

Assessment of the bird community that uses the Saco River's tidal marshes



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Thanks and acknowledgments to....

The many landowners for granting us access

Shane Murphy for collaborating on this work

Mark Adams for GIS data & Michelle Slater for phragmites data

Pam Morgan and Chris Feurt for inviting me to join the team!

Undergraduate field research assistants: Will Almeida, Cory French, Gale Loescher, Sarah Cowles, Chris Dracoules, Danielle Behn, Lindsay Kelly

Photos by Chloe Crettian

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My wife, Stacey, for being so patient with me and the birds



1983 Saco River Watershed Biodiversity Study by the USDA

56 species of mammals

32 species of amphibians and reptiles

36 species of fish

165 species of birds

Research goals

- 1) Document the species diversity and abundance of birds using the tidal marshes of the Saco River.
- 2) Explore what landscape and biological factors best explain variation in bird species diversity.





Methods

May through September, 2010-2013

10 minute point count

2x per month: 1x low tide; 1x high tide





160 m

112 m

BV

160 m

130 m



Model building to explain variation among marshes

Quantified marsh bird diversity (via marsh-specific Shannon Weiner Index).

Single factor, 2 and 3-way additive, and 2-way interactive generalized linear models.

Competing models were ranked by their corrected (for small sample size) Akaike Information Criterion (AIC_c) values.

| | |
|----------------------------|--|
| | plants species diversity |
| | salinity |
| | marsh area |
| | marsh width |
| | distance to the mouth of the river |
| | total area of marsh occupied by phragmites |
| % of surrounding landscape | open, fresh water |
| | mudflat |
| | forest |
| | barren |
| | developed open |
| | developed |
| | agriculture |
| | vegetated, not forest |

Results: variation in explanatory variables

plants species diversity: 11 – 35 (mean = 20)

salinity (ppm): 0.18 – 18.6 (mean = 8.4)

marsh area (ha): 0.2 – 19.1 (mean = 5.6)

marsh width (m): 9 – 200 (mean 81.2)

distance to the mouth of the river (m): 478 to 7000 (mean = 3410.9)

total area of marsh occupied by phragmites: 0 - 28.7% (mean = 2.6%)

% of surrounding landscape

open, fresh water (0 - 1.2%)

mudflat (0.3 – 19.5%)

forest (0 – 67.8%)

barren (0 – 5%)

developed open (0 – 28.5%)

developed (12 - 56.3%)

agriculture (0 – 24.7%)

vegetated, not forest (0 – 5.3%)

