



ECOLOGY OF SALT PANNE HABITATS IN *JUNCUS ROEMERIANUS* SALT MARSHES OF THE NORTH-CENTRAL GULF OF MEXICO: PRELIMINARY DATA.

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ABSTRACT

The Grand Bay National Estuarine Research Reserve (GBNERR) in Jackson County, Mississippi has some of the most extensive and best examples of salt panne habitat on the northern coast of the Gulf of Mexico (GOM). We have initiated a study to determine the ecological significance of these rare but important habitats within the north-central GOM landscape by examining two major types of salt pannes: sandy-clay (4 pannes) and organic-rich clay soil types (2 pannes). We established transects perpendicular and parallel to the longest axis of each panne, and used various sampling techniques to survey and inventory broad taxonomic groups such as plants, benthic and terrestrial invertebrates, fish, birds, and mammals on a seasonal basis. Additionally, we used remotely sensed imagery (0.3 m resolution Digital Aerial Photography) to determine the landscape attributes of each salt panne including landscape location, area (ha), perimeter (m), and nearest neighbor distance (m).

RESULTS

Tables 1, 2, 3, & 4: Organisms recorded on all salt pannes during spring and summer, 2005.

Bird Species (N = 21)	Nekton Species (N = 16)	Terrestrial Arthropod Taxons (N = 15)	Mammal Species (N = 10)
Black Belled Plover	Fish	Homoptera	raccoon <i>Procyon lotor</i>
Black-Crowned Night-Heron	<i>Adinia venica</i>	Heteroptera	coyote <i>Canis latrans</i>
Callitris spp. (PEEPS)	<i>Cyprinodon variegatus</i>	Diptera	domestic pig <i>Sus scrofa</i>
Clapper Rail	<i>Fundulus grandis</i>	Hymenoptera	nutria <i>Myocastor coypus</i>
Dowitcher spp.	<i>Fundulus jenkinsi</i>	Acari	canine <i>Canidae</i>
Dunlin	<i>Fundulus majalis</i>	Araneae	feral cat <i>Felis domestica</i>
Gull-billed Tern	<i>Fundulus pulvereus</i>	Orthoptera	whitetail deer <i>Odocoileus virginianus</i>
Laughing Gull	<i>Fundulus sp.</i>	Thysanoptera	bobcat <i>Lynx rufus</i>
Little Blue Heron	<i>Pecellia latipinna</i>	Caelifera	grey fox <i>Urocyon cinereoargenteus</i>
Least Sandpiper	Invertebrates	Lepidoptera larvae	marsh rice rat <i>Oryzomys palustris</i>
Nelson's Sharp-tailed Sparrow	Gammaridea		
Redwinged Blackbird	<i>Littorina irrorata</i>		
Seaside Sparrow	<i>Neritina recitata</i>		
Snowy Egret	<i>Palaeomonetes pugio</i>		
Sora	<i>Sesarma cinereum</i>		
Spotted Sandpiper	<i>Uca longisignalis</i>		
Whimbrel	<i>Uca sp.</i>		
Wilson's Plover	<i>Uca sp.</i>		
White Ibis	Reptiles		
Yellow Crowned Night Heron	<i>Nerodia clarkii clarkii</i>		



Gulf Salt marsh Snake (*Nerodia clarkii clarkii*)



Figure 1: Salt pannes located within the boundaries of the Grand Bay NERR



Figure 2: Non-Metric Multi-Dimensional Scaling of seasonal plant assemblages and mean % cover by salt panne (stress of 0.11) indicating three distinct classes of salt pannes



Wilson's Plover nest on salt panne

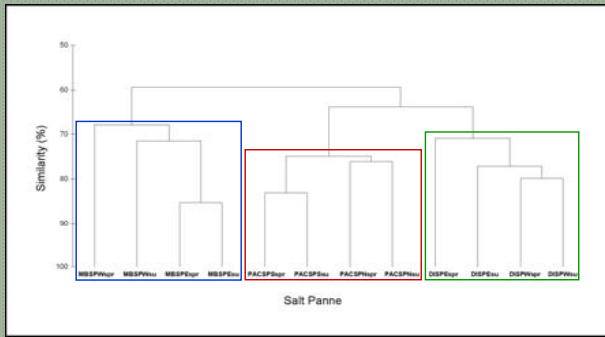


Figure 3: Percent similarity (Bray-Curtis) dendrogram based on UPGMA cluster analysis comparing seasonal plant assemblages (mean % cover) by salt panne.

