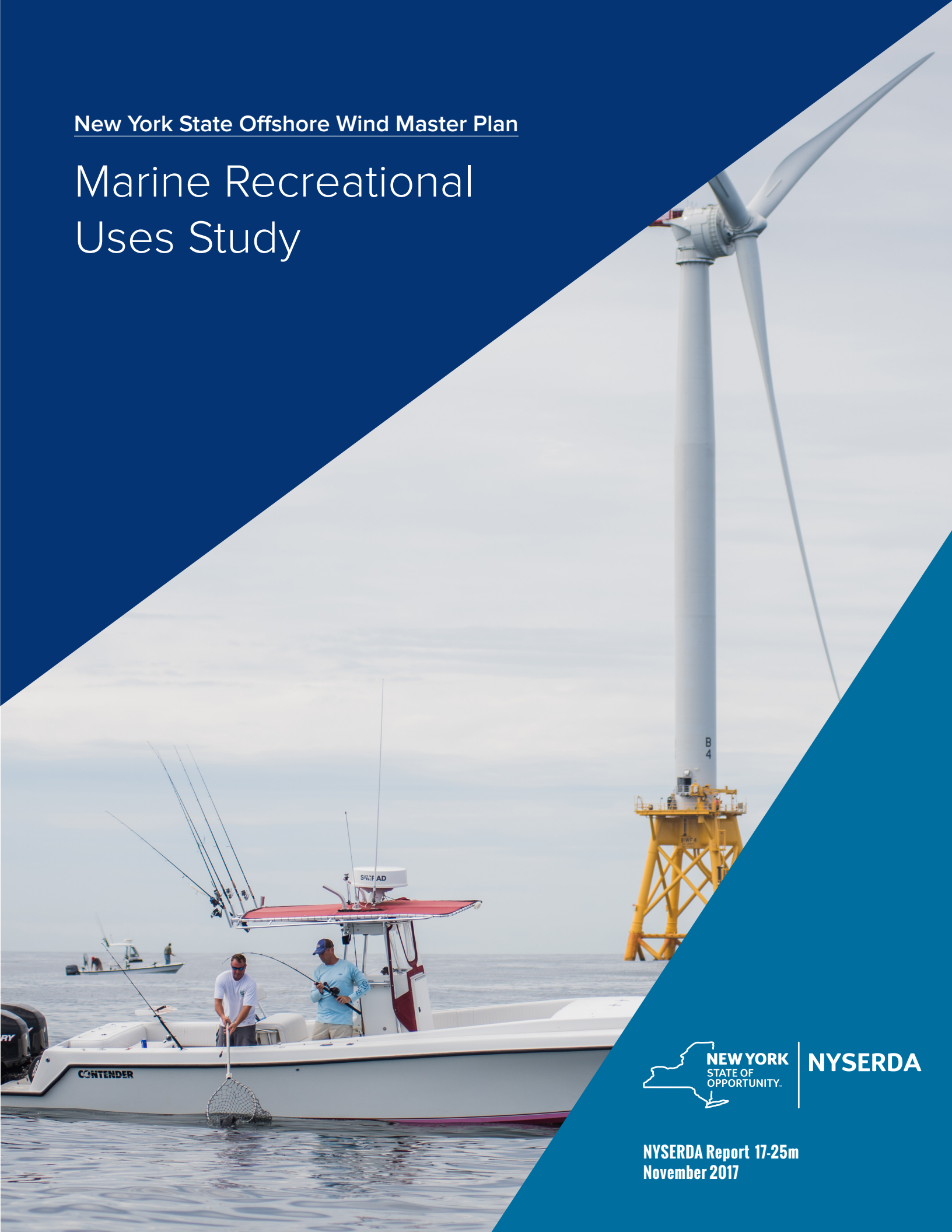
New York State Offshore Wind Master Plan

Marine Recreational Uses Study



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New York State Offshore Wind Master Plan
Marine Recreational Uses Study

Final Report

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New York State Energy Research and Development Authority

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New York, New York

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Acronyms and Abbreviations

AoA	Area of Analysis
AIS	Automatic Identification System
BMP	best management practices
BOEM	Bureau of Ocean Energy Management
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CMP	Coastal Management Program
CSC	Coastal Services Center
CZMA	Coastal Zone Management Act
DEC	New York State Department of Environmental Conservation
DOS	New York State Department of State
ESP	electrical service platform
GIS	geographic information system
EA	environmental assessment
EIS	environmental impact statement
km	kilometer
LWRP	Local Waterfront Revitalization Program
MARCO	Mid-Atlantic Regional Council on the Ocean
nm	nautical miles
MMS	Minerals Management Service
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NYSERDA	New York State Energy Research and Development Authority
OCS	Outer Continental Shelf
OCSLA	Outer Continental Shelf Lands Act
OSA	Offshore Study Area
PMSS	Project Management Support Services
RI CRMC	Rhode Island Coastal Resources Management Council
SAMP	Specific Area Management Plan
Study	Marine Recreational Uses Study
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USCG	U.S. Coast Guard
WTG	wind turbine generator

Executive Summary

This Marine Recreational Uses Study (Study) synthesizes existing information about the types and locations of marine recreational uses in and adjacent to the Area of Analysis (AoA). The AoA is a 17,196-square-mile area (44,537-square-kilometers) of the ocean extending from the coast of Long Island and New York City to the continental shelf break, slope, and into oceanic waters to an approximate maximum depth of 2,500 meters. For the purposes of this Study, adjacent areas generally include waters east and west of the AoA boundary offshore of Rhode Island and New Jersey. The types and locations of marine recreational uses within and adjacent to the AoA were identified by conducting a desktop analysis of relevant geospatial data and a literature review. Four publicly accessible data portals provided geospatial data characterizing marine recreational uses within and adjacent to the AoA: (1) Mid-Atlantic Regional Council on the Ocean Data Portal, (2) Northeast Ocean Data Portal, (3) Marine Cadastre, and (4) New York Geographic Information Gateway. These four data portals also provided access to written recreational use studies and surveys, and a web-based literature search was also conducted to identify other relevant publications and studies.

Based on the geospatial data and literature review, five prevalent marine recreational use categories were identified for evaluation in this Study: (1) wildlife viewing (bird watching and whale watching), (2) underwater activities, (3) surface water activities, (4) recreational boating, and (5) cruise ship tourism. (Recreational fishing is addressed in the separate Fish and Fisheries Study, which is appended to the Master Plan.) If sufficient data were available, each use category was assessed in terms of its spatial extent, frequency, and seasonality. High-level findings for each category are summarized below.

Bird watching. This activity is primarily shore-based in the vicinity of the AoA, occurring along the beaches and shoreline of Long Island. Bird-watching areas along the Long Island shoreline intersect with the northern boundary of the AoA, and charter-based bird watching occurs within the AoA in the vicinity of the 3-nm state/federal boundary. Additionally, offshore bird watching occurs, and a large area utilized specifically for pelagic bird watching overlaps with the AoA. This large area stretches almost 50 miles from the Jones Inlet to Hudson Canyon. Bird watching can occur year-round.

Whale Watching. This activity is described as occurring in general, dominant, and/or supplemental use areas. Whale watch operations in the vicinity of the AoA concentrate in two general use areas that extend from New York and Montauk harbors. The general and dominant use whale watching areas intersect the AoA in the northwest and northeast corners. One of the dominant use areas is located entirely within the northwestern corner of the AoA, and a portion of both general use areas overlap with the AoA. The supplemental use area covers almost the entire eastern half of the AoA; whale watching is either infrequent or supplemental to some other primary activity in this use area. While whale watching occurs from spring through fall, whale watching peaks in July and August.

Underwater Activities. Underwater activities, specifically scuba diving, occur in and around the AoA. Shipwrecks, artificial reefs, and canyons in and around the AoA all serve as potential scuba diving sites. There are multiple mapped dive sites in the AoA; these are limited to the northern and western portions of the AoA. These dive sites are all low intensity in terms of use (Surfrider Foundation et al. 2014). Several medium-intensity sites and one high-intensity site are located along the northern boundary of the AoA. Diving activity occurs year-round but is concentrated during the months of May through October.

Surface Water Activities. These activities consist primarily of swimming, windsurfing, surfing, and kayaking/paddling, including stand-up paddle boarding. These marine recreational uses predominantly occur near the coast and are correlated with beach activities. Therefore, there is no overlap with the AoA, but these activities occur along the northern boundary of the AoA. The seasonality of these activities varies, with swimming occurring during the summer and surfing occurring year-round.

Recreational Boating. This use category focuses on personal/pleasure craft. Information on recreational boating was taken from published surveys and Automatic Identification System (AIS) data. The majority of personal recreational boats that transit through the AoA originate from points in New York Harbor or along the Long Island or New Jersey coasts. Based on surveys of marine recreational boaters, boating density in the AoA is ranked low or medium, and only a few mapped routes traverse the AoA (SeaPlan 2013a). AIS data indicate that the transits of pleasure craft and sailboats within and adjacent to the AoA are almost all low density, and the majority of pleasure craft and sailboat routes tend from the southwest to the northeast (and vice versa); however, there are also a smaller number of routes that parallel the Long Island shoreline (NOAA 2015). One biennial distance sailing race, from Annapolis, Maryland, to Newport, Rhode Island, crosses the AoA. The traditional season runs from early spring to late fall, with the primary recreational boating activity occurring during the summer months.

Cruise Ship Tourism. Cruise ships regularly transit through the AoA, including those originating from the Port of New York and New Jersey: the Manhattan Cruise Terminal, the Brooklyn Cruise Terminal, and the Cape Liberty Cruise Port in New Jersey. According to the 2017-2018 scheduled cruise departure information, a total of 332 cruise ship departures will occur for the year (NYCruise 2017; Cape Liberty Cruise Port 2017). Cruise ships originating from the Port of New York and New Jersey utilize the six inbound and outbound designated shipping lanes that intersect the AoA. Because the cruise ships are concentrated in these shipping lanes, cruise ship use within the AoA is fairly predictable and confined to several major routes. Within these discrete routes, the level of cruise ship traffic is low compared with other vessel densities in the region (BOEM and NOAA 2017). Cruise ship activity occurs year-round, but increases in May and the summer months and peaks in September and October.

Using the data on spatial extent, frequency, and seasonality of the above five categories of marine recreational uses, an assessment of the potential for conflicts between these uses and offshore wind development activities during future siting, construction, and operation phases was conducted. The chief factors that determine the sensitivity of marine recreational uses to conflict/impacts are distance of a use from a potential project site within the AoA and/or from an activity associated with the wind farm, the geographic extent of the recreational activity, and seasonality of its occurrence. The future wind farm activities with the greatest potential to result in impacts on marine recreational uses during the siting, construction, and operation of offshore wind farms were identified through a review of environmental documentation of offshore wind farms in the U.S. and Europe. These include potential conflicts between marine recreational uses and wind farm vessel traffic during all three phases; potential temporary displacement of marine recreational uses by construction activities; and potential displacement of marine recreational uses by project facilities (i.e., the footprints of the wind turbine generators and electrical service platforms). The potential for impacts on marine recreational uses was assessed to be low to moderate, and would be reduced or mitigated following various guidelines and use of BMPs.

1 Introduction

This Marine Recreational Uses Study (Study) is one of a collection of studies prepared on behalf of New York State in support of the New York State Offshore Wind Master Plan (Master Plan). These studies provide information on a variety of potential environmental, social, economic, regulatory, and infrastructure-related issues associated with the planning for future offshore wind energy development off the coast of the State. When the State embarked on these studies, it began by looking at a study area identified by the New York State Department of State (DOS) in its two-year Offshore Atlantic Ocean Study (DOS 2013). This study area, referred to as the "offshore study area (OSA)," is a 16,740-square-mile (43,356-square-kilometer) area of the Atlantic Ocean extending from New York City and the south shore of Long Island to beyond the continental shelf break and slope into oceanic waters to an approximate maximum depth of 2,500 meters (Figure 1). The OSA was a starting point for examining where turbines may best be located, and the area potentially impacted. Each of the State's individual studies ultimately focused on a geographic Area of Analysis (AoA) that was unique to that respective study. The AoA for this study is described below in Section 1.1.

The State envisions that its collection of studies will form a knowledge base for the area off the coast of New York that will serve a number of purposes, including: (1) informing the preliminary identification of an area for the potential locating of offshore wind energy areas that was submitted to the Bureau of Ocean Energy Management (BOEM) on October 2, 2017 for consideration and further analysis; (2) providing current information about potential environmental and social sensitivities, economic and practical considerations, and regulatory requirements associated with any future offshore wind energy development; (3) identifying measures that could be considered or implemented with offshore wind projects to avoid or mitigate potential risks involving other uses and/or resources; and (4) informing the preparation of a Master Plan to articulate New York State's vision of future offshore wind development. The Master Plan identifies the potential future wind energy areas that have been submitted for BOEM's consideration, discusses the State's goal of encouraging the development of 2,400 megawatts (MW) of wind energy off the New York coast by 2030, and sets forth suggested guidelines and best management practices (BMPs) that the State will encourage to be incorporated into future offshore wind energy development.

Each of the studies was prepared in support of the larger effort and was shared for comment with federal and State agencies, indigenous nations, and relevant stakeholders, including non-governmental organizations and commercial entities, as appropriate. The State addressed comments and incorporated feedback received into the studies. Feedback from these entities helped to strengthen the quality of the studies, and also helped to ensure that these work products will be of assistance to developers of proposed offshore wind projects in the future. A summary of the comments and issues identified by these external parties is included in the Outreach Engagement Summary, which is appended to the Master Plan.

The Energy Policy Act of 2005 amended Section 8 of the Outer Continental Shelf Lands Act (OCSLA) to give BOEM the authority to identify offshore wind development sites within the Outer Continental Shelf (OCS) and to issue leases on the OCS for activities that are not otherwise authorized by the OCSLA, including wind farms. The State recognizes that all development in the OCS is subject to review processes and decision-making by BOEM and other federal and State agencies. Neither this collection of studies nor the State's Master Plan commit the State or any other agency or entity to any specific course of action with respect to offshore wind energy development. Rather, the State's intent is to facilitate the principled planning of future offshore development off the New York coast, provide a resource for the various stakeholders, and encourage the achievement of the State's offshore wind energy goals.

