Virginia Offshore Wind Technology Advancement Project on the Atlantic Outer Continental Shelf Offshore Virginia

Project Review Package (Biological Assessment and Avian Risk Assessment)

December 2014

For the U.S. Fish and Wildlife Service

U.S. Department of the Interior
Bureau of Ocean Energy Management (BOEM)
Office of Renewable Energy Programs

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List of Acronyms and Abbreviations

BA	biological assessment
BITS	Block Island Transmission System
BIWF	Deepwater Wind Block Island Wind Facility
BO	Biological Opinion
BOEM	Bureau of Ocean Energy Management
COP	Construction Activities Plan
DMME	Virginia Department of Mines, Minerals, and Energy
DOE	Department of Energy
ESA	Endangered Species Act
EA	environmental assessment
HDD	horizontal directional drilling
IPaC	Information, Planning, and Conservation
km	kilometers
kV	kilovolts
m	meters
MMS	Minerals Management Service
MW	megawatts
NMFS	National Marine Fisheries Service
nmi	nautical miles
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
OCS	Outer Continental Shelf
RAP	Research Activities Plan
sec	seconds
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service
VOWTAP	Virginia Offshore Wind Technology Advancement Project
WEA	Wind Energy Area
WTG	wind turbine generator

1. INTRODUCTION

Pursuant to Section 7(a)(2) of the Endangered Species Act (ESA) of 1973, the Bureau of Ocean Energy Management (BOEM) requests technical assistance from the U. S. Fish and Wildlife Service (USFWS) regarding the species and critical habitat that may be affected by offshore renewable energy development activity off the coast of Virginia. The activities being considered include approving a research activities plan for the construction of up to two 6-megawatt (MW) wind turbine generators (WTGs) in Outer Continental Shelf (OCS) (Figure 1), a 34.5 kV alternating current submarine cable interconnecting the WTGs (Inter-Array Cable), submarine transmission cable (Export Cable), and an underground cable (Onshore Interconnection Cable) that would connect the project with existing infrastructure located in Camp Pendleton State Military Reservation (Camp Pendleton) in Virginia (Figure 2). Onshore support facilities would be located at existing waterfront industrial or commercial sites in the cities of Virginia Beach, Norfolk, and/or Newport News, Virginia.

This document is a biological assessment (BA) of impacts to endangered and threatened species listed under the ESA that are under the oversight of the USFWS from the construction, operation and decommissioning of two wind turbines for the Virginia Offshore Wind Technology Advancement Project (VOWTAP) at the preferred location and alternative offshore and onshore locations (Figures 1 and 2). The preferred location for the two turbines is in aliquots D, H, and L within OCS Block 6111 (Figure 1). Alternative turbine locations in OCS blocks 6061, 6062 and 6112 were also analyzed in the VOWTAP environmental assessment (EA) (BOEM 2014a) and are also covered in this BA. The preferred export cable landfall site is near the rifle range parking lot at Camp Pendleton Beach (Figure 2). An alternative export cable landfall site at Croatan Beach and underground route was analyzed in the EA and is covered under this BA (Figure 2).

VOWTAP is a joint effort between Virginia Electric and Power Company, a wholly owned subsidiary of Dominion Resources, Inc. (Dominion) Dominion and the Virginia Department of Mines, Minerals, and Energy (DMME). BOEM is the lead action agency for this project in coordination with the U.S. Army Corps of Engineers (USACE) and the Department of Energy (DOE) who will be permitting and funding portions of this project, respectively. This BA initiates informal consultation under Section 7 of the ESA. A separate consultation is being conducted with the National Marine Fisheries Service (NMFS) for ESA-listed species under their oversight.

