

Monitoring Marsh Bird Communities to Support Rapid Wetland Condition Assessments

Alison Rogerson, Andy Howard
DNREC Watershed Stewardship

Maggie Pletta, Matt Jennette, Michelle Lepori-Bui

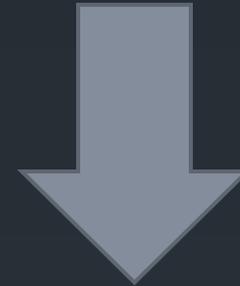


Wetland Assessment Framework

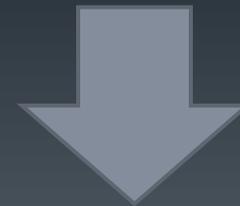
- Monitoring wetland condition is important for identifying sources of impacts and to guide restoration efforts



Level 1 – Landscape



Level 2 – Rapid



Level 3 – Intensive

Validating Rapid Assessments

- Biotic surveys commonly used to support rapid wetland assessments
 - Amphibians, macroinvertebrates, and birds
 - Community assemblages reflect habitat quality
 - Ex. Sensitive species typically absent from degraded sites
- Index of Marsh Bird Community Integrity (IMBCI)
 - Life history attributes used to rank species on a specialist to generalist gradient



Generalists
Low-quality sites



Specialists
High-quality sites

Research Questions

- Are rapid tidal assessment condition scores supported by an intensive biotic survey?
- How does salt marsh habitat complexity influence bird community composition?

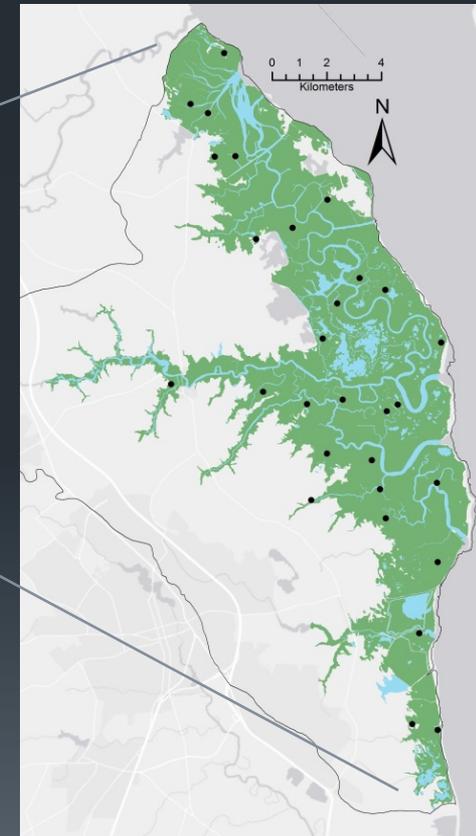
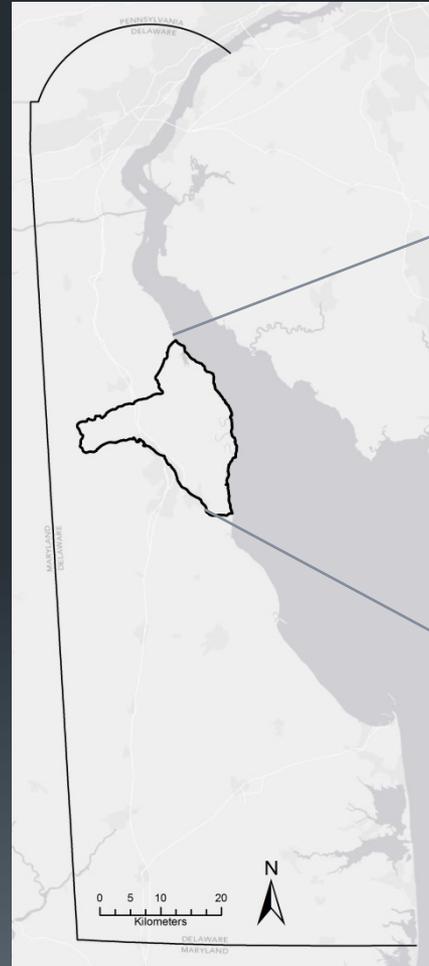


vs.