1.1 Scope of Study

This Study synthesizes existing information about the types and locations of marine recreational uses in and adjacent to the AoA. The AoA is a 17,196-square-mile area (44,537-square-kilometers) of the ocean extending from the coast of Long Island and New York City to the continental shelf break, slope, and into oceanic waters to an approximate maximum depth of 2,500 meters. Section 1 introduces the scope and objectives of the Study and the regulatory framework under which marine recreational uses would be considered during offshore wind farm development.. Section 2 characterizes predominant marine recreational uses within and adjacent to the AoA, providing, where possible, their spatial extent, frequency, seasonality, and relative demand. Section 3 presents types of potential risks and resource sensitivities relating to marine recreational uses that should be considered during future siting, development, and operation of offshore wind energy projects. Section 4 presents BMPs designed to minimize potential impacts on marine recreational uses during future siting, construction, and operation of offshore wind farms. Section 5 provides references to the materials used to prepare this Study.

Five categories of marine recreational uses are included in the scope of this Study:

- Wildlife viewing.
- Underwater activities.
- Surface water activities.
- Recreational boating.
- Cruise ship tourism.

These use categories cover a range of water-based recreational activities, which were determined to be most prevalent in the AoA and adjacent areas based on geospatial data and literature review with the exception of recreational fishing. Recreational fishing is covered in the Fish and Fisheries Study, which is also appended to the Master Plan.

For the purpose of this Study, adjacent areas generally include the waters east and west of the AoA boundary offshore of Rhode Island and New Jersey (see Figure 1). Upland areas and non-marine recreational uses along the shoreline are not included in the scope of this Study; however, the potential for future offshore wind farms to be visible to shore-based, non-marine recreational users as well as other shore-based viewers is being considered as part of the Visibility Threshold Study, which is also appended to the Master Plan. That study includes an assessment of potential viewshed effects on coastal areas that may be associated with recreational activities.

1.2 Objectives

The three principal objectives of this Study are to:

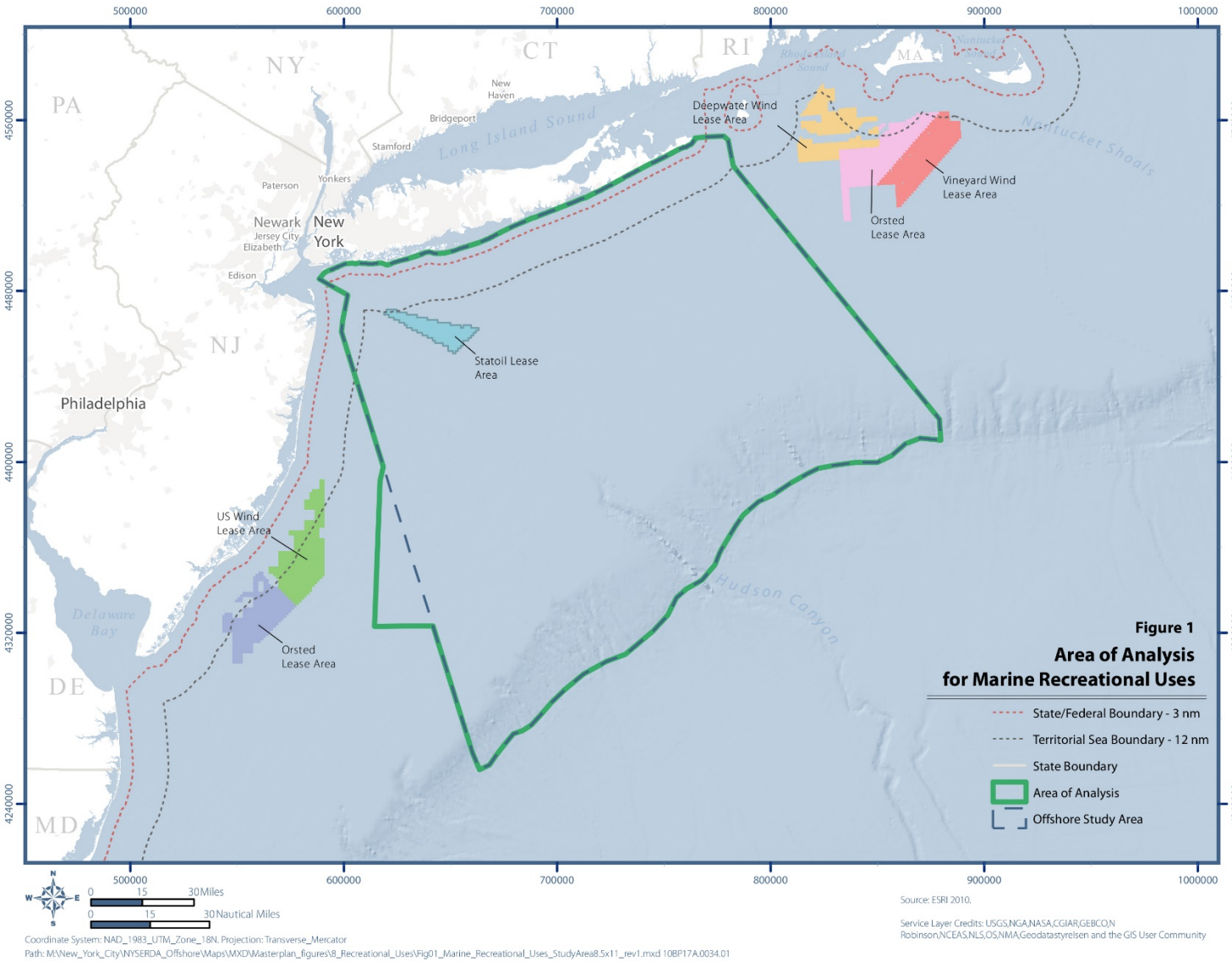
1. Characterize predominant marine recreational uses within and adjacent to the AoA.
2. Review and summarize the existing data and literature regarding the potential risks to marine recreational uses associated with wind energy development in the AoA.
3. Provide guidelines and BMPs that future offshore wind developers may consider to avoid or minimize potential project impacts on marine recreational uses.

1.3 Regulatory Framework

The regulatory framework under which marine recreational uses would be considered during offshore wind farm development is summarized below. Understanding these statutes and the agency regulations and policies associated with their implementation is important to the planning and development of future offshore wind farms.

Figure 1. Area of Analysis for Marine Recreational Uses

Source: ESRI 2010



National Environmental Policy Act. The National Environmental Policy Act (NEPA) of 1969, 42 United States Code (U.S.C.) 4321 et seq., requires that, prior to making permitting decisions, federal agencies assess the environmental effects of their own activities and development projects, and activities by others that require federal licenses or permits. Federal agencies do this by preparing documents that address the environmental consequences, if any, of the proposed action. An environmental assessment (EA) under NEPA contains an analysis for determining whether the impacts of the action would be significant. If significant, an environmental impact statement (EIS) is prepared and issued by the agency. If not significant, a finding of no significant impact (FONSI) is issued, which effectively ends the agency's NEPA obligations for that project. NEPA requires opportunities for public participation in the environmental impact review process (40 Code of Federal Regulations [CFR] 1500-1508).

NEPA also established the Council on Environmental Quality (CEQ). The CEQ, within the Executive Office of the President, promulgates guidelines for implementing NEPA procedures that apply to all federal agencies. Federal agencies are also free to create their own additional regulations. The CEQ reviews and approves federal agency NEPA procedures (40 CFR 1500-1508).

BOEM published regulations (found in 30 CFR 585) to establish procedures for issuing leases, right-of-way grants, and easements for renewable energy production on the OCS. As a federal agency subject to NEPA, BOEM requires sufficient information about marine recreational uses to conduct NEPA environmental reviews for offshore wind leases and lease sales, site assessment activities, and construction and operation activities on the OCS (30 CFR 585). According to current BOEM guidelines for submitting Renewable Energy Site Assessment Plans and Construction and Operation Plans, baseline information submitted by a commercial leaseholder must include recreational resource use patterns (BOEM 2016a, 2016b). These plans must also identify assessment, construction, and operation activities associated with offshore renewable energy developments that may disrupt or displace marine recreational uses.

Because BOEM will be the lead agency for future offshore wind farms in federal waters, BOEM will, in consultation with other agencies and stakeholders, oversee the required NEPA process for any such proposed offshore wind projects. For offshore wind farms proposed in federal waters, environmental consultations are required for two phases of the development process—the site assessment and leasing phase, and the construction and operations phase. Site assessment and leasing activities for future development would likely require an EA, while an EIS would likely be required for construction and

operations activities (New York State Energy Research and Development Authority [NYSERDA] 2015). Marine recreational uses would be a resource assessed in any such NEPA process; if potential significant adverse impacts are identified, mitigation measures would be identified (30 CFR § 585).

Coastal Zone Management Act. The federal Coastal Zone Management Act (CZMA) was enacted in 1972 to encourage the appropriate development and protection of the nation's coastal and shoreline resources (16 U.S.C. 33 §§ 1451-1465). The CZMA gives states the primary role in managing these areas. To assume this role, each state develops a coastal zone management plan that describes the State's coastal resources and how these resources are to be managed. The New York State Coastal Management Program (CMP), administered by the DOS, delineates the State's coastal zone and establishes 44 enforceable coastal policies that guide coastal management actions. The Waterfront Revitalization of Coastal Areas and Inland Waterways Act authorizes local governments to prepare and adopt a Local Waterfront Revitalization Program (LWRP), which provides more detailed implementation of the State's CMP.

In accordance with federal regulations, all federal agency activities and development projects, activities requiring federal licenses or permits, and activities requiring federal financial assistance that may have reasonably foreseeable effects on the coastal zone must be reviewed for consistency with the CMP and applicable LWRP. An offshore wind project would be subject to consistency review, as projects in areas offshore New York and elsewhere in the vicinity are subject to review for consistency with New York's enforceable policies—whether they are in New York coastal waters or in federal waters, and whether for construction of a future wind farm per se or for installation of the transmission cable and landings—if there would be reasonably foreseeable effects upon New York coastal resources or uses. The applicant/project proponent for an offshore wind farm would prepare a coastal zone consistency determination for review by the DOS.

A future offshore wind project would need to comply with State and any applicable LWRP coastal policies, including those specific to recreation. At the State level, the CMP has two policies pertaining to recreation: Policy 21, which states that water-dependent and water-enhanced recreation will be encouraged and facilitated, and will be given priority over non-water-related uses along the coast; and Policy 22, which states that development, when located adjacent to the shore, will provide for water-related recreation whenever such use is compatible with reasonably anticipated demand for such activities and is compatible with the primary purpose of the development (DOS 2017). These policies would need to be addressed in any future offshore wind project's coastal consistency determination, along with any applicable LWRP policies pertaining to recreation.

2 Data Review

2.1 Methods

The types and locations of marine recreational uses within and adjacent to the AoA were identified by conducting a desktop analysis of relevant geospatial data and a literature review.

Geospatial Data. Geospatial datasets were either retained and integrated for analysis, or eliminated, based on relevance and focus on the region of the AoA, the robustness of the methodology employed to collect the recreational use data, and the availability of other, more recent datasets. An example of a robust methodology is one in which collected data were vetted and refined over multiple meetings with outside stakeholders and experts. Most of the geospatial data used in this Study were derived from surveys of individuals and user groups. These survey data were compiled by marine-focused organizations supporting the Northeast and Mid-Atlantic regional planning bodies formed by order of the National Ocean Policy 2010 to better manage the nation's oceans and coasts[1].

All datasets selected for inclusion in the desktop study and the resultant analysis and Study figures were created from studies or data collection efforts dated 2010 or later. Four publicly accessible data portals provided geospatial data characterizing marine recreational uses within and adjacent to the AoA:

- Mid-Atlantic Regional Council on the Ocean (MARCO) Data Portal.
- Northeast Ocean Data Portal.
- Marine Cadastre.
- New York Geographic Information Gateway.

Literature Review. The four public data portals used to access geospatial data also provided access to written marine recreational use studies and surveys, and a web-based literature search was conducted to identify other relevant publications and studies. For the most part, the publications in the data portals proved to have the most recent and comprehensive inventories of recreational activities in the Study area, while other publications were more useful for determining guidelines and BMPs. In particular, documentation for two projects, the Block Island Offshore Wind Farm (Tetra Tech 2012) and the Cape Wind Offshore Wind Development (Minerals Management Service [MMS] 2009), provided information about guidelines proposed and/or required to reduce impacts on marine recreational uses. The Block

[1] The Policy focuses on maintaining healthy, resilient, and sustainable ocean, coastal, and Great Lakes resources and established an Ocean Policy Task Force, which developed recommendations to meet those objectives (BOEM 2017a).

Island wind farm went into commercial operation in 2017 and remains the nation's only operating offshore wind farm. The Cape Wind project is permitted, but no construction had taken place as of late 2017. To date, these are the only two commercial offshore wind projects in the United States with final NEPA documentation. *The Rhode Island Ocean Specific Area Management Plan* (SAMP; Rhode Island Coastal Resources Management Council [RI CRMC] 2010), which applies to the Block Island wind farm, provides an example of how marine recreational uses have been evaluated and considered in the context of offshore renewable energy development planning in the broader region.

Three studies/surveys were widely used throughout this Study. The purpose and methodologies each employed to collect data are summarized below.