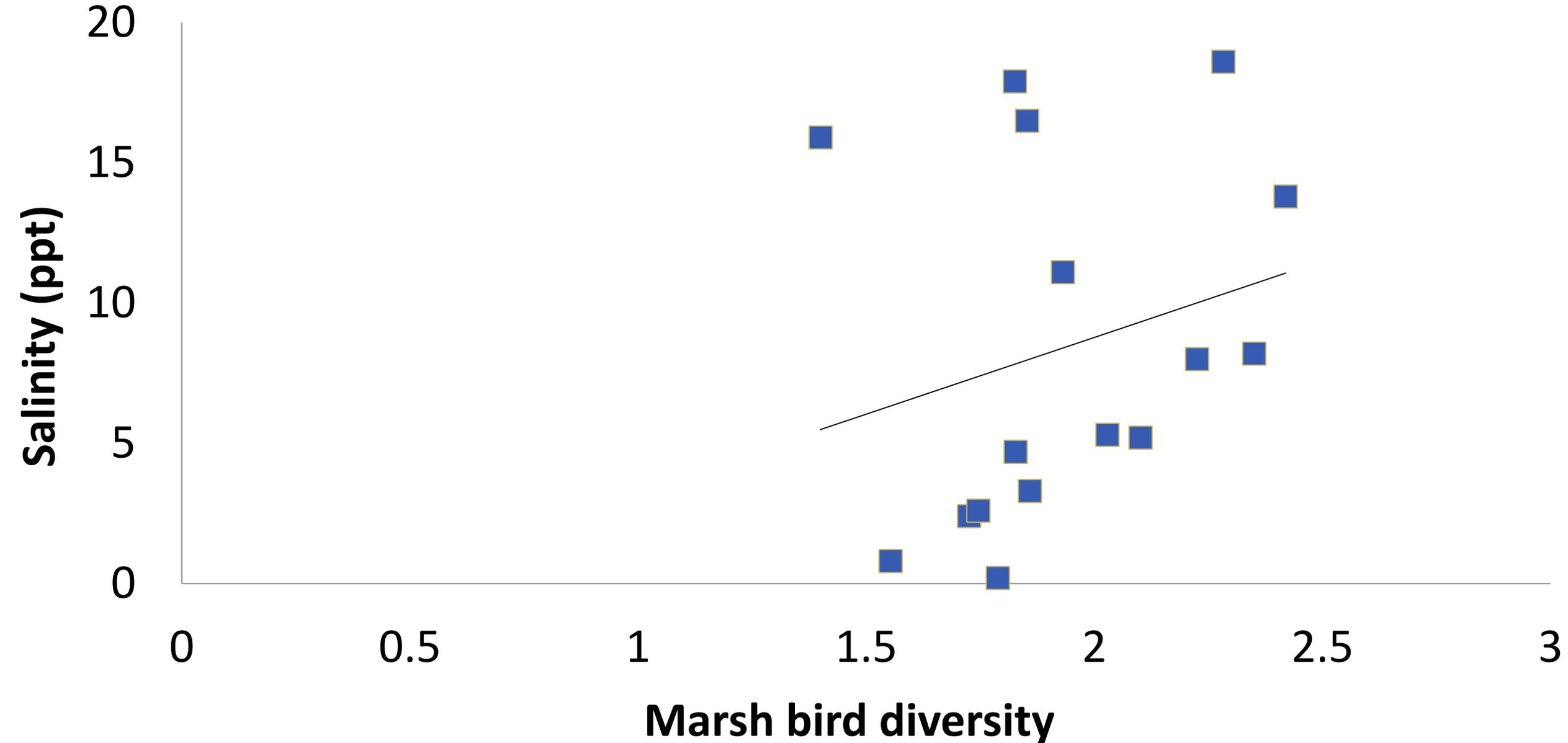
133 species (40.2% of the species occurring in Maine)

