What we know from the breeding grounds

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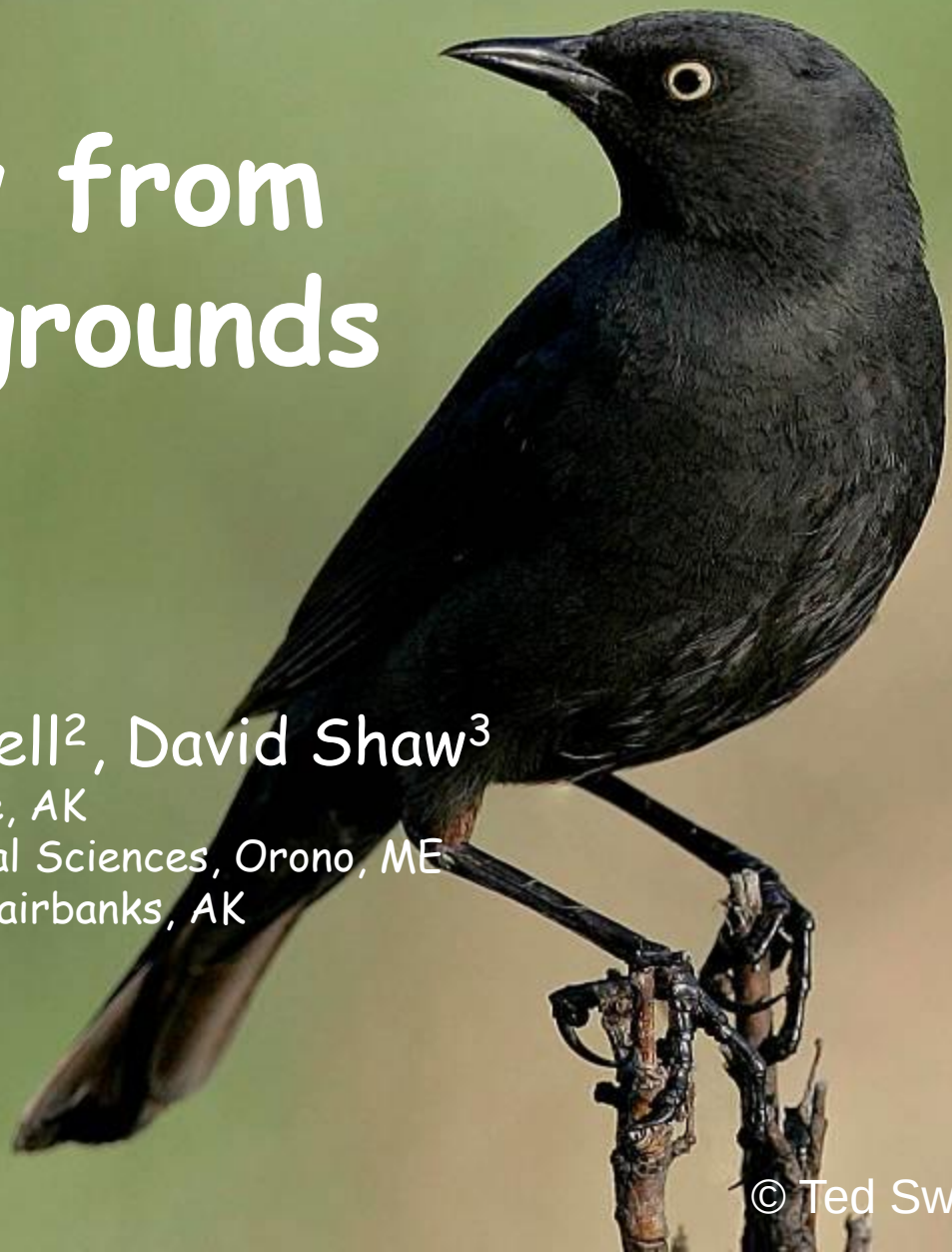

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What we started with…

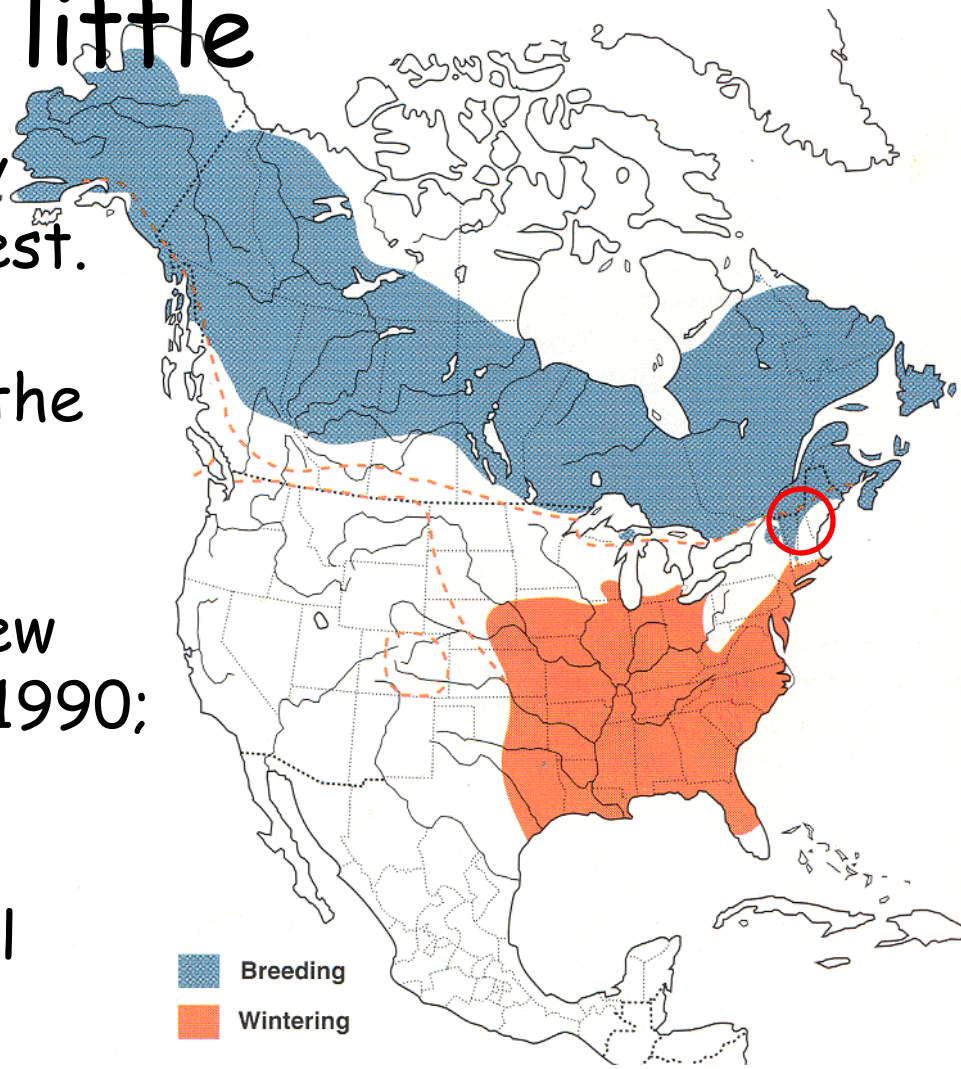
…very little

- Breeds in forested or shrubby wetlands across the boreal forest.

