Habitat Use and Reproductive Ecology of Rusty Blackbirds in New England and Alaska

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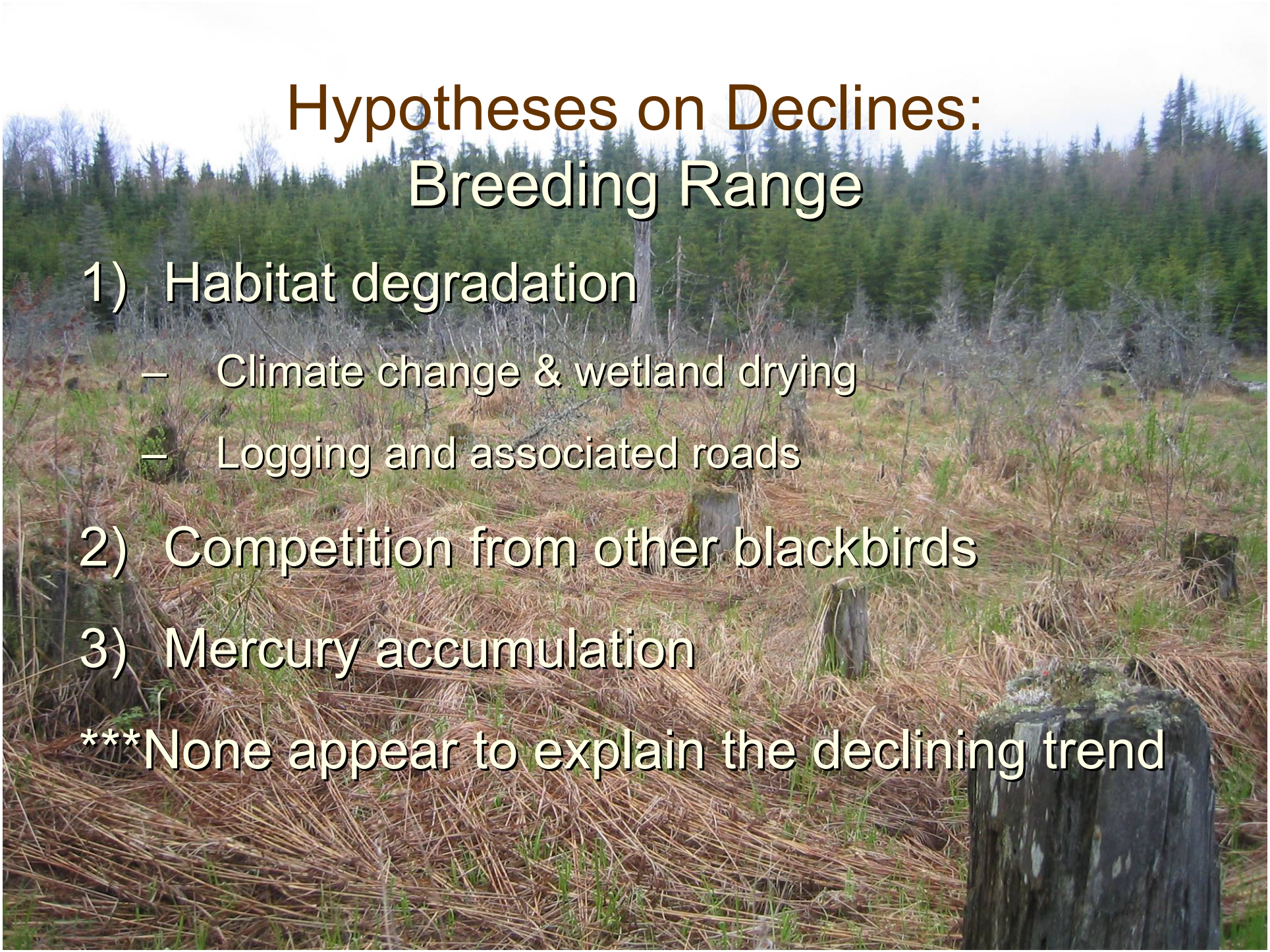
Info We Started With:

