MACROINVERTEBRATE SUCCESSIONAL RESPONSE TO HYDROLOGIC CONNECTIVITY OF OXBOW LAKES DURING A FLOOD PULSE

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Floodplains contain a unique and diverse array of habitats that rely on the activity of the river. In particular, oxbow lakes contain a high level of biodiversity, and are considered hotspots in coastal plain floodplains. These lentic systems are often considered important in the flux of nutrients and organic material during high levels of hydrologic connectivity. The level of this connectivity can contribute to the heterogeneity of the floodplain. Floodplain inundation also has the potential to displace certain species, and can lead to oxygen deficiency through bacterial respiration. The main objective of this study was to assess the macroinvertebrate assemblages during varying levels of hydrologic connectedness within oxbow lakes along the Savannah River to further understand community response to a flood pulse. Four lakes along the Savannah River were analyzed seasonally for macroinvertebrate assemblages between July 2015 and June 2016 (N=24). Two lakes were always connected and two were connected only during floodplain inundation. Macroinvertebrate assemblages were assessed for differences in: Composition (%EPT, %Trichoptera), Tolerance (Hilsenhoff Biotic Index) and Functional Feeding Group Structure. Bray-Curtis similarity matrix and permutational ANOVA/MANOVA were used to assess differences between the benthic community structure at various levels of flooding. In addition, a similarity percentage analysis (SIMPER) test was performed to determine which taxa were responsible for differences between macroinvertebrate assemblages at different stages of flooding. Results indicated there were significant differences in Functional Feeding Group Structure with shedders increased linearly from 29% of the community before flooding to 41% after flooding receded (P=0.021) and collector-filters decreased from 59% to 7% during flooding, then increased to 33% after flooding (P=0.029). PerMANOVA results indicated significant differences between flood stages (P=0.005) and SIMPER results showed Polypedilum spp. of Chironomidae increased from 11% to 56% during flooding, and subsequently decreased to 20% after flooding receded (P=0.002). Overall results indicate of oxbow connectedness be a significant driver of change in macroinvertebrate assemblages and functional feeding group structure. Additional sampling is needed to account for macroinvertebrate drift and natural seasonal variation.

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