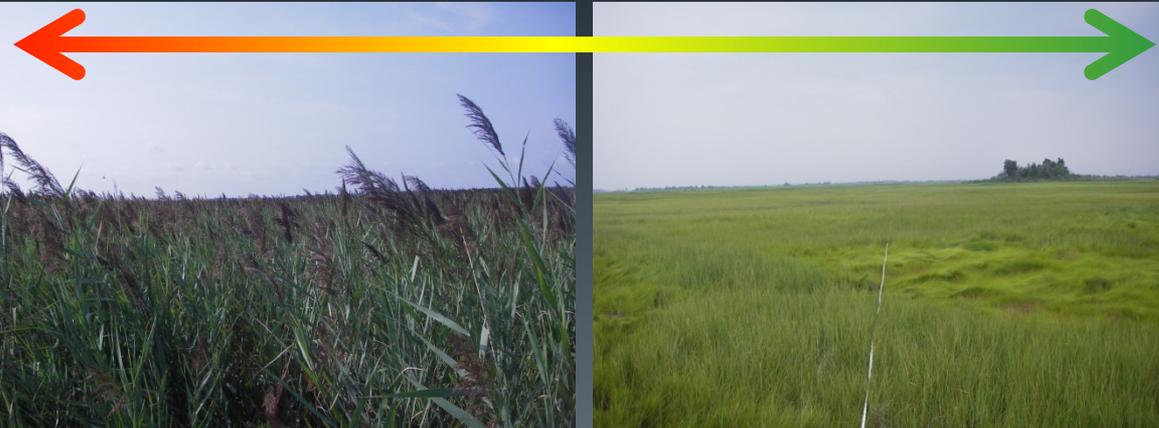
Study Area

- Leipsic River watershed, Kent Co., DE
- Land-use is primarily agriculture with extensive salt marshes and some forest land
- Includes Bombay Hook NWR and Little Creek WMA
- Surveys were conducted at 29 random sites



MidTRAM Condition Assessment

- Sites assessed in summer 2013
- 14 scored metrics:
 - Buffer condition
 - Hydrology impacts
 - Vegetation composition
- Obtain a final score from 0-100



Bird Surveys

- Standardized North American Marsh Bird Monitoring Protocol (Conway 2008)
 - Fixed point count sunrise surveys
 - 3 replicate surveys per site May-June
 - 5 minute passive plus broadcast calls for 6 secretive species
- Recorded species, abundance, and distance up to 75m in the wetland
- 2013 and 2014 surveys were pooled into a single dataset
- IMBCI score per site:
 - foraging habitat
 - nesting substrate
 - migratory status
 - breeding range
 - conservation status



Data Analysis

1. *Are condition scores and bird data related?*
 - MidTRAM condition scores and species richness/IMBCI
 - Simple linear regression
2. *Are bird data related to habitat features?*
 - Wetland habitat complexity and species richness
 - Poisson GLM with sum of habitat features present regressed with richness
 - # of herbaceous strata and the presence of shrubs, creeks, and/or pools
 - Multiple linear regression to estimate importance of each habitat variable
3. *Which features had the strongest influence on bird abundance?*
 - Species-specific response to habitat variables
 - Canonical correspondence analysis (CCA) with presence/absence of environmental variables and abundance of marsh birds

