



**US Army Corps
of Engineers** ®
Wilmington District

**General Re-evaluation Report and Environmental Assessment
Surf City, Onslow and Pender Counties, North Carolina
Coastal Storm Risk Management Project**



**Appendix L: Hardbottom Monitoring Plan
Draft
May 2024**

**SCOPE OF WORK
TOPSAIL BEACH BORROW AREA
BENTHIC HABITAT AND WATER QUALITY ASSESSMENT
Wilmington District, USACE
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Project Summary

Title: Benthic Habitat and Water Quality Assessment for Topsail Beach Borrow Area

Project Background: The U.S. Army Corps of Engineers, Wilmington District (SAW), is conducting a beach nourishment project at Topsail Beach, NC. Sand for the beach material will be borrowed from several borrow sites within 10km south of Topsail Beach using a trailing suction hopper dredge. This is the largest project of type to be done in the area and resource managers are concerned about potential effects on local aquatic habitats: 1) water quality (dissolved oxygen) and resuspended sediment covering EFH hard-bottom habitats in close proximity of the dredge, 2) effects on invertebrates which are an important food source within the borrow areas. This is just the scope of work (SOW) and budget for task 1 for FY 2022.

This SOW describes monitoring water quality (dissolved oxygen/turbidity) around the dredge and document any negative impacts (i.e. burial) of hard bottom habitats. Another aspect of this project is monitoring the recovery of benthic invertebrates within the borrow areas which is covered in another SOW. This is a very dynamic project so the following methods may adapt based on what is learned as the project progresses. Changing in methods will be discussed with interested parties.

Approach:

Turbidity/Dissolved Oxygen Monitoring:

Resource managers are concerned about resuspended sediment covering hard-bottom benthic habitat and decreases in dissolved oxygen. To get a better understanding of resuspended sediment and dissolved oxygen dynamics, handheld (YSI ProDSS) and continuous water quality monitors (YSI EXO2) will be deployed around the active hopper dredge. Water quality sondes will measure turbidity and dissolved oxygen at various distances from the active dredge. The monitoring will require very close coordination with the dredge contractor so sampling can be conducted at the right time and area. One week of water quality monitoring will occur at the onset of dredging which is planned for December. Water quality will be monitored for one week when dredging starts at each borrow site during Contract 1.

Hard-Bottom Habitat Monitoring:

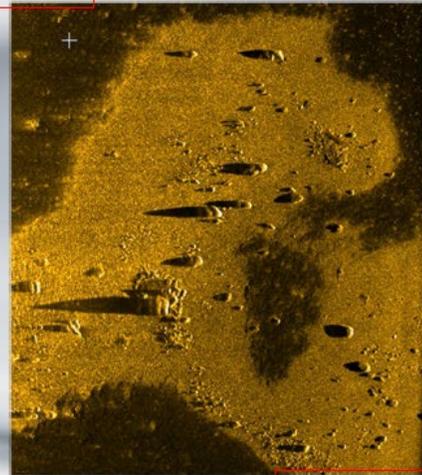
Eight borrow sites will be used for the beach nourishment project (Figure 1). Benthic surveys taken as part of previous beach nourishment projects mapped hard-bottom habitat throughout the

project area. Those earlier surveys encompass areas around all eight borrow sites being used for the current project. National Environmental Policy Act (NEPA) documents require monitoring to determine if resuspended sediment settles and smothers nearby hard-bottom habitat. A combination of sidescan sonar (SSS) and photography will be used to help determine if resuspended sediment caused by dredge activities is smothering neighboring hard-bottom habitat.

Backscatter from an EdgeTech 600/1600 SSS system SSS is able to delineate hard-bottom versus sandy or muddy bottoms (Figure 2). Within two months of dredge work starting at a borrow site, SSS transects will be used to re-delineate hard-bottom edges that were mapped out during the previous each nourishment project (Figure 2). A Seaviewer 950 underwater camera will be used to take images of hard bottoms within and up to 500m outside of borrow sites. Images will be taken around 200 meters apart along the edge of the hard-bottom habitat (Figure 3). As the project progresses repeat photo surveys at the same locations will be conducted every four months or until the borrow site is no longer in use. A report will be provided to the district after each sampling event.