- Commonly seen feeding along the shores of ponds and streams.

- Breeding biology studied in New England (Kennard 1920, Ellison 1990; *n* = 20 nests).

- Nest in dense patches of small spruces or firs in New England.

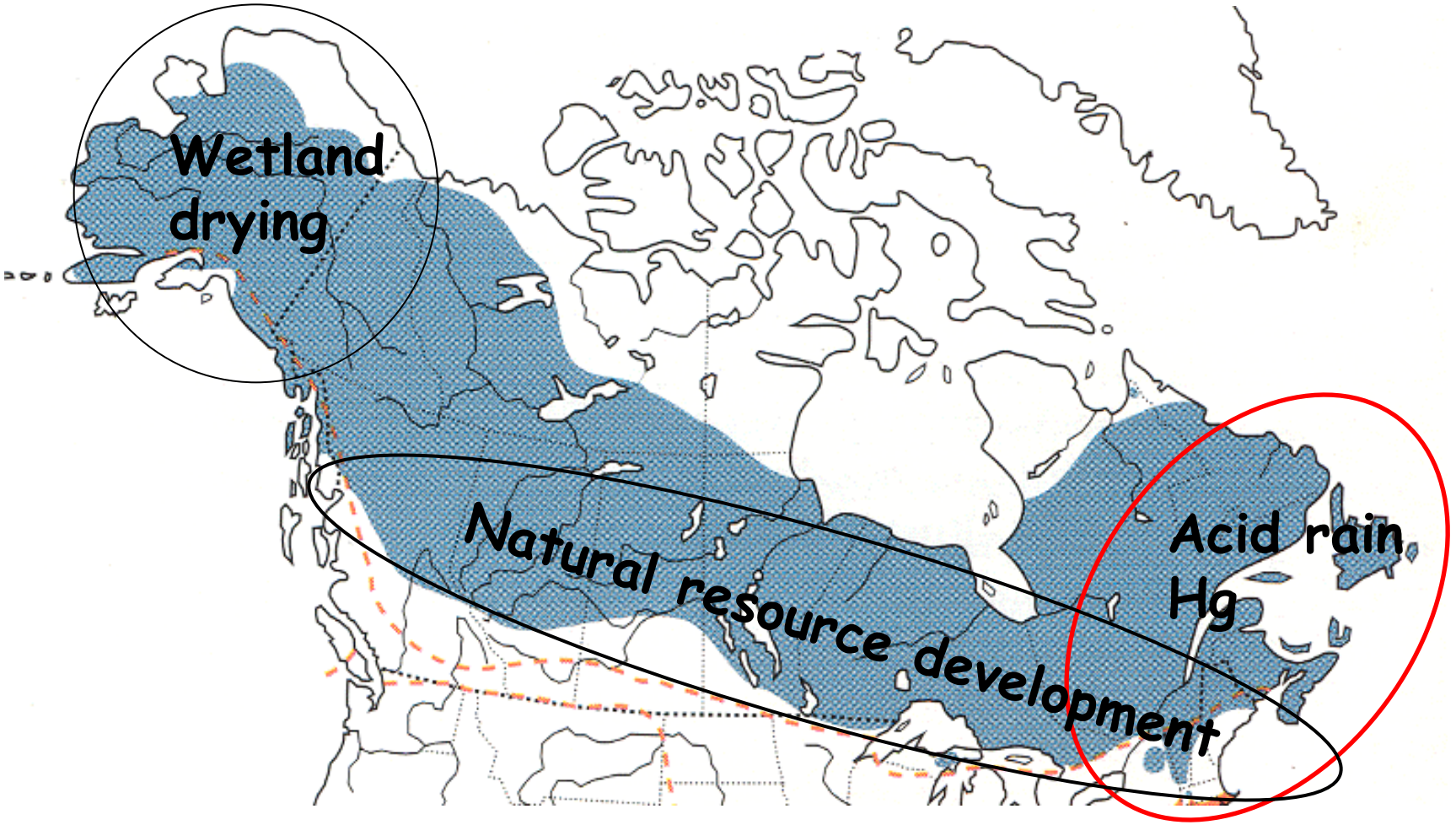


Little information to assess resource requirements or population stressors

From Avery 1995

What we were concerned with

Concerns vary across the species



From Avery 1995

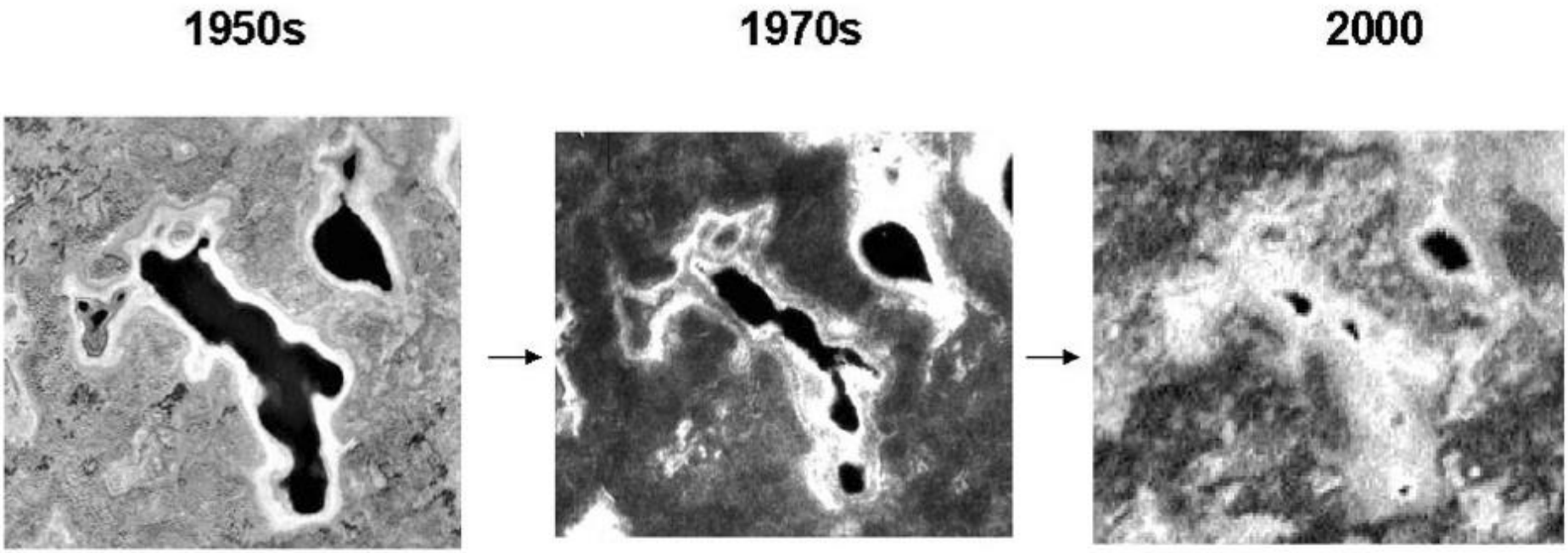
Natural Resource Development in Southern Canada

Oil and gas:	40 million ha
Timber harvest:	24 million ha
Hydro electric:	1 million ha
Intact:	140 million ha

Courtesy of Jeff Wells

Wetland shrinking in Alaska

Increased evapotranspiration
permafrost melting



<u>Changes in water chemistry</u>

+ + total nitrogen & cations,

- - Chlorophyll *a*

<u>Changes in invertebrates</u>

- - benthic macrophytes

+ + grazing zooplankton

From Corcoran 2006 and Riordan et al. 200

Objectives 2006-2008

Assess site occupancy (Ψ):

- Assess status
- Identify important wetland features for breeding

Assess home range requirements

Examine nesting ecology

- Assess reproductive success relative to habitat use.

