INTRODUCTION

In April and May 2015 the NOAA Chesapeake Bay Office used several acoustic seabed mapping systems and ground truthing methods to characterize bottom habitat to aid in restoration planning.

This document briefly summarizes the different spatial datasets within the Geodatabase.

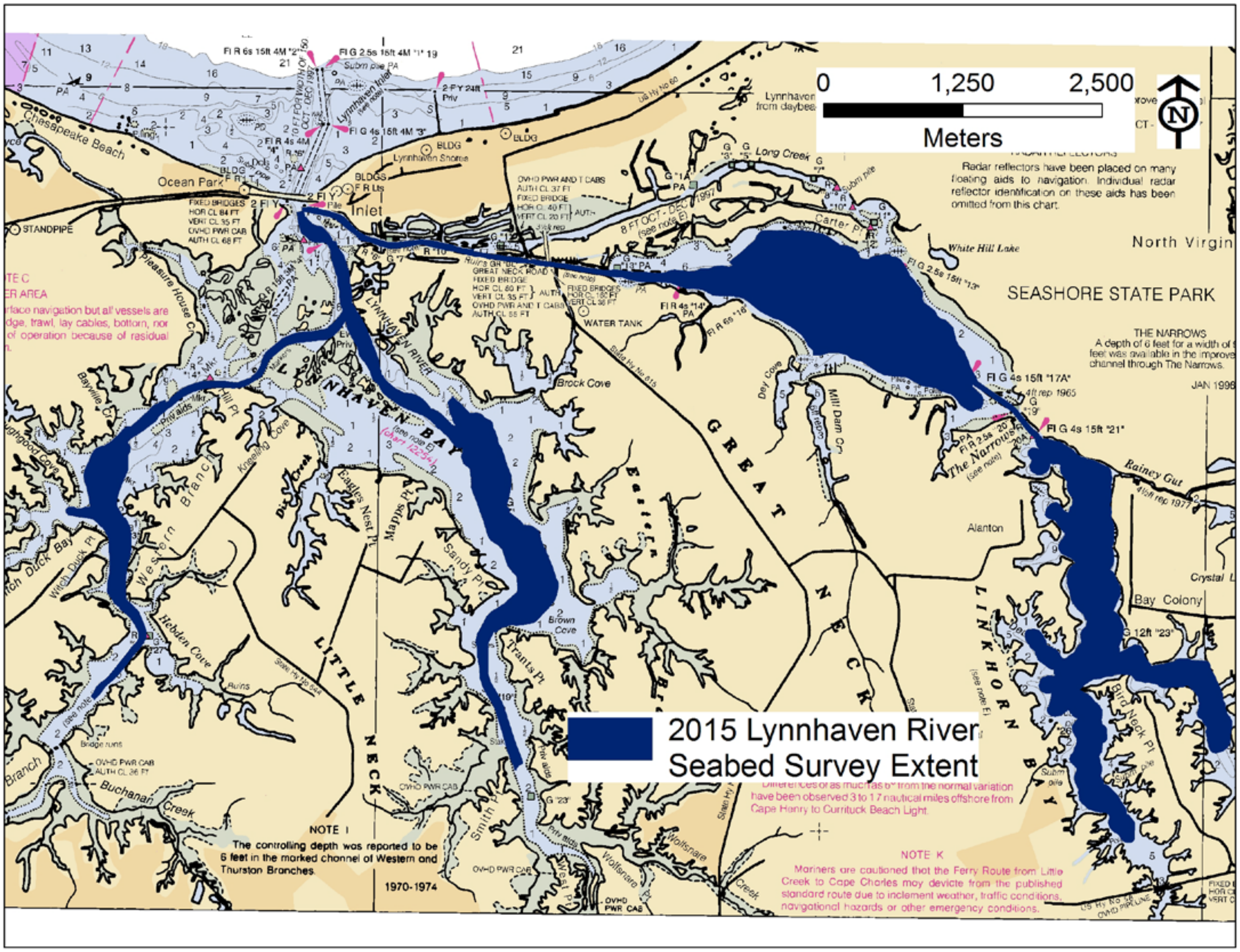
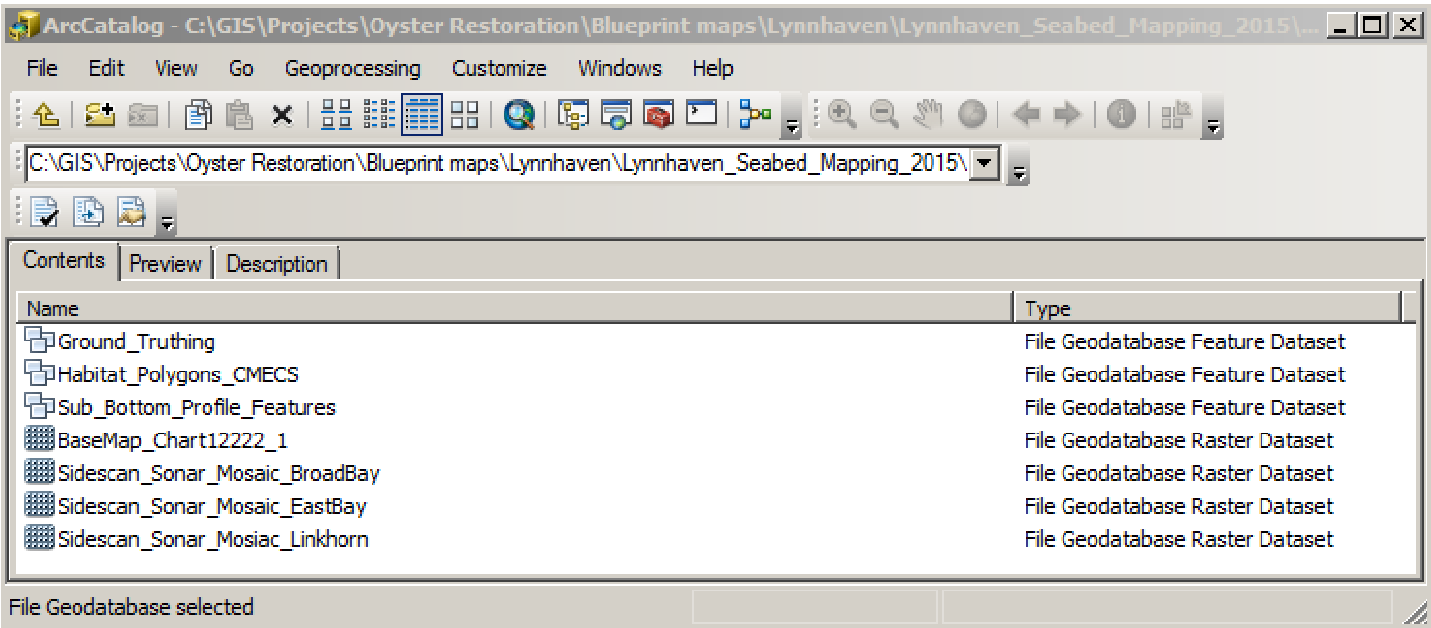


