INVERTEBRATE COMMUNITIES OF TWENTY DITCHED CAROLINA BAY WETLANDS SCHEDULED FOR RESTORATION

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Abstract. In February 1998, we began collecting invertebrates in 20 ditched Carolina bays and bay-like wetlands near Aiken, South Carolina. In the winter of 2001, these 20 wetlands will have their ditches plugged in an attempt to restore them to a more natural state. We have collected 24 different insect families and 14 different crustacean families in these impacted wetlands prior to the restoration. The three years of invertebrate community data that have been collected will be used as a reference to evaluate faunal changes following the restoration.

INTRODUCTION

Depressional wetlands are a focus of concern because the majority of them have been impacted by human activity. Primary impacts on these wetlands are draining or filling for agricultural and construction purposes (Mitsch and Gosselink, 1993). Carolina bays are elliptical, depressional wetlands of the Atlantic Coastal Plain. Bay habitats vary from forested wetlands to open meadows. Common tree species include pond cypress (*Taxodium ascendens*), swamp tupelo (*Nyssa sylvatica biflora*), red maple (*Acer rubrum*), and sweetgum (*Liquidambar styraciflua*). Bay water is typically acidic, soft, and heavily colored (Taylor et al., 1999). Water levels tend to fluctuate widely from precipitation and evapotranspiration and many experience seasonal drying. This means that aquatic fauna residing in the wetlands must have some capacity to resist desiccation. Fish are absent from bays that dry regularly.

This study investigates 20 impacted Carolina bays and bay-like wetlands located on the Savannah River Site (SRS) near Aiken, South Carolina. Ditches were dug in the early 1900's to drain the bays and convert them into agricultural lands. Since the creation of the SRS and the elimination of agriculture, all sites have reverted to more forested settings. However, remnant ditches still affect hydroperiods. In the winter of 2001, the ditches in these bays will be plugged to restore the bays to a more natural state. Plugging the ditches should increase the length of the hydroperiod in these bays. The purpose of this study was to describe the invertebrate communities of these bays prior to the restoration to provide a basis for determining restoration success.

SITE DESCRIPTION

The 20 study bays range from 0.28 ha to 3.32 ha in size. Hydroperiod varies from bays that hold water for more than half of the year to bays that do not fill every year. Additional details about the sites are given in "Carolina Bay Restoration: SRS Wetland Mitigation Bank Documentation" (unpublished manuscript by Barton and Singer).

METHODS

Since February 1998 semi-quantitative macroinvertebrate samples and qualitative microinvertebrate samples were collected every 2 months during periods when the bays held water (except in the fall of 1998). Macroinvertebrates were sampled by using 3 standardized sweeps with a sweep net. Microinvertebrates were collected in the water column and around substrates using a fine-meshed sweep net. Preserved samples were sorted and invertebrates identified in the laboratory.

RESULTS

Table 1 lists all of the insect taxa and Table 2 lists all of the crustacean taxa collected in the 20 Carolina bays. Dipterans made up 88% of all macroinvertebrates, largely due to the high number of chironomids. A diversity of Coleoptera were collected, however, they made up only 6% of the total macroinvertebrates found in samples. Within the orders Ephemeroptera and Megaloptera, the genera *Caenis* and *Chauliodes* were only present in a single collection. Insects in the order

Table 1. Insects Collected in the 20 Ditched Carolina Bays

Ephemeroptera	**Coleoptera**	**Megaloptera**
Caenidae*	Curculionidae*	Corydalidae
Caenis	Dytiscidae	*Chauliodes*
Odonata	*Celina*	**Diptera**
Aeshnidae*	*Coptotomus*	Chaoboridae*
Aeshna	*Cybister*	*Chaoborus*
Coenagrionidae*	*Dytiscus*	Chironomidae
Argia	*Hydaticus*	Tanypodinae
Lestidae*	*Hydroporous*	Non-Tanypodinae
Lestes	*Hydrovatus*	Culicidae*
Libellulidae	*Laccophilus*	*Aedes*
Erthrodiplax	*Nebrioporous*	*Culex*
Libellula	Gyrinidae*	Muscidae*
Sympetrum	*Dineutus*	*Limnophora*
Hemiptera	Haliplidae*	Tabanidae*
Corixidae	*Peltodytes*	*Tabanus*
Sigara	Hydrophilidae*	**Trichoptera**
Gerridae*	*Berosus*	Hydroptilidae*
Gerris	*Enochrus*	*Oxyethira*
Naucoridae*	*Hydrophilus*	Phryganeidae*
Pelocoris	*Tropisternus*	*Ptilostomis*
Notonectidae	Noteridae*	Polycentropodidae*
Buenoa	*Hydrocanthus*	*Polycentropus*
Notonecta		

***Indicates families that comprised less than 1% of total number of macroinvertebrates collected.**

Trichoptera were rare (<1%).

