Seismic and Core Studies south of Long Island: New Data and New Insights

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The continental shelf immediately south of Long Island can be described as a generally flat area that is characterized by numerous large-scale sand ridges that trend WNW-ESE. The sand ridges can have heights of about 1 to 5 m and spacings of about 1,500 to 2,000 m, and they may prove to be important sources of sand for nourishing the shoreline in a time of rising sea level. Workers at USGS-Woods Hole have been studying the evolution of the near-shore region, but until recently there has been little new data on the shallow structure of the shelf past about 3 to 5 miles offshore. Following Superstorm Sandy, the Federal Bureau of Ocean Energy Management (BOEM) initiated a series of studies along the US East Coast that resulted in the collection of 1,880 line kilometers of new high-resolution seismic profiles and 90 new sediment vibracores up to 20 feet (6.1 m) in length from Federal waters between 3 and 8 nautical miles offshore of Long Island (Figure 1). While the new geological and geophysical data is being used to identify potential offshore sand resources, it also is providing some new insights into the depositional history of the inner shelf. One sequence of particular interest includes the erosional surface that apparently formed during the post-glacial sea-level rise and the units above and below that surface. The erosional surface can have local relief of a meter or more and some cores that penetrate the erosional surface contain peats, muds, wood fragments and rocks. The irregular nature of the erosional surface may be due to the rapid post-glacial sea-level at this time. Cores suggest that sandy shelf sediments from an earlier time of high sea level underlie the erosional surface in other areas. However, the sediments underlying the unconformity can also contain truncated depressions that are apparently filled with finer-grained sediments. Such depressions might be remnants of channels that cross the shelf, but at least one of the depressions has a limited length and is oriented parallel to the shoreline. Perhaps this depression resulted from deformation related to a moving ice sheet during an earlier ice age such Marine Isotope Stage 2 or 4. Thickness variations of the surficial (Holocene) sands in the sand ridges appear to be independent of the underlying topography, and erosion also occurs along the flanks and in the troughs of the sand ridges, suggesting a dynamic origin of the sand ridges we observe today.

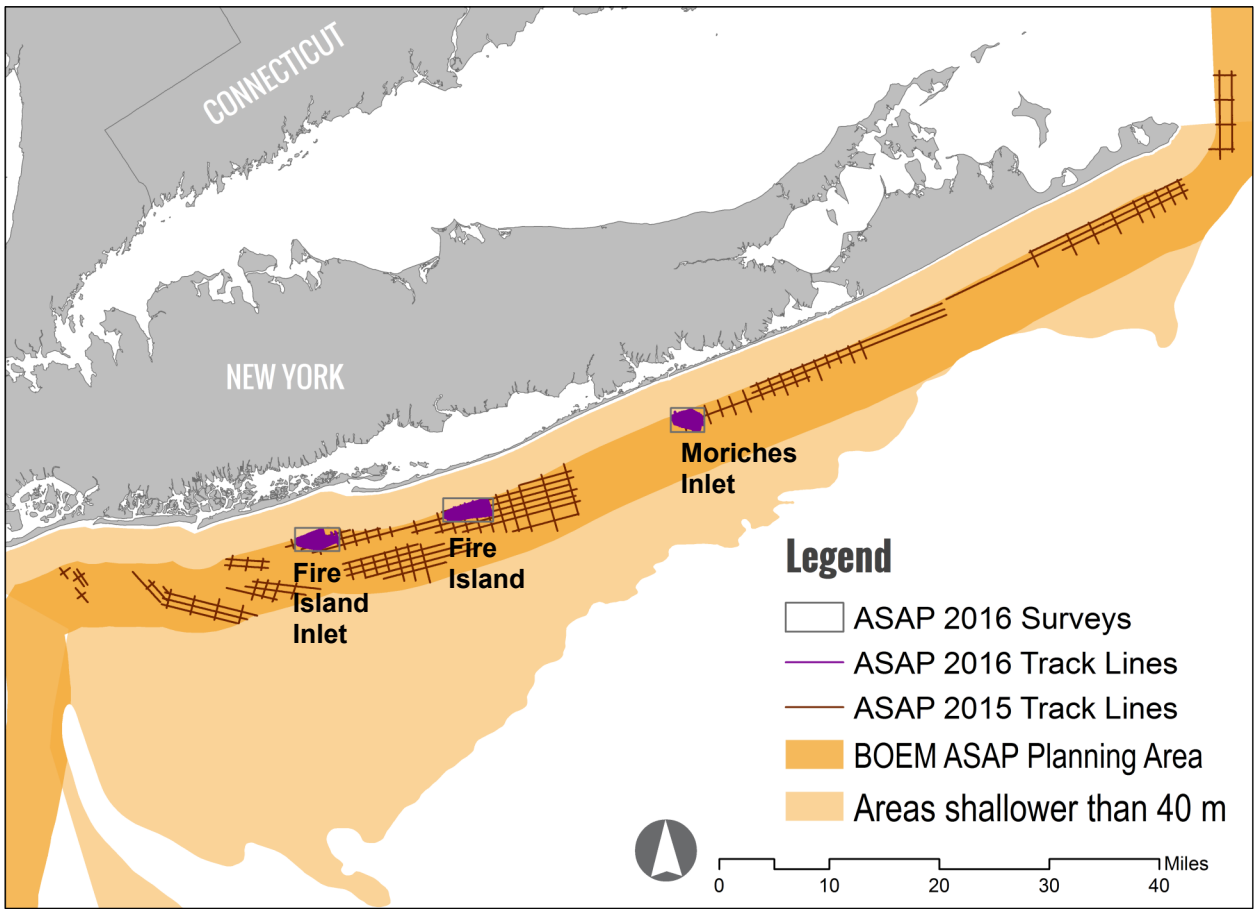

Figure 1. New seismic and core data were collected during 2015 and 2016 from offshore New York as part of the BOEM Atlantic Sand Assessment Project (ASAP). Regional, reconnaissance-level lines were run in Federal waters at a distance of 3 to 8 nautical miles offshore in 2015 while design-level surveys were conducted in three areas in 2016. In addition to seismic profiles and sediment samples, the surveys also collected side-scan sonar, bathymetric and magnetometer data.