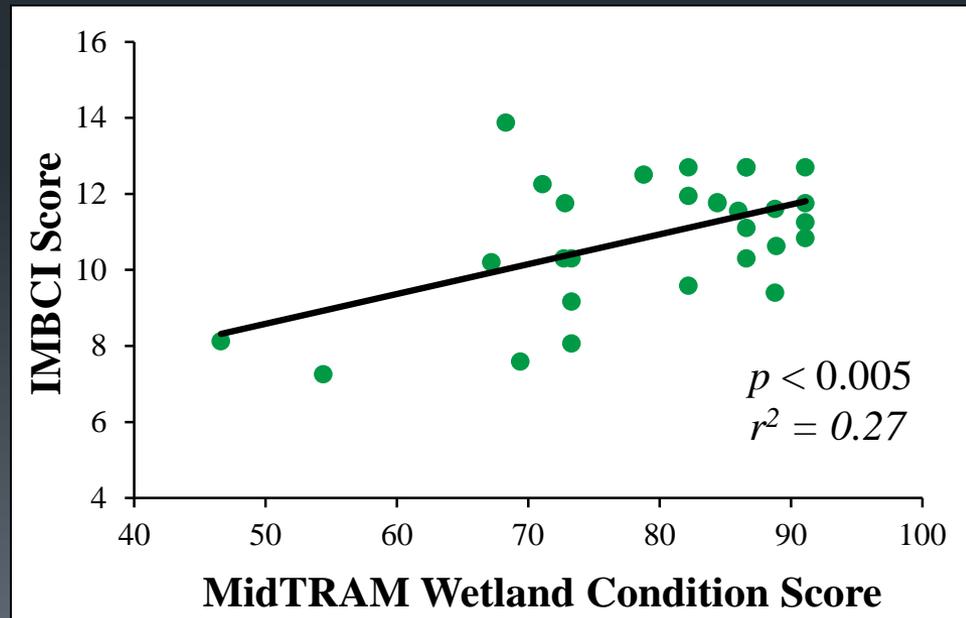
Bird Survey Results

- 27 species recorded
 - 4-9 species per wetland (average 6.1 ± 1.4 spp.)
 - 14 species only recorded at a single wetland
 - Marsh wrens, red-winged blackbirds, clapper rails, and seaside sparrows occurred most frequently and were the most abundant



Bird Communities and Wetland Condition

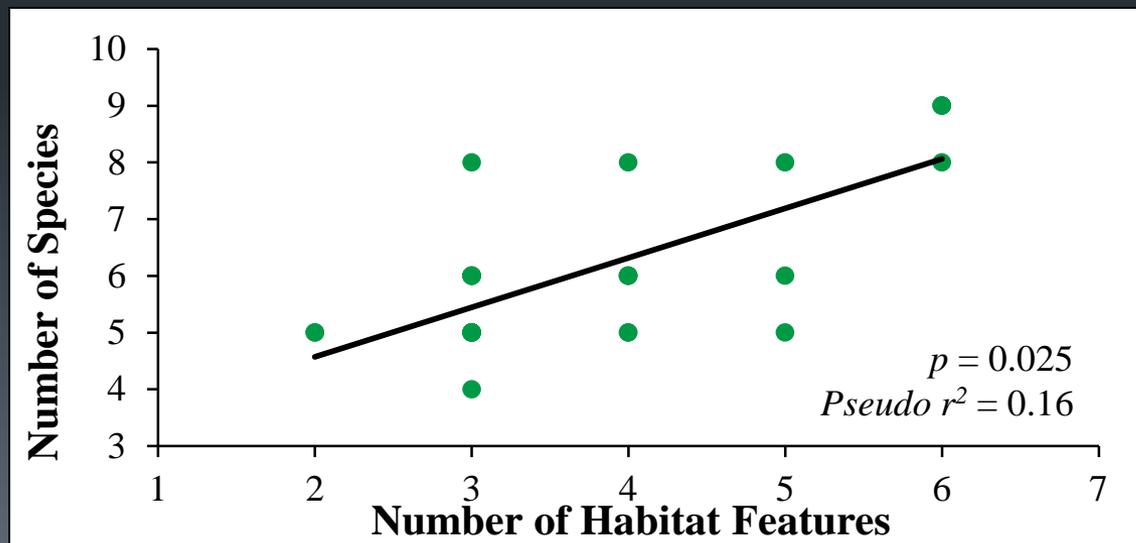
- Wetland condition did not influence species richness ($p = 0.128$)
 - Separate buffer, hydrology, and habitat scores were also unrelated
- IMBCI increased with MidTRAM condition scores
 - Higher condition wetlands supported marsh bird communities with greater biotic integrity



