New York Offshore Atlantic Ocean Study

New York State’s Department of State (DOS) has completed a two-year study to generate and assemble the most comprehensive dataset of physical, biological, geographic, and socioeconomic information available for the Atlantic Ocean waters. For planners and wind farm operators planning on expanding into this wind-rich territory, it’s essential reading...
New Yorkers rely on the ocean for a wide range of economic activities. Over two-thirds of them live in counties that are located within the State’s ocean and estuarine regions, accounting for over 275,000 ocean and coastal-related jobs and nearly $7.5 billion in wages in 2009.

The Port of New York and New Jersey is North America’s largest container port and the third biggest port in the United States, handling over $175 billion in cargo. The overall economic contributions of the sport fishing, commercial fishing, and seafood industries to New York State total $11.5 billion annually; Long Island’s tourism industry accounts for over $4 billion annually and includes a robust community of recreational divers, boaters, fishers, and others who enjoy using the water. In fact, New York has the largest concentration of registered recreational boats in the Northeast, with Suffolk and Nassau Counties accounting for almost two-thirds of the 15,502 total vessels in New York.

In acknowledgement of the breadth of connections between New York’s coastal area and the offshore environment, DOS studied an expansive area. In its entirety, the offshore planning area constitutes approximately 12,650 square nautical miles (16,740 square miles) off the south shore of New York City and Long Island. These waters are under the jurisdiction of either the state (0-3 nautical miles from shore) or federal (3-200 nautical miles) governments, and are managed by numerous government agencies. Through the New York State Coastal Management Program, authorized by the federal Coastal Zone Management Act (CZMA) and administered by DOS, New York has an important role in federal decisions made in waters beyond the State’s territorial boundary through its Federal Consistency authority.

This study provides information for state and federal decision-making, supplementing available use and resource data. When future decisions are to be made regarding offshore activities, state and federal agencies will rely upon all data and information available at the time of the decision-making. This study illustrates the abundance and diversity of the uses and resources that can be found off New York’s offshore Atlantic environment. The information that follows supplements existing datasets and highlights a broader body of ongoing work. It is not intended to be an exhaustive accounting of New York’s ocean interests.

This study contains physical, biological, geographic, and socioeconomic information including:

- The locations and characteristics of existing uses, such as commercial vessel traffic, recreational boating, commercial fishing, recreational fishing, diving, surfing, nature viewing, and research and exploration;
- Predicted locations of existing natural resources, such as fish, whales, seabirds, and sea turtles, and observed locations of corals and sponges;
- A range of modeled physiographic information, such as ocean floor features, sediment characterization, depth, current, temperature, wind speeds, and bathymetry (bottom contours); and
- The locations of infrastructure and regulated areas, such as dump sites, unexploded ordnance, navigation lanes, turning basins, fiber-optic cables, electric transmission cables, pipelines, and aviation-restricted areas. The purpose of this study is to improve the understanding
of habitats that New York’s existing ocean-based industries depend upon based on the actual or predicted locations of existing uses and resources. This study is the first of many steps to guide and inform the future siting of offshore activities. The methodologies and data represented here can be found in their entirety in a series of separate scientific reports developed for DOS by federal partner agencies and oceanographic organizations.

The continued growth and vitality of New York’s Atlantic coastal communities are closely linked to a healthy and productive ocean ecosystem that remains accessible to New Yorkers for their commercial and recreational activities. As the understanding of ocean resources increases and as ocean-based technologies mature, new opportunities are becoming available for commercial development. These opportunities include an increased technical ability to harness offshore wind energy resources, and new research and exploration into biological resources that have the potential for biomedical and other technical applications.

In particular, one of the main drivers for this study is to aid the siting and associated state and federal regulatory review of future offshore wind energy projects in the study area. The wind resources offshore of New York State in the Atlantic Ocean are relatively strong, close to load centers, and commercially-available technology currently exists to generate and transmit electricity from offshore wind resources to New York’s electric grid. The taking advantage of this renewable resource could help New York State reduce its dependency on fossil fuels while meeting a growing energy demand.

In addition, offshore wind could bring new economic development opportunities to New York industries involved in the siting, permitting, manufacturing, construction, operations, or decommissioning activities necessary to build, maintain and retire an offshore wind energy facility. As with any new form of energy development, decision-making requires a robust analysis of the potential costs, including impacts on electric rates, as well as the benefits of future projects.

