METHODS

Study Sites

Five floodplain locations were used for the study, three sites on Altamaha River floodplains and two sites on Savannah River floodplains. All of the locations are on the Atlantic Coastal Plain and in the lower reaches of the respective rivers, above the reach of tides. All locations are in protected wildlife management areas.

Within each of the five locations, we assigned three treatments: 1) river ecotone, 2) upland ecotone, and 3) the interior floodplain. All of the sites (N=15) are backwater swamps, which contain water between over bank events; most remain flooded for multiple months. River sites had the highest connectivity to the river and upland sites had the least, with the interior sites have an intermediate connectivity.

Sampling

The floodplains were sampled throughout the inundation period to account for any temporal invertebrate variation. In 2007, we sampled in late winter (February-March) soon after inundation and once again in spring (April). In 2008, we were able to sample the floodplain three times, late winter (February-March), spring (April) and late spring (May). At each sampling event, invertebrate sub-samples were collected by using a Hess sampler (860 cm^2) at four randomly selected locations along transects where the water depth did not exceed the height of the sampler (60 cm). The substrate and water column enclosed was flushed through the collection net for 30 seconds. Henke (2001) determined that this sampling method was an efficient way to sample the invertebrate community structure of floodplain backwater swamps. Samples were stored in 95% ethanol until they were sorted in the laboratory. For fish, study sites were electroshocked for 750 seconds and all the fish were then collected, anesthetized, and preserved in formalin (1%).

In the laboratory, the invertebrate samples were separated into two size classes (>1.0 mm and <1.0 mm) by sieving. Random sub-samples were taken from the larger samples and all invertebrates were removed and identified to family or genus level. We then calculated invertebrate densities. Organisms were also measured to the nearest millimeter, and biomass determined using mass-length regression (Benke et al., 1999; Stead et al., 2003). We identify fish to species and measure standard length.

Water samples were collected from each site and analyzed for total nitrogen, total phosphorus, pH, conductivity, and temperature. Finally, we used a GPS unit to assess the distance from the river to each site and estimate elevation.

Data Analysis

This experiment is a 5-block design with nested effects. Locations served as a block. Mean abundance of organisms and total biomass are calculated for each Hess sample (subunit), and then calculated for the whole site (whole-unit). Biomass and abundance data was analyzed by two-way factorial blocked ANOVA with river and site serving as factors and location serving as the block to determine any differences associated with connectivity to the river. Non-metric multidimensional scaling ordination program based on the Bray-Curtis distance of abundances and the biomasses at each site were used to assess community similarities among all samples. ANOSIM analysis will explore the similarities of the communities to examine any differences of connectivity. All analyses are ongoing, but preliminary analyses suggest that communities differ significantly among sites near the river, in the floodplain interior, and near the upland in ways that at least partially support our hypotheses

ACKNOWLEDGEMENTS

The Nature Conservancy and US Geological Survey Water Research Institutes Program provided funds for this project.

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