- Rusties are the species most closely linked to breeding in boreal forest wetlands.
  - (Niven et al., American Birds 2004)
- Habitat: bogs, fens, beaver ponds, flooded meadows
- Often nest in conifers w/ dense cover
- Wade in shallow water for aquatic prey



Hypotheses on Declines: Breeding Range

1) Habitat degradation
   - Climate change & wetland drying
   - Logging and associated roads
2) Competition from other blackbirds
3) Mercury accumulation

***None appear to explain the declining trend

Objectives

1. Develop survey techniques to estimate site occupancy and breeding abundance.
2. Identify wetland features important in predicting breeding occupancy or abundance.
3. Determine whether reproductive success was low.

Objectives

4. Assess blackbird breeding ecology among contrasting wetland landscapes.

   – *New England*: small dispersed wetlands in industrial timberland (predicted poor quality).

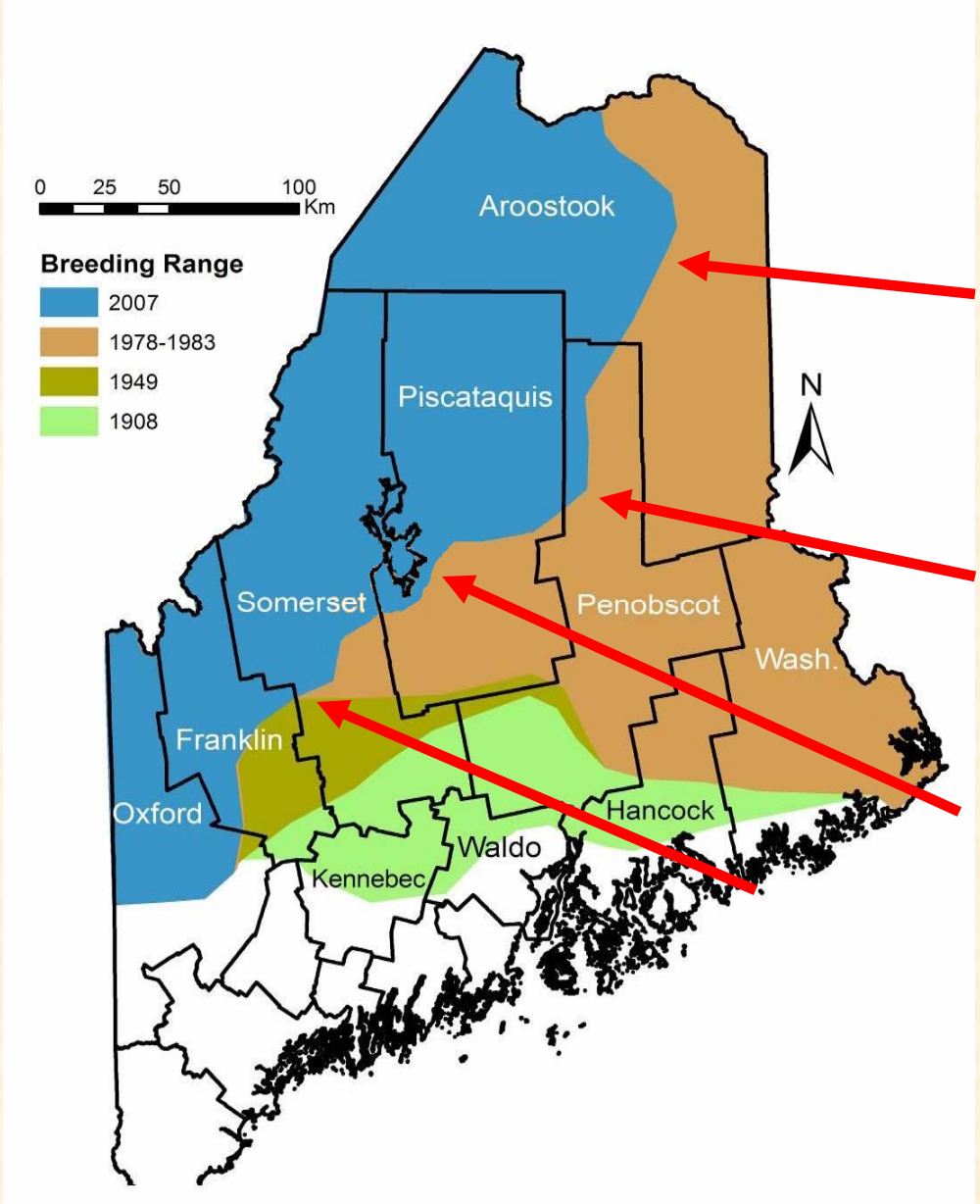
   – *s.-central Alaska:* small dispersed wetlands in a lightly disturbed and primarily upland landscape (moderate quality).

