

The Biocriteria of Isolated Wetlands in the North and South Carolina Coastal Plain



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Introduction

Isolated wetlands in the NC and SC coastal plain are a significant ecological resource in terms of habitat, water quality, and flood control. These wetlands also harbor diverse plant and macroinvertebrate communities. The US Supreme Court ruling on the Solid Waste Agency of Northern Cook County (SWANCC vs. ACOE et. al. 2001) and the Rapanos/Carabell cases (Rapanos and Carabell vs. ACOE 2006) have removed federal jurisdiction protecting these isolated wetlands from development. In NC, impacts to these wetlands have been subject to permitting regulations since 2001. However, SC only gained the authority to regulate isolated wetlands in the coastal region in February 2010 and is currently trying to move forward in the protection of them state-wide.

Objectives

1. Assess isolated wetland amphibian, macroinvertebrate, and vegetation communities.
2. Further develop and validate the North Carolina Wetland Assessment Method (NCWAM) using survey results.
3. Develop biocriteria for use in Coastal Plains isolated wetlands.

Methods

Amphibian Survey

- Qualitative survey performed twice at each site
- Survey Dates: February-March and April-May, 2012
- 2 man-hour visual search
- 23 plywood cover boards placed 1 yr prior to survey
- Funnel traps deployed for 24hr when surface water was present

Macroinvertebrate Survey

- Semi-Qualitative survey performed once at each site
- Survey Dates: February-March, 2012
- Multi-habitat sweep net technique
- Used D-framed sweep net in 1m² areas at 5 locations

Vegetation Survey

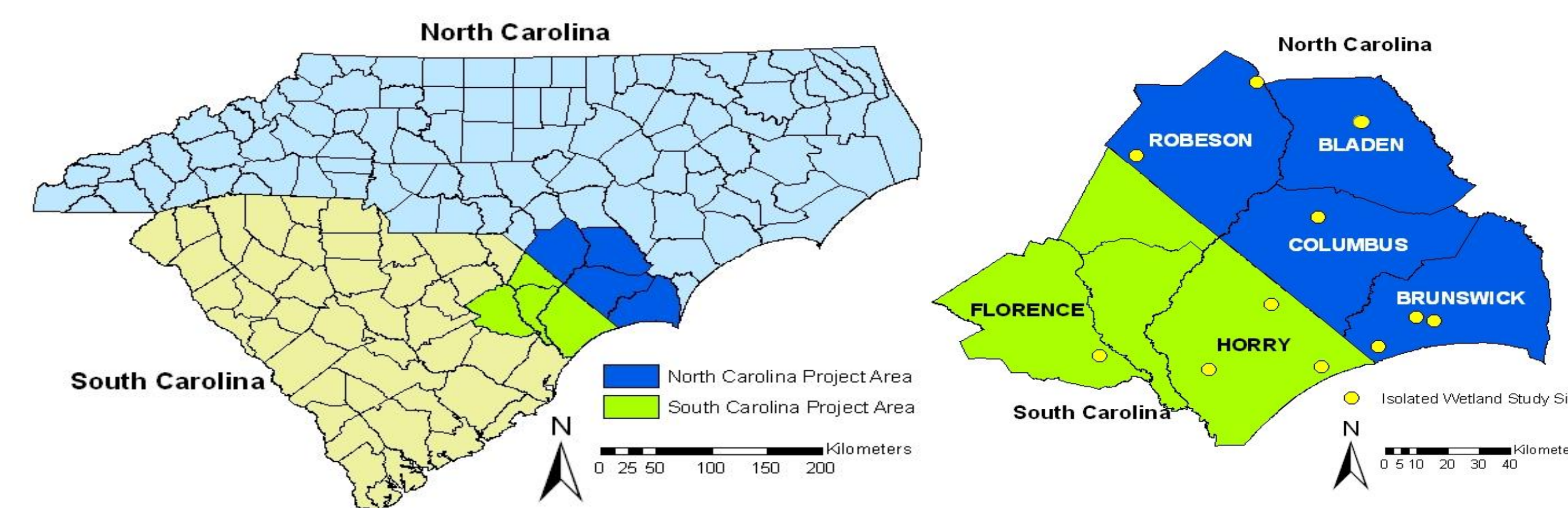
- Performed plant species coverage survey using Carolina Vegetation Survey methods
- Eight 10x10 m quadrates
- Performed woody stem survey (trees, shrubs, vines)
- Survey Dates: July-September, 2010