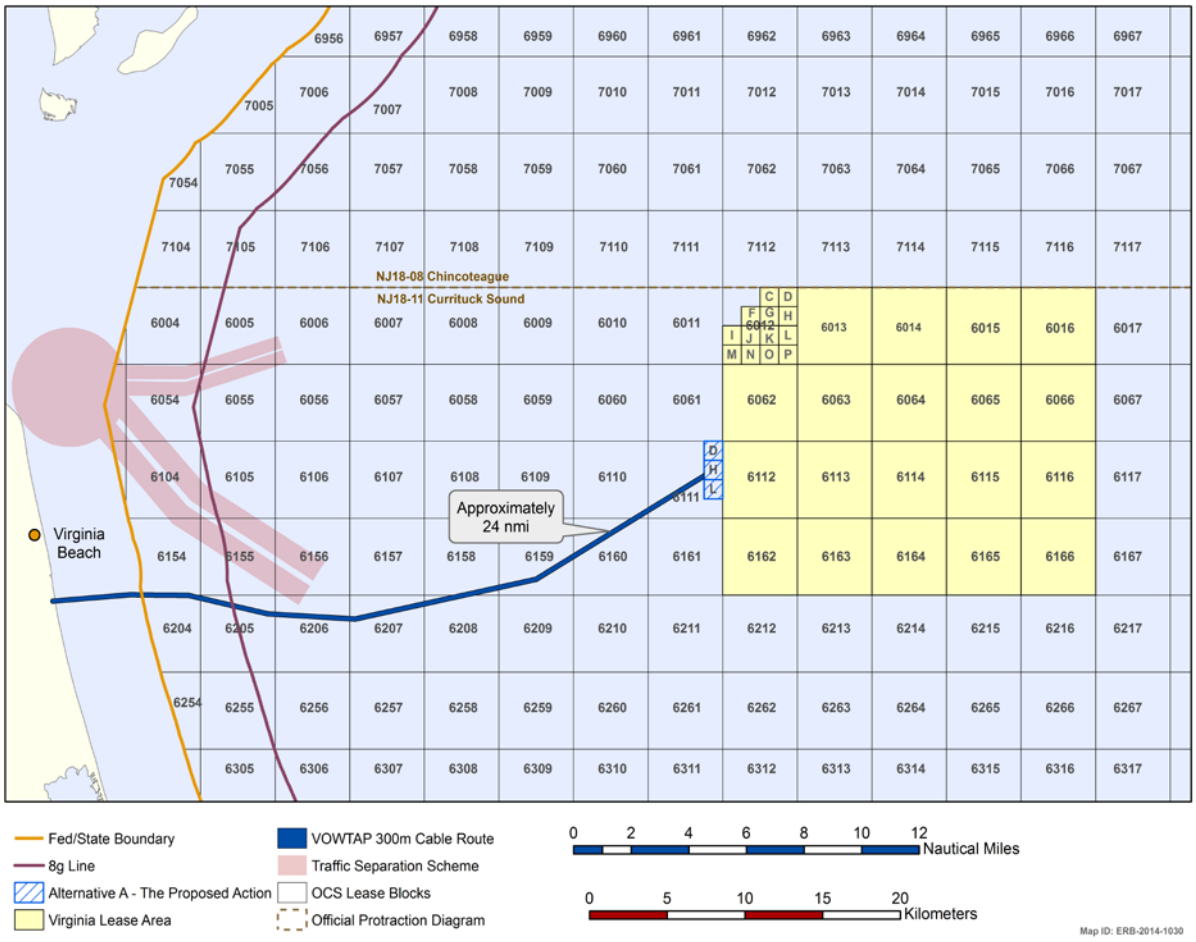

Figure 1. Location of the research lease area 24 nautical miles from shore and export cable route.

Figure 2. The VOWTAP onshore portion of the project area. Preferred on shore underground cable route (purple) and the alternative landfall and cable route (green) within Camp Pendleton.

BACKGROUND

On December 12, 2012, DOE announced funding awards for seven proposed "Offshore Wind Demonstration Projects" off the Nation's Coasts. One of these proposed projects is located on the OCS offshore Virginia, to the west of the commercial WEA. The purpose of these monetary awards is to enhance the deployment of stronger, more efficient offshore wind energy technologies - thereby helping to further lower costs and drive greater performance. DMME submitted a research lease application to BOEM on February 8, 2013 for the installation and operation of two 6 MW turbines, ancillary metocean facilities, a meteorological tower or buoy and installation of associated cabling to shore outside of the Virginia WEA. The nomination requests six specific aliquots (i.e., sub-blocks) in OPD NJ18-11 Currituck Sound Blocks 6061 and 6111.

On July 30, 2013, BOEM published a "Public Notice of an Unsolicited Request for an OCS Research Lease, Request for Competitive Interest, and Request for Public Comment" in the *Federal Register* for a 30-day comment period to obtain public input on a research proposal received from DMME, its potential

environmental consequences, and the use of the area in which the proposed project would be located. The notice published under Docket ID BOEM-2013-0020.