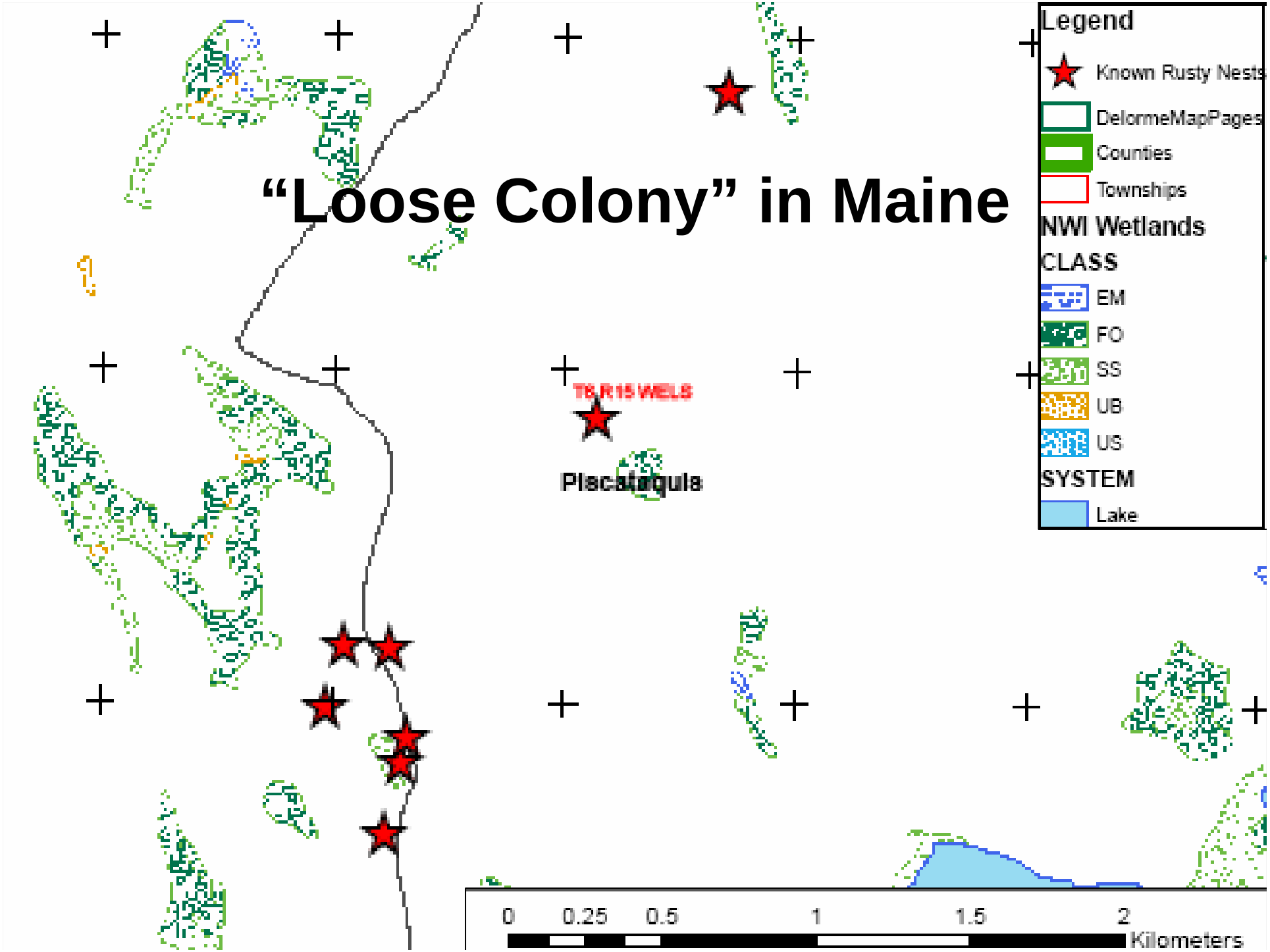
   – *interior Alaska:* large river floodplain dominated by undisturbed boreal wetlands (high quality).