Author Information

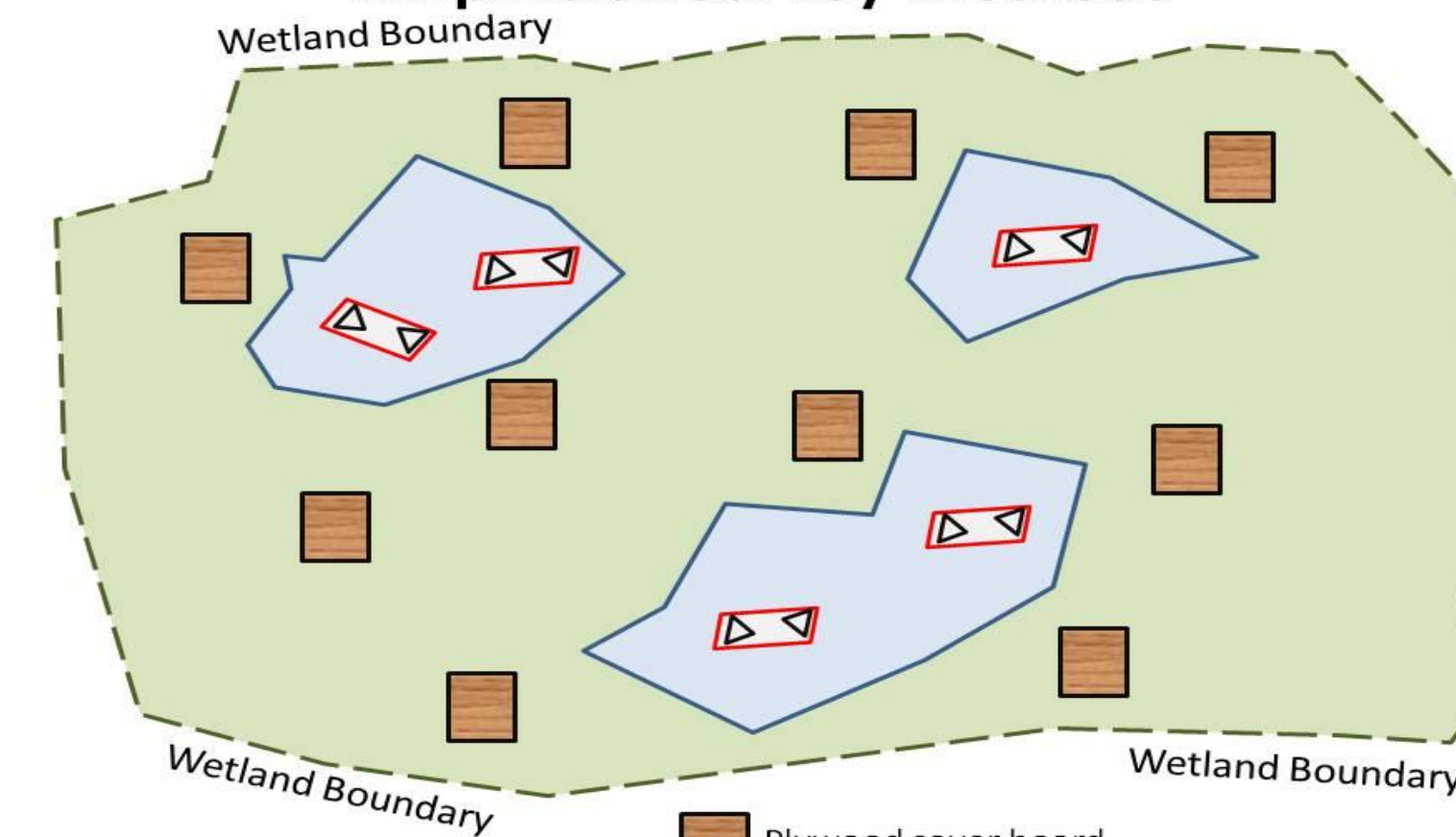