- ***Offshore Atlantic Ocean Study* (DOS 2013).** Data collection for ocean-based recreation locations in New York was led by the DOS, in partnership with the National Oceanic and Atmospheric Administration's (NOAA's) Coastal Services Center (CSC), in a broader effort to identify ocean-based recreational activities in the region (DOS 2013). Through a series of five mapping workshops, the agencies trained representatives from partner organizations and other targeted individuals to use participatory geographical information system (GIS) tools to collect recreational use data from their own extended networks. These data included locations of various coastal and offshore uses (e.g., diving, wildlife viewing, surfing) (DOS 2013). The data collection effort occurred over several months and resulted in more than 130 records of new ocean-based recreation information, specifically recreational fishing locations, wildlife viewing areas, dive sites, and surfing locations (DOS 2013). DOS staff digitized the locations and, over several months, reviewed and refined the data with participating organizations, including the wreck and reef dive sites. The resulting study contains a static map of the data, while the geospatial layer provided on the New York Geographic Information Gateway and MARCO data portal allows users to gather more-specific information about each mapped location (DOS 2013, 2014; MARCO n.d.).
- ***Characterization of Coastal and Marine Recreational Activity in the U.S. Northeast* (Point97 et al. 2015).** This study characterized spatial patterns of coastal and marine recreational activity in the Northeast region (CT, MA, ME, NH, NY, RI, and VT) through stakeholder-engaged data collection. Data were collected through two types of surveys—industry leader surveys, which focused on commercial whale watching, scuba diving, etc.; and individual user surveys, which utilized an online opt-in survey for use by recreational users from the general population. Both surveys were online mapping surveys in which respondents had to map where recreational activities take place; spatial data sets were then developed to represent recreational use patterns in the Northeast region.

- ***U.S. Mid-Atlantic Coastal and Ocean Recreation Study* (Surfrider Foundation et al. 2014).** The Surfrider Foundation et al. (2014) conducted an internet opt-in survey targeted toward coastal and ocean-based recreationists in four Mid-Atlantic states: New York, New Jersey, Delaware, and Maryland. During the six-month period in 2013 in which the survey was "open," more than 1,500 surveys were returned (Surfrider Foundation et al. 2014). Survey participants were asked to map and categorize the ocean-based recreational activities they engaged in during the last 12 months, including the underwater activities of scuba diving, snorkeling, and free diving.

2.2 Current Work that Can Inform Future Project Planning

Several ongoing efforts may inform future project planning specifically related to marine recreational uses. These are discussed below.

BOEM has contracted with the University of Delaware to perform a regional study titled, "Atlantic Offshore Wind Energy Development: Public Attitudes, Values, and Implications for Recreation and Tourism" (BOEM 2017b). That study, which considers the implications of offshore wind on marine recreational uses along the Atlantic seaboard, has been underway since 2012 and is expected to be completed in 2017. Relevant objectives of the BOEM study include:

- Gaining an understanding of offshore wind farm impacts on valued amenities of coastal areas as perceived by tourists.
- Determining whether recreationists and tourists would be more likely to avoid recreational activities near wind turbine generators (WTGs) or more likely to visit such areas.

The main findings of the BOEM study will be summarized in a final report, expected in the fall of 2017. The study is intended to help BOEM prepare environmental impact review documents related to offshore wind and will help developers during siting and developing their required Site Assessment Plans and Construction and Operation Plans.

To understand how recreation and tourism may be impacted by the development of offshore wind energy facilities, BOEM has also contracted with the University of Rhode Island to complete an "Analysis of the Effects of the Block Island Wind Farm on Rhode Island Recreation and Tourism Activities." Relevant objectives of that study include (BOEM 2017c):

- Identifying potential indicators for evaluating the impacts of the Block Island wind farm on recreation and tourism activities.
- Identifying and analyzing observed effects of the Block Island wind farm on recreation and tourism activities.
- Providing a framework for tourism and recreation monitoring at other locations.

In addition, MARCO and the Surfrider Foundation co-hosted a series of four workshops in the fall of 2017 throughout the Mid-Atlantic region, including on Long Island, to solicit input from ocean recreation users in support of the implementation of a specific action included in the Mid-Atlantic Regional Ocean Action Plan: "Identify, characterize, and share information about measures to maintain the recreational value of important non-consumptive recreational areas and the activities they sustain." There were three main objectives for these workshops (MARCO 2017):

- To begin to define what it would mean for ocean and coastal uses and areas to be considered important for non-consumptive recreation.
- To solicit ideas for a process to identify and assess potential impacts on and use conflicts with important non-consumptive recreational uses from other human uses, as well as potential impacts and conflicts between non-consumptive recreational uses and marine and coastal resources.
- To explore ideas for effective two-way engagement processes to share information with and solicit input from ocean recreation users.

A report summarizing the input received is expected to become available in early 2018 (MARCO 2017).

2.3 Summary of Findings

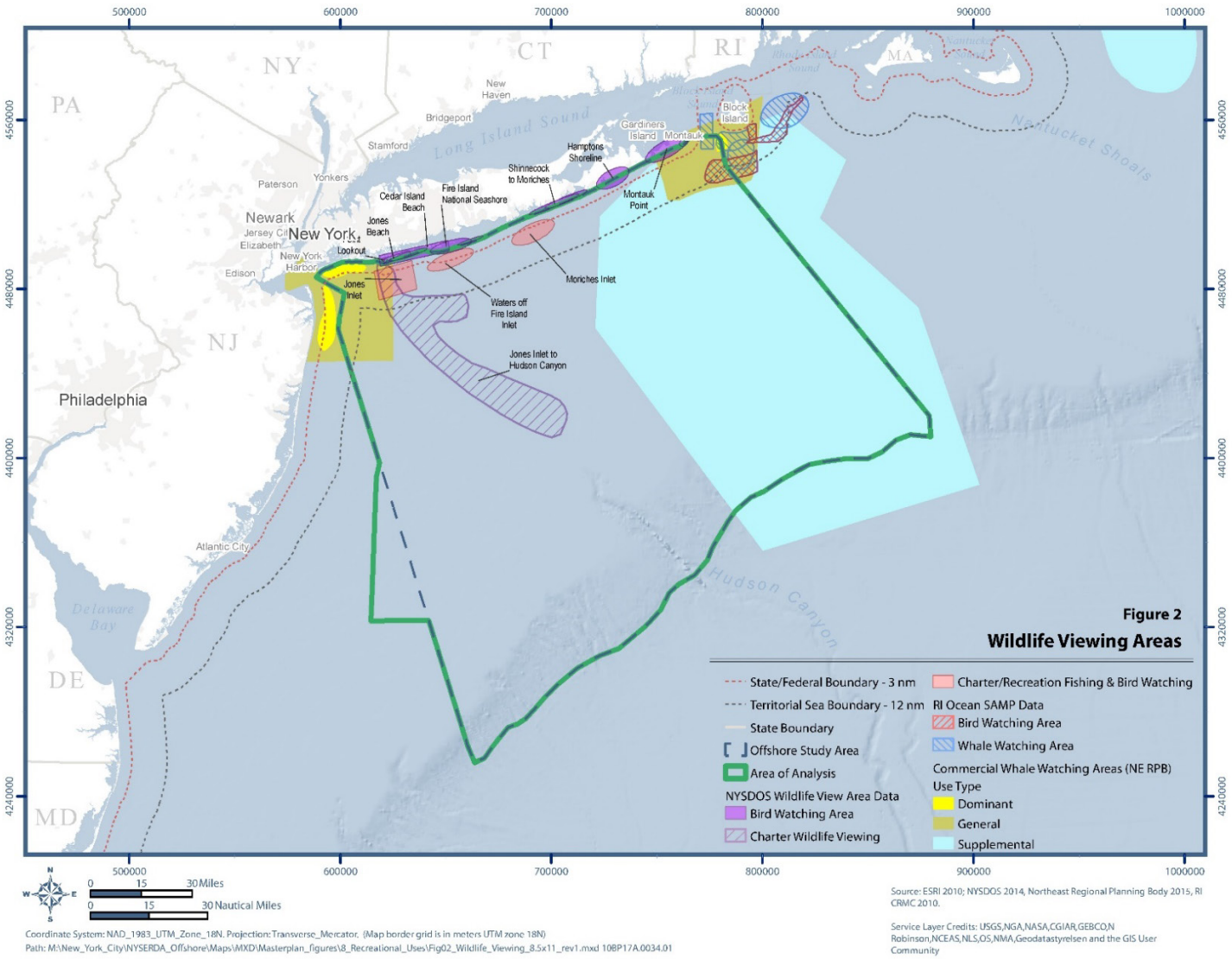
This section summarizes, in text and figures, the best available data characterizing each of the five prevalent marine recreational use categories: wildlife viewing, underwater activities, surface water activities, recreational boating, and cruise ship tourism. The assessment of each use category attempts to establish the spatial extent, frequency, seasonality, and relative demand of the investigated marine recreational uses. If sufficient data were available, a recreational use's relative popularity or user population size was assessed. The assessment informed several recommended BMPs, discussed in Section 4.

2.3.1 Wildlife Viewing

Boat-based wildlife viewing in the region of the AoA consists primarily of bird watching (pelagic and shorebirds) and whale watching aboard charter vessels of various sizes. Figure 2 illustrates the distribution of both activities in and adjacent to the AoA, as assessed during multiple survey and stakeholder outreach efforts (Point97 et al. 2015; DOS 2014; RI CRMC 2010). Boat-based bird watching occurs all along the Long Island coast, and occasionally further offshore, on chartered vessel trips (DOS 2014). Whale watching extends somewhat farther offshore than most of the bird watching areas (see Figure 2; Point97 et al. 2015).

Figure 2. Wildlife Viewing Areas

Source: ESRI 2010, NYSDOS 2014, Northeast Regional Planning Body 2015, RI CRMC 2010



2.3.1.1 Bird Watching

Bird watching within and in the vicinity of the AoA is primarily shore-based, occurring along the beaches and shoreline of Long Island where it overlaps with the northern boundary of the AoA (see Figure 2) (DOS 2014). Offshore bird watching has been documented in a few locations off the coast of Long Island where it typically pairs with fishing activities on charter and other recreation boats. As shown on Figure 2, these locations include Jones Inlet, the waters off Fire Island Inlet, and Moriches Inlet (DOS 2014). These locations are all within the northern portion of the AoA. Additionally, a large outlined area stretching almost 50 miles from Jones Inlet to Hudson Canyon has been documented as an area for charter wildlife viewing within the AoA, specifically for viewing pelagic birds during the winter (see Figure 2). The frequency at which bird-watching trips are chartered in the Jones Inlet to Hudson Canyon area is unknown, as this information was not published in the study associated with the data collection effort (DOS 2014). Pelagic bird watching occurs across the continental shelf, continental slope, canyons, and beyond through both commercial fishing charters and personal craft (Wilson 2017).

Additional data regarding the frequency and spatial extent of pelagic bird watching trips in and near the AoA was obtained from local charters specializing in pelagic birding. Pelagic bird watching occurs primarily in the summer and fall, though limited trips do occur in the winter (January and February) (Sea Life Paulagics 2017; CRESLI 2017). One company based on Long Island offers both local and offshore pelagic bird watching cruises that are combined with whale watching. These cruises do not overlap with the AoA. The local and offshore cruises leave from Montauk and the local cruises stay within 22-25 nm of Montauk, with the eastern edge of Block Island being the furthest extent of their trips (CRESLI 2017). Local cruises occur approximately weekly from late June through early September.

Offshore whale and pelagic bird watching cruises leave from Montauk heading east to the Great South Channel, out to Nantucket Island and back; these trips occur once or twice per year in July and August (CRESLI 2017). These trips originate in the northeast corner of the AoA and then head outside of the AoA, continuing east/northeast toward Massachusetts.

Bird watching charters generally coincide with the seasonal migratory patterns, starting in spring and ending in the fall. Popular times for offshore bird watching are after storms, because strong winds can blow rare offshore species closer to shore (RI CRMC 2010).

Additional offshore birdwatching areas were identified and mapped during the data collection effort for the *Rhode Island Ocean SAMP* (RI CRMC 2010). These locations, shown on Figure 2, are south and east of Block Island and overlap with the northeast corner of the AoA. According to the *Rhode Island Ocean SAMP,* offshore bird watching in the vicinity of Rhode Island occurs on private charters or in conjunction with whale watching charters (RI CRMC 2010). In addition, offshore bird watching may concentrate in areas where mobile-gear commercial fishing vessels operate, because their gear is known to attract birds. As stated in the *Rhode Island Ocean SAMP*, offshore bird watching is a niche market, such that only a few charter boats feature the activity (RI CRMC 2010). The percentage of charter boats in Long Island that feature bird watching among their services is unknown, but presumably their numbers are comparable to those in Rhode Island.

In addition to bird watching, sea duck hunting occurs within the coastal waters of New York. Sea duck hunting occurs within a Special Sea Duck Area, which is defined by the New York State Department of Environmental Conservation (DEC) as the coastal waters of New York State lying in Long Island Sound, Block Island Sound, Great Peconic Bay, and associated bays eastward from a line running between Miamogue Point in the town of Riverhead to Red Cedar Point in the town of Southampton, and any ocean waters of New York State lying south of Long Island (DEC 2017a). Based on this definition, the portion of the Special Sea Duck Area in the ocean waters south of Long Island are located within the AoA. According to DEC, most hunting activity occurs within 3 nm of the shoreline, with more activity occurring near inlets than in the open ocean. On average, there are 1,500 sea duck hunters in the coastal waters of New York per year, recording 7,000 days of recreational activity (Huber Jones 2017). The sea duck hunting season is limited to the winter, between late November and late January (DEC 2017b).

2.3.1.2 Whale Watching

Figure 2 shows areas in the AoA and adjacent area used by vessels dedicated to whale watching. These data were collected as part of the *Characterization of Coastal and Marine Recreational Activity in the U.S. Northeast* (Point97 et al. 2015). The Point97 study defined the whale watching use areas as follows:

- General use area: Includes the full footprint of activity in the last three to five years, regardless of frequency or intensity; does not include areas where the use may occur once or twice or where it might conceivably occur now or in the future.
- Dominant use area: Includes all areas routinely used by most users most of the time, within seasonal patterns for that use, and must be within the general use area.
- Supplemental use areas: Includes areas used for closely related activities and infrequent specialty trips (e.g., multi-day offshore excursions) or historical uses.