Survey Methods: New England

- Occupancy based approach
- 8 minute callback surveys
- May - June of 2006 & 2007
- 550 wetlands within breeding range
- Geographically stratified random design
- Repeat visits

Range Contraction in Maine




“Loose Colony” in Maine
Legend
Known Rusty Nests
DelormeMapPages
Counties
Townships
NWI Wetlands
CLASS
EM
FO
SS
UB
US
SYSTEM
Lake
T8 R15 WELS
Piscataquis
0
0.25
0.5
1
1.5
2
Kilometers

Results: Occupancy and Detectability in New England

- Rusties detected in 48 of 550 wetlands
  - Naïve occupancy = 0.087
  - Detectability = 0.194 (+/- 0.1)
  - Estimated Occupancy = 0.371 (+/- 0.239)
  - *Repeat surveys necessary*

Results: Habitat Occupancy in New England

- "Best" model w/ QAIC
  - ψ(PUDDLES + WETAREA + SOFTWD_UPLAND), *p*(WIND)

Covariate	Estimate	95% CI
Habitat occupancy (Ψ)		
Intercept	-3.090	-4.676 , -1.504
PUDDLES Present	1.110	0.083 , 2.137
WETAREA	0.513	-0.022 , 1.048
SOFTWD_UPLAND	1.511	0.237 , 2.785
Detection probability(p)		
Intercept	-1.421	-2.062 , -0.780
WIND	-0.002	-0.004 , 0.000

•No support for models including blackbird competition or effects of logging

Survey methods in Alaska

Surveys to provide unbiased estimators of:

- Site occupancy based on repeated visits.
- Breeding abundance using double sampling.

Sample 1: Rapid area searches

- Two territory mapping visits to each site from 10-25 May.
- Presence/absence of breeding pairs (occupancy models).
- # breeding pairs for each survey to calculate detection probabilities (double sampling).

Sample 2: Intensive nest searches

- Determine # of nests on survey units to calculate detection probabilities for rapid surveys.

$$\text{Detection probability} = \frac{\text{\# breeding pairs from sample 1}}{\text{\# nests from sample 2}}$$