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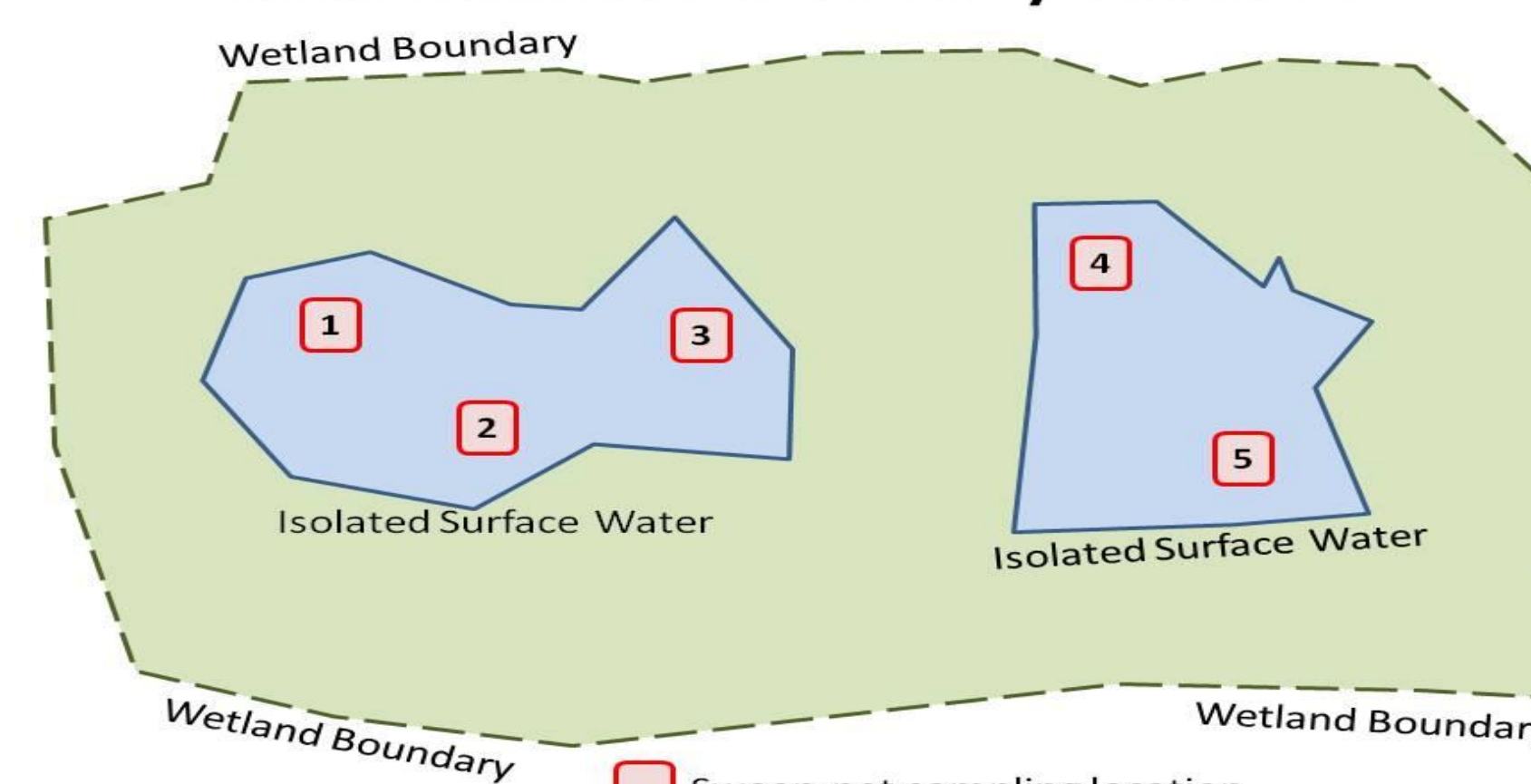
Study Area