53 marsh species

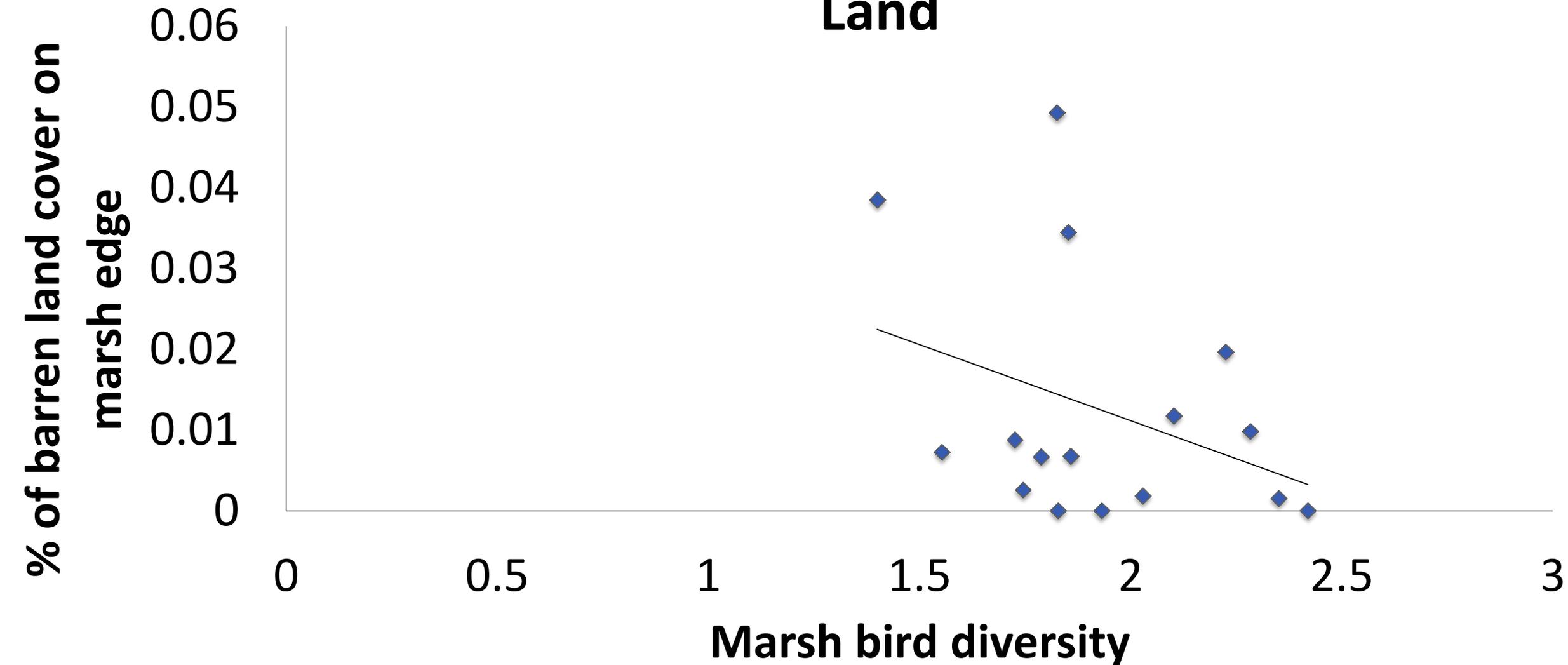


| Model | AIC _c | Δ_i | ω_i |
|-------------------------------------|------------------|------------|------------|
| Salinity + Barren | 6.35 | 0.00 | 0.18 |
| Salinity*Open Water (fresh) | 7.42 | 1.07 | 0.11 |
| Salinity*Barren | 8.02 | 1.66 | 0.08 |
| Vegetated (Not Forest) | 9.02 | 2.67 | 0.05 |
| Null | 9.13 | 2.77 | 0.04 |
| Marsh Area + Vegetated (Not Forest) | 9.76 | 3.41 | 0.03 |
| Barren | 10.08 | 3.72 | 0.03 |
| Salinity*Vegetated (Not Forest) | 10.49 | 4.14 | 0.02 |
| Plants*Vegetaed (Not Forest) | 10.50 | 4.15 | 0.02 |
| Open Water (Fresh) | 10.53 | 4.18 | 0.02 |
| Developed | 10.64 | 4.29 | 0.02 |
| Forest | 10.65 | 4.30 | 0.02 |
| Marsh Area*Open Water (Fresh) | 10.81 | 4.46 | 0.02 |
| Mudflat | 10.85 | 4.50 | 0.02 |
| Distance to Mouth | 11.12 | 4.76 | 0.02 |
| Salinity | 11.24 | 4.88 | 0.02 |

