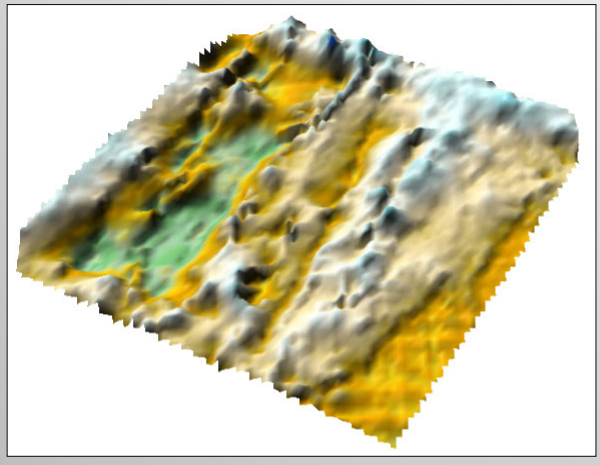
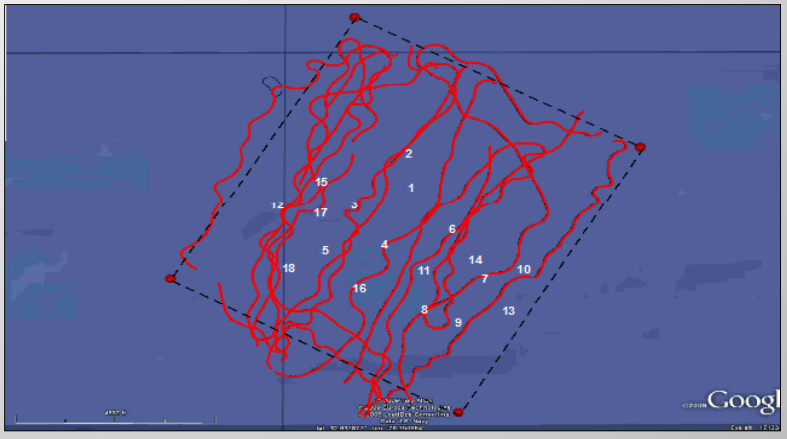
Continuous Resistivity Profiling for Sand Resource Assessments

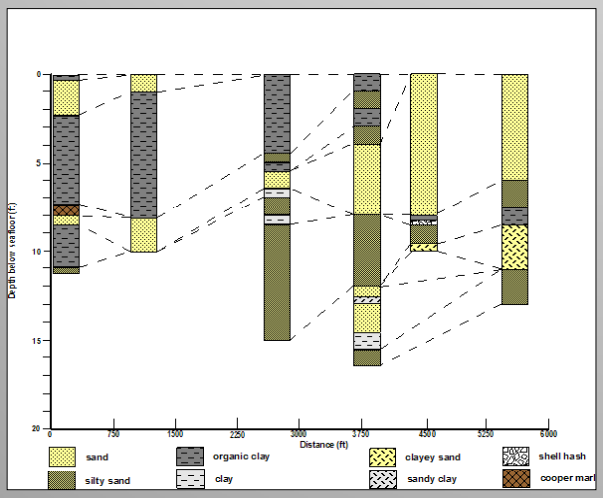
OET utilized Continuous Resistivity Profiling (CRP) on the U.S. Atlantic east coast to identify sand resources for a harbor construction project. The study area was a 1.6x1.8 mile section of seafloor designated as a dredge spoil that contains non-uniform and intermingled sand, clay, shell hash, and organic clay. Through analysis of resistivity ranges, OET was able to differentiate these various sediment types. Data products from this mapping included maps at discrete depth intervals showing the spatial distribution of usable sands and maps with depth intervals overlain to determine sand thickness.