- Backscatter
 - The energy reflected from the seafloor
- The rougher or more features the bottom has the more acoustic energy is reflected back to the sonar
- Gravel and sand reflect more than mud and clay materials.

MUDDY
MATERIAL



SANDY MATERIAL

Figure 1. Sidescan image of muddy and sandy material with various hard rocks spread throughout.

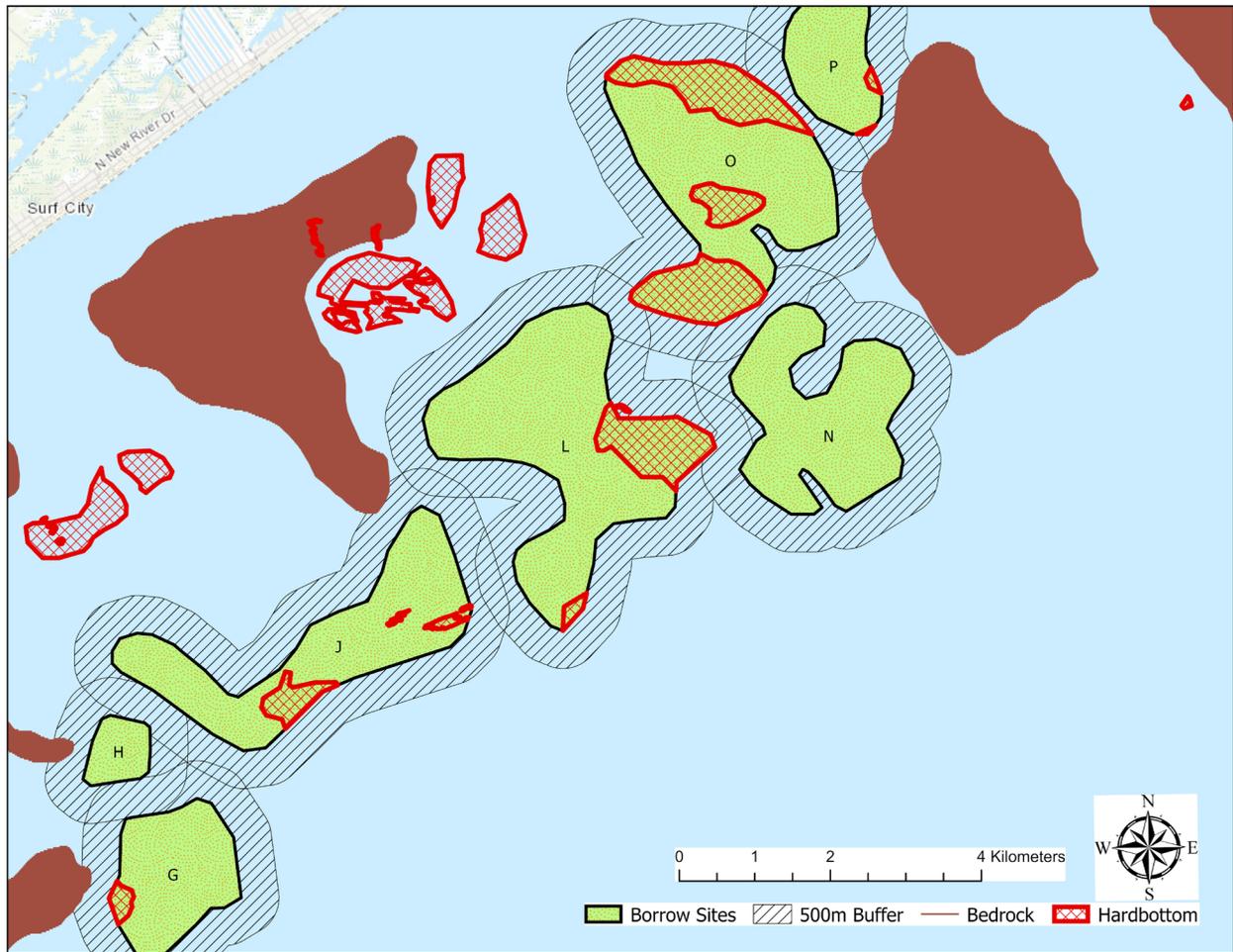


Figure 2. Overview map showing borrow sites with 500m ring buffer and hard-bottom habitats delineated during previous project.