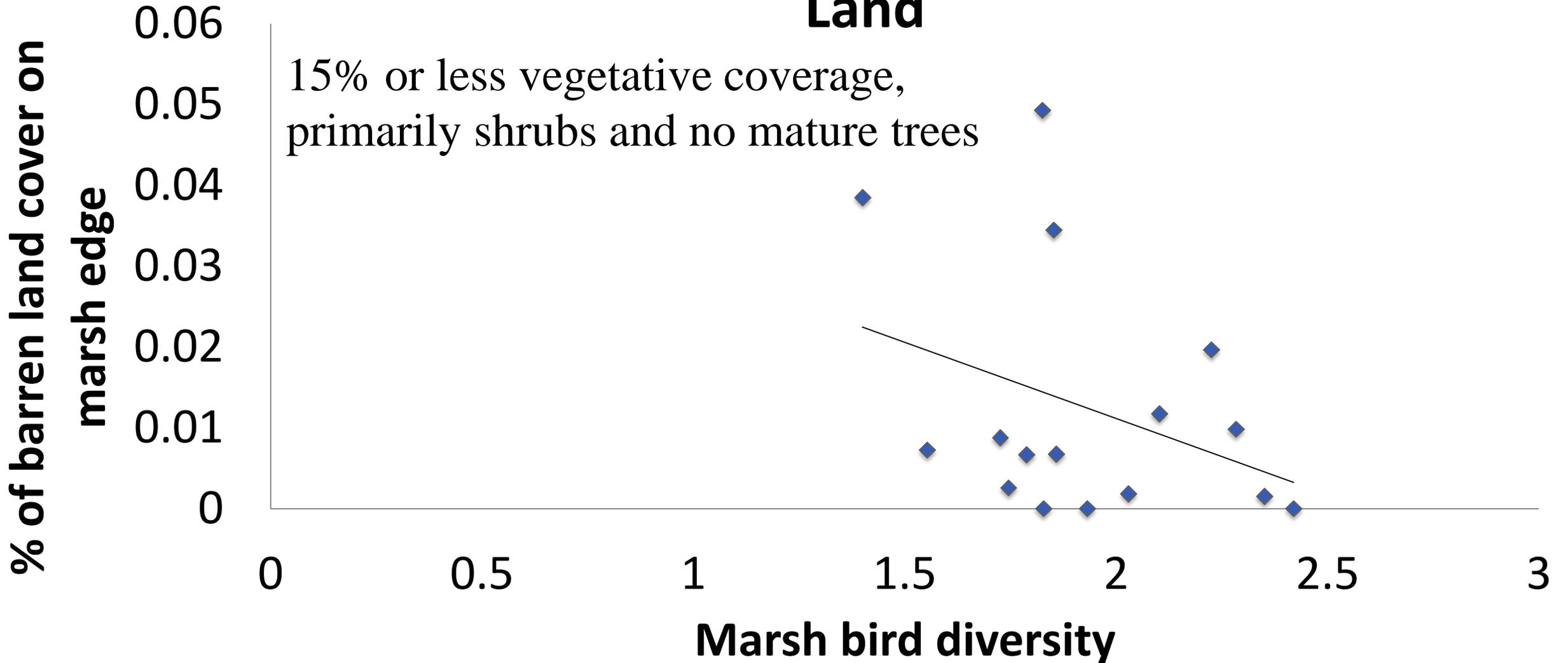
Marsh Bird Diversity & Salinity



Marsh Bird Diversity & Percent Cover of Barren Land



Marsh Bird Diversity & Percent Cover of Barren Land



Maine Listed Species

Endangered (10 species on list) Threatened (10 species on list)



Least Tern



American Pipit



Peregrine Falcon



Black-crowned Night Heron

Maine Species of Special Concern (53 species on list)

American Redstart

Bald Eagle

Barn Swallow

Black-and-white Warbler

Bonaparte's Gull

Brown Thrasher

Chestnut-sided Warbler

Chimney Swift

Common Tern

Eastern Kingbird

Great Blue Heron

Lesser Yellowlegs

Nelson's Sharp-tailed Sparrow

Northern Harrier

Northern Rough-winged Swallow

Orchard Oriole

Saltmarsh Sharp-tailed Sparrow

Semipalmated Sandpiper

Tree Swallow

Wood Thrush

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Common Tern
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Great Blue Heron
Lesser Yellowlegs
Nelson's Sharp-tailed Sparrow
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Bald Eagle



Common Tern



Saltmarsh Sharp-tailed Sparrow



Nelson's Sharp-tailed Sparrow



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Common Tern



Semipalmated Sandpiper



Lesser Yellowlegs

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Bald Eagle



Saltmarsh Sharp-tailed Sparrow



Nelson's Sharp-tailed Sparrow



Common Tern



Semipalmated Sandpiper



Lesser Yellowlegs



Barn Swallow



N. Rough-winged Swallow



Tree Swallow



Chimney Swift





Questions?