Results: S.C. Alaska Surveys

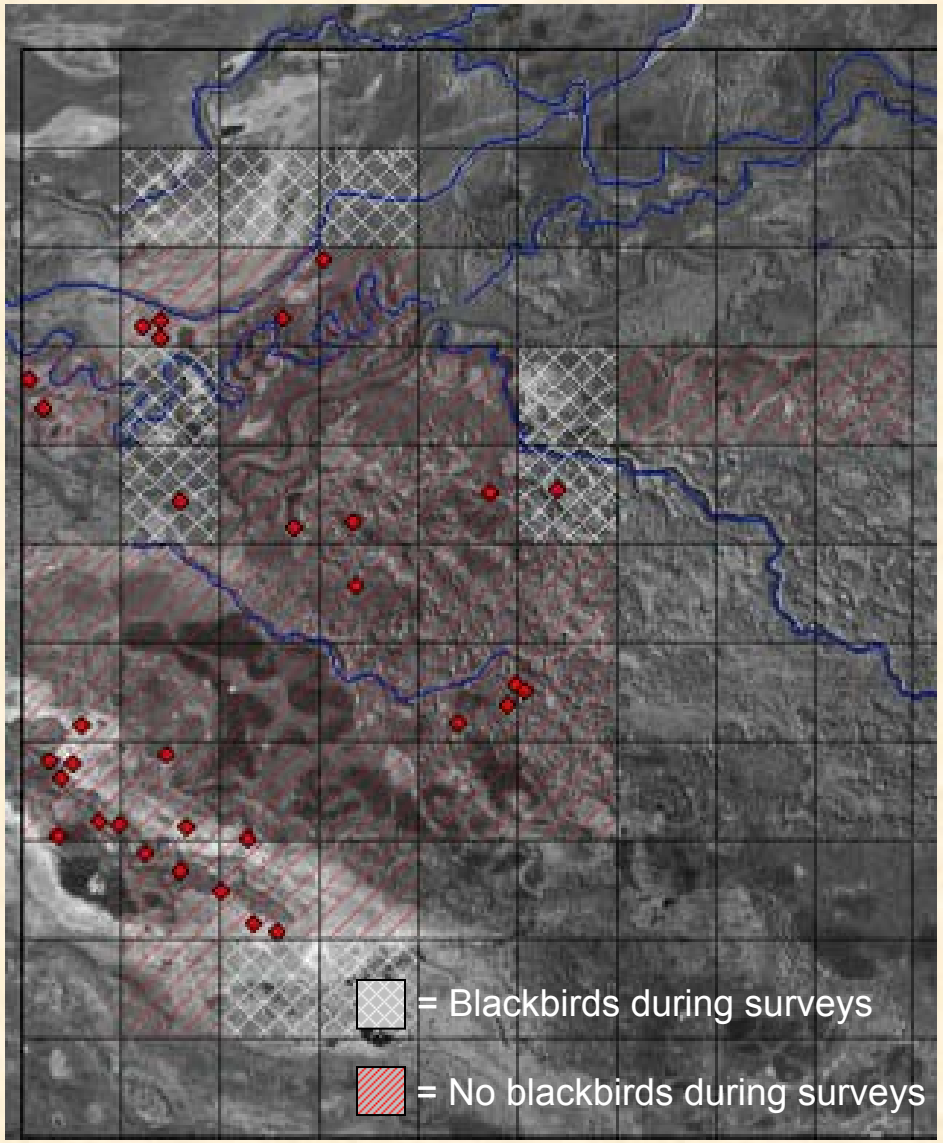
Survey units (n=33): wetland bodies with open water (blue) or emergent wetland vegetation (light green).

- Adults detected at 10 of 33 survey sites (30%).
- 20 nests (•) found and monitored.

Interior Alaska Surveys

Survey units (n=44): 500-m x 500-m blocks within the floodplain of the Tanana River.

- Adults detected at 35 of 44 survey units (80%).
- 32 nests (•) found and monitored.



Site occupancy in Alaska

Alaska Region	Detectability by visit 1	Detectability by visit 2	Occupancy rate (± SE)
South-central	0.83	0.56	0.34 ± 0.10
Interior	0.88	0.62	0.97 ± 0.05
Pooled	0.86	0.59	

- Detectability was high and similar between study areas.
- Detectability higher during first visit.
- Occupancy rate higher in Interior Alaska.
- Most suitable breeding habitat appeared to be occupied.

Double sampling: Detection ratios of breeding pairs in s.-central Alaska

	Detectability ± SE		
Region	**Visit 1**	**Visit 2**	**Pooled**
South-central	**0.95 ± 0.27**	**0.85 ± 0.32**	**0.90 ± 0.29**

- Detectability slightly higher for visit 1.
- A single rapid survey may accurately estimate breeding densities in this species.