Figure 1. Extent of the 2015 Lynnhaven River seabed survey. Dark blue features identify the 1431 acres covered by sidescan sonar. Areas not covered were too shallow for the survey vessel.

GEODATABASE ELEMENTS

GIS compatible survey products are located in an ESRI File Geodatabase named "Lynnhaven_Seabed_Mapping_2015" and can be accessed through an ArcGIS Map Document with the same name.



Data contained in the geodatabase include:

1) Ground truthing points that identify surficial material and seabed hardness from sediment grab and probing pole samples.

2) Seabed habitat polygons that identify the distribution of surficial materials. Polygons were derived from sidescan sonar, singlebeam acoustic classification, and ground truthing, and were classified with the Coastal and Marine Ecosystem Classification Standard - Substrate Component (CMECS-SC).

3) Digitized sub-bottom profiling sonar features; lines that identify areas of hard and soft subsurface sediments.

4) Basemap of NOAA navigation chart number 12222_1.

5) Sidescan sonar mosaic raster imagery that differentiates areas of hard and soft seabeds.

Multibeam and Singlebeam bathymetry data in XYZ format are found in the directory: \Bathymetry XYZ

Sidescan Sonar Mosaics

Figure 2. An example of seabed features identified in the sidescan sonar mosaic at the entrance to Lynnhaven Bay. Large sand waves are indicative of a dynamic and high tidal energy environment.

Sidescan Sonar Mosaics continued

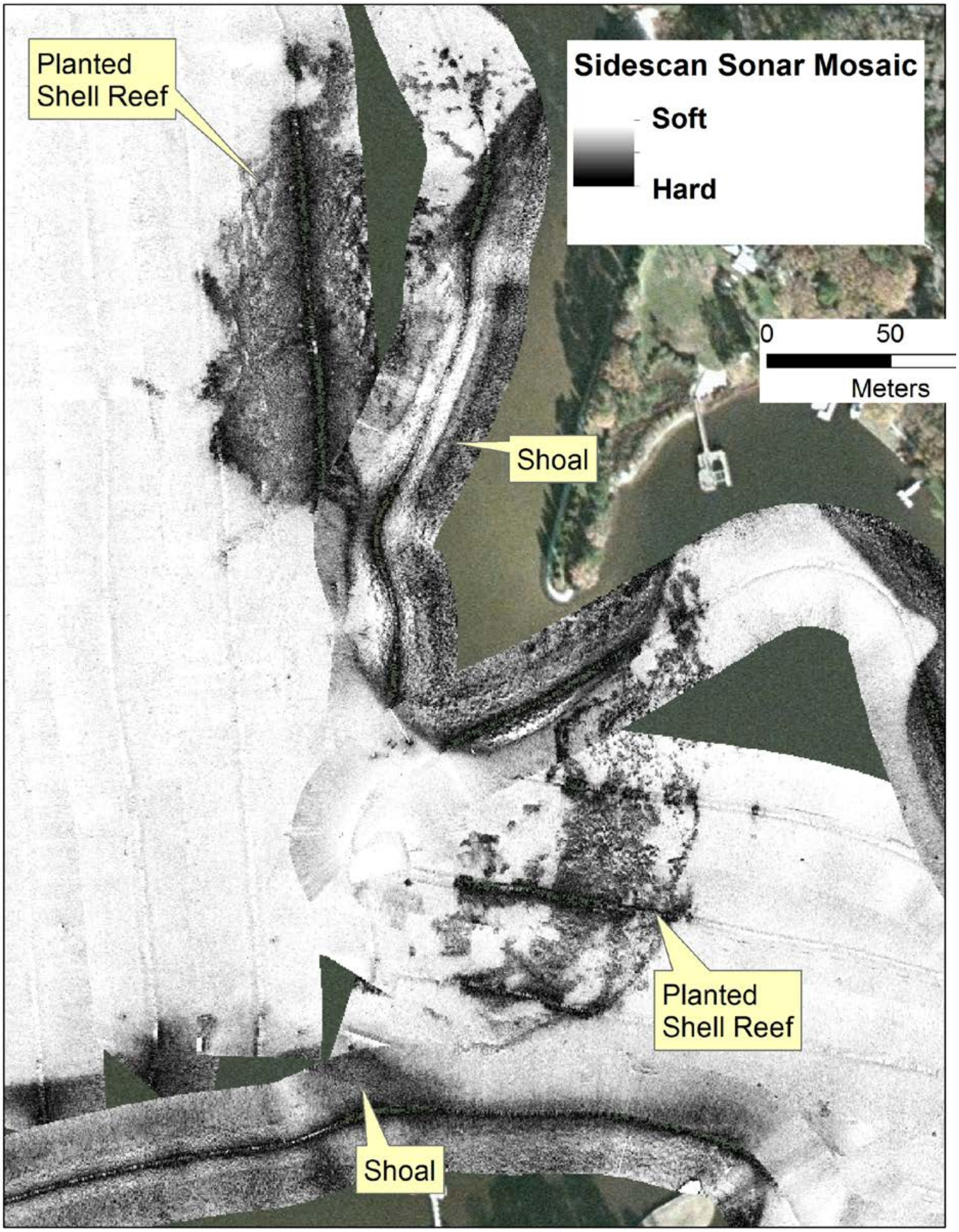


Figure 3. Example of seabed features identified in the sidescan sonar mosaic in Linkhorn Bay. Light imagery is acoustically absorptive bottom (soft: mud) and dark imagery is acoustically reflective bottom (hard: sand/oyster shell). Sidescan is incapable of differentiating hard features covered with thin layers of fine sediment from hard features without layers of fine sediment.