The Point97 et al. (2015) study covered an area extending from New York to Maine and employed several strategies for developing footprints for general use, dominant use, and supplemental use areas along the coast. The Point97 et al. project team conducted multiple workshops in 2014 with commercial whale watching industry members[2] and employed participatory mapping software tools to allow participants to map use areas. Participants were instructed to limit the areas to those visited in the last three to five years (2010-2014). Whale watch vessel transits and whale sighting data recorded by whale watch operators were circulated to provide reference data and serve as an aid to workshop participants mapping whale watch areas.

The results of the Point97 et al. (2015) study effort demonstrate that whale watch operations in the vicinity of the AoA concentrate in two general use areas that extend some distance from New York and Montauk harbors. The general use area of whale watch operations out of New York Harbor begins in Lower New York Bay and extends into the northwest corner of the AoA (see Figure 2). The dominant use areas parallel relatively short stretches of the northern New Jersey and western Long Island coasts, and one of the dominant use areas is located entirely within the northwest corner of the AoA. Additionally, a small portion of the dominant use area east of Long Island intersects with the northeast corner of the AoA. In the early part of the season, operators frequently transit the dominant use area parallel to New Jersey and are located shoreward of the AoA. Later in the season, if whale sightings offshore of New Jersey decline, operators tend to travel east and parallel to the south shore of Long Island. These transits likely overlap with the northern boundary of the AoA.

Out of Montauk Harbor on the eastern end of Long Island, the whale watch general use area extends east about 30 nm to Block Island and south into the Atlantic Ocean. This general use area is similar in size to the general use area out of New York Harbor, and it overlaps with the northeast corner of the AoA. The dominant use area is relatively small and lies between Long Island and Block Island and includes whale watching out of Montauk Harbor. A portion of the dominant use area also overlaps with the northeast corner of the AoA.

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[2] Industry members included whale watch company owners and operators, naturalists, and data managers. The study targeted commercial operators and company owners whose primary business activity is whale watching, as opposed to operators who offer a broader suite of activities during vessel excursions. The reasoning was that dedicated operators were more likely to report areas unique to whale watching, as opposed to areas visited for multiple activities.

The comparatively large supplemental area covers almost the entire eastern half of the AoA, though whale watching is either infrequent in this area or supplemental to some other primary activity. The Point97 et al. (2015) study did not include further specific characterization of the supplemental area.

Additional whale watch areas identified in the *Rhode Island Ocean* SAMP are also shown on Figure 2 and are predominantly outside the AoA; only a small portion of one area overlaps with the northeast corner of the AoA (RI CRMC 2010). These areas surround Block Island and, in some places, they overlap the general and dominant use areas originating out of Montauk Harbor identified by Point97 et al. (2015). The whale watch areas from *the Rhode Island Ocean SAMP* were mapped through stakeholder engagement, and through additional data confirmation provided by charter boat operators (RI CRMC 2010).

In the Northeast U.S., July and August are the peak months for whale watching; demand is high because the weather is generally favorable and the target viewing species are most likely to be sighted in the area (Point97 et al. 2015; RI CRMC 2010). During these peak months, whale watching trips occur most days during the week. The full whale watching season extends from the spring through the fall, with varying levels of activity depending on weather conditions (Point97 et al. 2015). Vessels that offer whale watching range from small, semi-private charters accommodating up to six passengers that conduct a single voyage per day, to large charters carrying up to 400 passengers that conduct three to five trips per day (Point97 et al. 2015). Typical commercial whale watching vessels are greater than 65 feet long and hold from 100 to 300 or more passengers. Vessels outside this range frequently offer whale watching as one of several recreational activities but are not “dedicated” whale watching operations.

2.3.2 Underwater Recreational Activities

Underwater recreational activities in the region of the AoA consist of shore- and boat-based scuba diving, free diving, and snorkeling (Surfrider Foundation et al. 2014; Point97 et al. 2015). Figure 3 identifies the locations of underwater-based activities.

Along the Northeast coast of the U.S., scuba diving and snorkeling activity is highest in waters off the coast of Massachusetts and Rhode Island, based on respondent data. However, shipwrecks, artificial reefs, canyons, and underwater wildlife present in and around the AoA make diving and snorkeling popular in this region as well (Point97 et al. 2015; DOS 2013).

Historical shipwrecks, artificial reefs, and bottom structures, or benthic habitats that generally attract wildlife, are all potential scuba diving sites. Divers are primarily interested in wildlife viewing, photography, and exploration, and some engage in hunting and fishing (Point97 et al. 2015). For example, lobster diving is a permitted activity in New York. Scuba divers in the region of the AoA launch from shore, private boats, or charter boats. The method most frequently practiced by divers in general is undetermined (Point97 et al. 2015). Generally, the deeper dive sites farther offshore are limited to the more experienced divers (Point97 et al. 2015).

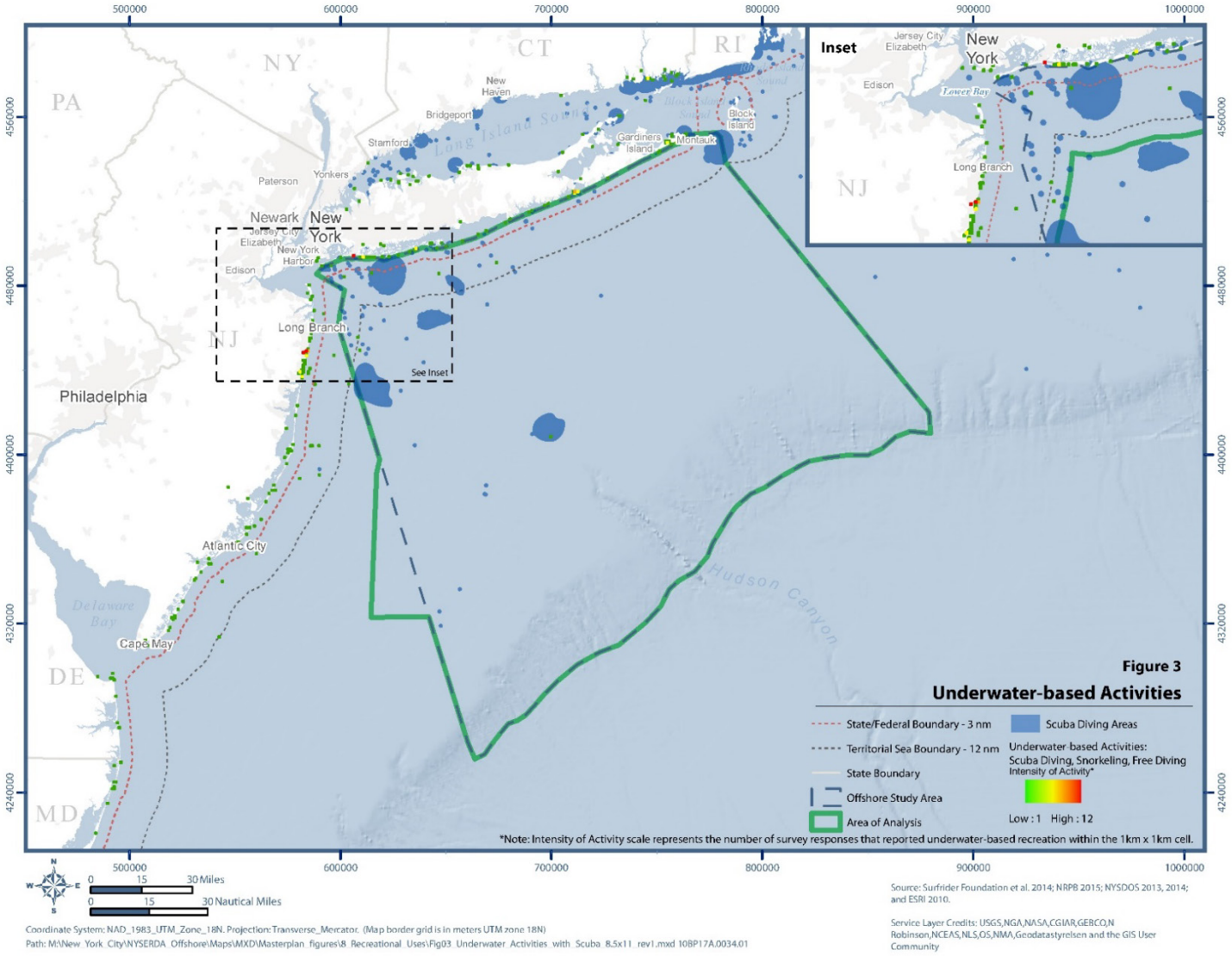
The scuba diving locations shown on Figure 3 are sourced from multiple studies. DOS, in collaboration with the NOAA CSC, gathered data on artificial reef and shipwreck dive sites in New York in its study of ocean-based recreation (DOS 2013). The Point97 et al. (2015) study identified scuba diving locations region-wide in the Northeast U.S. Because the Point97 et al. (2015) study consulted data collected at the state level, the majority of sites identified in the DOS (2013) study were also included in the final Point97 et al. (2015) dataset and are presented as one undifferentiated layer in Figure 3.

The additional dive sites presented by Point97 et al. (2015) were identified through online and printed scuba guides, a general recreational use survey, and targeted online surveys and participatory mapping workshops with scuba industry experts. The team conducted an outreach campaign to improve survey participation and continuously vetted collected data through webinars and workshops.

The sites collected during the Point97 et al. (2015) regional study include shipwrecks, artificial and natural reefs, canyons, aquaculture sites, and other diving attractions. The associated geospatial data presented in Figure 3 does not distinguish among these multiple site categories due to the scale of the figure and because the purpose of the figure is to identify overlapping recreation use locations in and around the AoA. However, the GIS data layers available from the DOS (2013) and Point97 et al. (2015) studies can be consulted for specific dive site categories as needed during offshore wind farm siting. Dive sites considered sensitive were buffered by 5 kilometer (km) so as not to reveal exact coordinates and are depicted as large blue areas on Figure 3; other point-specific dive locations were buffered by 1 km to achieve consistency of presentation across the map. There are six such sites within the AoA.

Figure 3. Underwater-based Activities

Source: Surfrider Foundation et al. 2014; NRPB 2015; NYSDOS 2013, 2014; and ESRI 2010



The DOS (2013) and Point97 et al. (2015) studies are the most comprehensive sources for dive site identification in and around the AoA, while a third study, Surfrider Foundation et al. (2014), collected complementary data indicating the popularity of diving, snorkeling, and free diving sites near the coast. Although the Surfrider Foundation et al. (2014) study did not intentionally exclude far offshore waters such as the AoA, nearly all of the diving locations identified during the survey were within 12 nm of the coast. Surfrider Foundation et al. (2014) digitized the locations and created an "intensity" map of underwater recreation sites by creating 1-km by 1-km cells and ranking each according to the number of survey responses reporting diving, free diving, or snorkeling activity in that location (see Figure 3). The survey included a questionnaire and an interactive mapping tool, which participants used to mark locations where they engaged in non-consumptive coastal and ocean recreation activities in the last 12 months. Each marked location earned a point, regardless of the activity, and the number of points within a 1-km by 1-km grid cell determined the relative intensity of recreational activity in that location, with a green-to-red color scale, with green representing the lowest intensity and red representing the highest intensity (Surfrider Foundation et al. 2014). Based on these data, the intensity of underwater recreation appears to be highest along the Long Island and New Jersey shorelines nearest the entrance to the Lower New York Bay, as well as near Belmar Beach, New Jersey. Lower intensity underwater recreation extends along the New York, New Jersey, Delaware, and Maryland coasts (see Figure 3). Of the survey respondents who recreated off the coast of New York, 14.2% had engaged in free diving or snorkeling from shore or boat in the previous 12 months, and 6.3% had gone scuba diving from a charter boat (Surfrider Foundation et al. 2014). As pointed out in the Surfrider Foundation et al. 2014 study, scuba diving is practiced by a relatively small percentage of coastal and ocean recreationists, yet it makes an important economic contribution.

Diving activity along the Northeast coast of the U.S. is concentrated in the months of May through October, though it occurs year-round (Point97 et al. 2015). In offshore diving areas, visibility improves steadily from May through September or October, and further inshore, good visibility may extend through November (Point97 et al. 2015). Across the Northeast region of the U.S., a majority of dive sites were reported to have at least 50 visitors per year (Point97 et al. 2015).

2.3.3 Surface Water Recreational Activities

Surface water recreational uses in the region of the AoA consist primarily of swimming, windsurfing, surfing, and kayaking/paddling, which includes stand-up paddle boarding. As shown on Figure 4, these marine recreational uses predominately occur near the coast and overlap with the northern boundary of the AoA (Surfrider Foundation et al. 2014) and are correlated with beach locations, especially publicly

managed areas such as the Fire Island National Seashore, Rockaway Beach Park, Jacob Riis Park, Ocean Beach Park (Long Beach), Jones Beach State Park, and others out to the easternmost part of Long Island. Along the New Jersey coast, surface water recreational uses are correlated with Long Beach Island and Atlantic City and extend south along the Atlantic Coast to the beaches of Delaware and Maryland, including Rehoboth Beach, Bethany Beach, and Ocean City.

Information on the surface water recreational activity presented on Figure 4 was collected through stakeholder engagement and web-based surveys as part of the *U.S. Mid-Atlantic Coastal and Ocean Recreation Study* (Surfrider Foundation et al. 2014). On Figure 4, intensities are displayed as discussed above for underwater recreational activities. (Refer to Appendix A for a copy of the survey questions.) The locations of individual surface water activities are not denoted on the map, nor would that approach be practical at this scale since multiple activities frequently occur in the same general area. The value of the dataset is in illustrating locations along the coastline where recreationists tend to concentrate. In the context of regional planning for offshore wind farms, this is a more important consideration versus where each individual activity occurs. Along the southern coast of Long Island, and the northern boundary of the AoA, the "hottest" portion of the coast appears to be the western third; activity is moderate along the eastern third, while the middle third seems to host the least surface water activity (Surfrider Foundation et al. 2014). Surface water recreation intensity is relatively high along the entirety of the New Jersey coast (see Figure 4).

The Surfrider Foundation et al. (2014) collaborated with recreational businesses, groups, and associations to engage marine surface water recreationists, which helped generate more than 1,500 completed surveys and over 22,000 unique activity points along the Mid-Atlantic coast. Table 1 lists the number of surface water activity responses collected for locations along the coast of New York (Surfrider Foundation et al. 2014).