Bird Communities and Wetland Habitat Complexity

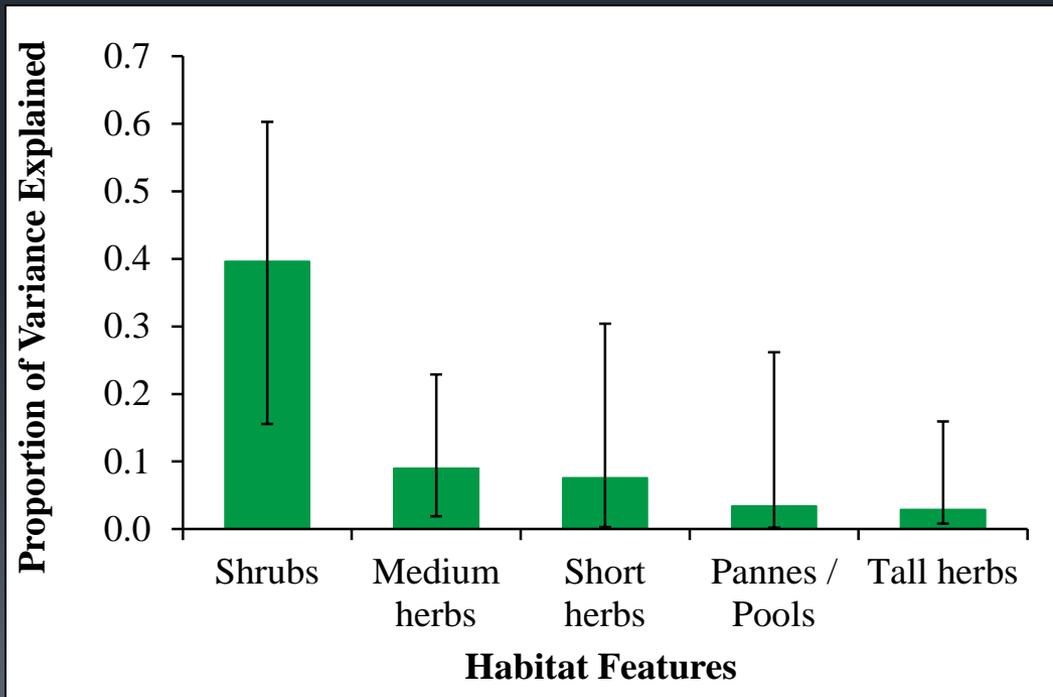
- Marsh bird species richness increased with habitat complexity

Wetland Habitat Variable	Example of Typical Community	% of Sites
Short herbs	D. spicata/S. patens	24%
Medium herbs	S. alterniflora	66%
Tall herbs	S. alterniflora/S. cynosuroides/P. australis	72%
Very tall herbs	P. australis/S. cynosuroides	55%
Shrubs	I. frutescens	41%
Pannes and pools	Natural salt pannes or persistent pools	21%
Creeks and ditches	Natural creeks, manmade mosquito ditches	*100%



Bird Communities and Wetland Habitat Complexity

- Final multiple regression model explained 62% of the variance in bird species richness
 - Woody shrubs accounted for 40% of that variance



Bird Communities and Wetland Habitat Complexity



- Woody shrubs = common yellowthroat, song sparrow, swamp sparrow, saltmarsh sparrow, boat-tailed grackle, and Virginia rail
 - Marsh elder (*Iva frutescens*)



Bird Communities and Wetland Habitat Complexity

- Very tall herbs = marsh wren
 - Big cordgrass (*Spartina cynosuroides*)
 - Common reed (*Phragmites australis*)



Bird Communities and Wetland Habitat Complexity



- Short herbs = willet, seaside sparrow
 - Smooth cordgrass (*Spartina alterniflora*)



Conclusions

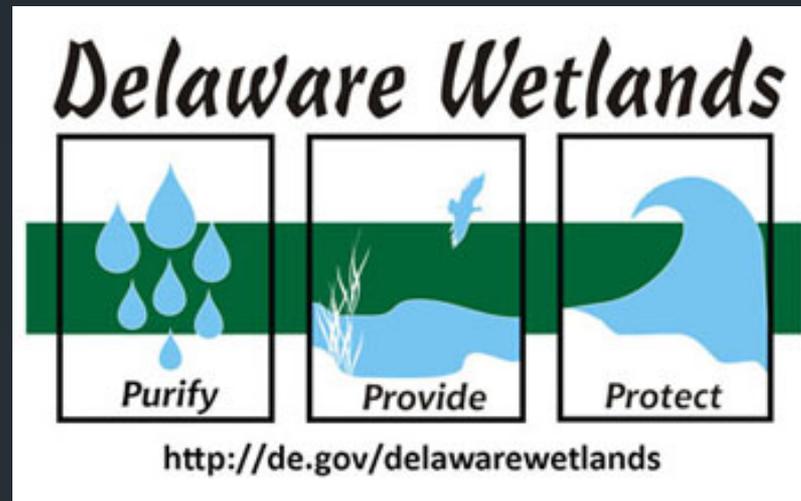
- MidTRAM metric HAB3 - “Number of Plant Layers”
 - Awards sites for having more plant layers
 - Often criticized for penalizing monotypic stands of *Spartina alterniflora*
 - Plant diversity is good!



Conclusions

- Rapid condition scores validated by marsh bird assemblages
 - Higher condition wetlands had greater marsh bird community integrity
 - Level 2 assessments should be validated by Level 3 intensive measures of wetland condition
- Habitat complexity is important for bird assemblages
- Woody shrubs were most important for tidal wetland birds





alison.rogerson@state.de.us
302-739-9939