1970s
- Rusty Blackbird forms small component of mixed roosting flocks
- Flock composition of affected flocks not always available/reliable



Blackbird Control

- Does not appear to be major contributor to historic decline
- But...poison bait at cattle feedlots in migration areas: affects on RUBL?



Disease

- Unexpectedly high levels of blood parasites in winter (Barnard *et al.*)
- Typically low in winter when insect vectors are dormant
- May indicate stress

No silver bullet



photo: Ted Swem



Knowledge Gaps

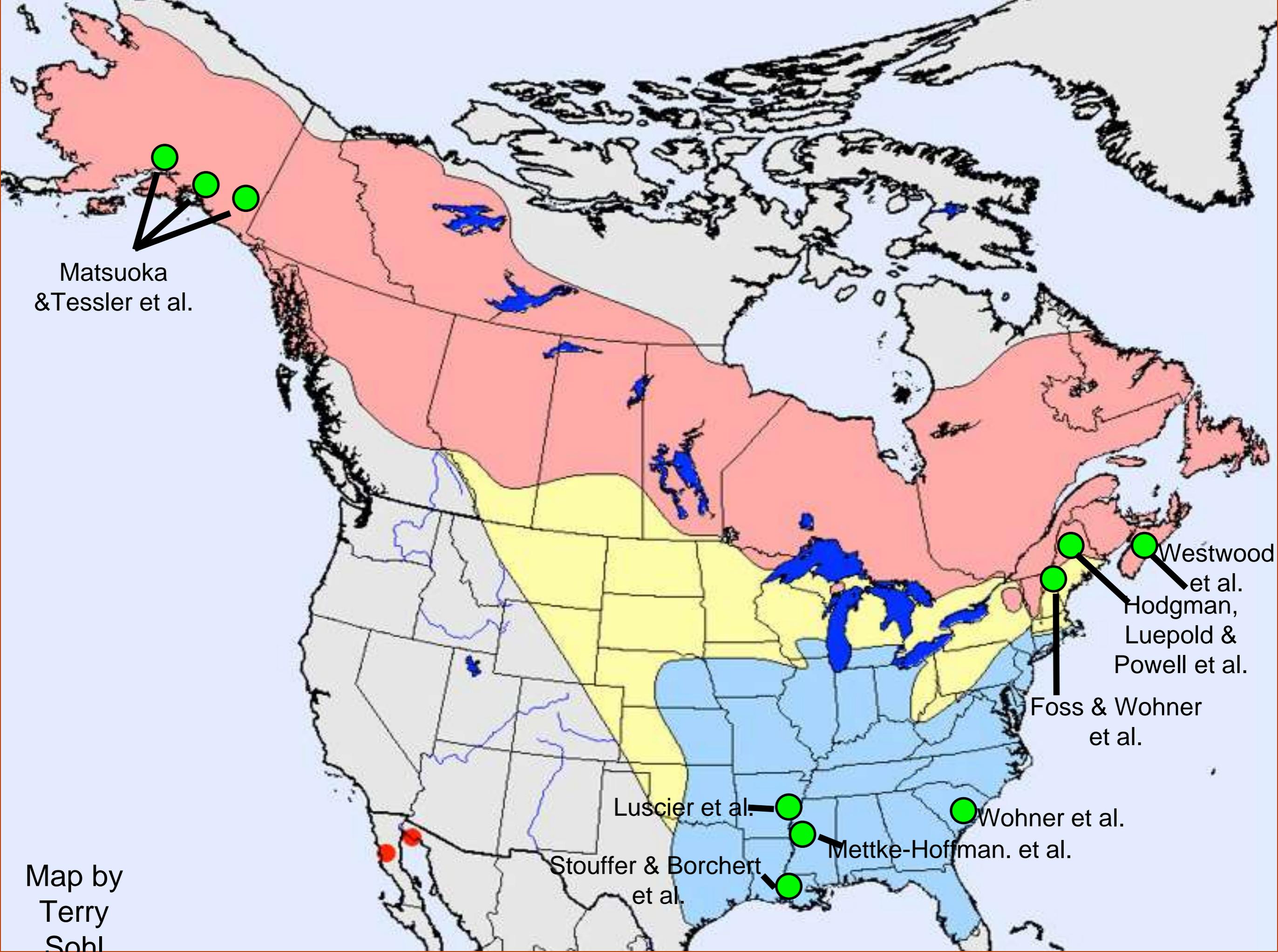
- Migration ecology: “winter” and “breeding” only cover half of the year
- Central boreal region
- Hotspots: doing more with the Blitz data
- What is limiting the population now?
- Recommendations for recovery

Missing piece: Fall Migration

Q: Is November an additional stationary period of life cycle?