Begin to assess adult survival

Methods

1) Breeding surveys to estimate site occupancy and abundance relative to habitat.

2) Radio telemetry to assess home-range size in NE.

2) Intensive nest searches and monitoring

3) Capture of nesting adults to assess adult survival & home range size

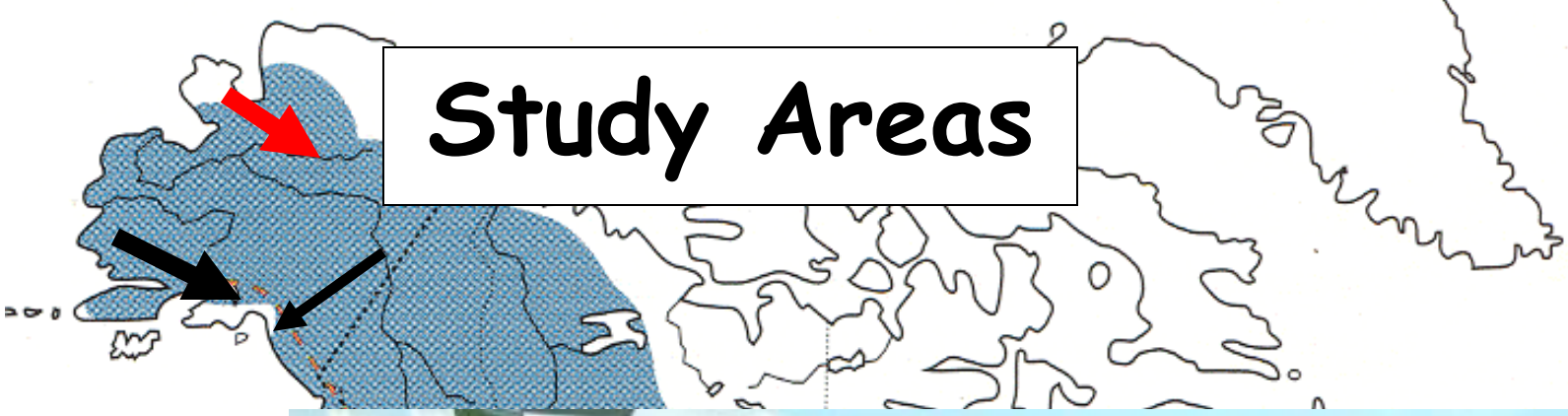
Study Areas

From Avery 1995

New England

- Regenerating clearcut
- Spruce & fir border wetlands

Study Areas



Interior Alaska

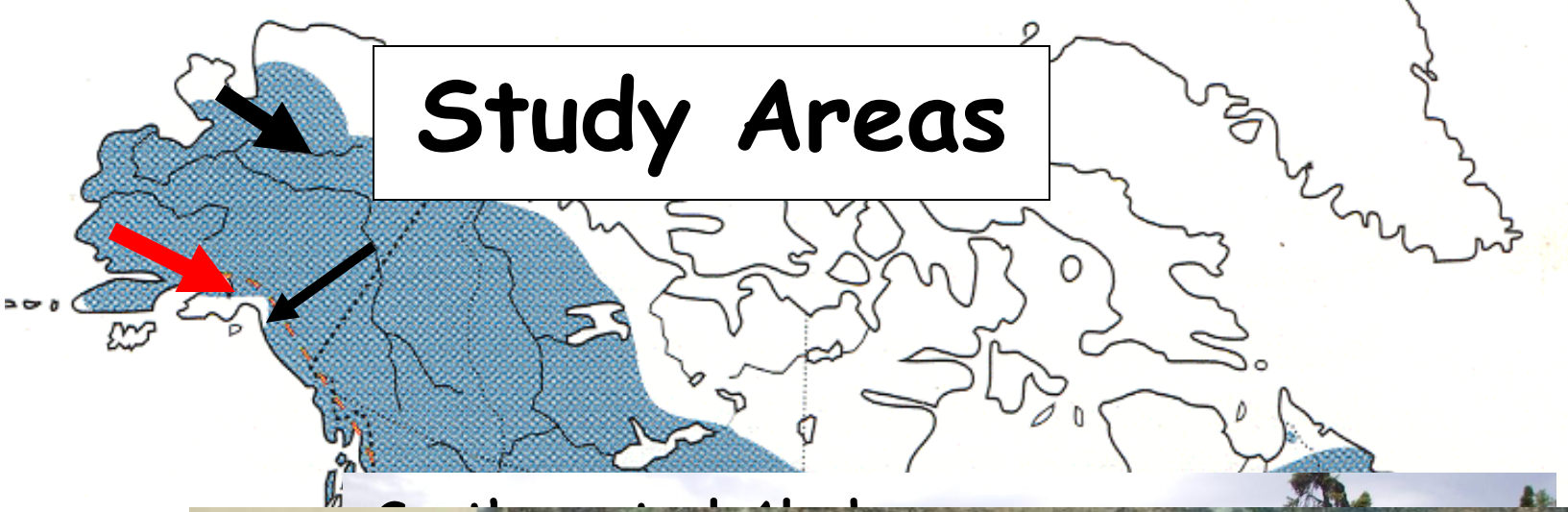
Floodplain of the Yukon River

Large mosaic of wetlands

Willows border wetlands

Unmanaged

Study Areas



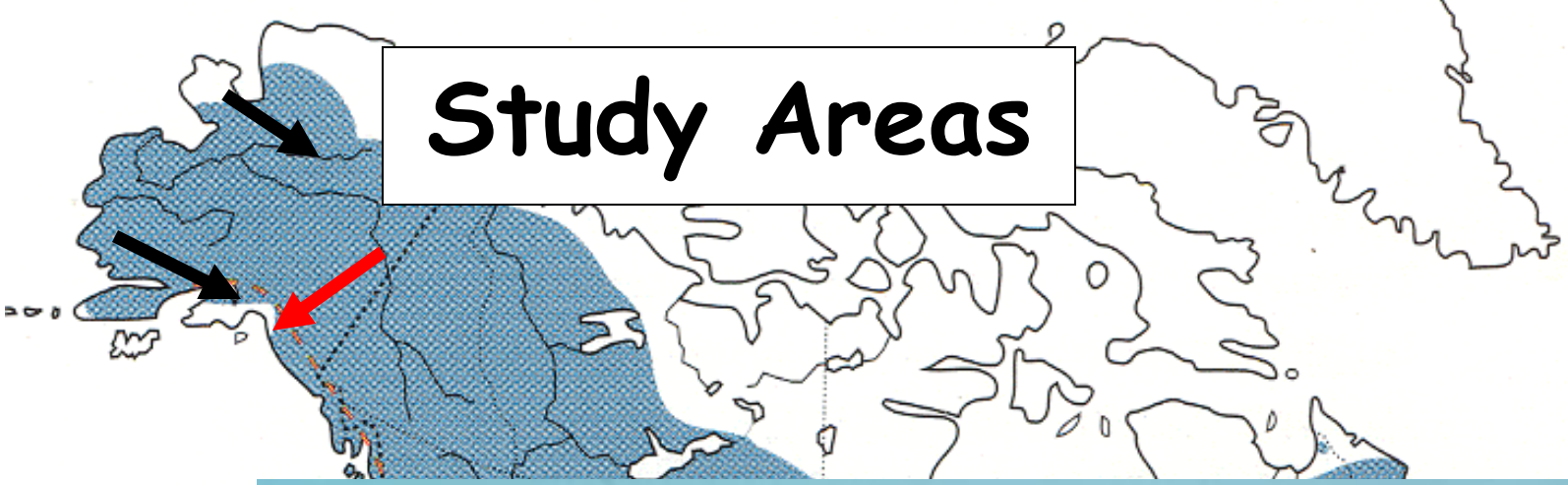
South-central Alaska

Dominated by boreal forest uplands

Isolated wetlands of varying size

Some development

Study Areas



Southern Rainforest Alaska

- Uplands dominated by coastal rainforests
- Blackbirds along major mainland rivers
- Sitka spruce and alders boarder wetlands
- Unmanaged