Ground Truthing

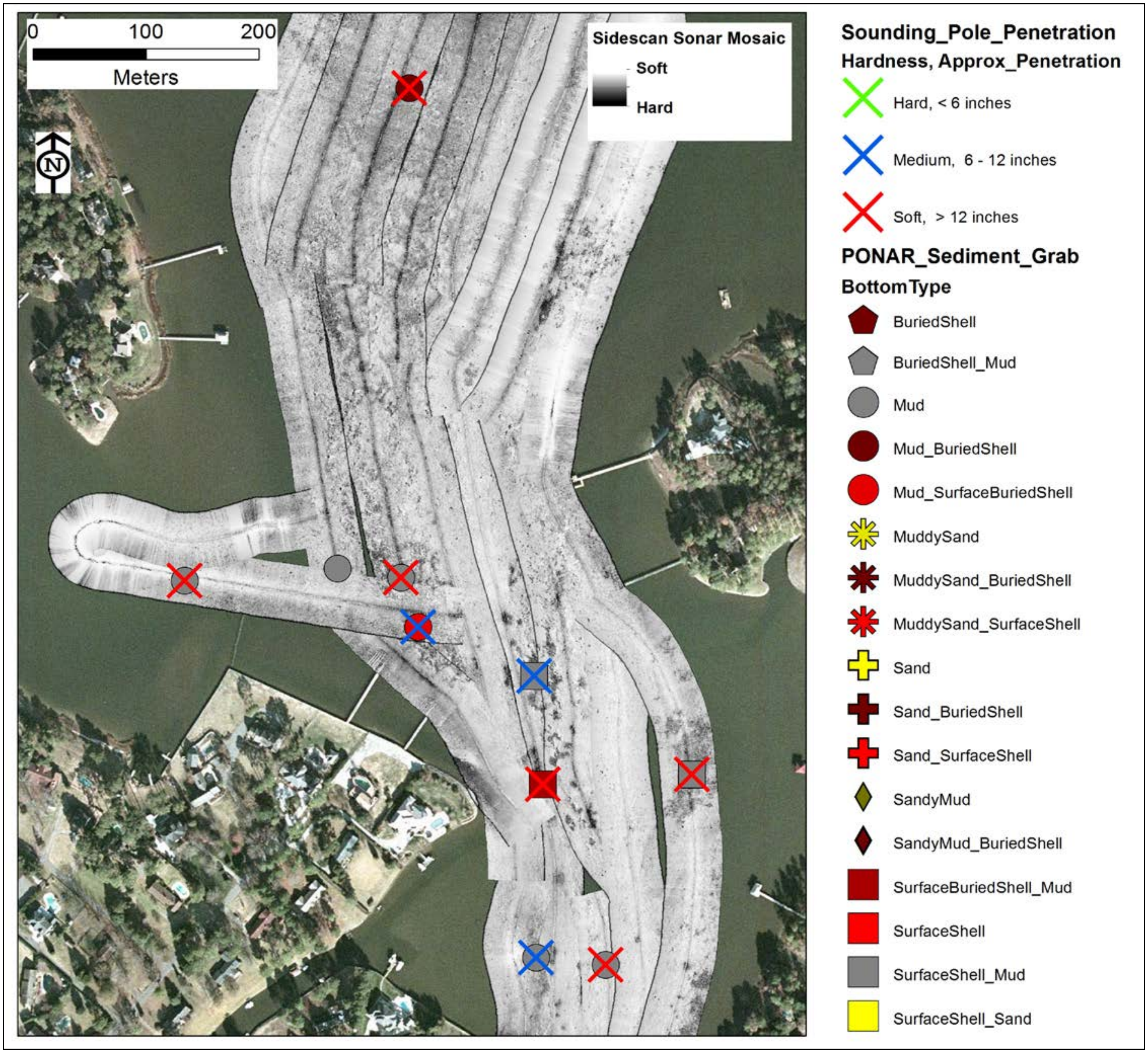


Figure 4. Examples of ground truthing data in the Western Branch of the Lynnhaven River. Site selection was determined from features identified in the sidescan mosaic and with singlebeam seabed classification (not shown). A total of 116 sites were sampled. At each site a sediment grab sample was taken and the bottom was probed with a 1 inch sounding pole. Sediment grab contents were used to identify surficial material and pole probing provided a qualitative assessment of bottom hardness.