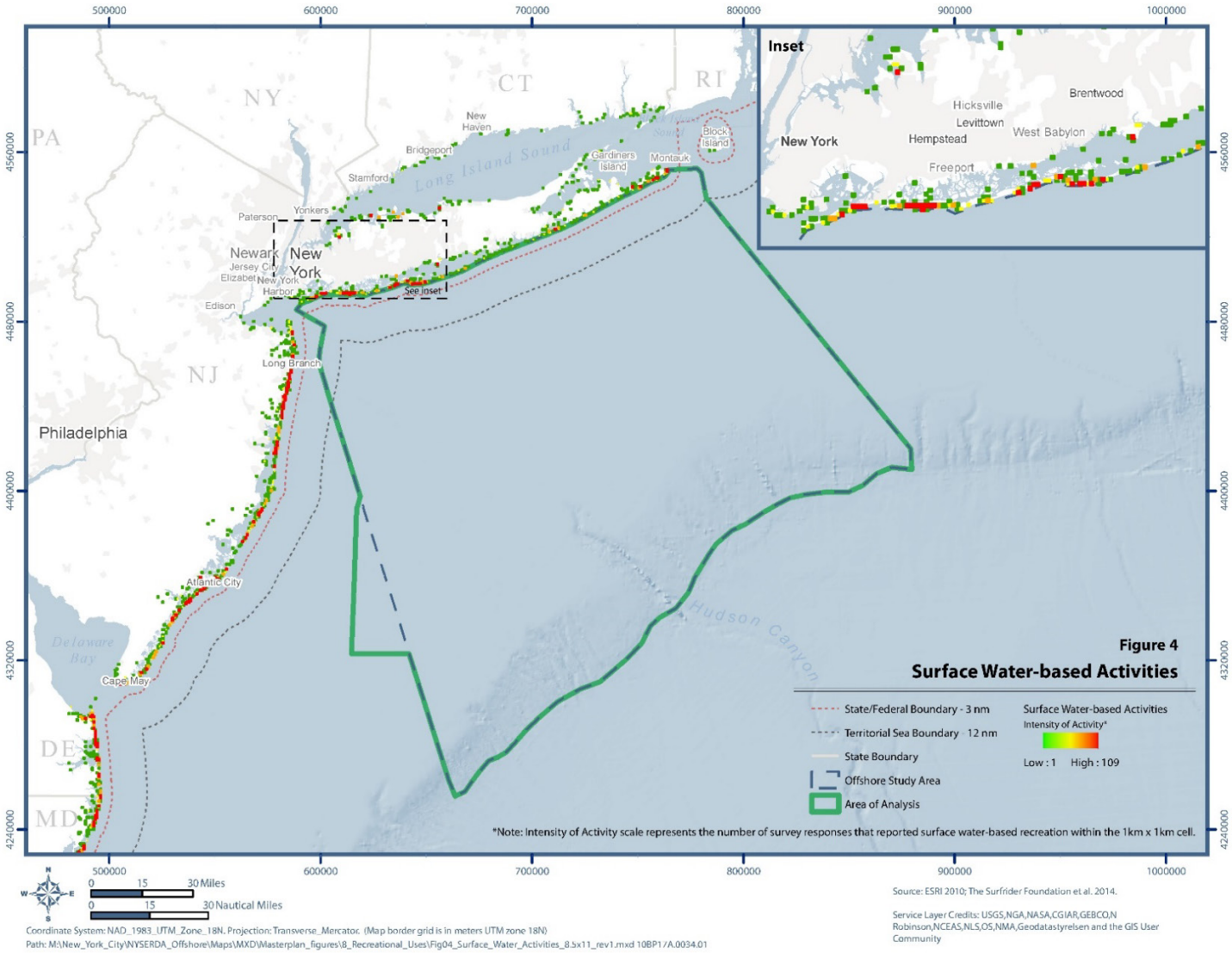
Table 1. Survey Responses Indicating Activity Occurrence Off the New York Coast

Source: Surfrider Foundation et al. 2014

Activity	Total
Kayaking/Paddling	304
Swimming	641
Surfing	640
Windsurfing	225
Kite Boarding	65

Figure 4. Surface Water-based Activities

Source: ESRI 2010; the Surfrider Foundation et al. 2014



The seasonality of these surface water recreational activities varies; while swimming occurs during the warmer months, the most avid surfers surf year-round, taking advantage of storm swells and vacant waters (RI CRMC 2010).

2.3.4 Recreational Boating

The discussion of recreational boating focuses on personal/pleasure craft. It excludes a discussion of charter boats offering trips for recreational activities, which is generally covered under wildlife viewing and scuba diving, as well as charter fishing boats, which are discussed in the Fish and Fisheries Study, which is also appended to the Master Plan.

The majority of personal recreation boats that transit through the AoA originate from points in New York Harbor or along the Long Island or New Jersey coasts. Figure 5 depicts this trend, presenting routes and densities of private motorized recreational boats and sailboats collected during the 2012 Northeast Recreational Boater Survey and 2013 Mid-Atlantic Boater Survey (SeaPlan 2013a; Monmouth University 2016).

The 2012 Northeast Recreational Boater Survey targeted marine recreational boat owners from New York to Maine whose boats were registered in coastal counties (SeaPlan 2013a). Boats included in the survey were only those 10 feet or greater in length and used exclusively in marine waters. The survey team mailed 67,772 invitation packages to a random sample of registered boat owners, requesting their participation in six monthly online surveys throughout the 2012 May through October boating season and one end-of-season survey. The team employed extensive outreach and engagement methods (e.g., social media, meeting presentations, boat show booths, sponsorship programs, website) to encourage participation. A total of 4,297 marine boaters completed at least one monthly survey, and of those, 699 completed all six monthly surveys. Each online survey contained a questionnaire and a mapping application in which boaters plotted their last roundtrip boating route and the locations of recreational activities during that trip (i.e., fishing, wildlife viewing, scuba diving, swimming, relaxing, or other). Their responses were processed to create geospatial records of recreational vessel density throughout

the Northeast U.S., presented on a relative scale from low density to high density[3] (SeaPlan 2013a, 2013b). Nearly half of the survey participants owned open motor boats (46% of participants). Other types of boats owned by participants included cabin cruisers (25%), sailboats (18%), and other (10%). Approximately 1% of the survey participants owned a personal watercraft, or jet ski (SeaPlan 2013a).

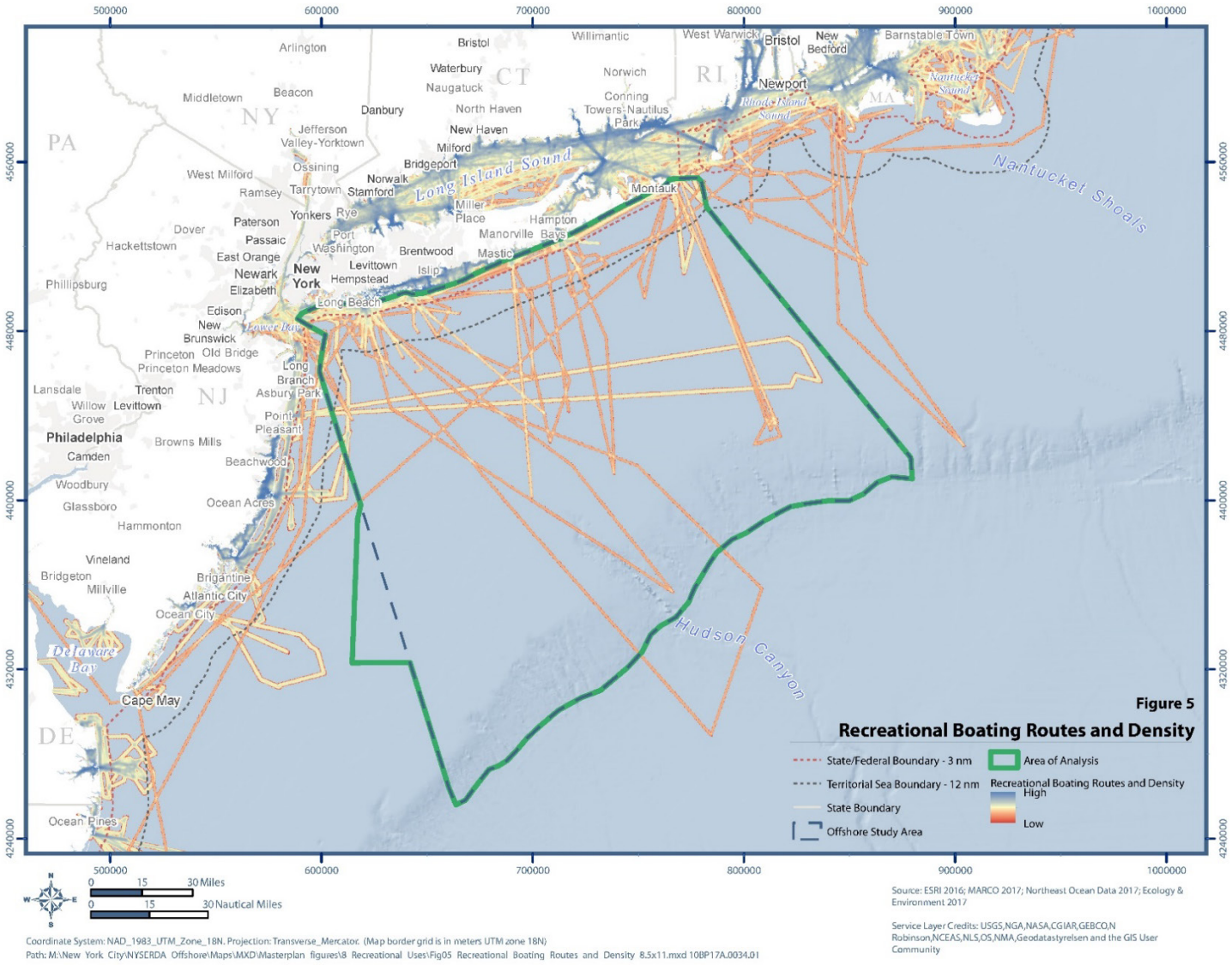
Survey results indicate that more frequent and longer recreational boating trips occur during the summer months (SeaPlan 2013a). Moreover, just over half of marine recreational boating activity in the Northeast U.S. occurs within 1 mile of the coast, and the trend appears consistent in New York (see Figure 5; SeaPlan 2013a, 2013b). Compared with the density of recreational boating throughout the Northeast U.S., boating density in the AoA is ranked low or medium where represented, and only a few mapped routes traverse the AoA (SeaPlan 2013a, 2013b). These low- to medium-density routes originate from multiple points along the New York coast, including Long Beach, Mystic Beach, Hampton Bays, and Montauk (see Figure 5). Of the mapped routes that cross the AoA, one long-distance, low-density route extends from Rhode Island Sound to Delaware Bay, crossing the northwest corner of the AoA. This may be a known boating route for sailing vessels or motorized vessels transiting from one harbor to another. The other distinct, long-distance routes that cross the AoA may be routes to and from major recreational locations; however, this detail was not provided in the SeaPlan (2013a) study. Other low- to medium-density routes to the east and northeast of the AoA originate along the Rhode Island and Massachusetts coasts, including from the vicinity of Newport, Rhode Island, and New Bedford, Massachusetts (see Figure 5).

Based on the recreational activity component of the survey, recreational fishing was the most common activity by boaters throughout the Northeast U.S., including New York State waters and in federal offshore waters. In New York State waters, boaters reported “other” and “relaxing” as the next most common activities, followed by swimming. In federal waters, swimming was the second most popular activity reported by recreational boaters (SeaPlan 2013a).

[3] The vessel density scale is qualitative; low density implies that recreational boating route density is low compared with other recreational boating route densities offshore of the Northeast states that were included in the survey.

Figure 5. Recreational Boating Routes and Density

Source: ESRI 2016; MARCO 2017; Northeast Ocean Data 2017; Ecology & Environment 2017



Only a handful of boaters (1%) reported scuba diving as an activity, and wildlife viewing represented only 4% of boaters' recreational activity in both New York State waters and federal waters. Given those results, scuba diving and wildlife viewing may occur more often from chartered vessels, which were not included in the Northeast recreational boating survey. (Refer to Section 2.3.1 for a discussion of charter boat operations for wildlife viewing and Section 2.3.2 for a discussion of scuba diving.) Of those that engaged in wildlife viewing, recreational boaters in northeast federal waters reported viewing whales, other wildlife, seals, and birds. In New York State waters, 81% of viewing activity points reported by boaters were for birds. Survey participants also were asked about the compatibility of recreational boating with various marine uses, including wind farm development. More than half reported that boating was compatible with offshore wind farms (SeaPlan 2013a).

The 2013 Mid-Atlantic Recreational Boater Survey (Monmouth University 2016) provided recreational vessel densities off the coast of New Jersey (see Figure 5). The study was modeled on the 2012 Northeast Recreational Boater Survey (SeaPlan 2013a), and similar to that survey, the Mid-Atlantic survey did not include charter recreation boats in its scope (Monmouth University 2016). Initially, 32,000 recruitment surveys were mailed, targeting boat owners in New Jersey, Delaware, Virginia, and Maryland whose boats were likely used in ocean waters. (New York was not included in this survey as it would have duplicated the SeaPlan 2012 Northeast Recreational Boater Survey efforts.) Ultimately, 715 recruited marine boaters (249 from New Jersey) completed at least one of the six monthly surveys distributed online during the May-October boating season or a seventh survey distributed at the end of the season. The surveys included a web-based mapping application that allowed participants to draw their boating routes from the previous month and mark locations where they recreated (Monmouth University 2016). The submitted routes were converted to a geospatial layer that displays the density of recreational vessels (see Figure 5).