Objectives: Site occupancy & radio telemetry

Assess site occupancy (Ψ) in relation to habitat in contrasting landscapes

- Are most suitable sites occupied?
- Identify wetland features that predict distribution.
- Do competing blackbird spp. or forestry neg. affect distribution.
- What are the minimum size wetlands used for breeding?

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Regional site occupancy (Ψ)

New England: 37%
(*n* = 550 wetlands)

South-central Alaska: 71%
(*n* = 33 wetlands)

Interior Alaska: 91%
(*n* = 44 wetlands)

Not all suitable sites used in NE

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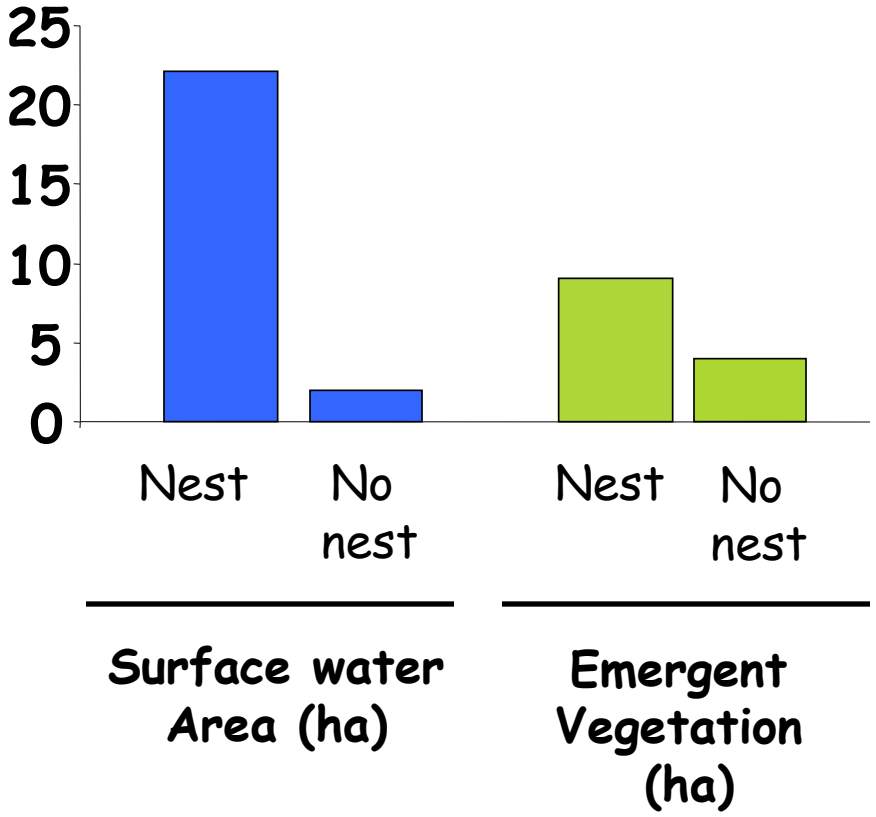
Habitat occupancy: New England

Predictor	Parameter estimate
Wetland area	+0.51 ± 0.27 (SE)
• **Model indicates wetlands ≥ 0.5 ha are needed**	
Conifer upland	+1.51 ± 0.65
Puddles present	+1.11 ± 0.52

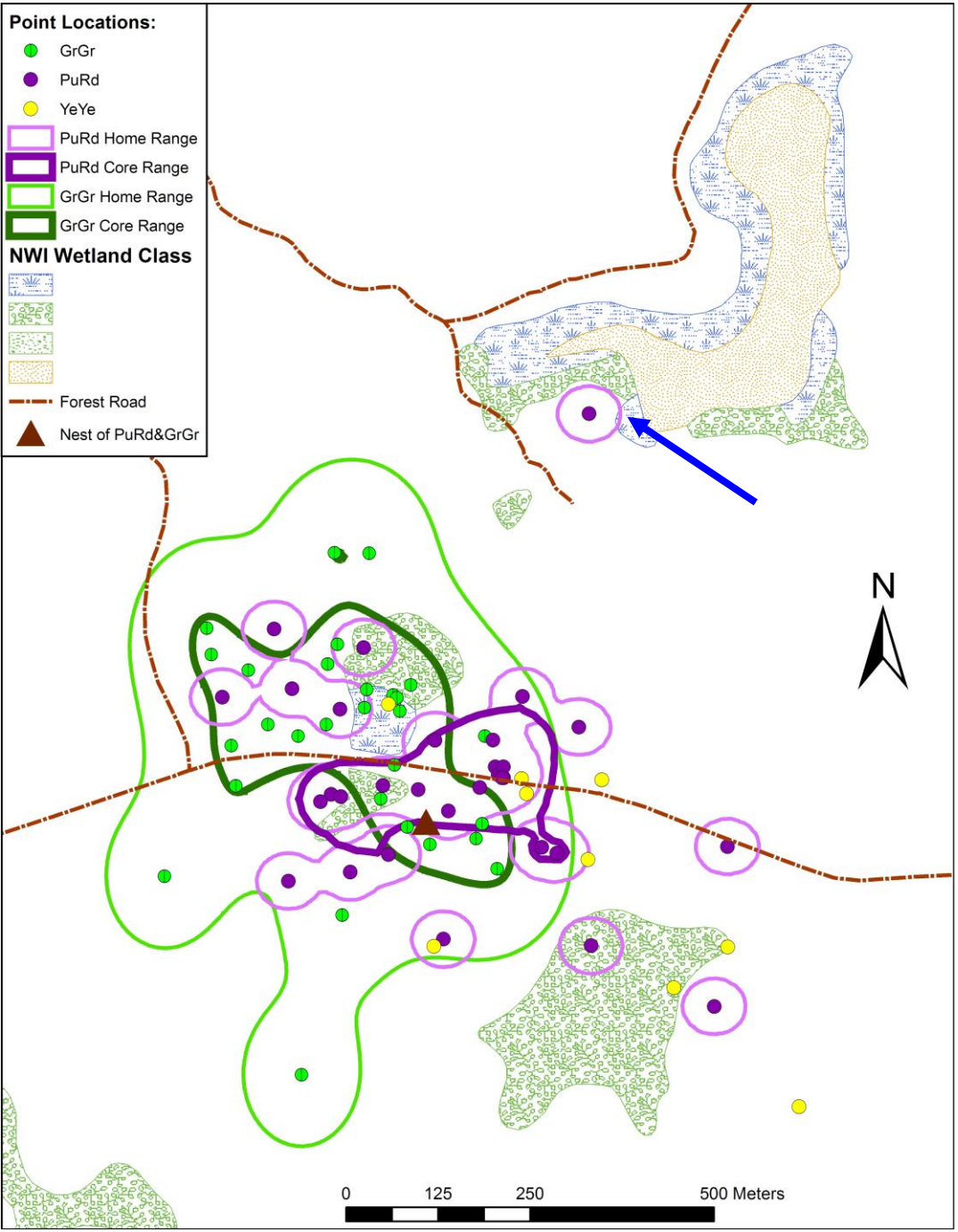
Puddles provide foraging habitats with abundant aquatic insects