The public comment period in response to the *Federal Register* Notice closed on August 29, 2013. None of the comments received in response to the Notice expressed competitive interest in the area proposed by DMME. Accordingly, BOEM published a "Determination of No Competitive Interest" in the Federal Register on December 09, 2013, and will proceed with the leasing process on a non-competitive basis. The decision cleared the way for DMME to submit a plan for renewable research activities.

A Research Activities Plan (RAP; http://www.boem.gov/Research-Activities-Plan/) was submitted by DMME to BOEM on February, 21, 2014 plus two revised versions (July 2014 and October 2014). The plan details the VOWTAP proposed location and schedule and includes resource and assessment information and data collected to date in support of the planned design, construction, installation operation and maintenance of two 6MW turbines offshore Virginia. The plan also provides information related to the installation of approximately 27 nautical miles of submarine transmission cable as well as other ancillary facilities and improvements to terrestrial substations required to support the VOWTAP. Construction is expected to start in February 2017 and continue through September 2017 (RAP, 2014).

On March 13, BOEM announced that it was seeking public input as part of the scoping process as it prepares an EA to analyze potential impacts from proposed wind energy research activities offshore Virginia (http://www.boem.gov/Press03132014/). On April 3, 2014, BOEM also held a public scoping meeting in Virginia Beach, Virginia to solicit additional comments. On May 6, 2014, BOEM offered a research lease to DMME. In December 2014, BOEM published the EA for public comment. Additional background information can be found at: http://www.boem.gov/Research-Nomination-Outside-and-to-the-West-of-the-WEADOE/.

CONSULTATION HISTORY

This informal consultation for VOWAP builds upon BOEM's experience with similar but larger scale offshore wind development projects on the Atlantic.

On March 24, 2011, BOEM requested informal ESA Section 7 consultation with the USFWS for lease issuance and site assessment activities off New Jersey, Delaware, Maryland and Virginia. (The area off Virginia included the area covered under this BA). On June 20, 2011, USFWS concurred with BOEM's determinations regarding lease issuance and associated site characterization and assessment activities (construction, operation and decommission of buoys and meteorological towers) that the risk to roseate tern, piping plover, Bermuda petrel (cahow), and red knot was "small and insignificant" and therefore not likely to adversely affect the three ESA listed species.

BOEM was also involved in other consultations on construction, operation and decommissioning of offshore wind energy projects on the Atlantic. First, BOEM consulted with USFWS regarding the construction, operation, and decommissioning of offshore wind turbines for the Cape Wind Energy Project in federal waters of Nantucket Sound, Massachusetts. The USFWS biological opinion (dated November 21, 2008; http://www.boem.gov/uploadedFiles/BOEM/Renewable_Energy_Program/Studies/FWS%20Biological%20Opinion%20Cape%20Wind%20Project.pdf) concluded that the proposed Cape Wind Energy Project was not likely to jeopardize the continued existence of the piping plover and roseate tern and that, in all cases except collisions, the effect were insignificant or discountable and would not result in take (mortality) of roseate terns and piping plovers.

The second and more recent project, where BOEM was a cooperating agency, was with USACE who informally consulted with USFWS on the Deepwater Wind Block Island Wind Facility (BIWF) and Block Island Transmission System (BITS). The BIWF is comprised of five 6 MW wind turbines within three miles of Block Island, Rhode Island. On July, 31 2013, USFWS concurred that the proposed BITS and BIWF were not likely to adversely affect the American burying beetle, roseate tern, piping plover, or red knot "due to insignificant (should never reach the scale where take occurs) and discountable (extremely unlikely to occur) effects."

In preparation of this BA, BOEM requested, on February 20, 2014, USFWS concurrence on a list of species to be considered in the assessment required under ESA Section 7(a)(2). The Virginia Field Office informed BOEM of the online process they use to complete all project reviews, and given that is no online review process for an offshore wind energy project, the field office recommended that the voluntary Land-Based Wind Energy guidelines be incorporated into the VOWTAP to the maximum extent practicable (Troy Anderson, personal communication, February 28, 2014). On March 10, 2014, BOEM obtained the official species list for preferred onshore cable route and for an alternative onshore route on March 12, 2014 (Appendix A). To inform the EA and the ESA consultation process, Dominion

submitted the annual avian report (dated June 2014) which replaces the interim avian report in Appendix L of the RAP.

