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RESPONSE OF BENTHIC MACROINVERTEBRATE COMMUNITY STRUCTURE AND
AQUATIC INSECT SECONDARY PRODUCTION TO COARSE WOODY DEBRIS
ADDITION IN PERI-URBAN TO URBAN GOLF COURSE PONDS

Golf courses represent 29% and 26% of all greenspace areas in the U.S. urban regions and the Chicago metropolitan region, respectively; however, they are often overlooked among urban greenspaces as a tool to mitigate the impacts of increased urbanization on ecological communities. The primary aim of this research was to assess whether manipulating golf course pond habitats by adding coarse woody debris (CWD) would enhance aquatic invertebrate community structure and secondary production, with the potential to increase local biodiversity.

One pond in each of six golf courses was selected for this study and sampled in summer 2020 before wood addition (Year 1) and summer 2021 after wood addition (Year 2). At the end of Year 1, CWD was added to three ponds, while three served as controls (no CWD addition). Benthic macroinvertebrate community structure and secondary production were evaluated each year to quantify changes associated with wood addition.

Wood addition had no effect on any invertebrate taxa densities; however, there were significant effects on functional composition, i.e., functional feeding groups (FFGs) and functional habit groups (FHGs), and some diversity metrics. Shannon's equitability, Inverse Simpson's index of diversity, and Shannon's diversity of many functional groups increased disproportionately more in wood-added (WA) ponds and either decreased or increased less than in no-wood added (NWA) ponds. There was a significant decrease in sprawler (FHG) richness in WA ponds and an increase in NWA ponds.

Adding CWD to ponds did not affect aquatic insect secondary production at the taxonomic or functional level. Four of 67 taxa collected accounted for 93% of the mean total secondary production across years and ponds. This lack of response is likely linked to an interaction between (1) low sample size, (2) many ponds with high macrophyte densities, which confounds the effect of CWD increasing detritus accumulation, and (3) newly added CWD in early stages of decomposition.

Although results from this study suggest that wood in an early decay stage has limited effects on aquatic macroinvertebrate communities, they provide insight for future studies on using CWD addition as a habitat enhancement approach in golf courses, an understudied urban greenspace.