- *No evidence that other blackbirds or timber management negatively affected occupancy*

Habitat occupancy: south-central Alaska



Birds did not use wetlands < 7 ha



Home range size in NE (n = 13 adults)

95% Fixed kernel: 38 ± 13 ha

Core Range: 11 ± 3 ha

Wetlands: 2.7 ± 0.4

Conclusions: Site occupancy

Not all suitable habitats were occupied in NE.

- Declines are leading to local extirpations in NE.

Most sites with suitable habitat were occupied in Alaska.

- Declines may not be leading to local extirpations in AK.

Aquatic habitat (i.e., shallow water) were the best predictors of occupancy.

- Specialized foraging requirements may dictate breeding distribution.

- Require large wetlands due to large home range sizes

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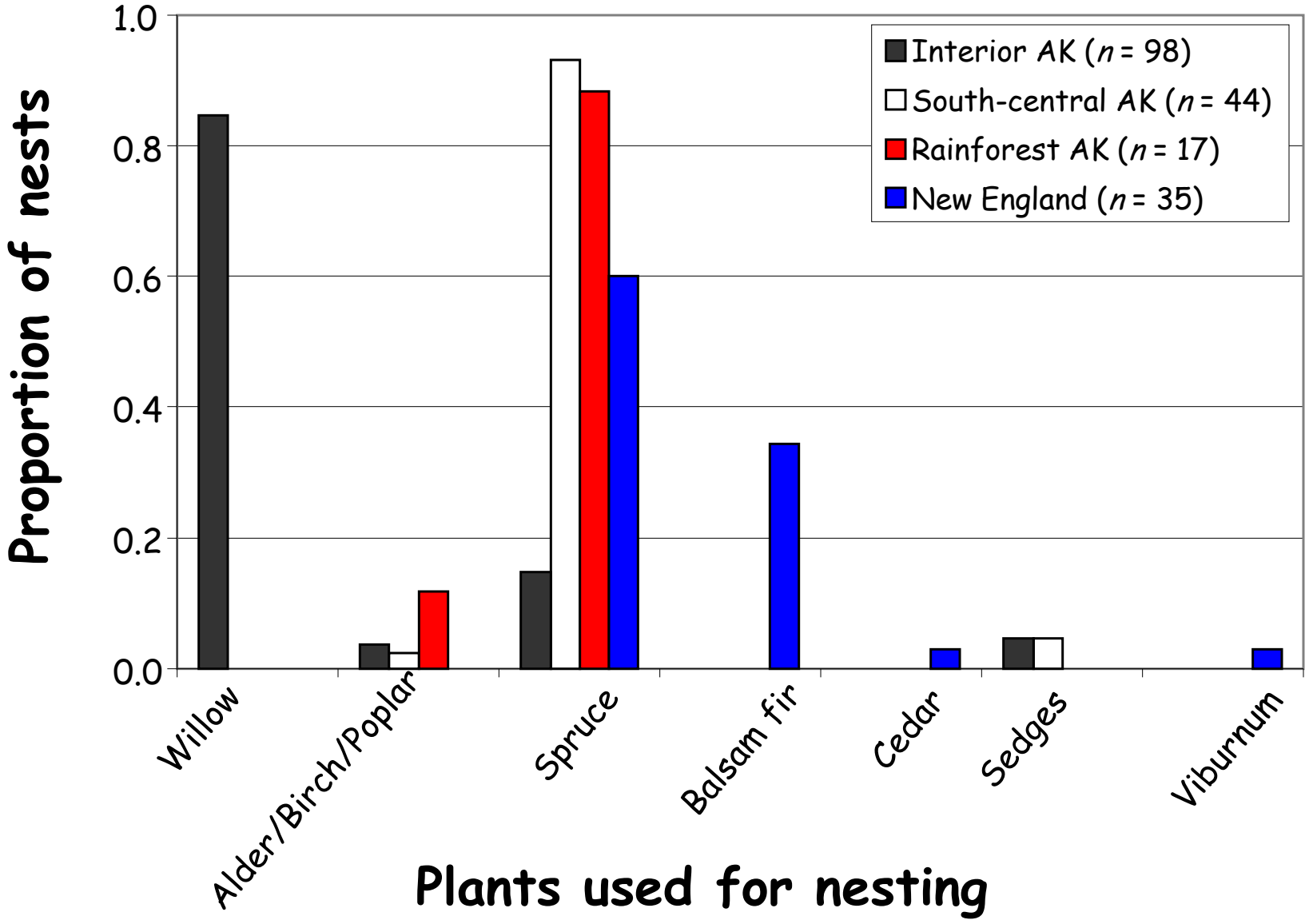
Objectives: Nesting ecology and demography

Nesting ecology

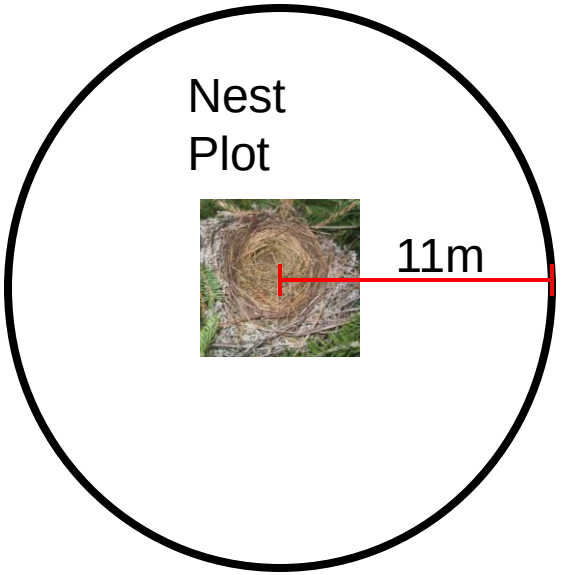
- Identify microsite characters that predict nest site use.
- Determine if nest survival is aberrantly low.
- Does nest survival or fecundity vary regionally or by habitat?