Much of the recreational boating activity originating from the New Jersey shore does not intersect the AoA (Monmouth University et al. 2014). However, medium- to high-density routes are visible all along the New Jersey coast, with particular concentration along the upper mid-coast and in Raritan, Lower New York, and Sandy Hook bays. Several low- and medium-density routes overlap or run adjacent to the northwest corner of the AoA (Monmouth University et al. 2014). These appear to

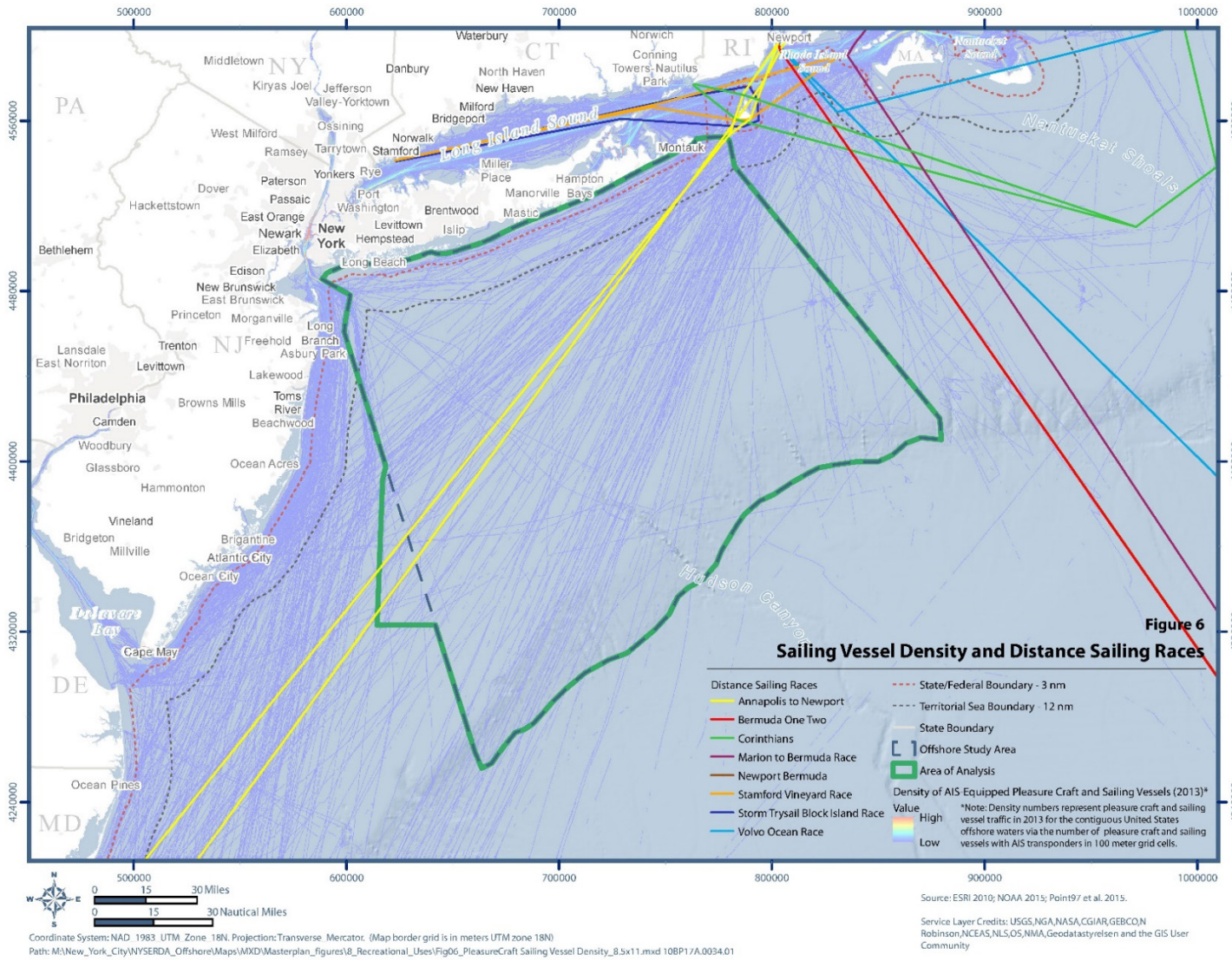
originate from the aforementioned bays. From the Lakewood, New Jersey, area, one clearly identifiable medium-density round-trip route runs east-west, transecting nearly the entire width of the AoA (Monmouth University et al. 2014). It may be a known transit route to and from a major recreational location (SeaPlan 2013a). Several low- to medium-density routes originating in the Ocean City, New Jersey, area are located adjacent to the AoA's western boundary but do not intersect the AoA.

Automatic Identification System (AIS) data provide another source of recreational boating activity in and around the AoA. AIS refers to an automated vessel-tracking system intended primarily to maintain safety and avoid collisions; ships equipped with AIS transponders automatically transmit location and identification information to other vessels and shore-based facilities. At this time, only relatively large commercial vessels are required to carry AIS equipment. For example, the U.S. Coast Guard (USCG) requires vessels with a gross tonnage of 300 tons or more, passenger ships with a gross tonnage over 150 tons, and commercial self-propelled fishing vessels of 65 feet or more are required to carry AIS equipment (USCG Navigation Center 2017). However, some smaller vessel owners have voluntarily elected to install AIS transponders, including owners of pleasure craft and sailing vessels. These locational data can be converted into geospatial density, transit-route pathways as a visual representation, though the densities frequently do not represent actual vessel counts given the magnitude and complexity of the data. Figure 6 depicts densities of AIS-equipped pleasure craft and sailing vessels in 2013 in the region of the AoA (NOAA 2015). Pleasure craft are loosely defined as large motorboats with conveniences necessary for living on board; however, that term is not defined in the AIS data source (NOAA 2015).

AIS data have pros and cons compared with stakeholder-gathered data, e.g., vessel routes collected in the Northeast and Mid-Atlantic Recreational Boater surveys (SeaPlan 2013a; Monmouth University 2016). The collection of AIS data do not rely on human memory: vessel locations are recorded in real-time. In addition, AIS data are continuously recorded through the year, which permits year-to-year comparisons and seasonal analyses. Cons associated with AIS data include the fact that only self-selected mariners purchase and install AIS transponders for vessels that do not have AIS carriage requirements, and AIS data are difficult to manipulate in GIS because of their volume.

Figure 6. Sailing Vessel Density and Distance Sailing Races

Source: ESRI 2010; NOAA 2015, Point97 et al. 2015



As evidenced by the AIS data, the apparent transits of pleasure craft and sailboats in Figure 6 are almost all low density (blue), based on the figure extent. In the AoA, the majority of the pleasure craft and sailboat routes trend from the southwest to the northeast (and vice versa) (NOAA 2015). A large proportion of these routes appear to originate and/or terminate at ports in Rhode Island and Massachusetts, and some of the transits may originate from Long Island Sound. Southwest of the AoA, several of these routes appear to originate and/or terminate at Atlantic City, Ocean City, and Cape May, New Jersey (NOAA 2015). Others continue south to Norfolk and Virginia Beach, Virginia. Pleasure craft and sailboats are found at low densities along the length of the New Jersey coastline, as well as along the Rhode Island and Massachusetts coastlines and within the Rhode Island and Nantucket Sounds (see Figure 6). Within the AoA, the highest concentration of pleasure craft and sailboats appears to be in the northeast corner, when boats originate in Rhode Island and Massachusetts and then transit through the AoA south of New York (NOAA 2015). Pleasure craft and sailboat routes also parallel the Long Island coast.

In addition to the recreational boater activity discussed above, a few distance sailboat races occur in the vicinity of the AoA (see Figure 6). Only one distance sailing race, beginning in Annapolis, Maryland, and ending in Newport, Rhode Island, actually crosses the AoA. This event occurs biennially in June and is organized by the Annapolis Yacht Club and the Newport Racing Center (Annapolis to Newport 2017). The remainder of the distance races occur north and east of the AoA and include the Bermuda One Two, the Volvo Ocean Race, the Marian to Bermuda Race, the Corinthians, the Stamford Vineyard Race, and others.

2.3.5 Cruise Ship Tourism

Cruise ships regularly transit through the AoA, frequently on international voyages, including those originating from three cruise ship terminals within the Port of New York and New Jersey: the Manhattan Cruise Terminal and the Brooklyn Cruise Terminal in New York, and the Cape Liberty Cruise Port in Bayonne, New Jersey (see Figure 7) (Port Authority of New York and New Jersey 2017). Cruise ships departing or making ports of call at these terminals frequently transit through the AoA. Manhattan Terminal, with five 1,000-foot-long berths, is the largest of the three terminals (Port of New York and New Jersey 2017). The estimated number of cruise passengers that passed through the New York terminals combined was 602,265 in 2014; this includes embarking and transit cruise passengers (NYCruise 2015). In 2016, Cape Liberty Cruise Port reported 509,306 passengers passing through the port, the highest number on record (Lin 2017). These are the most recent, readily available passenger numbers.

With respect to total numbers of departures from these three ports, Table 2 provides the total monthly 2017-2018 scheduled cruise departures. Cruise ship activity in the region of the AoA increases in May and the summer months and peaks in September and October, with a total of 55 and 82 departures, respectively. Winter and early spring are slower cruise ship seasons by comparison.

Table 2. Cruise Terminals in the Port of New York and New Jersey: Monthly Scheduled Departures

Source: NYCruise 2017; Cape Liberty Cruise Port 2017

Terminal Location	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	YR
Manhattan	8	6	7	10	12	13	19	19	36	61	20	13	**224**
Brooklyn	1	0	0	0	2	1	3	1	8	8	2	2	**28**
Bayonne	3	3	4	3	8	9	9	9	11	13	4	4	**80**
Total	**12**	**9**	**11**	**13**	**22**	**23**	**31**	**29**	**55**	**82**	**26**	**19**	**332**

The AIS data indicate the principal transit routes of passenger ships, including cruise ships, in and around the AoA. The 2013 AIS passenger vessel density data presented in Figure 7 were created by NOAA's Office for Coastal Management and reviewed by stakeholders in the port and shipping sectors and the USCG during outreach conducted in early 2015 (Shmookler 2015). The data represent the number of passenger vessels with AIS transporters in 100-meter grid cells. At the time of this report, 2013 vessel density data were the most recently processed AIS data available. It is important to note that the passenger vessel density in Figure 7 indicates vessel density along a low-to-high scale, not actual vessel counts. A similar discussion of passenger vessel density, including cruise ships, is included in the separate Navigation Study, also appended to the Master Plan.

Figure 7. 2013 Passenger Vessel Density

Source: ESRI 2010; NOAA 2015; Point97 et al. 2015

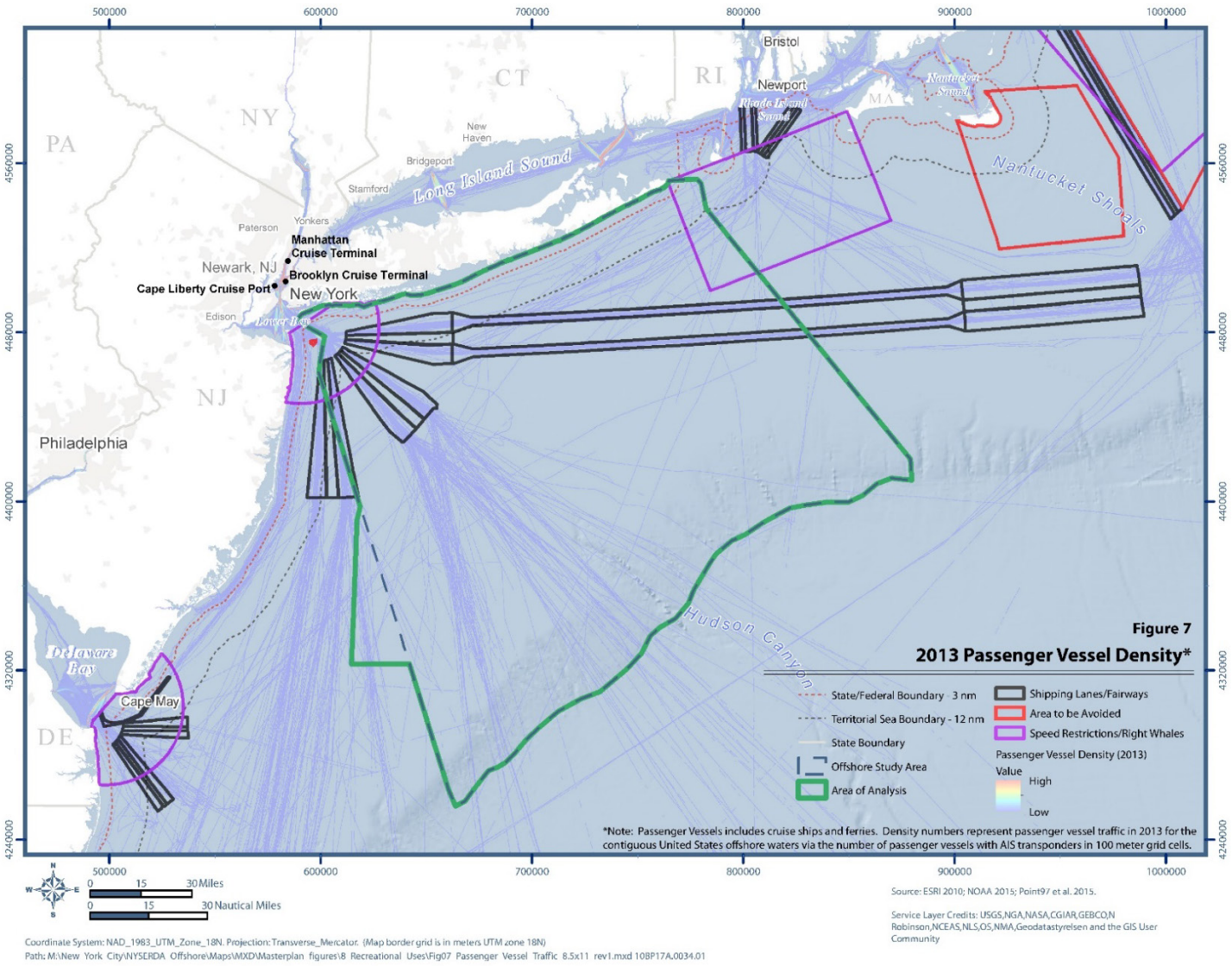


Figure 7 shows that passenger vessel transits originating from the Port of New York and New Jersey are concentrated within the six inbound and outbound designated shipping lanes that branch out like spokes on a wheel from the precautionary area/speed restrictions at the entrance of Ambrose Channel and Lower New York Bay (see Figure 7).[4] These shipping lanes intersect the AoA. The passenger vessels transiting are assumed to be cruise ships because the orientation of the transits imply oceanic voyages. As a category of AIS vessel data, "passenger vessels" include cruise ships and ferries, and ferries are assumed to have shorter transits confined to the bays or along the coastline. Given assumptions about the length and direction of cruise ship transits, the AIS data also show that some cruise ships passing through the AoA travel a route approximately parallel to the Long Island shore toward Rhode Island Sound. Some passenger vessels originating in Rhode Island transect the eastern portion of the AoA and others continue east of the AoA. Still other cruise ships navigate a corridor parallel to the New Jersey coast within approximately 5 nm of shore, west of the AoA (BOEM and NOAA 2017).