2. THREATENED AND ENDANGERED SPECIES

Birds

The Atlantic coast is a major flyway for birds, including terrestrial species, shorebirds, waterbirds, and marine birds. Four federally listed birds may be found within the BA area: Bermuda petrel (*Pterodroma cahow*), piping plover (*Charadrius melodus*), and roseate tern (*Sterna dougallii dougallii*). In addition, two candidate species, black-capped petrel (*Pterodroma hasitata*) and red knot (*Calidris canutus rufa*), may be found within the BA area. The black-capped petrel is currently under review by the USFWS to determine if the species should be proposed as threatened or endangered under the ESA. On September 30, 2013, the red knot was proposed as threatened under the ESA (78 FR 189). The Draft VOWTAP EA also provides a comprehensive description (Section 3.2.3.1) and an impact analysis (Section 3.2.3.2) for each threatened, endangered and candidate avian species that may occur within the proposed project area.

Piping Plover

The piping plover is a small migratory shorebird that breeds in sandy dune-beach-riparian habitat along the Atlantic Coast, the Great Lakes, and the Great Plains regions of the United States and winters in coastal habitats of the southeastern United States, coastal Gulf of Mexico, and the Caribbean (Elliot-Smith and Haig, 2004; USFWS 2009). The Great Lakes breeding population is listed as endangered, while the Atlantic Coast and Great Plains breeding populations are listed as threatened (USFWS, 2009). Critical wintering habitat has been established for the species along the coasts of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas (66 FR 36038). Only the Atlantic Coast population is likely to occur within the project area.

Coastal development is the most likely cause of population declines and the primary anthropogenic threat to piping plovers. Other threats include disturbance by humans, dogs, and vehicles on sandy

beaches and dune habitats (Elliott-Smith and Haig, 2004; USFWS, 2009). Despite these population pressures, there is little risk of near-term extinction of the Atlantic Coast population of piping plovers (Plissner and Haig, 2000). Since the listing of this species in 1986, the Atlantic Coast piping plover population has increased 240 percent, from approximately 790 breeding pairs to a preliminary estimate of 1,898 pairs in 2012 (USFWS, 2013). Although increased abundance has reduced near-term vulnerability to extinction, piping plovers remain sparsely distributed across their Atlantic Coast breeding range, and populations are highly vulnerable to even small declines in survival rates of adults and fledged juveniles (USFWS, 2009). Nevertheless, the piping plover is among 72 species (out of 177 species on the Atlantic OCS) that ranked moderate in its relative vulnerability to collision with wind turbines (Robinson Willmott et al., 2013). As of 2012, 259 pairs were nesting on the Virginia coast (USFWS, 2013) up from 100 in 1986 (USFWS, 2011). The piping plover was not detected during onshore surveys (RAP, 2014) or from previous efforts at Camp Pendleton (Wolf et al., 2013).

The piping plover breeding season extends from April through August. Piping plovers arrive at breeding locations in mid-March and into April. Post-breeding staging in preparation for migration extends from late July through September. The breeding season and spring and fall migration overlap; therefore, at either end of the breeding season, there may be plover movement through the project area. The Atlantic coast population of piping plovers winters along the southern Atlantic Coast from North Carolina to Florida and in the Bahamas and West Indies (Elliott-Smith and Haig, 2004). The migratory pathways along the coast and to the Bahamas are not well known (USFWS 2009; Normandeau et al., 2011). Due to the difficulty in detecting piping plovers in the offshore environment during migration because of nocturnal or high-elevation migratory flights (Normandeau et al., 2011), there are no definitive observations of this species in offshore environments greater than three miles from the Atlantic Coast (Normandeau et al., 2011).