The public interest in offshore wind is complicated by a current relative lack of data on the locations of important offshore habitats and uses. The offshore environment is relatively vast and unknown, particularly when compared to information available for coastal and nearshore areas. The geographic focus of this study therefore emphasizes the offshore aspects of ocean uses and resources to help address this knowledge gap. The data and information contained in this document show, for the first time, the State’s perspective on the complexity of the natural and human environment offshore New York.

In developing the scope and methodologies for this study, DOS relied on modeling approaches rather than invest substantial resources to collect and process new natural resource observational data. These models utilized datasets that provided the best available information for the offshore
environment and are a cost-effective means to inform and guide future research, fulfill regulatory requirements, and aid in project review analyses.

While some nearshore and coastal information is included, this study is not designed to highlight or draw attention to nearshore and coastal areas. Instead, the study complements existing data and information that show the value of nearshore areas (e.g., bycatch data that show important coastal foraging areas used by sea turtles and also acoustic survey data showing patterns of nearshore foraging activity by Atlantic sturgeon) and is intended to be used in conjunction with these other datasets for decision-making. While the State’s interest in coastal uses and resources is relatively well-understood, the information in this study confirms that the geographic breadth of State interests extends well beyond the State’s territorial boundary, requiring collaboration and partnership across multiple levels of government.

Both nearshore and offshore data will be important to aid future decision-making in the siting of offshore wind projects. As examples, existing and future data on important nearshore recreational areas in Moriches and Shinnecock Bays or the coastal foraging habitats of sea turtles may be important for analyzing potential transmission cable sites and landfall locations. Likewise, the whale information in this study and other reports on marine mammal presence may be important for analyzing potential sites for project elements that are farther offshore, such as wind turbine foundations and offshore electrical collection and transmission infrastructure.

The immediate impacts of this study will include:

- Informing future analyses that will guide offshore wind project development and permitting efforts toward the areas that demonstrate potential for compatibility with existing uses and resources.
- Informing future protection measures for the habitats and places that sustain New York’s ocean-based industries, particularly commercial fishing and marine navigation.
- Increasing the availability of information for use in decision-making in federal waters, using widely-accepted scientific analyses and information collected directly from New Yorkers who depend on the ocean for their livelihoods and enjoyment.

Future offshore planning efforts will build from this Study and will include additional data collection and analysis of uses and resources important to New York. DOS is continuing to work with partners to model natural resources (e.g., benthic habitats, commercially and recreationally-valuable fish stocks) and obtain use data (e.g., surf clamming activity) and anticipates making data from these future analyses available in the same data portal used for this study.

This study and subsequent efforts are intended as a planning exercise and do not bind or pre-determine future decision-making. As a result, the pre-screening of sites is based upon a scientific analysis of available data and information and does not constitute a pre-clearance, a pre-approval or an exemption from current and future compliance with all state and federal statutory and regulatory requirements pertaining to the siting of offshore energy facilities.

DOS staff partnered with multiple federal and state agencies, non-government organizations, universities, and other stakeholders. These partners provided critical support in developing, vetting, organizing, analyzing and depicting the information provided in this report. In particular, the National Oceanic and Atmospheric Administration (NOAA) National Centers for Coastal Ocean Science Biogeography Branch (NCCOS) provided significant technical assistance and direct modeling efforts in support of DOS.

Most of the data used in this planning effort are from federal agencies or from universities with oceanographic research and exploration programs. DOS engaged key federal entities responsible for offshore environmental and industry regulation, and other activities related to ocean energy planning within federal waters. Many of these federal entities maintain datasets relevant to DOS’s offshore planning area and have helped to analyze the information included in this study.

DOS also created an “Offshore Renewable Energy Work Group” and an “Offshore Habitat Work Group”. The work groups were created as issue-specific forums for discussing site information needs for renewable energy projects offshore New York, and evaluating the best available data to identify and describe unique offshore habitats, respectively.

DOS evaluated and organized information into four general data topics: infrastructure, bio-geography, renewable energy requirements and offshore use. This review led to the identification of initial data gaps, particularly offshore use information. DOS then worked with a wide range of interests and stakeholder groups to identify, locate and characterize offshore uses. This new dataset includes commercial and

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recreational fishing, boating, surfing, diving, and wildlife viewing activities. DOS supplemented this work with existing information on commercial fishing and commercial vessel traffic generated by the federal government.