CMECS SC Seabed Habitat Polygons

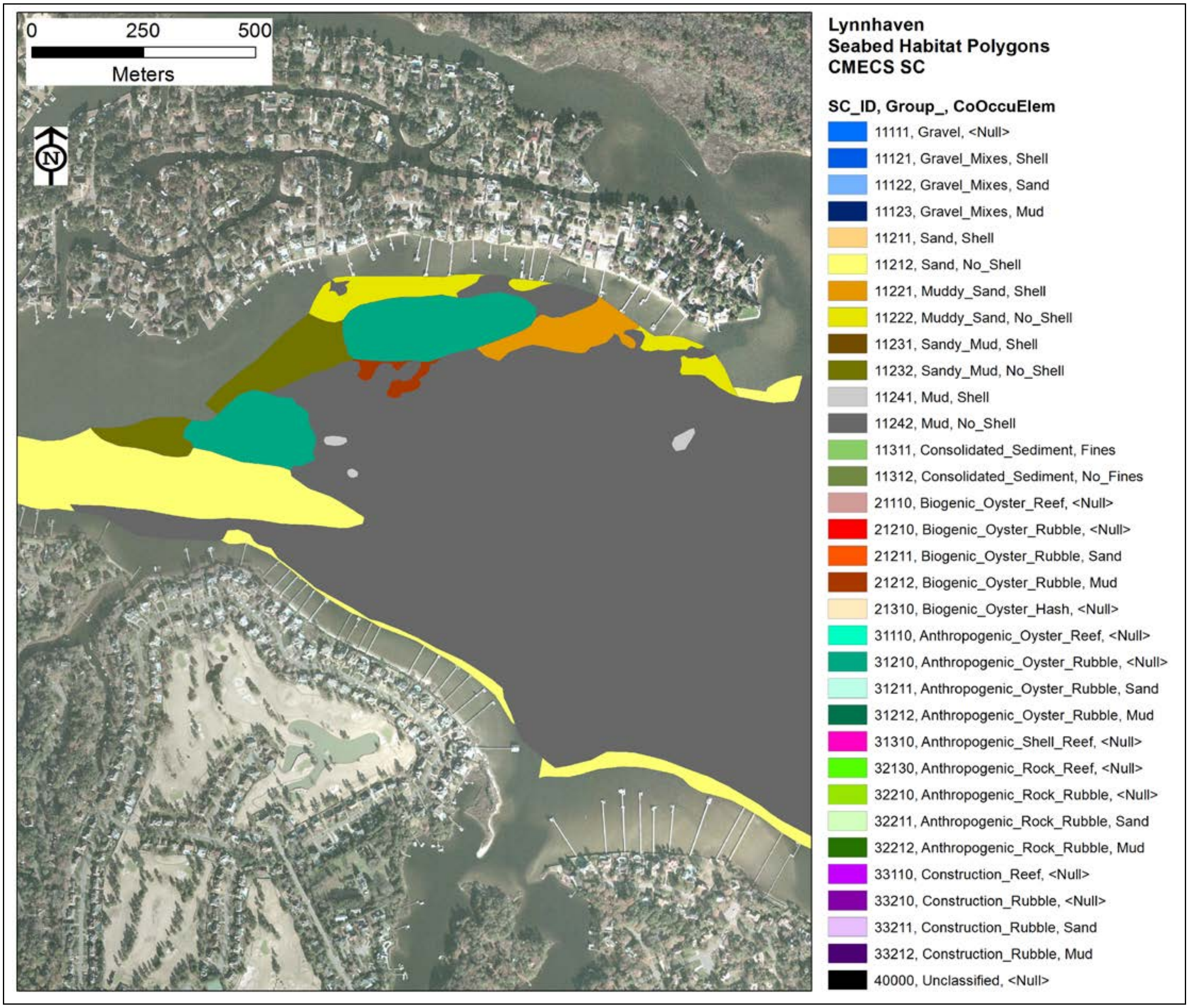


Figure 5. Seabed habitat polygons in the eastern portion of Broad Bay. Bottom habitats were characterized from sidescan sonar imagery, singlebeam seabed classification, and from ground truthing data. Habitat segments were classified with the Coastal and Marine Ecological Classification Standard – Substrate Component.

<u>CMECS SC Seabed Habitat Polygons Continued</u>

Table 1. Area summary of Lynnhaven River seabed habitat segments.

CMECS Substrate Component			