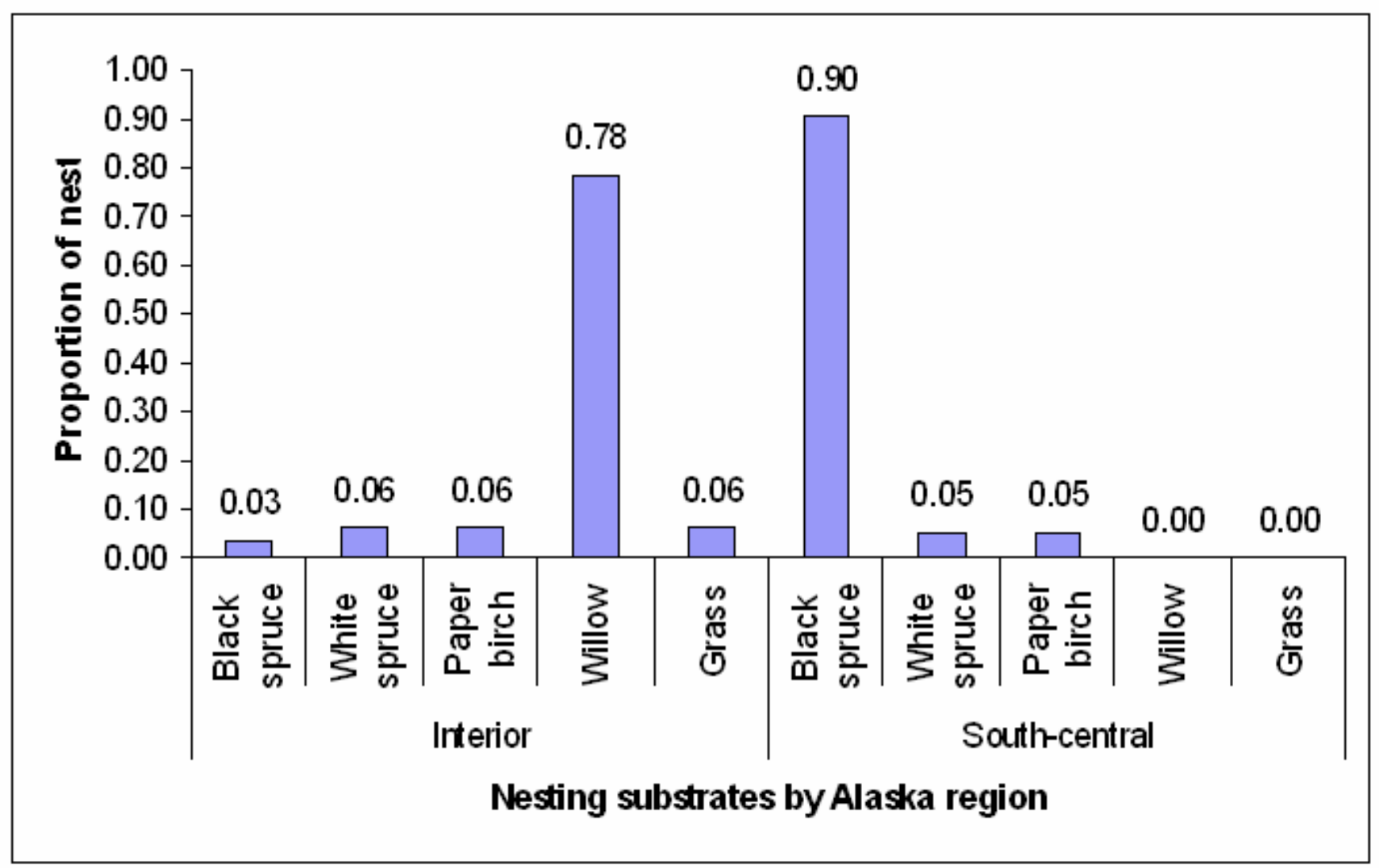
S.Central Alaska: Best Poisson regression for predicting number of nests per survey unit

Parameter	*Estimated coefficient*	*P*
Intercept	**-2.07 ± 0.50**	**<0.01**
Surface water of ponds or lake (ha)	**0.06 ± 0.01**	**<0.01**
Emergent wetland vegetation (ha)	**0.03 ± 0.01**	**<0.01**

- Adults fed on large aquatic insect larvae (e.g. Order Odonata) along shorelines in shallow water and wetland vegetation.

- Model likely reflects specialized foraging requirements.

Nest Tree Selection - Alaska



Nest Success

- New England:
  - 24 of 35 nests successful (69%)
- Alaska:
  - s.c.: 13 of 18 nests successful (72%)
  - interior: 19 of 30 nests successful (61%)

Regional Conclusions

- Alaska
  - Single visit, rapid area searches provided unbiased estimates of breeding abundance for Rusty Blackbirds.
  - Detectability declined over the course of the season.
  - Most suitable breeding habitat appeared to be occupied.
- New England
  - No evidence for negative effects of logging or other icterids.
  - Low detectability: repeat surveys necessary
  - Many suitable wetlands appear *un*occupied.
  - Mercury may be an issue in Maine.