As stated above, the origins of cruise ship transits in the AoA are concentrated in the shipping lanes offshore of Lower New York Bay, and most of these transits continue further offshore into the Atlantic Ocean in the same general directions. Thus, the majority of cruise ship use within the AoA is fairly predictable and confined to several major routes. In fact, cruise ships transiting due east or west confine themselves almost exclusively within the boundaries of shipping lanes and shipping safety fairways between the entrance to the New York and New Jersey Harbor and the Nantucket Shoals, as shown on Figure 7 (BOEM and NOAA 2017).

Cruise ship vessel densities are low within the AoA compared with other vessel densities in the region. Where they converge just outside the entrance of the New York and New Jersey Harbor, the cruise ship transit density increases, but this general location is outside of the AoA boundary. In sum, cruise ship traffic within the AoA is concentrated in fairly discrete routes headed in a few directions, but even within those discrete routes, the relative level of cruise ship traffic is low (BOEM and NOAA 2017).

[4] The referenced shipping lanes are New York Eastern Approach: Nantucket to Ambrose; New York Southeastern Approach: Hudson Canyon to Ambrose; and New York Southern Approach: Barnegat to Ambrose.

3 Potential Risks

This section describes potential risks to marine recreational uses from offshore wind development activities during future siting, construction, and operation stages. Given the presence of recreational activity in and adjacent to the AoA, marine recreational uses have the potential to conflict with offshore wind farms and activities related to future wind farm siting, construction, and operation, resulting in potential impacts on marine recreational uses. This section provides information that should be considered during site selection for future offshore wind projects.

The chief factors that determine the potential risk that marine recreational uses could be impacted by offshore wind development activities are: (1) distance of the use from a potential project site within the AoA and/or from an activity associated with the wind farm; (2) geographic extent of the recreational use; and (3) seasonality. Given the locations of the various marine recreational uses, certain wind development activities could present potential conflicts depending on where they are sited. Marine recreational activities that occur close to shore (e.g., surfing or recreational boating) may be at risk due to construction of underwater transmission cables from offshore wind farms. In addition, construction vessel traffic between an offshore wind farm location and a port staging area could pose risks to or temporarily disrupt recreational activities close to shore, depending on the location of the port. Marine recreational activities that occur farther from shore (e.g., whale watching or sailboat racing) could be at risk due to in-water construction of wind turbines, inter-turbine cable arrays, and electrical service platforms (ESPs). They could also be at risk due to construction vessel traffic, depending on the vessel volume and frequency.

The wind farm activities with the greatest potential to create impacts on marine recreational uses during the siting, construction, and operation of offshore wind farms are summarized below. The activities discussed below were identified through a review of environmental documentation of offshore wind farms in the U.S. and Europe.

- **Conflicts of Recreational Uses with Wind Farm Vessel Traffic during Siting, Construction, and Operation.** Various pre-construction siting studies would be required prior to future wind farm development. Siting studies may occur at different times during the year and would likely include geological, geotechnical, archaeological, and biological surveys, as well as meteorological data collection.

Performance of these studies would require vessel transits to/from shore and within the AoA, which may impact recreational use vessels in the nearshore/adjacent area of the AoA. Based on estimates included in the *Commercial Wind Lease Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf Offshore New York EA* (BOEM 2016c), the total number of vessel trips associated with pre-construction siting studies could range from 200 to 540, depending on the length of survey (i.e., 24 hours versus 10-hour days). Survey vessels would likely use smaller ports such as those associated with Staten Island, Kimet Harbor, and Ocean Beach Harbor, New York; and Perth Amboy, Shark River, and Manasquan, New Jersey. Estimates of the number of round trips anticipated for the construction of a meteorological tower are up to about 40 round trips (BOEM 2016c). Vessels associated with the installation of a meteorological tower would be anticipated to depart from larger ports such as Staten Island, Erie Basin, and Brooklyn, New York; and Bayonne, Newark, Elizabeth, and Perth Amboy, New Jersey.

Numerous construction and support vessels would be required during construction of an offshore wind farm and its components; the use of these vessels may be spread over multiple construction seasons. Support vessels may transit back and forth on a daily basis, while large construction vessels could remain at their posts for extended periods. If the offshore staging area for a wind farm is near a nearshore recreational use area, the support vessel traffic and occasional construction vessel traffic back and forth to the offshore staging dock could potentially impact the safety or level of enjoyment of the recreationists. Likewise, if the support and construction vessel transit routes from shore pass through the locations of any of the marine recreational uses occurring in the nearshore area, they could potentially disrupt recreationists' enjoyment or pose safety concerns.

During maintenance, vessel traffic associated with repairing or inspecting offshore wind farm components could potentially pose the same concerns, but their probability of occurrence may be very low due to their lower frequency of transit and lower numbers of vessels needed.

- **Displacement by Construction Activities.** Construction vessels and floating equipment used to install a future offshore wind farm and its components would displace a certain amount of available ocean area during the construction period. Recreational activities and recreational boats would be required to avoid active construction areas. Temporary exclusion zones, essentially buffers, may be established around the construction equipment and work areas, including the export cable right-of-way, which may potentially impact recreation uses during construction in the nearshore environment. These temporary exclusion zones would occupy a substantially larger percentage of ocean area than would construction vessel transits, displacing recreational activity in the interim. Except in the nearshore areas where cables would be constructed, the temporary exclusion zones around wind farm construction activities represent just a small fraction of the ocean area that remains available. After construction is completed, temporary exclusion zones would likely be suspended during operation and maintenance of the future wind farm. Additionally, construction activities may result in visibility and sound impacts that could potentially displace recreational users, specifically divers, from the area.
- **Displacement by Project Facilities.** The footprint of any future WTGs and ESP would be the only elements potentially displacing marine recreational activity. However, with the use of appropriate marking, lighting, and sound warning devices for WTGs, recreational boaters

would have the ability to safely navigate through a future wind farm. These safety measures would also identify any restricted access or exclusion zones as/if applicable. Divers would not be displaced by project facilities because they would be allowed to dive at the base of the future turbines.

Table 3 provides a high-level summary of regularly occurring marine recreational activities, their associated seasonality, and geographic range in the AoA, and their relative risk of impacts from future siting, construction, and operation of an offshore wind farm. Seasonality of activities affects risk as those with a broader seasonal occurrence (e.g., year-round) would be associated with greater potential for impact. The geographic range of a particular activity relative to the locations of offshore wind farms and associated activities (i.e., siting, construction, and operation) also influences the potential risk. The marine recreational activities that occur in areas also identified for a project site or for construction activities, e.g., staging areas and construction vessel transits, would have a higher potential for impact.

As indicated in Table 3, the level of potential risk ranges from low to moderate due to the assumed implementation of many of the BMPs described in Section 4. The level of potential risk varies depending on the influence of seasonality (i.e., how much of an overlap with project activities) and the geographic range of a particular activity relative to the locations of offshore wind farms and associated activities, coupled with the assumed ability of potential risk to be avoided or mitigated with the implementation of the BMPs identified in Section 4.

Definitions of the levels of potential risk were informed by the impact levels included in the *Commercial Wind Lease Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf Offshore New York EA* (BOEM 2016c). They are defined as follows:

- Low: These risks are associated with potential impacts on a marine recreational activity that can be avoided with mitigation, and once the cause of the potential impact is eliminated, the recreational activity would return to a condition with no measurable effects. Low risks are also associated with activities with a narrow seasonal window and greater distance from project activities.
- Moderate: These risks are associated with potential impacts on a marine recreational activity that can be mitigated, but would result in an activity having to adjust somewhat to disruptions from the construction or operational phase of an offshore wind farm. Moderate risks are also associated with activities having broader seasonal windows and shorter distances from project activities.

Table 3. Potential Risk Posed to Marine Recreational Uses by Offshore Wind Development Activities

Marine Recreational Uses	Seasonal Occurrence	Geographic Range Adjacent to/within the AoA	Potential Impact and Relative Sensitivity
Surface water activities (swimming, windsurfing, surfing, kayaking/paddling, kite boarding)	Summer for all but surfing, which can occur year-round	Primarily nearshore and along northern boundary of AoA: Near the coastlines of New York and New Jersey	Siting: • Temporary low safety risk associated with the transit of various survey vessels within the AoA due to the predominantly narrow seasonal occurrence (i.e., summer). • Temporary low safety and displacement risk because of exclusion zones for surveys of onshore landing areas and the narrow seasonal occurrence. Construction: • Low safety risk associated with the transit of support vessels required for construction. Operation: • Low safety risk associated with the transit of vessels for repair/maintenance of offshore wind farm.
Underwater activities (snorkeling and free diving)	May through October	Primarily nearshore within the AoA: Near the coastlines of New York and New Jersey, especially the western end of Long Island and northern New Jersey	Same as those listed above for surface water activities with the exception that risk of impacts during the siting process could be moderate due to the broader seasonality.
Whale watching	Spring through fall, with a peak in activity in July and August	Nearshore and offshore within AoA: Dominant use areas along the western Long Island and northern New Jersey coasts and within northwestern corner of AoA; general use areas extend into the northwest and northeast corners of AoA; supplemental use area comprises the eastern half of the AoA	Siting: • Temporary low safety risk associated with the transit of various survey vessels within the AoA. • Temporary low safety and displacement risk associated with exclusion zones for surveys of onshore landing areas. Construction: • Low safety risk associated with the transit of support vessels required for construction. • Low safety and displacement risk associated with temporary exclusion zones around WTG and cable footprints and the limited seasonal occurrence of whale watching. Operation: • Low safety risk associated with the transit of vessels for repair/maintenance of offshore wind farm. • Moderate displacement risk due to overlap with the AoA and potential need to adjust routes around WTGs and ESPs.
Bird watching	Year-round (includes winter pelagic bird watching)	Primarily nearshore and within AoA: Primarily along the shoreline and within the 12-nautical-mile territorial sea boundary, with the exception of an area stretching almost 50 miles from Jones Inlet to Hudson Canyon within the AoA	Siting: • Temporary low safety risk associated with the transit of various survey vessels within the AoA. • Temporary low safety and displacement risk associated with exclusion zones for surveys of onshore landing areas. Construction: • Low safety risk associated with the transit of support vessels required for construction. • Moderate safety and displacement risk associated with temporary exclusion zones around WTG and cable footprints and the broader seasonal occurrence of bird watching. Operation: • Low safety risk associated with the transit of vessels for repair/maintenance of offshore wind farm. • Moderate displacement risk due to overlap with AoA and potential need to adjust routes around WTGs and ESPs.

Table 3 continued

Marine Recreational Uses	Seasonal Occurrence	Geographic Range Adjacent to/within the AoA	Potential Impact and Relative Sensitivity
Scuba diving	May through October	Nearshore and offshore within AoA: Multiple sites within the northern and western halves of the AoA	Siting: • Temporary moderate safety risk associated with the transit of various survey vessels within the AoA due to the broader seasonality of occurrence. Construction: • Moderate safety risk associated with the transit of support vessels required for construction. • Low safety and displacement risk associated with temporary exclusion zones around WTGs and cable footprints; these zones are assumed to mitigate any visibility and sound impacts during construction. Operation: • Low safety risk associated with transits of vessels for repair/maintenance of offshore wind farm. Risk is lower than during construction due to lower frequency of transits and numbers of vessels needed during operation. • Moderate displacement risk due to potential access issues if a turbine is sited near a dive site (low probability).
Recreational boating	May through October with a peak in summer months	Nearshore and offshore within AoA: Routes originating from Raritan, Lower New York, and Sandy Hook bays; medium-density route traversing the AoA from west to east originating in Point Pleasant, New Jersey; multiple low- to medium-density routes originating from the New York coast that traverse the AoA in a north-south direction	Siting: • Temporary low safety risk associated with the transit of various survey vessels within the AoA. • Temporary low safety and displacement risk associated with exclusion zones for surveys of onshore landing areas. Construction: • Moderate safety risk associated with the transit of support vessels required for construction due to the presence of multiple recreational boat routes within the AoA. • Moderate safety and displacement risk associated with temporary exclusion zones around WTG and cable footprints and the limited seasonal occurrence of recreational boating. Operation: • Low safety risk associated with the transit of vessels for repair/maintenance of offshore wind farm. • Moderate displacement risk due to overlap with AoA and potential need to adjust routes around WTGs and ESPs.
Cruise ship tourism	Year-round	Primarily offshore and within AoA: Adjacent to and within the AoA, including within the three defined shipping lanes that overlap with the AoA; highest concentration of activity is in the western half of the AoA	Siting: • Temporary low safety risk associated with the transit of various survey vessels within the AoA. Construction: • Moderate safety risk associated with the transit of support vessels required for construction due to year-round seasonal occurrence of cruise ship tourism. • Moderate safety and displacement risk associated with temporary exclusion zones around WTGs and cable footprints due to the broad seasonality of cruise ship operation and the presence of shipping lanes within the AoA. Operation: • Low safety risk associated with transits of vessels for repair/maintenance of offshore wind farm. Risk is lower than during construction due to lower frequency of transits and numbers of vessels needed during operation. • Moderate displacement risk due to the presence of shipping lanes within the AoA and year-round cruise tourism.