Group	Co-Occurring Element	Total Acres	Percent
Mud	No_Shell	928.8	64.9
Sand	No_Shell	308.8	21.6
Anthropogenic_Oyster_Rubble	<Null>	48.1	3.4
Muddy_Sand	No_Shell	42.7	3.0
Mud	Shell	38.9	2.7
Sandy_Mud	No_Shell	28.2	2.0
Unclassified	<Null>	12.0	0.8
Sand	Shell	9.1	0.6
Muddy_Sand	Shell	8.8	0.6
Biogenic_Oyster_Rubble	Mud	3.2	0.2
Sandy_Mud	Shell	1.9	0.1
Biogenic_Oyster_Rubble	Sand	0.6	0.0
		1431.0	100.0

Bathymetry

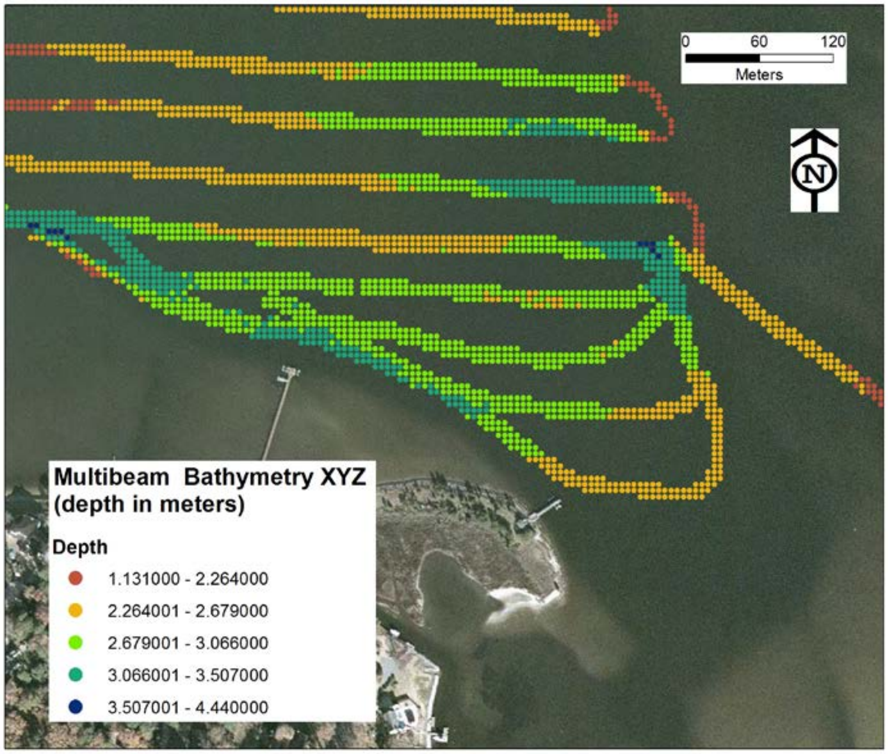


Figure 6. Multibeam swath bathymetry, with depth in meters.