Overall Conclusions

- Nest success and egg viability appears “normal” in NE and AK
- Flexibility in nest site use suggests that nesting habitat is not limited
- Availability of foraging habitat (i.e. shallow water) may drive habitat selection
- No “smoking gun” explains declines
  - Indicative of problems elsewhere?
- Research is needed to understand where, when, and how adult or juvenile survival is constrained.

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More to do

- Adult/juvenile survival
- Establish an effective monitoring plan
- Population linkage and migration
- Home range etc. w/ telemetry

“Loose colony” Discovered in Maine

- **June 2007**
  - **Discovery of first “loose colony” ever documented in New England**
  - **Eight nests found within a few Ha**
- **July 2007**
  - **Site scheduled for 90% Pre-commercial thinning**
  - **Loggers agreed not to cut this year**

Need to Know:

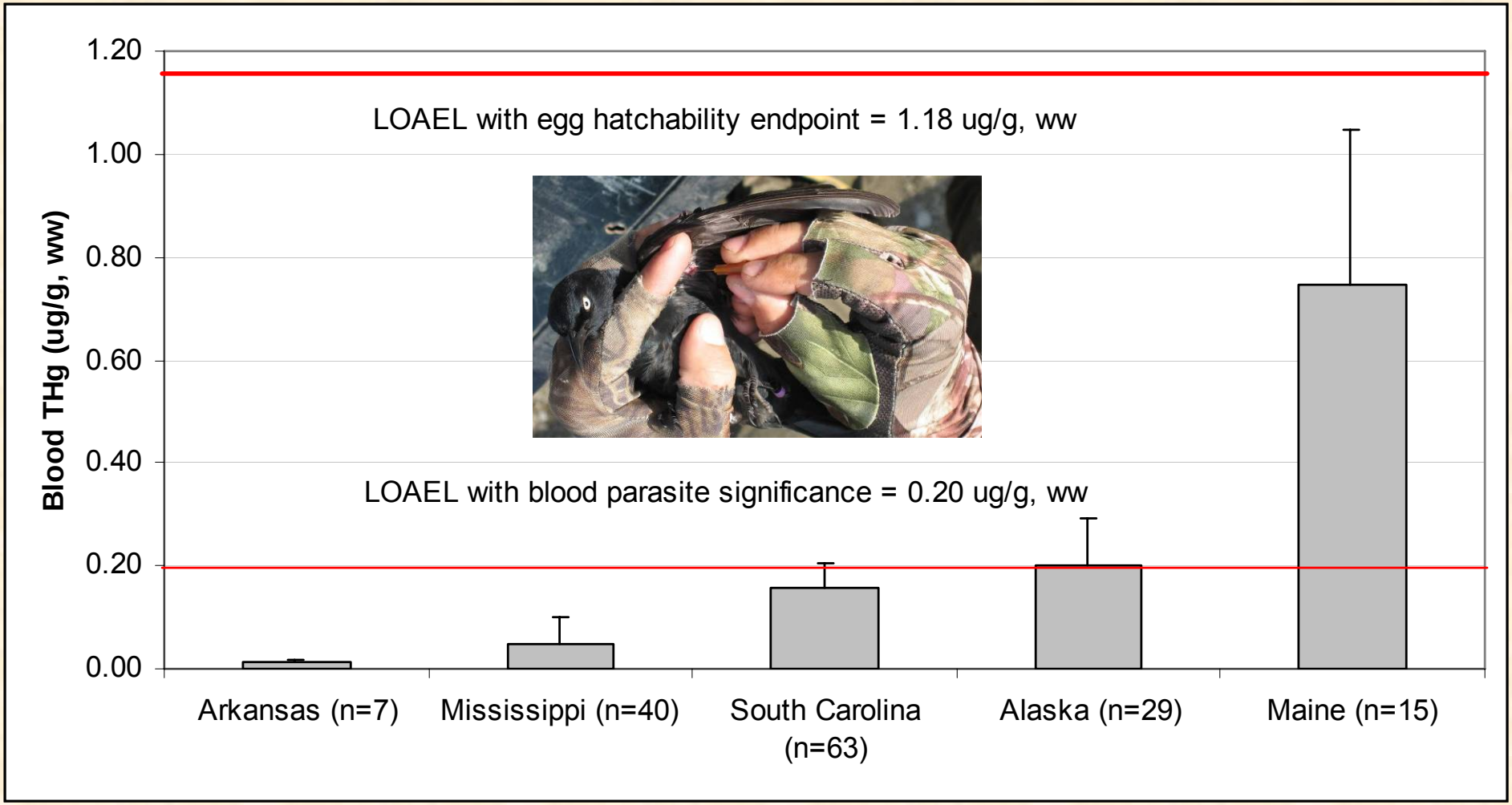
- Reproductive success?
- Habitat use?
- Social organization?
- Are declines continuing regionally?
- What is limiting populations?