The Bray-Curtis coefficient (UPGMA cluster analysis; Figure 3) indicated that the Pt. aux Chenes salt pannes (PACSPS and PACSPN; spr = spring and su = summer) were most similar (74.89 %) in relation to their seasonal plant assemblages and % cover of those species. The Deer Island Salt Pannes (DISPE and DISPW) ranked next in similarity at 70.90 %, while the Middle Bayou salt pannes (MBSPE and MBSPW) grouped together with 67.92 % similarity. Additionally, the Pt. aux Chenes and Deer Island pannes clustered together with 63.76 % similarity.



Representative photo of the Middle Bayou Salt Pannes = organic-rich clay type



Representative photo of the Pt. aux Chenes Salt Pannes = sandy-clay type



Representative photo of the Deer Island Salt Pannes = sandy-clay type

INTRODUCTION

The Grand Bay National Estuarine Research Reserve (GBNERR) in Jackson County, Mississippi has some of the most extensive and best examples of salt panne habitat on the northern coast of the Gulf of Mexico (GOM). These salt pannes may be categorized into two major groups based on soil type: sandy-clay and organic-rich clay soil types. They occur in *Juncus roemerianus* salt marshes between the middle and high marsh and seem to follow the contour of the upland areas. The salt pannes appear to be tidally flooded and have distinctive vegetative characteristics. The ecological significance of these rare but important habitats within the north-central GOM landscape is not clearly understood.

METHODS

- We selected six different salt pannes located in the GBNERR (four pannes, Figure 1) and Deer Island Coastal Preserve (two pannes) as sampling sites.
- The pannes located on Middle Bayou were organic-rich clay soil type and the Pt. aux Chenes and Deer Island pannes were the sandy-clay soil type.
- These pannes will be sampled quarterly for one year. Two seasonal quarters of sampling have been completed.
- On each panne, transects running both parallel and perpendicular to the longest axis were laid out to guide sampling efforts.
- The main groups of organisms we sampled were birds, mammals, vegetation, terrestrial arthropods, and nekton.
- The % coverage of each vegetative species was determined using a 1/2 m² quadrat randomly thrown multiple times along each transect segment.
- Birds were surveyed using line-transects sampling methodologies.
- Small mammals were captured using Sherman live traps set along both the upland and marsh sides of the salt pannes when the pannes had the least amount of flooding. The mammals were measured, weighed and released. Additionally, we identified and counted larger mammals based on their tracks.
- Terrestrial arthropods were collected by sweep netting.
- Nekton were sampled during flooding events using a 1 m² x 0.75 m aluminum throw trap.
- Physical parameters were collected during each sampling period.
- Also, we used remotely sensed imagery (0.3 m resolution Digital Aerial Photography) to determine landscape attributes of all salt pannes in the GBNERR.

DISCUSSION AND CONCLUSIONS

The salt pannes examined in this study can be distinguished based on soil type alone, but these pannes may also be classified based on their plant assemblages. Ecologically, vegetative communities play an integral role in how an ecosystem functions. We hypothesize that additional sampling for mammals, birds, terrestrial arthropods, and nekton will reveal similar patterns of clustering. Tables 1-4 displays organisms that we have sampled to date on all salt pannes.

Additionally, Figure 3 indicated that the Pt. aux Chenes pannes and Deer Island pannes are more similar (63.76 %) to each other than to the Middle Bay salt panne group. Again, we return to the soil type classification which appears to influence plant assemblages, which in turn may drive the composition of other species assemblage. This would create the distinct salt panne communities which we appear to be observing.

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