Fourteen different families of crustaceans were found in the bay samples. Most crustaceans were either copepods and cladocerans, with the family Chydoridae having the greatest diversity in the number of species collected of all crustaceans. Annelids and mollusks were rare.

DISCUSSION

The pre-restoration samples indicate that a viable invertebrate community is already present in these impacted bays. With restoration and an increase in the length of hydroperiod, it is plausible that some taxa that prefer shorter hydroperiods will actually be eliminated. One example is the clam shrimp *Lynceus gracilicornis*, which does not occur in bays that are flooded for more than half of the year (Taylor and DeBiase, unpublished). Some desiccation resistant organisms prefer a shorter hydroperiod because it allows them to develop with fewer or smaller predators. Following the restoration, we would expect to see a change in the invertebrate community from organisms that prefer and tolerate long periods of drying to organisms that require a longer hydroperiod (Wissinger, 1999). We might also expect to see a shift in the top predator complex from being dominated by insects to becoming dominated by amphibians or even fish (Wellborn et al., 1996).

Table 2. Crustaceans Collected in the 20 Ditched Carolina Bays

Subclass Branchiopoda

Cladocera

Daphniidae

Ceriodaphnia megops
Ceriodaphnia laticaudata
Ceriodaphnia sp.
Ceriodaphnia cf. quadrangula
Daphnia laevis
Scapholeberis armata
Simocephalus expinosus
Simocephalus serrulatus

Bosminidae

Neobosmina tubicen

Macrothricidae

Acantholeberis curvirostris
Ilyocryptous spinifer
Iheringula sp.
Lathonura sp.
Macrothrix laticornis
Streblocercus serricaudatus

Chydoridae

Acroperus sp.
Alona affinis
Alona costata
Alona guttata
Alona rustica
Alona quadrangularis
Alonella cf. excisa
Alonella exigua
Alonella pulchella
Camptocercus sp.
Chydorus cf. biovatus
Chydorus brevilabris
Chydorus sp. 1
Chydorus sp. 2
Chydorus sp. 3
Disparalona cf. acutirostris
Ephemeroporus sp. 1
Eurycercus microdontus
Kurzia latissima
Pleuroxus denticulatus
Pleuroxus straminimus
Pleuroxus sp.
Pseudochydorus cf. globosus

Sididae

Diaphanosoma birgei
Diaphanosoma brachyurum
Pseudosida bidentata

Anostraca

Chirocephalidae

Eubranchipus sp.

Streptocephalidae

Streptocephalus seali

Conchostraca

Lynceidae

Lynceus gracilicornis

Subclass Copepoda

Calanoida

Diaptomidae

Aglaodiaptomus clavipoides
Aglaodiaptomus atomicus
Aglaodiaptomus stagnalis
Leptodiaptomus moorei
Onychodiaptomus birgei
Onychodiaptomus sanguineus

Cyclopoida

Cyclopidae

Acanthocyclops robustus-vernalis complex
Acanthocyclops cf. venustoides
Diacyclops crassicaudis brachycercus
Diacyclops haueri
Diacyclops bicuspidatus thomasi
Diacyclops sp.
Ectocyclops phaleratus
Eucyclops conrowae
Eucyclops macrurus
Eucyclops speratus
Macrocyclops albidus
Macrocyclops fuscus
Microcyclops sp.
Orthocyclops modestus
Paracyclops affinis
Tropocyclops extensus
Tropocyclops prasinus
Tropocyclops prasinus mexicanus

Subclass Malacostraca

Isopoda

Asellidae

Caecidotea sp.

Amphipoda

Crangonycticdae

Crangonyx sp.

Gammaridae

Gammarus sp.

Decapoda

Cambaridae

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