Interior Alaska: Best logistic regression for predicting breeding occurrence

Parameter	*Estimated coefficient*	*P*
Intercept	**0.58 ± 0.66**	**0.38**
Upland habitat (ha)	**-0.50 ± 0.23**	**<0.01**
Scrub-shrub wetlands (ha)	**0.16 ± 0.08**	**<0.01**

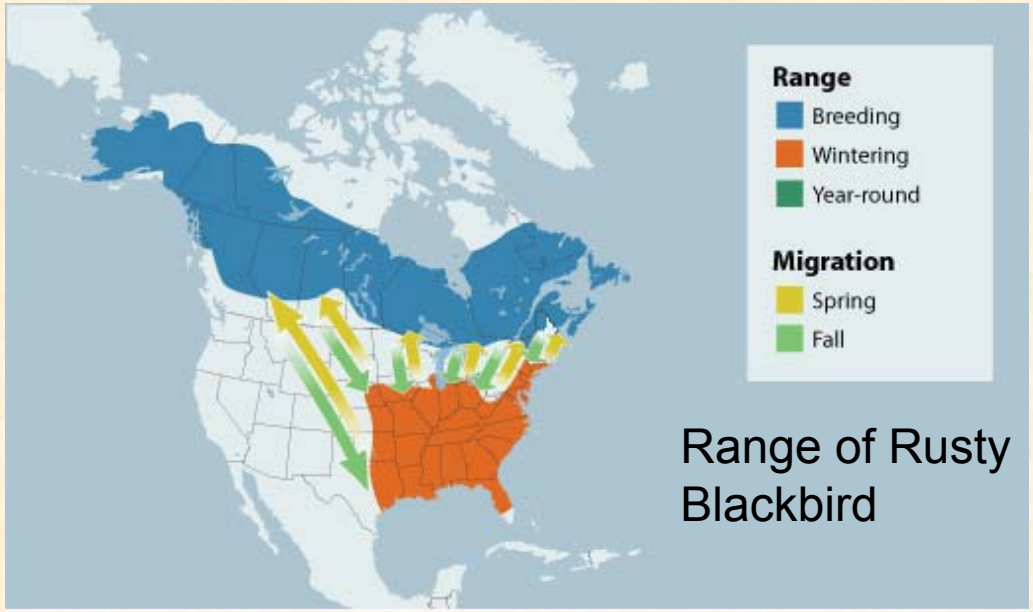
- Uncertainty as to which was the best model.
- Scrub-shrub wetlands often used for nest sites.
- More refined models based on abundance, rather than occurrence are needed to assess habitat selection in interior Alaska.

Rusty Blackbird adult blood total mercury levels (ug/g, ww)



The North American Boreal Forest

- Contains **25%** of the remaining intact forest in the world
- **>300** of the **700** bird species that occur in North America breed in boreal forest
  - 3 billion+ birds



Range of Rusty Blackbird

Consistent cross-species declines in Boreal wetland breeding birds

Lesser Yellowlegs

Use old Rusty Blackbird nests

Solitary Sandpiper

Lesser Scaup

White-winged Scoter