Begin to assess adult survival or recruitment

Regional use of nest substrates



Nest Site Selection



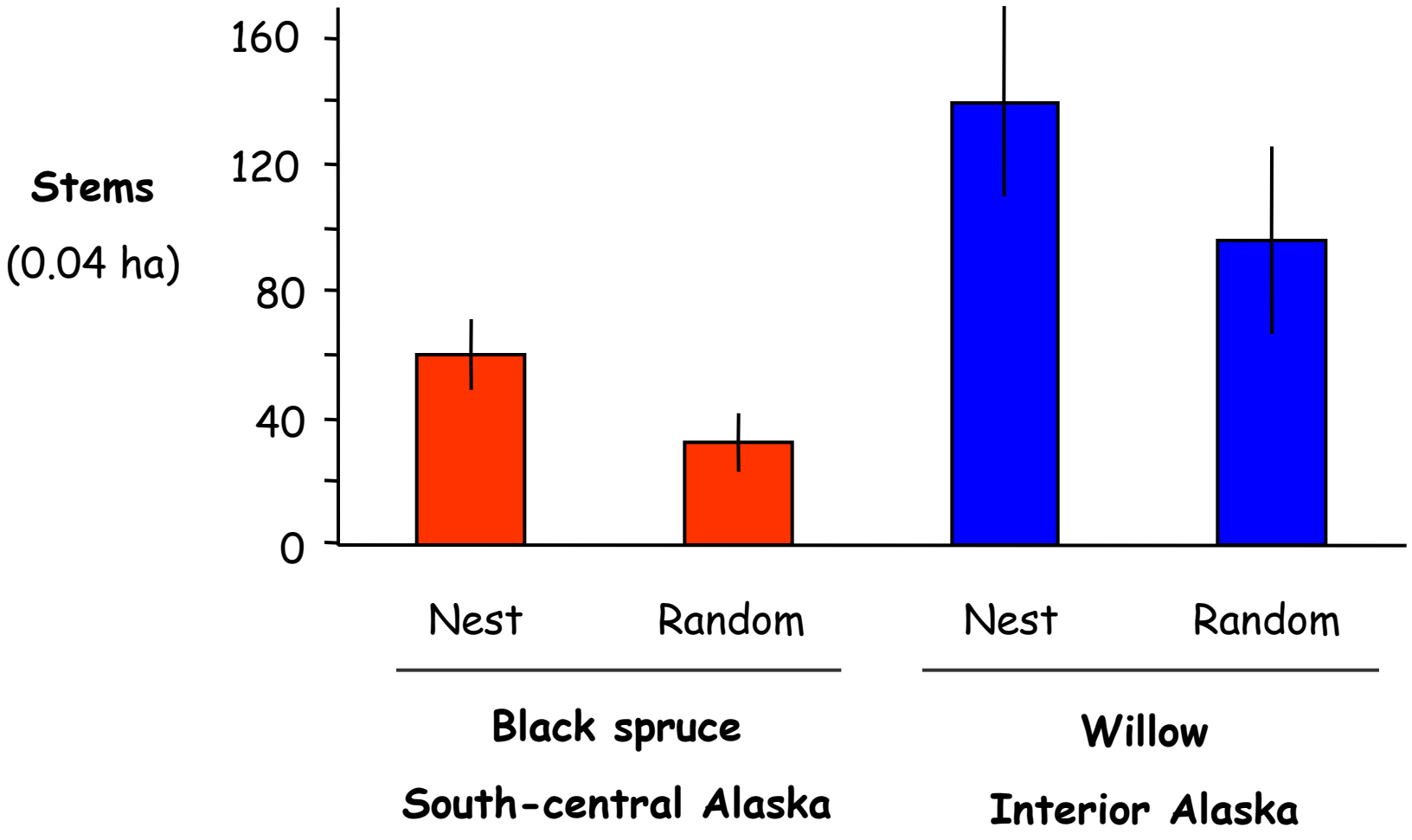
Control:
random
plot at the
same site

Nest Site Selection – New England

Variable	Effect(β)	Σw_i^b
Trees >10m tall	negative	0.54
Firs 2-3m tall	positive	0.52
Canopy Height	negative	0.27
Spruces 4-5m tall	positive	0.25
Firs <3" DBH	positive	0.13

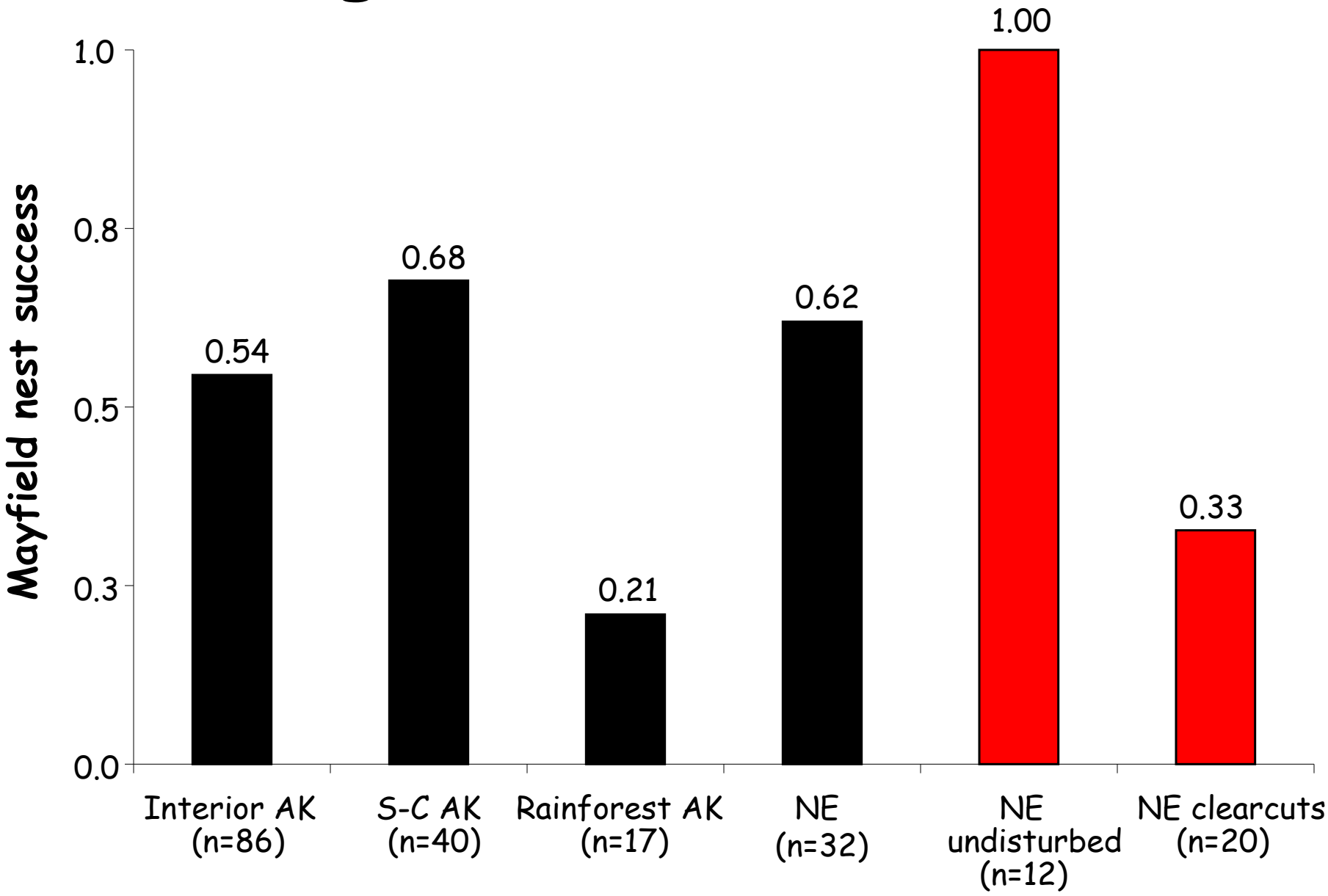
Small firs and spruces often in regenerating clearcuts