Johnson, Matsuoka, Tessler, Greenberg & Fox,
2012, WJO



Matsuoka
& Tessler et al.

Westwood
et al.
Hodgman,
Luepold &
Powell et al.

Foss & Wohner
et al.

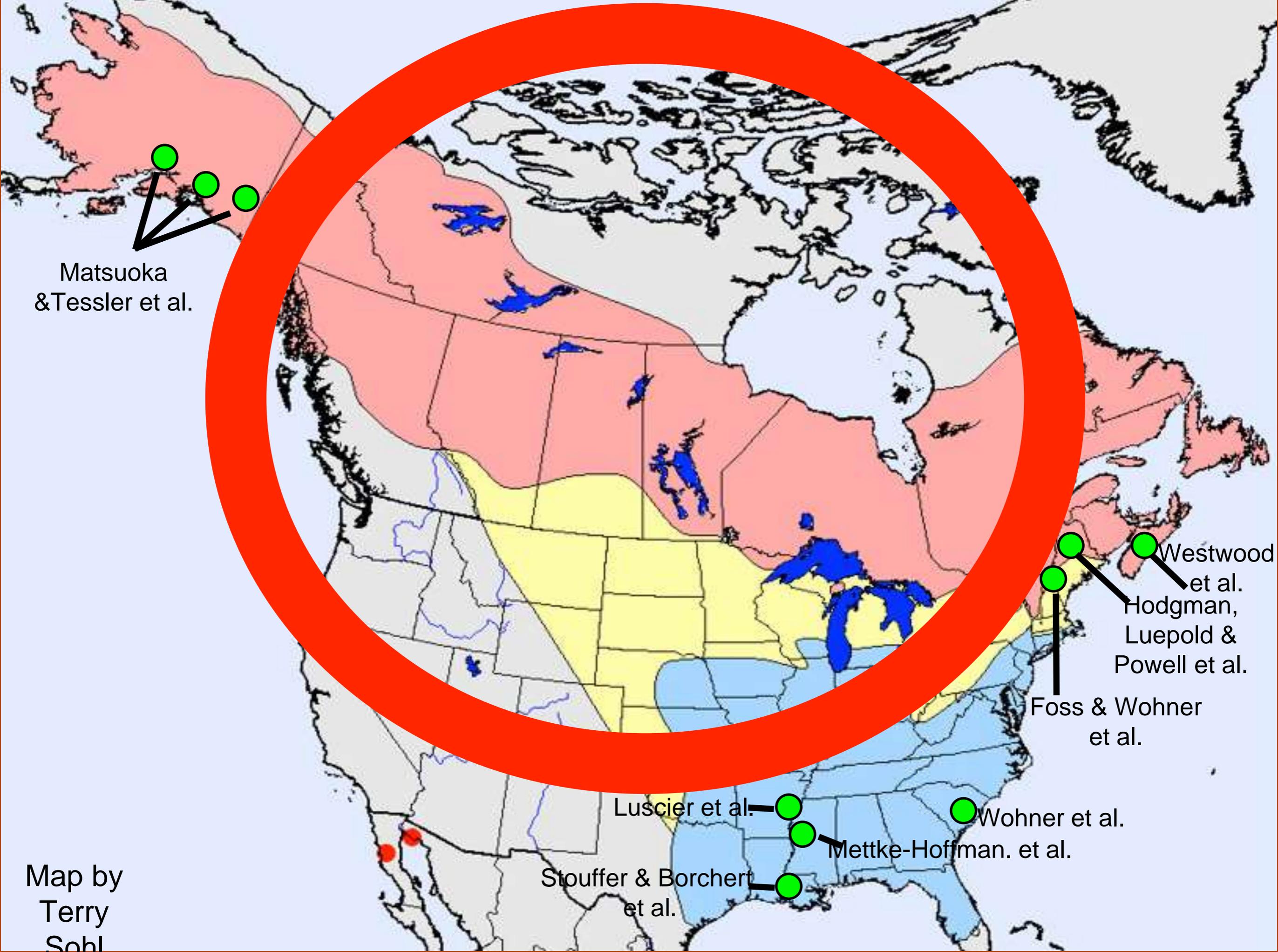
Luscier et al.

Wohner et al.