Roseate Tern

The roseate tern is a small tern that breeds in colonies. Birds from the Atlantic and Caribbean populations winter along the northeastern coast of South America (USFWS, 2010); neither population has a breeding colony in Virginia (USFWS, 2010). Roseate terns in the northwestern Atlantic population are listed under the ESA as endangered, while terns in the Caribbean population are listed as threatened (USFWS, 2010). No critical habitat has been designated for this species (52 FR 42064). The USFWS published a five-year status review of the roseate tern that provides detailed information about the species (USFWS, 2010). The roseate tern is one among 61 species (out of 177 species on the Atlantic OCS) that ranked high in its relative vulnerability to collision with wind turbines (Robinson Willmott et al., 2013). The migration routes of roseate terns are poorly known but are believed to be largely or exclusively pelagic in both spring and fall (Nisbet 1984; Gochfeld et al., 1998; USFWS 2010).

Roseate terns have been sighted along the length of the Virginia coastline (eBird 2014). However, no roseates were detected during onshore and offshore surveys (RAP, 2014) or from previous efforts (Wolf et al., 2013; Williams et al., 2013). Nevertheless, very little roseate tern activity is expected to occur within the marine portion of the project area (Kinlan et al., 2013 [Appendix L]). The model was built using 124 roseate tern sightings throughout the mid-Atlantic during the summer and fall months. The modeled results from Kinlan et al., (2013) are based on the relationship between roseate terns and distance from shore, sea surface temperature, turbidity, surface chlorophyll a, and other factors (Kinlan et al. (2013 [Appendix H]). The model predicts (in blue) that terns are virtually absent from the marine portion of the project area.