Nest site selection - Alaska

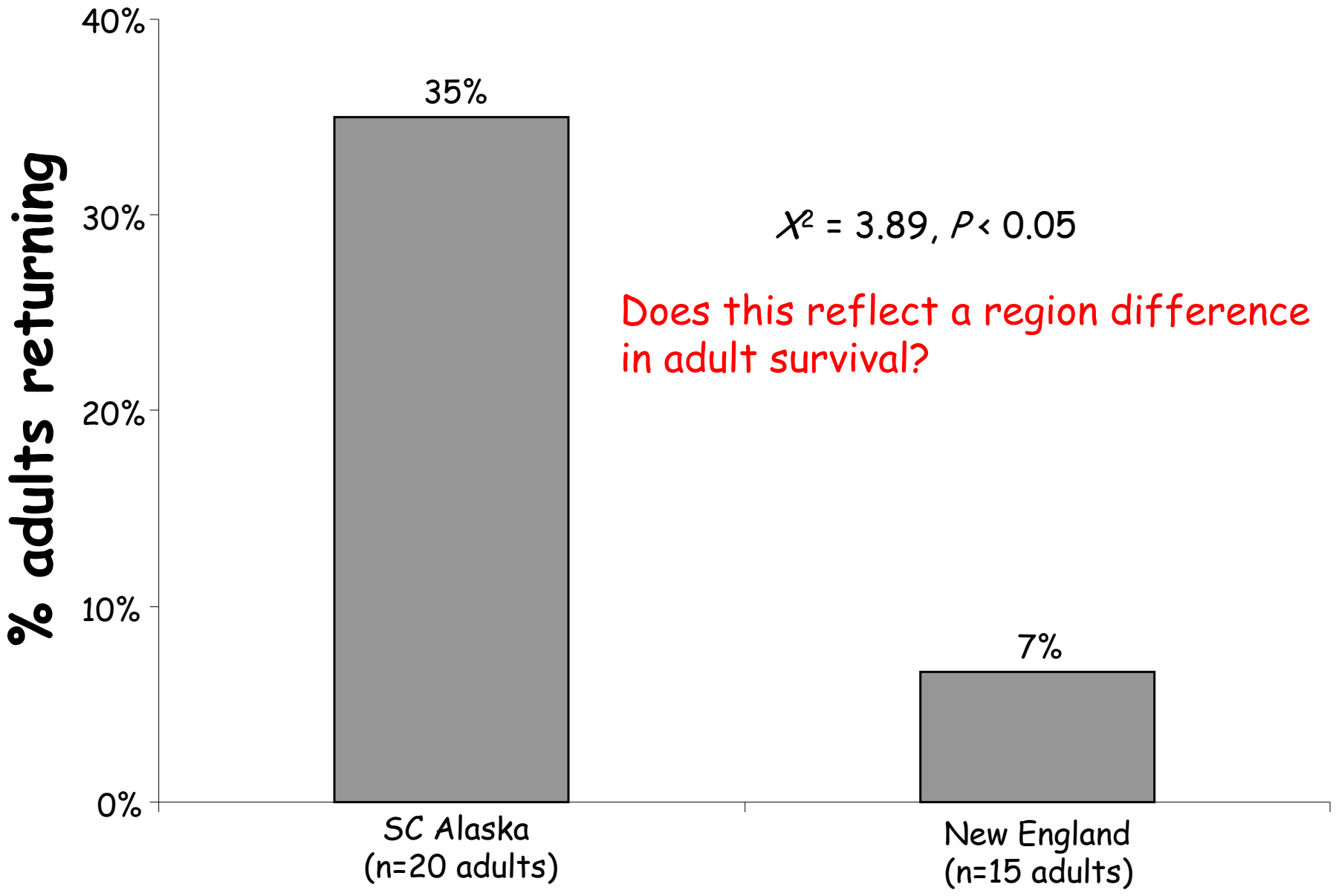


Daily nest survival relatively high in these substrates

Regional nest success



Adult return rates (2007-2008)



$X^2 = 3.89, P < 0.05$

Does this reflect a region difference in adult survival?

Fecundity similar in all regions

Modal clutch size = 5 eggs (range 3–6 eggs)