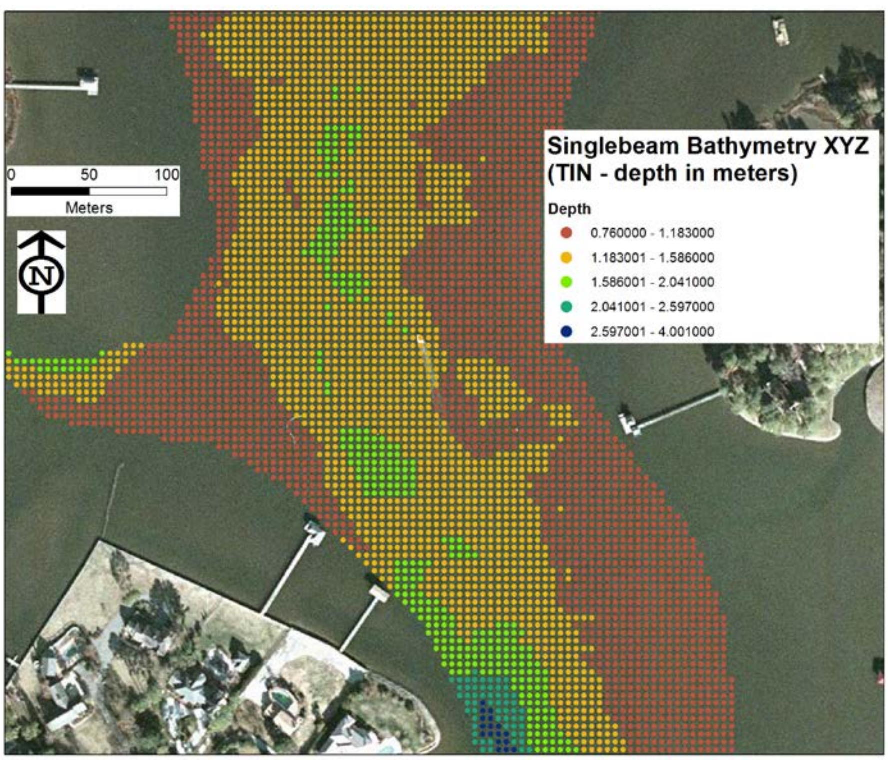


Figure 7. Triangulated Irregular Network (TIN) nodes derived from singlebeam bathymetry. Depth in meters.