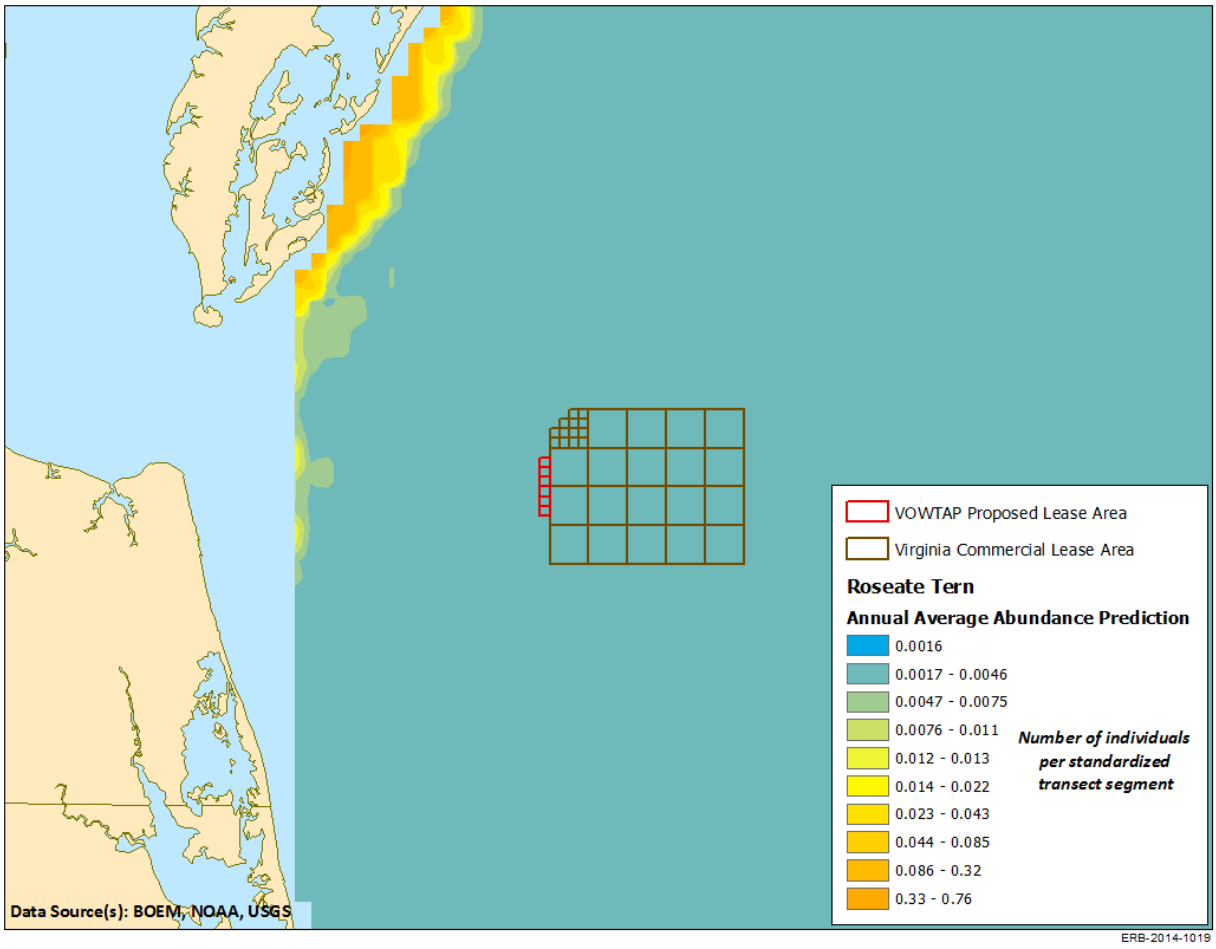

Figure 3. Predicted average annual distribution of roseate terns.

Red Knot

The red knot is a shorebird that breeds in the central Canadian arctic and winters as far south as Tierra del Fuego in South America. Each May, red knots congregate in Delaware Bay during their northward migration to feed on horseshoe crab eggs (*Limulus polyphemus*) and refuel for breeding in the Arctic. There are sightings of red knots along the shores of Virginia (eBird, 2014). No red knots were detected during onshore surveys (RAP, 2014) or from previous offshore (O'Connell et al., 2009; Williams et al., 2013) and onshore efforts (Wolf et al., 2013).

The red knot has declined dramatically over the past twenty years from a population estimated at 100,000 to 150,000 down to 18,000 to 33,000 (Niles et al., 2008). The primary threat to the red knot population is the reduced availability of horseshoe crabs eggs in Delaware Bay arising from elevated harvest of adult crabs (Niles et al., 2008). Despite restrictions to the crab harvest, the 2007 horseshoe crab harvest was still greater than the 1990 harvest, and no recovery of knots was detectable (Niles et al., 2009).

Although the precise migration route has not been firmly established, recent studies using birds tracked with light-sensitive geo-locators as well as analysis of large geospatial datasets of coastal observations

have revealed some migratory patterns of red knots in the U.S. Atlantic OCS (Niles et al. 2010; Normandeau Associates 2011; Burger et al. 2012a, 2012b). Some individuals traverse the northern sections of the US Atlantic OCS as they travel directly between northeastern U.S. migratory stopover sites and wintering areas or stopover sites in South America and the Caribbean, while others follow the US Atlantic coast or traverse the US Atlantic OCS further to the south as they move between US Atlantic coastal stopover sites and wintering areas (Niles et al. 2010; Normandeau Associates 2011; Burger et al. 2012a).

Red knots are known to fly very high during migration (78 FR 60024). Despite the presence of many onshore turbines along the red knot's migration route overland, there are no records of knots colliding with turbines (78 FR 60024). However, it has been speculated that red knots are more vulnerable to collision with wind turbines during periods of poor visibility as they prepare to land (78 FR 60024). The red knot is one among 72 species (out of 177 species on the Atlantic OCS) that ranked moderate in its relative vulnerability to collision with wind turbines (Robinson Willmott et al., 2013).

Bermuda Petrel

The Bermuda petrel, or cahow, is pelagic bird that is endemic to Bermuda and is federally listed as endangered (35 FR 6069). From October to June, the cahow nests in burrows among the uninhabited islets of Bermuda. The cahow was believed to be extinct in the 1620s; however, 18 breeding pairs were found on rocky islets in Castle Harbour in 1951, and an extensive conservation program has since developed, resulting in a record 105 breeding pairs in 2013 (Madeiros, 2013). Cahows are extremely aerial birds and rarely land on the sea, feeding by snatching food or "dipping" near the sea surface. They are known to feed at night, primarily on squids but also on fishes and invertebrates to a lesser degree. They are also known to scavenge dead or dying prey floating on or near the sea surface (Warham, 1990).

Threats to the cahow include the flooding of nesting areas by storms, destruction of nesting areas due to collapsing cliffs and erosion, and rats (Dobson and Madeiros, 2008). The cahow is one among 61 species (out of 177 species on the Atlantic OCS) that ranked high in its relative vulnerability to collision with wind turbines and medium for displacement (Robinson Willmott et al., 2013).