Stouffer & Borchert
et al.

Mettke-Hoffman. et al.

Map by
Terry
Sohl



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2016 Workshop

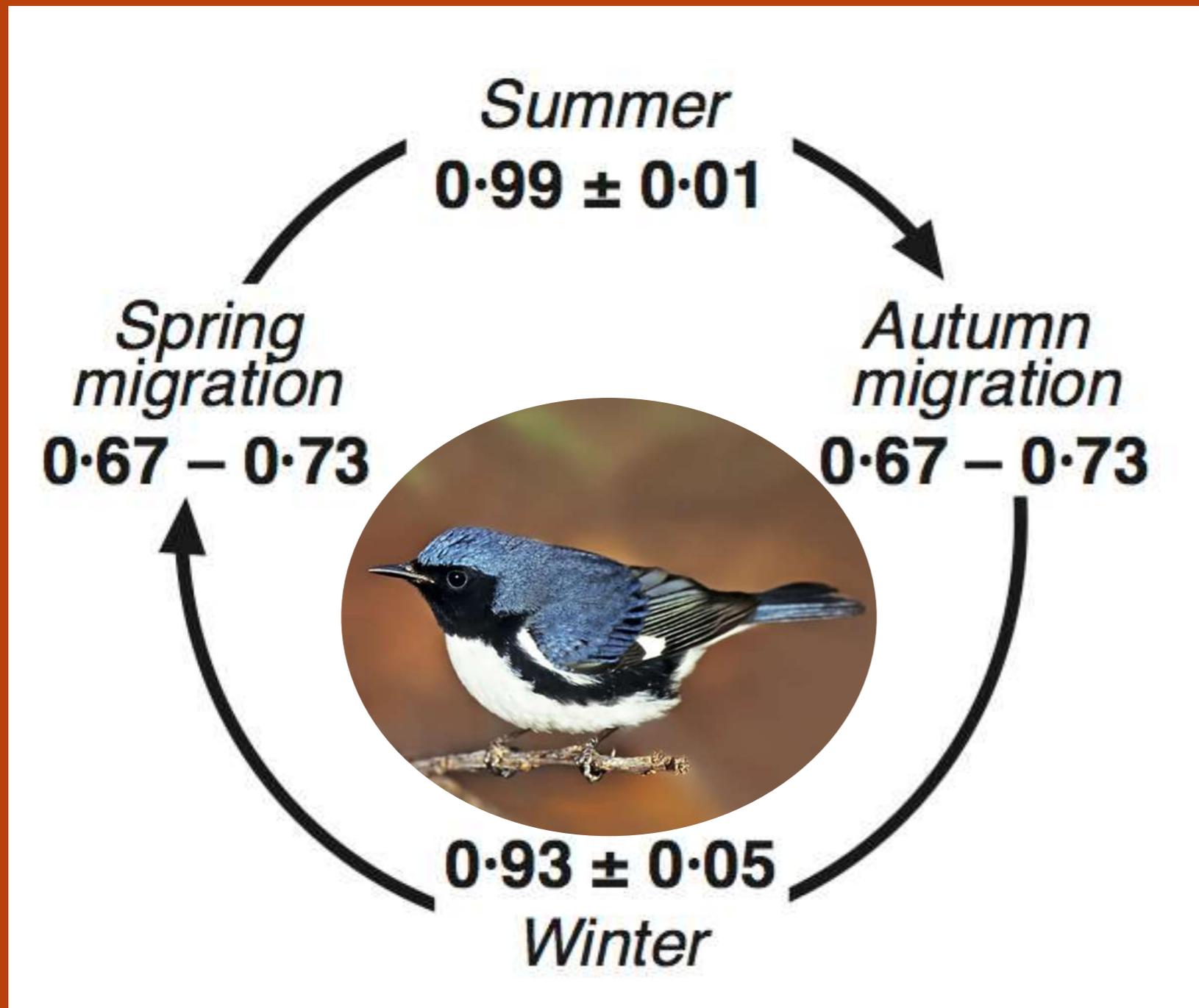
- Update on recent research
 - Filling in geographic gaps
 - Post-breeding, migration
- Using the Blitz data
- Full cycle Population Model
- Conservation and Research Strategy



What's limiting the population?



Full annual cycle population model:



$$\Phi_{\text{annual}} = \Phi_{\text{breeding}^*} \Phi_{\text{winter}^*} \Phi_{\text{migration}}$$



**Thank you
to all of the researchers
and working group members!**