Using passive acoustics for long-term, continuous measurements of fish biodiversity in estuarine systems

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Assessing the biodiversity of underwater habitats can be challenging; traditional sampling methods do not record all fish species, and are often conducted intermittently. As a result, fish diversity, ecosystem health, and resulting conservation decisions are often inferred through incomplete “snapshots” in time. Passive acoustic recordings can be conducted with high spatiotemporal resolution, and can provide data on species of ecological and economic importance that are missed by traditional sampling. This information is vital to understanding fish behavior, including when and where certain species are spawning, which is key to habitat conservation. We investigated the use of soundscapes as a tool to monitor fish biodiversity on oyster reefs in Pamlico Sound, NC, by coupling soundscape surveys with traditional biodiversity sampling. Fish vocalizations were detected in the soundscape especially at night when traditional biodiversity sampling would not normally occur, and during short periods of activity which may be missed by periodic sampling. In addition, soundscape composition changed over time, and was related to changes in biological community composition. When coupled with traditional biodiversity sampling methods, soundscape monitoring may provide a more complete understanding of spatiotemporal patterns in fish biodiversity and ecosystem health, which will inform future habitat conservation efforts in coastal ecosystems.

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