4 Guidelines and Best Management Practices

Existing guidelines and BMPs are available for future offshore wind developers to consider when designing ways to mitigate and reduce risks to marine recreational uses in and adjacent to the AoA. Table 4 provides a list of BMPs that have been implemented in the past at other offshore wind farms; these have been compiled for inclusion here simply for consideration by developers to potentially avoid or mitigate risks on marine recreational activities. Thus, the guidelines and BMPs included here are not being explicitly suggested for implementation on any specific future offshore wind project off New York State.

The BMPs in BOEM's 2016 Guidelines for Information Requirements for a Renewable Energy Site Assessment Plan are based on a 2007 MMS-prepared programmatic Environmental Impact Statement related to the Alternative Energy and Alternate Use Program (MMS 2007); for the most part, the guidelines do not include BMPs specifically related to marine recreational uses (BOEM 2016a). However, other NEPA environmental studies of specific offshore wind farm projects in the United States, as well as similar studies from Europe, provide examples of such BMPs. These include the *Deepwater Wind Block Island Environmental Assessment* (U.S. Army Corps of Engineers [USACE] 2014), the *Cape Wind Energy Project Final Environmental Impact Statement* (MMS 2009), the *Triton Knoll Offshore Wind Farm Electrical System Environmental Impact Assessment Scoping Report* (RWE Innogy 2014), and the *Greater Gabbard Offshore Wind Farm Environmental Statement* (Project Management Support Services [PMSS] 2005).

Guidelines and BMPs summarized from regulatory guidance documents are subject to change over time, and new guidance, technologies, or regulations are likely to arise after publication of this Study. Therefore, developers should consult BOEM and other federal and state agencies for up-to-date recommendations or regulatory requirements. This Study does not intend to propose changes to existing guidance or to develop new guidance. The State is in the planning phase for offshore wind energy development, the outcome of which will help to inform their next steps, including an approach to develop guidelines.

Table 4. Existing Offshore Wind Guidelines and Recommended BMPs Related to Marine Recreational Uses

Applicable Recreational Activity(ies)	Guidelines/BMPs	Source
All	Bury cables at target depth of 6-10 feet below seafloor to avoid interactions with anchors to maximum extent practicable. Where cable burial is less than 4 feet, install concrete matting, rock piles, or other protection.	USACE 2014; MMS 2009; PMSS 2005
Surface water activities	Bury transmission cables at a minimum depth between Mean High Water and Mean Low Water of Elevation minus 10 feet Mean Low Water.	USACE 2014
All	Implement communication plans during construction to inform recreational boaters and charter boat operators of construction activities and construction vessel movements; facilitate plans through a project website, public notices to mariners, and vessel float plans.	USACE 2014
Recreational boating, boat-based scuba diving, boat-based wildlife viewing, cruise ship tourism	Provide mariner information sheets on the project website with details on location of project facilities and specifics such as blade clearance above sea level.	USACE 2014
All	Establish designated construction vessel traffic routes, construction standby areas, and work areas.	USACE 2014
Recreational boating, boat-based scuba diving, boat-based wildlife viewing, cruise ship tourism	Submit information to the USCG to issue Local Notices to Mariners during offshore installation activities.	USACE 2014
All	Add turbine locations to NOAA navigational charts.	Permit stipulation by USCG to Block Island Wind Farm
All	Post notices with local harbor masters and points close to landfall location(s), and notify local recreational groups identified through stakeholder outreach process regarding construction activities.	RWE Innology 2014
Recreational boating, boat-based scuba diving, boat-based wildlife viewing, cruise ship tourism	Mark and light wind turbines with both USCG- and Federal Aviation Administration-approved navigational aids.	USACE 2014; BOEM 2007; PMSS 2005
Recreational boating, boat-based scuba diving, boat-based wildlife viewing, cruise ship tourism	Affix a sound signal to the WTG located in the center of the WTG array.	USACE 2014
Recreational boating, boat-based scuba diving, boat-based wildlife viewing, cruise ship tourism	Ensure construction vessels display appropriate day shapes and/or lighting and that they continuously monitor appropriate VHF channels for other vessel activity in the area.	MMS 2009

Table 4 continued

Applicable Recreational Activity(ies)	Guidelines/BMPs	Source
Recreational boating, boat-based scuba diving, boat-based wildlife viewing	Minimize or eliminate navigation exclusion areas for any recreational boating vessels, including charters during operation.	USACE 2014
All	Ensure construction, supply, and maintenance vessels that travel to the AoA operate at slow speeds, (e.g., 10 knots or less).	USACE 2014; MMS 2009
All	Ensure that all construction and operation vessels comply with regulatory requirements related to the prevention and control of spills and discharges. A Project-specific Spill Control and Response Plan must be developed prior to construction and operation to further minimize risk.	Per BOEM's regulations that direct offshore wind developers to reference 30 CFR 254.46.

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Appendix A Survey Questions from the U.S. Mid-Atlantic Coastal and Ocean Recreation Study

Appendix A. Coastal and Ocean Recreation Survey Questions

The following is an exact copy of the survey text.

Welcome! We are conducting a survey of recreation activities in the coastal and ocean areas of New York, New Jersey, Delaware, Maryland, and Virginia. This survey is being conducted to help inform ocean planning in the U.S. Mid-Atlantic region. We want to hear from you even if you have not visited the coast recently.

Please remember that all your individual information will be kept private and that survey results will be presented in summarized form. If you need to stop and come back to the survey, simply use the survey link sent to your email--all your information will automatically be saved. If you'd like to go back to any survey question, please use the browser back button.

Q1. What state do you live in? (Include all state- short list shown here)

1. New York
2. New Jersey
3. Delaware
4. Maryland
5. Virginia
6. District of Columbia
7. Other <fill in>

Q2. You indicated you live in <fill in from Q1> State. What county to you live in?

Information Page:
The following questions are about where you recreated **during the last 12 months in Mid-Atlantic coastal and ocean areas (see yellow area of map)**.

The Mid-Atlantic coastal and ocean areas include the states of New York, New Jersey, Delaware, Maryland, and Virginia and excludes **Delaware Bay, Chesapeake Bay, and the Long Island Sound**.

For the purposes of this survey, recreation includes activities such as beach going, wildlife viewing, scenic enjoyment, surfing, kayaking, etc. This survey **does not include consumptive activities** such as recreational fishing or clamming as this information is being collected through a separate survey effort.

Q3. Which of the following recreation activities have you participated in **during the last 12 months** in Mid-Atlantic coastal and ocean areas? Select all that apply.

b) Biking or hiking
c) Collection of non-living resources/beachcombing (beach glass, shells, fossils, driftwood)
d) Camping
e) Photography
f) Scenic enjoyment/sightseeing
g) Sitting in your car watching the scene
h) Watching birds, whales, seals and/or other marine life (from shore or private boat)
i) Watching birds, whales, seals and/or other marine life (from a charter boat)
j) Hang gliding/parasailing
k) Kite boarding
l) Skim boarding
m) Surfing (from board or kayak or stand up board)
n) Swimming or body surfing
o) Windsurfing
p) Free diving/snorkeling (from shore or boat)
q) Kayaking or other paddling activity (canoe, stand up paddle board)
r) SCUBA diving (from a charter boat)
s) SCUBA diving (from shore or private boat)
t) Other, please list: [TEXTBOX]

Q4. Please estimate how many trips you have made to Mid-Atlantic coastal and ocean areas in the **last 12 months that were primarily for coastal and ocean recreation** (e.g., beach going, wildlife viewing, surfing, kayaking, etc.). A trip is defined as an **intentional trip outside of daily routine**. Your best estimate is fine.

Q5. Mapping of coastal and ocean recreation activity locations
In the mapping component the respondent will be presented with a navigable map of the coast (e.g., Google maps) and will be ask:

1) Navigate the map or use search function to zoom to the areas which they conducted ocean and coastal and ocean recreation activities in last 12 months.
    a. The user can zoom in and out and move the map around to navigate the map to specific areas
    b. The user can also utilize a search function (similar to google maps) to zoom to specific areas
    If the use zooms out to far and a
    c. ttempts to drop an activity

   d. The user will also receive an error message if they place an activity marker outside the study region
2) For each activity point the user will be asked to associate one or more activity with the activity marker they place on the map

Now we'd like you to think about your **last trip** to Mid-Atlantic coastal and ocean areas that was **primarily for coastal or ocean recreation purposes**. A trip is defined as an **intentional trip outside of daily routine**. Based on this, we'd like you to answer the following questions.

Q6. During your **last trip** to Mid-Atlantic coastal and ocean areas, what recreation activities did you participate in? Select all that apply.

a) Beach going (sitting, walking, running, dog walking, kite flying, etc.)
b) Biking or hiking
c) Collection of non-living resources/beachcombing (beach glass, shells, fossils, driftwood)
d) Camping
e) Photography
f) Scenic enjoyment/sightseeing
g) Sitting in your car watching the scene
h) Watching birds, whales, seals and/or other marine life (from shore or boat)
i) Watching birds, whales, seals and/or other marine life (from a charter vessel)
j) Hang gliding/parasailing
k) Kite boarding
l) Skim boarding
m) Surfing (from board or kayak or stand up board)
n) Swimming or body surfing
o) Windsurfing
p) Free diving/snorkeling (from shore or boat)
q) Kayaking or other paddling activity (canoe, stand up paddle board)
r) SCUBA diving (from a charter vessel)
s) SCUBA diving (from shore or boat)
t) Other, please list: [TEXTBOX]

Q7. Of the recreation activities you just selected, what was your **primary** recreation activity during your **last trip** to Mid-Atlantic coastal and ocean areas?

Q8. How many nights did you spend at the coast during your **last trip** to Mid-Atlantic coastal and ocean areas?

Q9a. During your **last trip** to Mid-Atlantic coastal and ocean areas please indicate if your party spent money on the following items.

a. Parking
b. Car fuel
c. Airline flight
d. Food and beverages from a store
e. Food and beverages at a restaurant or bar
f. Shopping and souvenirs (t-shirts, posters, gifts, etc.)
g. Sundries (sunscreen, surf wax, motion sickness pills, batteries, camera data cards, etc.)
h. Car rental
i. Dive equipment rental and airfills
j. Equipment rental (Surfboard, bike, kayak, stand up paddle, etc)
k. Lodging (if you stayed overnight)
l. Charter fee (whale watching, etc.)
m. Park entrance, museum, aquarium, or other entrance fee
n. Lessons, clinics, camps
o. Other, please list

Q9b. During your **last trip** to Mid-Atlantic coastal and ocean areas, please estimate how much **your party** spent on the following items and the number of people it covered.

Expense item	**Cost: $**	**# of people covered**
a) Parking		
b) Car fuel		
c) Airline flight		
d) Food and beverages from a store		
e) Food and beverages at a restaurant or bar		
f) Shopping and souvenirs (t-shirts, posters, gifts, etc.)		
g) Sundries (sunscreen, surf wax, motion sickness pills, batteries, camera data cards, etc.)		
h) Car rental		
i) Dive equipment rental and airfills		
j) Equipment rental (Surfboard, bike, kayak, stand up paddle, etc)		
k) Lodging (if you stayed overnight)		
l) Charter fee (whale watching, etc.)		
m) Park, museum, aquarium, or other entrance fee		
n) Lessons, clinics, camps		
o) Other, please list		

DEMOGRAPHIC SURVEY QUESTIONS
Information Page:
We have just a few more questions for you. Please keep in mind that your answers are confidential and your personal information will be kept private. The following questions are optional, you may skip any particular question by simply clicking 'continue'.

D1. Please estimate approximately how many miles (driving miles one way) do you live from the coast?

1. 1–10 miles
2. 11-30 miles
3. 31-60 miles
4. 61–120 miles
5. 121–180 miles
6. 180+ miles

D2. If you live on the coast, please tell us how much nearby coastal and ocean recreation opportunities played into your decision to live on the coast:

1. I do not live on the coast
2. Not at all
3. A Little
4. Not sure
5. A Lot
6. Main reason I live on the coast

D3. What was your total HOUSEHOLD income in the past 12 months?

Less than $25,000	1
$25,000 to $49,999	2
$50,000 to $74,999	3
$75,000 to $99,999	4
$100,000 to $124,999	5
$125,000 to $149,999	6
$150,000 to $174,999	7
$175,000 to $199,000	8
$200,000 or greater	9
Don't know	10

D4. Are you…?

Male	1
Female	2

Please indicate what you consider your racial background to be. We greatly appreciate your effort to describe your background using the standard categories provided. These race categories may not fully describe you, but they do match those used by the Census Bureau. It helps us compare our survey respondents to the U.S. population.

D5. Please check one or more categories below to indicate what race(s) you consider yourself to be.

White	1
Black or African American	2
Hispanic, Spanish, or Latino	3
American Indian or Alaska Native	4
Asian/Pacific Islander	5
Other	6

D6. What is the highest level of school you have completed?

No formal education	1
Less than high school	2
High school	3
Some college	4
Bachelor's degree or higher	5

QFEEDBACK. To help us improve future surveys, would you agree that the mapping portion of this survey easy to understand and use?
Strongly Agree……1
Somewhat Agree……2
Neither Agree nor Disagree……3
Somewhat Disagree……..4
Strongly Disagree……..5

QCOMMENTS. To help us improve future surveys, please provide any comments or feedback you may have that will help us improve this survey. Was there a specific section of the survey that you had trouble understanding? What would make it easier?

Thank you for participating in our survey. We appreciate your help and input! If you have friends or colleagues who would be interested in taking this survey as well, please direct them to:

http://www.surfrider.org/mid-atlantic-recreation

Results from this survey will be posted to the Mid-Atlantic Data Portal <http://portal.midatlanticocean.org/portal/>. For more information on the Mid-Atlantic costal and ocean recreation survey project please see our FAQ, for more information on the Mid-Atlantic marine spatial planning process please see the MARCO website, and for more information on the Surfrider Foundation please visit our website.

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