The Offshore Atlantic Ocean Study is the most comprehensive collection of information available for the offshore planning area. The study is built from 750 datasets, involved dozens of federal agencies, state agencies and non-government organizations, and includes input from over one hundred individual ocean users and user groups. DOS’s emphasis on collaboration and direct engagement with ocean users and data repositories provided real-time peer review and greater confidence in study results. The figures and information presented here are a representative subset of the hundreds of datasets collected and accessed by DOS. DOS will make the information in this study, and additional data, available on the DOS website. The website will be updated periodically to incorporate additions and modifications.

**Meteorological-oceanographic factors**

Basic physical processes that occur in the offshore planning area can have a significant influence on the presence of certain species and the viability of a range of commercial and recreational ocean uses. In particular, oceanographic conditions are of fundamental importance to understanding the context and root causes of many biological processes.

Meteorological conditions of particular relevance for offshore wind-related planning include average wind speeds (annualized) and extreme weather events. The U.S. Department of Energy’s National Renewable Energy Laboratory (NREL) is the United States’ primary laboratory for renewable energy and energy efficiency research and development. NREL’s meteorologists, engineers, and GIS staff have led the production of wind resource characterization maps and reports, working with leading private industry experts.

DOS used NREL-validated offshore wind resource maps to approximate predicted wind resources in the offshore planning area. Data on hurricanes and extratropical/subtropical storms and depressions were obtained from NOAA’s National Hurricane Center. Extratropical storms most frequently take the form of nor’easters, which usually occur during winter months.

Wind speeds in the offshore planning area are consistently above 8.5 m/s. Extreme weather events include Atlantic hurricanes that have historically occurred in and around the offshore planning area. Because of the large size and high energy of these storms, significant impacts may be felt in areas far from the storm’s center.

Several key dynamic oceanographic variables are important to understand spatial and seasonal patterns in the offshore planning area. NCCOS compiled data on: relative ocean temperature at the surface (sea surface temperature, or SST) and within the water column (stratification); the relative presence of particulates in the water (surface turbidity); and the relative biological productivity, both primary/photosynthetic (surface chlorophyll a, a type of chlorophyll) and secondary (near-surface zooplankton biomass), a measure of the amount of particulates in the water. Data were gridded and long-term averages were mapped by season.

SST estimates were obtained by averaging monthly satellite data from the NASA Advanced Very High Resolution Radiometer SST archive for the Northwest Atlantic region, 1985-2001. NCCOS calculated stratification values by subtracting seawater density at 50 meters depth from seawater density at the surface. Three-dimensional seawater density estimates were interpolated by NCCOS from conductivity-temperature-depth casts. By this definition, stratification is usually negative, corresponding to less dense, warmer water occurring on top of denser, colder water. Higher negative values indicate greater stratification.

**Initial wind siting data**

In consultation with state and federal agencies and consistent with recent findings, DOS is pre-screening the offshore planning area to identify those locations that appear most compatible with offshore wind development activities. Since the strongest and most consistent winds are farther offshore, in OCS waters, DOS’s offshore wind planning effort is intended to align not only with existing State efforts but also with the federal offshore leasing and licensing process.

As a first step, in consultation with the Offshore Renewable Energy Work Group, DOS identified initial uses and resources that are known or assumed to be incompatible with offshore wind energy generation or transmission. DOS staff reviewed federal, state, industry, and consultant literature to identify potential uses and resource incompatibilities, based on the planning efforts of other States.

The resulting list formed the basis of the “baseline criteria”, the initial exclusion areas listed below and used for planning purposes to pre-screen sites. As the next step in this pre-screening, DOS will continue to evaluate additional siting constraints, based on the use and resource data in this study, that may also limit a site’s suitability for development or make the site less desirable for commercial wind development. The identification of these constraints and their locations within the offshore planning area will help DOS better assess the “technical potential”, or upper bound, of the developable offshore wind resource within the offshore planning area.

As defined by the U.S. Department of Energy’s classification system for renewable energy potential, technical potential addresses the system/topographic and ocean use constraints, as well as system performance, but does not include market or economic considerations. Consistent with this approach, in developing baseline criteria DOS is not considering cost or the availability of equipment or components as limiting factors.