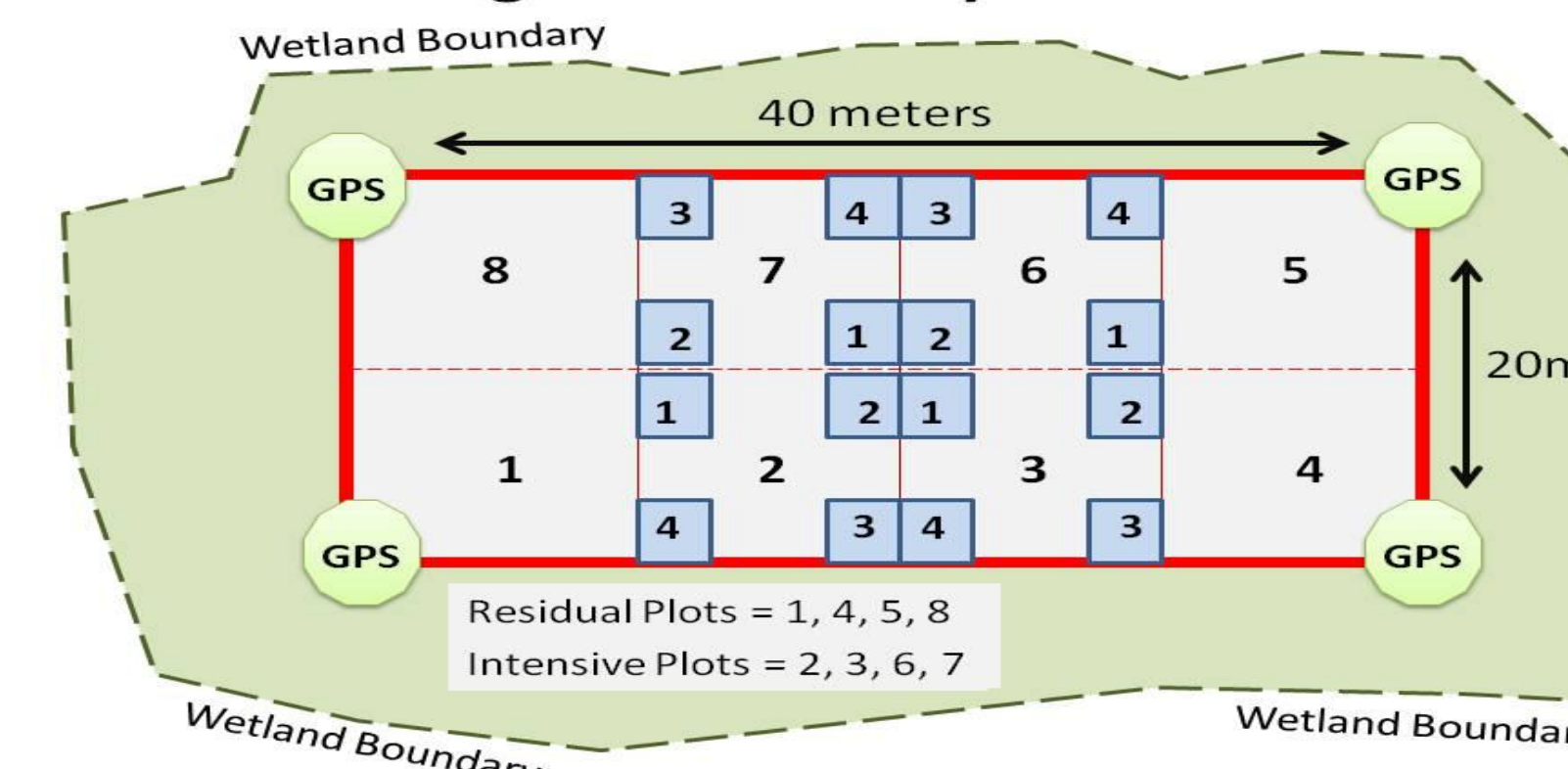
Amphibian Survey Methods



Macroinvertebrate Survey Methods



Vegetation Survey Methods



Ambystoma maculatum



Ophiogomphus sp.



