Executive Summary

This report provides a compilation of new maps and spatial assessments for seabirds, bathymetry, surficial sediments, deep sea corals, and oceanographic habitats in support of offshore spatial planning led by the New York Department of State Ocean and Great Lakes Program. These diverse ecological themes represent priority information gaps left by past assessments and were requested by New York to better understand and balance ocean uses and environmental conservation in the Atlantic. The main goal of this report is to translate raw ecological, geomorphological and oceanographic data into maps and assessments that can be easily used and understood by coastal managers involved in offshore spatial planning.

*Image 0.1. Roseate Tern (*Sterna dougallii*) in flight. This species is endangered in the Mid-Atlantic. Photo credit: David Pereksta, BOEM.*

New York plans to integrate information in this report with other ecological, geophysical and human use data to obtain a broad perspective on the ocean environment, human uses and their interactions. New York will then use this information in an ecosystem-based framework to coordinate and support decisions balancing competing demands in their offshore environment, and ultimately develop a series of amendments to New York's federally approved Coastal Management Program.

The targeted users of this report and the compiled spatial information are New York coastal managers, but other State and federal decision-makers, offshore renewable energy development interests and environmental advocates will also find the information useful. In addition, the data and approaches will be useful to regional spatial planning initiatives set up by the Mid-Atlantic Regional Council on the Ocean (MARCO) and federal regional planning bodies for coastal and marine spatial planning.

This report represents a synthesis of existing information rather than a new data collection effort. Given the short time frame over which management decisions frequently need to be made and the high cost of new natural resource surveys, this approach may be one other coastal zone managers will want to consider. The data and maps were developed by employing a spatial analytical approach which applies predictive modeling and geostatistics to interpolate among data, identify important spatial patterns and develop continuous distribution maps of species and physical resources at fine spatial resolutions required to support spatial management decisions. This analytical approach also allows for a quantitative description of prediction certainty a useful parameter for spatial planning. For example, maps of prediction reliability can be used to target efforts to collect new survey data to fill information gaps, or to incorporate measures of certainty into risk assessments.

In Chapter 2, a new bathymetric model with spatially-explicit certainty estimates is presented which builds on previous predictive bathymetric modeling approaches in the region. The new model provides a continuous gridded bathymetric surface for the study area, and allows users to view and explore spatial variation in the vertical accuracy of depth predictions. The new model is similar to the National Oceanic and Atmospheric Administration's Coastal Relief Model but provides estimates of prediction certainty, which can be used to prioritize locations for new bathymetric surveys and better understand the reliability of depth predictions and derived spatial layers (e.g., benthic habitats, positions of depth contours).

Predictive models of mean grain size, sediment composition, and hard bottom occurrence were developed to map the distribution of surficial sediments and habitats on the seafloor. These new models presented in

Chapter 3 build upon the data compilations and analytical frameworks laid out by existing work in the area. For mean grain size and sediment composition (e.g., mud, sand, gravel) the models provide continuous, gridded spatially-explicit prediction surfaces and corresponding certainty estimates. A hard bottom occurrence model also provides a continuous gridded prediction surface representing the likelihood of hard bottom habitats.

In Chapter 5, the locations of deep sea coral and sponge records within NOAA's Deep Sea Coral Research and Technology Program's geodatabase are examined within the New York Bight. Predictive models were not developed for deep sea corals or sponges because of limitations on the quantity and type of data available within the New York Study area. Instead, we focused on mapping known locations of deep sea corals and sponges, discussing their role as important habitat for other marine organisms, and discussing and summarizing past studies in the region.

In Chapter 6, new maps of the seasonal and annual distributions of seabird species and seabird ecological groups are provided. These distributions were predicted based on statistical models fit to visual shipboard seabird observational data collected as part of a standardized survey program from 1980-1988. Species and group distributional models were then combined to produce "hotspot" maps depicting multi-species abundance and diversity patterns. Spatial predictors included long-term archival satellite, oceanographic, hydrographic, and biological datasets. Seabird distributional maps for seasonal and annual relative indices of occurrence and abundance were produced, accompanied by maps depicting metrics of certainty. The resolution of predictions is approximately 400 times finer than previous 10 arc-minute maps of seabird distribution in this region. These high-resolution, contiguous predictive maps of seabird distribution are expected to be useful contributions to offshore spatial planning, particularly of activities that may affect seabirds or their habitats.