Evaluating the Impacts of Maintenance Dredging on Species of Concern in the Lower Cape Fear River
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Background

- Maintenance dredging along the lower Cape Fear River is typically restricted to a window from December to April when it has the least impact on biological productivity.
- The US Army Corps of Engineers (USACE) has been granted a three-year moratorium on this window.
- Maintenance hopper dredging is conducted in rivers and harbors to deepen waterways for navigation and commercial purposes by vacuuming material from the channel floor.
- Bioacoustic monitoring requires the use of hydrophones which can be deployed in the water column to collect underwater sound.
- Masonboro and Zeke’s Island Reserve are included in the North Carolina National Estuarine Research Reserve System and act as nurseries and habitats to species of concern (NERRS Technical Report, 2002).
- There is concern for migration and spawning activity of species in the area combined with impacts from suspended sediment on river water quality, nearby habitats, and benthic communities.

Objectives

- Evaluate potential impacts from maintenance dredging utilizing underwater sound, coupled with water column and benthic monitoring techniques, around Masonboro Island and Zeke’s Island.
- Establish a baseline understanding of bioacoustic sound, water quality parameters, and riverbed characteristics.
- Understand what potential effects maintenance dredging has on species of concern by comparing each phase of the study.

Methods

- Three hydrophones will be placed in the water column for a few days at a time under continuous recording mode.
- One hydrophone will be placed in a control location that will not be impacted by dredging activities. The other two hydrophones will be placed within proximity to the estimated dredging locations and/or protected reserves.
- The first 5 to 10 minutes of each hour will be analyzed to count call rates and to examine frequencies and amplitudes, in addition to any peaks seen on the spectrogram.
- Frequencies will be isolated and identified which match the calls and sounds of e.g., red drum, spotted sea trout, crabs and shrimp using specialized acoustic software.
- Water column and bathymetric properties will also be collected including turbidity, dissolved oxygen, temperature, salinity, current speeds and directions, and water levels using a variety of sensors.
- Side scan sonar and echo sounders will be used to monitor riverbed changes and potential disturbances to riverbed habitats.

References


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Pilot test site located behind Masonboro Island

Spectrogram from a recent test recording