No evidence of second broods

Birds will renest following failure

Reproductive potential similar among regions

Conclusions: Nest ecology

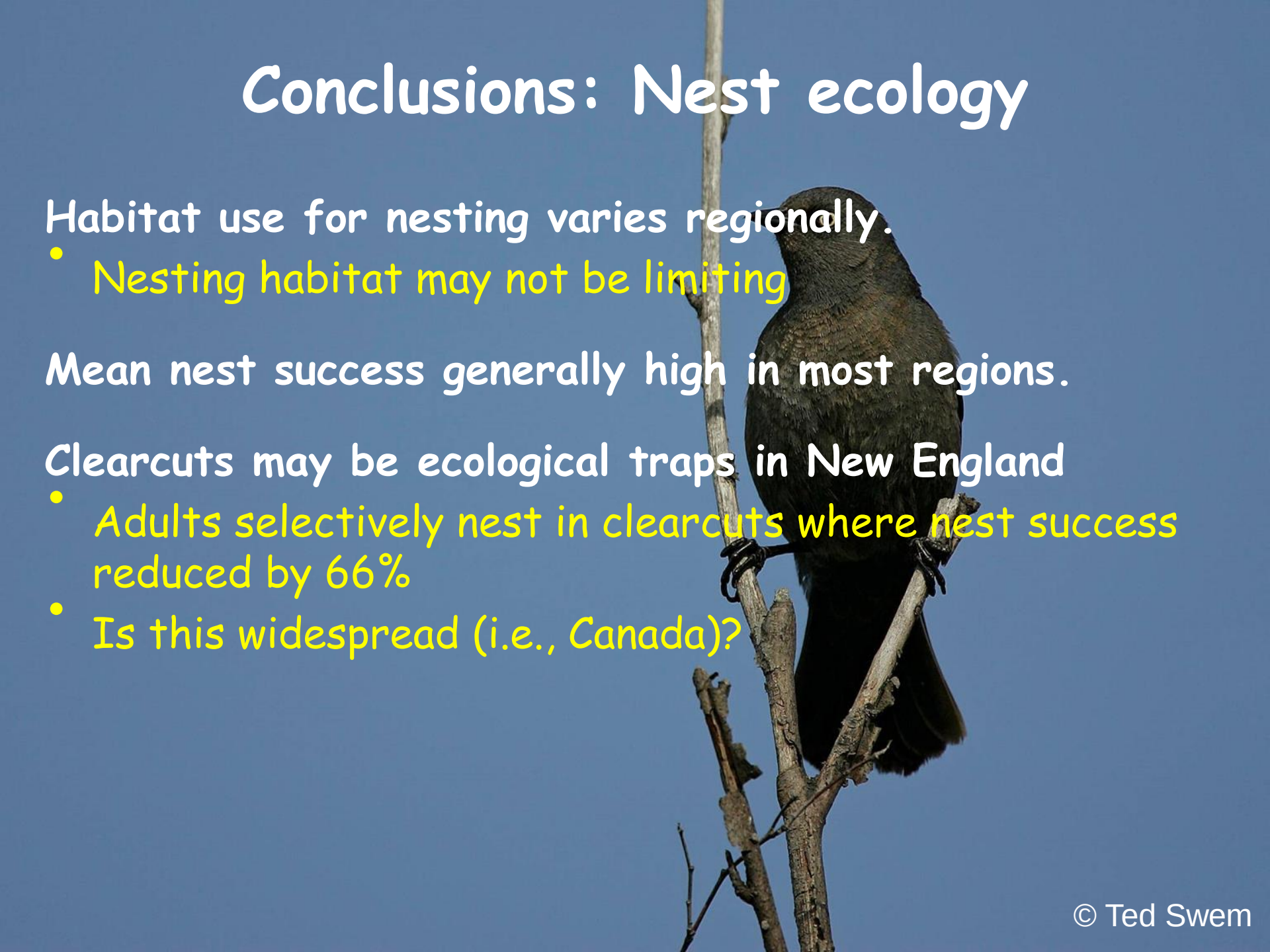
Habitat use for nesting varies regionally.

- Nesting habitat may not be limiting

Mean nest success generally high in most regions.

Clearcuts may be ecological traps in New England

- Adults selectively nest in clearcuts where nest success reduced by 66%
- Is this widespread (i.e., Canada)?



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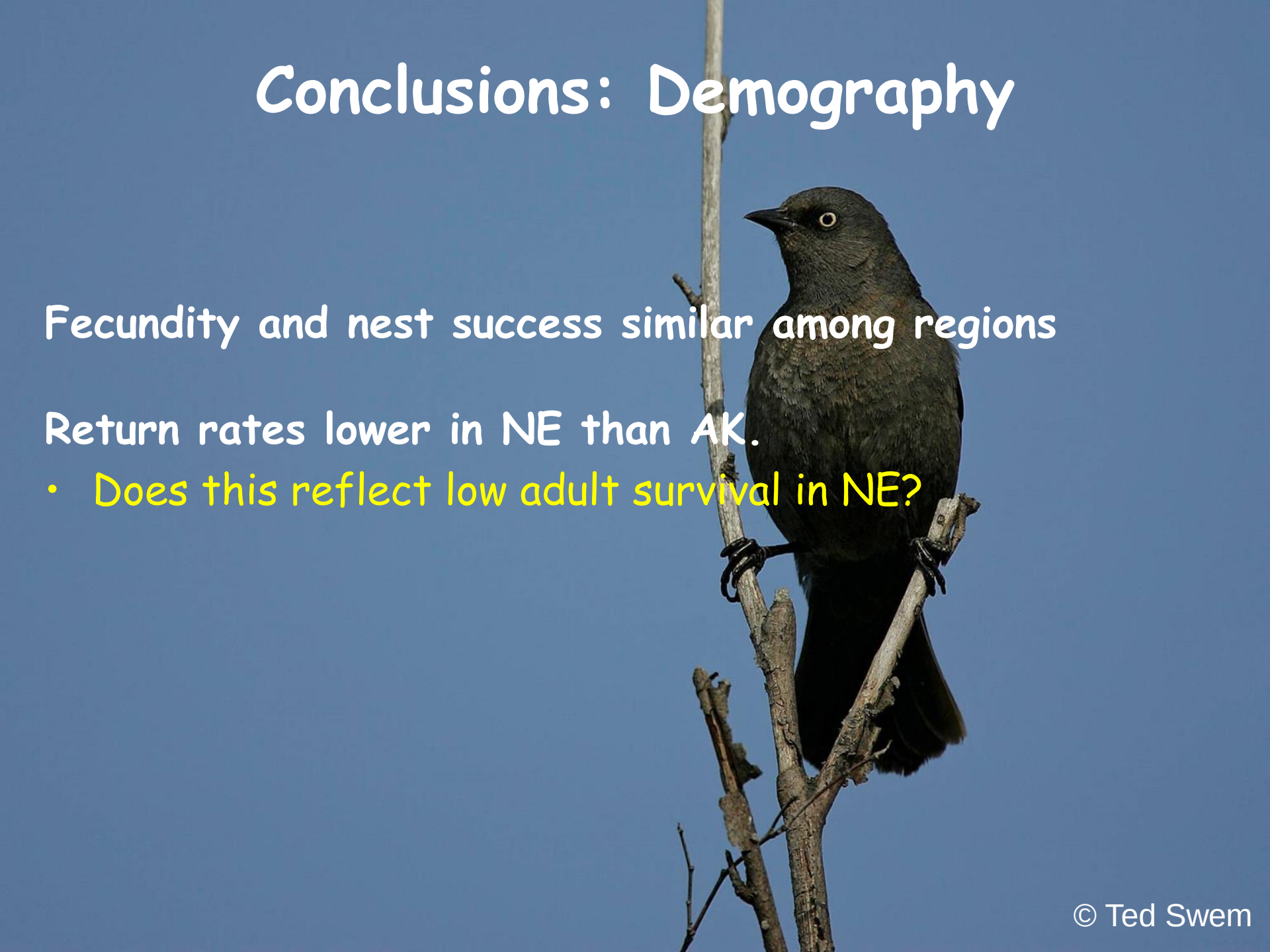
Conclusions: Demography

Fecundity and nest success similar among regions

Return rates lower in NE than AK.

- Does this reflect low adult survival in NE?



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