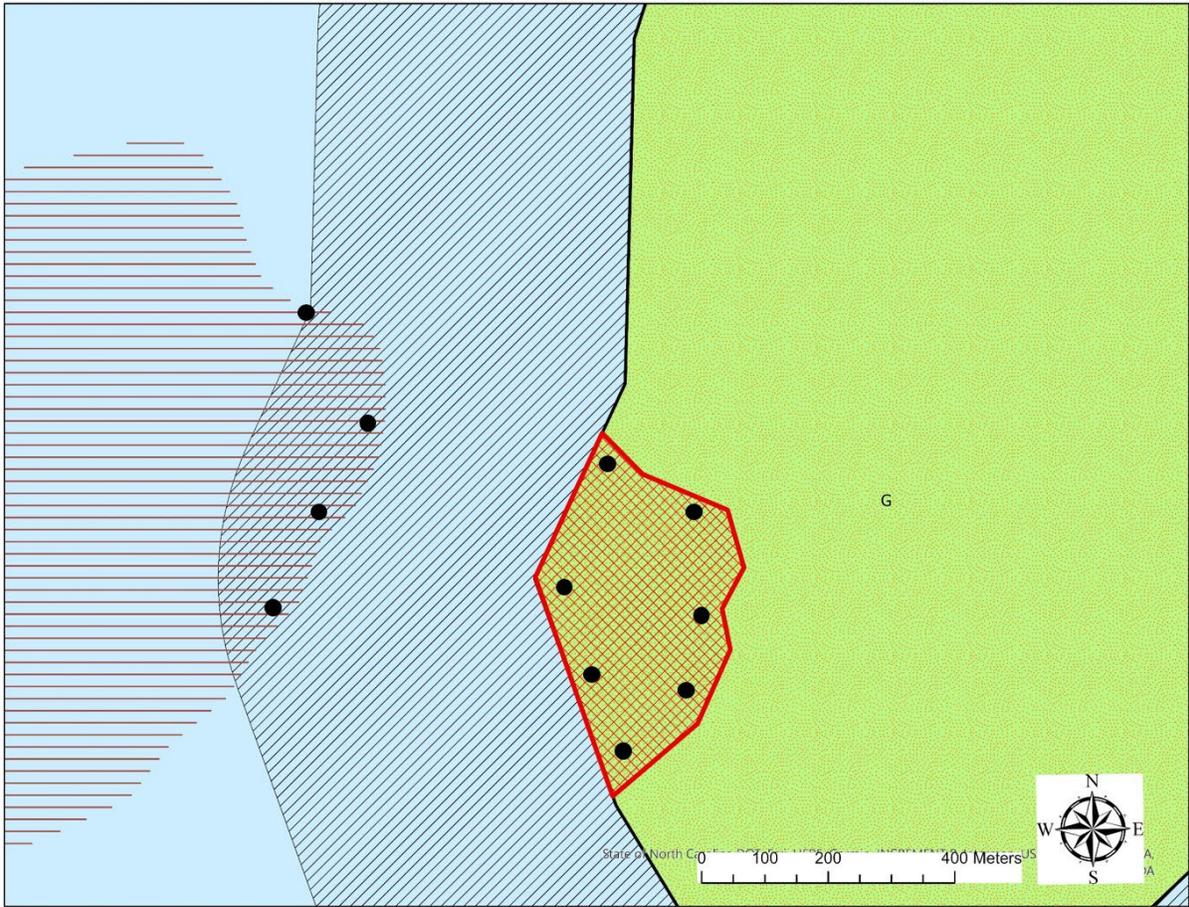


Figure 3. Hypothetical example of where habitat pictures would be taken at 200m intervals along the fringes of delineated hard-bottom habitat.