Hyla cinerea



Bufo americanus



Rhododendron atlanticum



Plethodon glutinosus



Arisaema triphyllum

Results

Amphibians

Common Name	Species Name
Southern Cricket Frog	<i>Acris gryllus</i>
American Toad	<i>Bufo americanus</i>
Cope's Grey Treefrog	<i>Hyla chrysoscelis</i>
Pine Woods Treefrog	<i>Hyla femoralis</i>
Barking Treefrog	<i>Hyla gratiosa</i>
Squirrel Treefrog	<i>Hyla squirella</i>
Northern Slimy Salamander	<i>Plethodon glutinosus</i>
Spring Peeper	<i>Pseudacris crucifer</i>

Surveys yielded 8 amphibian species in isolated wetland study sites. *Plethodon glutinosus* (Northern Slimy Salamander) was the most common species found. Species diversity was highest in the Robeson 7 site, where 3 *Hyla* species were recorded in one visit. Amphibian cover boards were not inhabited more frequently than natural habitats. Amphibian diversity and abundance was affected by dry wetland conditions in the study area.

Macroinvertebrates

Order	Family	Genera
Amphipoda	Crangonyctidae	<i>Crangonyx</i>
Coleoptera	Dyticidae	<i>Copelatus</i>
		<i>Laccornis</i>
		<i>Liodes</i>
		<i>Sphaeridiinae</i>
Crustacea	Hydrophilidae	<i>Platambus</i>
		<i>Tropisternus</i>
		<i>Cambarus</i>
Diptera	Chironomidae	<i>Polypedilum</i>
		<i>Pseudosmittia</i>
		<i>Psilometriocnemus</i>
Hemiptera	Culicidae	<i>Aedes</i>
		<i>Dolichopodidae</i>
Isopoda	Corixidae	<i>Hesperocarixa</i>
		<i>Asellidae</i>

Only 4 of 11 sites had surface water during the sampling period. Surveys yielded macroinvertebrate taxa from 6 orders, 9 families, and 14 genera. Coleoptera taxa were the most diverse group inhabiting isolated wetland study sites. Sites were characterized by highly mobile and tolerant taxa that are able to quickly establish themselves in temporary pools. It appeared the majority of crayfish burrow deep into the sediments to survive long periods with no surface water present. Small, isolated pools had harsh water characteristics including low dissolved oxygen and high temperatures.

Vegetation

Site	Species Richness	Total Coverage	FQAI	Percent Wetland Plant Cover	Percent Wet Shrub Cover
Bladen 9	12	29.3	10.4	88.0	85.5
Brunswick 17	35	337.5	18.4	20.2	10.0
Brunswick 4	28	346.3	23.3	68.6	7.2
Brunswick 7	52	688.0	15.3	33.8	10.5
Columbus 26	30	601.5	23.9	30.2	7.5
Florence 14b	41	209.0	9.2	10.8	0.6
Horry 1	31	522.3	19.8	26.2	10.5
Horry 28	25	395.5	31.8	90.2	56.0
Horry 41	28	661.3	19.7	7.7	3.2
Robeson 1	12	420.5	41.8	90.0	29.3
Robeson 7	43	310.3	8.2	21.2	0

FQAI = Floristic Quality Assessment Index

Surveys yielded a diverse plant community in isolated wetland sites. Species diversity and coverage varied greatly between sites. Diversity was highest in Brunswick 7 (52) and lowest in Bladen 9 and Robeson 1 (12). Sites were randomly selected and land use varied greatly between sites affecting our results.

Conclusions

Results indicate diverse groups of plants, amphibians, and macroinvertebrates in isolated wetlands despite very dry surface water conditions during the study period. Developing biocriteria in isolated wetlands will require long term data collection in order to account for the seasonal variability in precipitation impacting these systems.

Acknowledgements

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