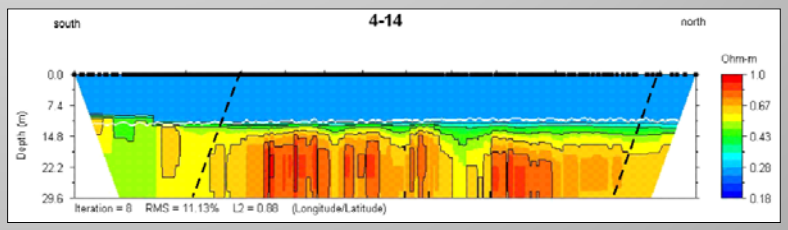
Bathymetry map of study site. Bathymetry data are collected simultaneously with CRP mapping.



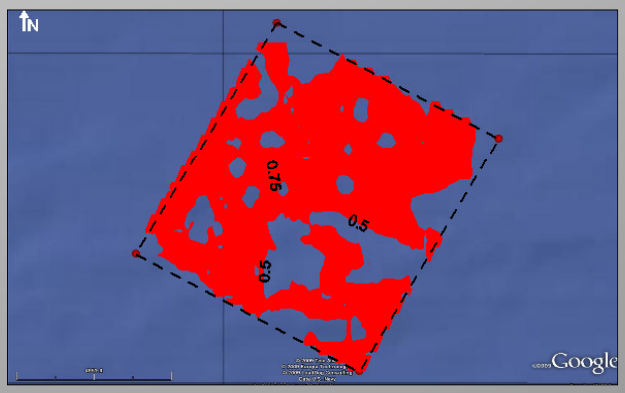
CRP transect location map and location of vibracores collected within the study area.



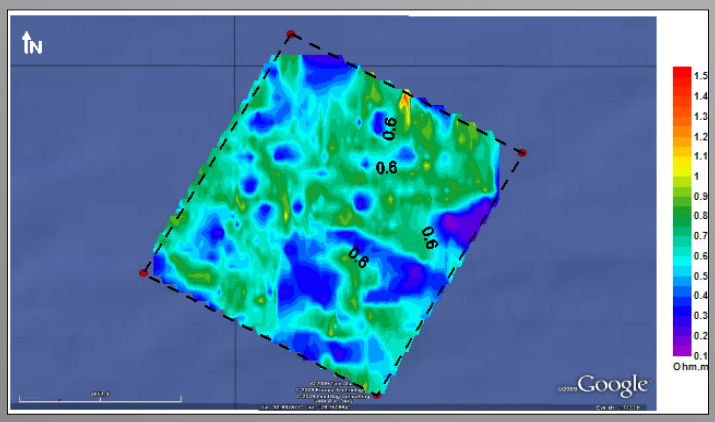
Vibracores show the heterogeneous mix of sediment types within the dredge spoil study site that range from very coarse to very fine grained material.



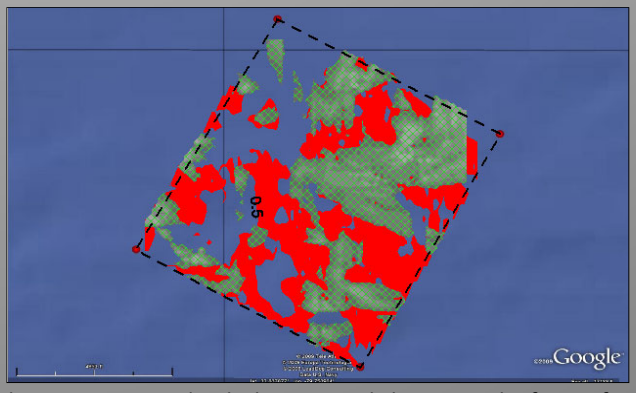
Representative CRP profile within the dredge spoil. Sands are represented as the yellow to orange shaded material. Lower resistivity material shaded green to blue represents silty sands and clays.



Spatial distribution of suitable sand deposits (colored red) at the 18 meter (below ocean surface) depth slice.



To assess the distribution of sediment types within the study site, resistivity values were extracted at consecutive 1-meter depth slices (horizontal layers) throughout the vertical resistivity profile (18 meter depth slice shown above).



By overlaying successive depth slices, spatial changes in the focus of sand deposition and vertical thicknesses of deposits can be determined. Example above shows 14 meter depth slice overlain by 13 meter depth slice.

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