Sub-Bottom Profile Features

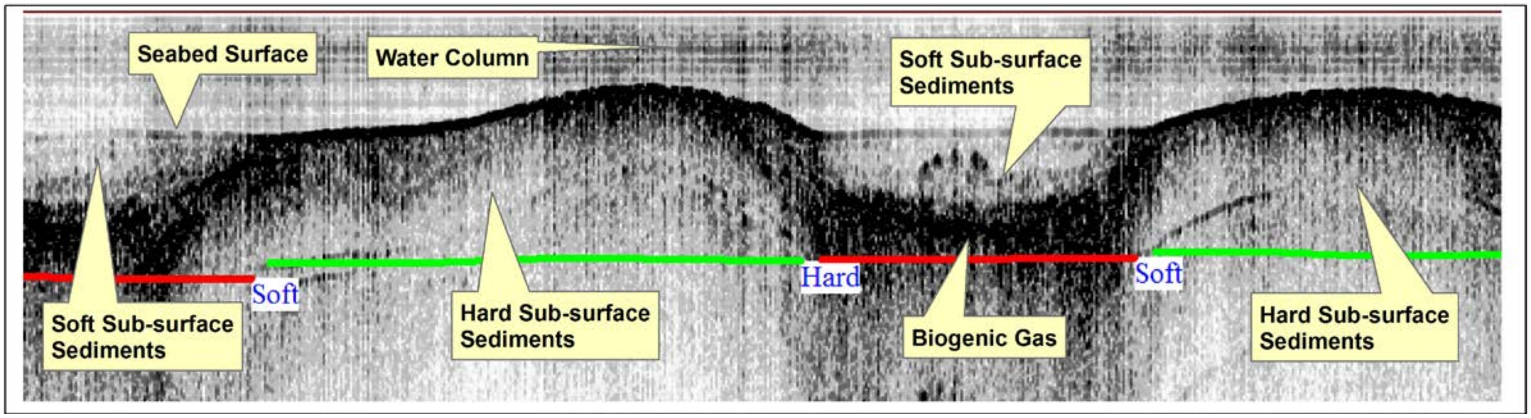


Figure 8. Imagery from sub-bottom profiling sonar that shows the cross section of the water column, seabed surface, and sub-surface sediments. This information is used to identify areas of hard sub-surface sediments where subsidence of constructed reefs or other restoration activities would be minimized. Red and green lines, identifying hard and soft sediments, were digitized from the imagery, and converted to a GIS layer.

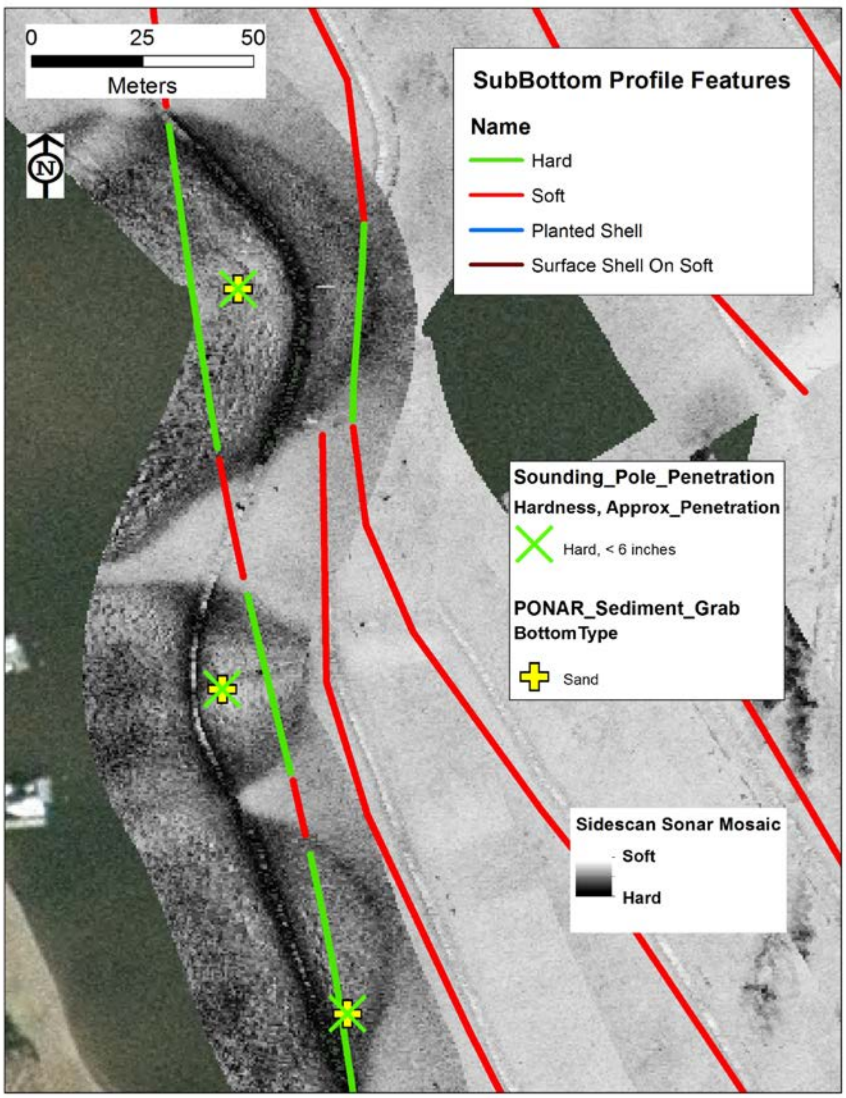


Figure 96. Linkhorn Bay sub-bottom profile features layered on the sidescan sonar mosaic in planar view. Green sub-bottom lines and ground truthing data indicate that areas of dark imagery in the mosaic are most suitable for sustainable oyster restoration sites.