Outside of the breeding season, the cahow is probably widespread in the North Atlantic, following the warm waters on the western edges of the Gulf Stream, feeding on squid near the surface at night. There are confirmed sightings of the cahow offshore North Carolina (Lee, 1987) plus one record offshore that is 110 nautical miles due east of the VA WEA (eBird, 2014). The cahow was not detected during offshore surveys (RAP, 2014) or from previous efforts (O'Connell et al., 2009; Williams et al., 2013).

Black-Capped Petrel

The black-capped petrel is a rare seabird found in North America and the Caribbean. There are only 13 known breeding colonies and an estimated 600 to 2,000 breeding pairs. The USFWS conducted a 12-month status review to determine whether the Black-capped Petrel be listed under ESA (77 FR 37367). Current breeding populations are known only on the island of Hispaniola (Goetz et al., 2012) where the loss of forest habitat, predation by introduced mammalian predators, and collisions with communication towers have contributed to the bird's decline. Several potential and emerging threats at sea include fisheries bycatch, collisions with wind farm structures, oil platforms, and oil spills (Goetz et al., 2012). The black-capped petrel is one among 61 species (out of 177 species on the Atlantic OCS) that ranked high in its relative vulnerability to collision with offshore wind turbines and high for displacement (Robinson Willmott et al., 2013).

The black-capped petrel is typically found over waters deeper than >1,000 m (Simons et al., 2013). At night, they feed on squid and small fish near the surface. Petrel flight is consists of distinctive bounding or rising pattern that only occasionally rise >25 m above the ocean surface (Haney, 1987). Black-capped petrels may occasionally be seen off the Outer Banks of North Carolina, the Georgia Embayment, and other portions of the South Atlantic Bight (Cape Hatteras, North Carolina, to Cape Canaveral, Florida) (Simons et al., 2013). Over the last 10 years, there has been several sightings offshore Virginia (eBird, 2014). The black-capped petrel was not detected during offshore surveys (RAP, 2014) or from previous efforts (O'Connell et al., 2009; Williams et al., 2014).

Sea Turtles

The USFWS's Information, Planning, and Conservation (IPaC) decision support system (http://ecos.fws.gov/ipac/) was used to identify ESA listed species that may be impacted by the proposed onshore activities. IPaC identified five sea turtle species (green, hawksbill, Kemp's Ridley, leatherback and loggerhead) that may potentially nest near the preferred and alternative export cable underground landfall site. The "Species Conclusions Table" (Appendix A) includes the relevant biological information for each sea turtle species in relation to the proposed onshore activities and the official species list from IPaC.

3. Effects of Proposed Action

VOWTAP is a small-scale demonstration project comprised of two turbines 24 nautical miles from shore adjacent to the Virginia WEA. The impacts of construction activities to avian resources associated with technology testing for demonstration projects have been addressed and are expected to be negligible (MMS, 2007; Sections 5.2.9.2 and 5.2.9.3). Likewise, the impacts of meteorological tower construction and decommissioning to avian resources were expected to negligible in the Mid Atlantic EA (BOEM, 2012), and the associated ESA consultations concluded that the risk to roseate tern, piping plover, Bermuda petrel (cahow), and red knot was "small and insignificant."

Generally, the activities associated with construction and decommissioning of meteorological towers and their impacts to avian resources are nearly identical to those associated with the construction and decommissioning of WGT towers. Only two activities in the proposed VOWTAP are different from those that were previously covered by the Mid Atlantic EA (BOEM, 2012), laying cable and operating the two wind turbines. As in other projects (e.g., USACE, 2014; BOEM 2014b), the activity of laying subsea cable is not expected to impact avian resources (RAP, 2014; Section 3.3.4.3). Onshore activities such as drilling, cable laying and installation of electrical switch cabinet would occur within disturbed areas in parking lots and along right-of-ways. To minimize any potential impacts to sensitive shoreline habitats, horizontal directional drilling (HDD) would be used to install the underground onshore interconnection cable.

Direct Effects

Direct effects include pile driving and construction, collision with WTGs, lighting, decommissioning, and discharge of waste and accidental fuel leaks

Pile Driving and Construction

The construction of met towers would result in increased airborne noise, primarily from pile driving activities. As with any sound in the atmospheric environment, the type and intensity of the sound, and

the distance it travels, are greatly dependent on multiple factors and can vary greatly. These factors include atmospheric conditions, the type and size of the pile, the type of substrate, the depth of the water, and the type and size of the impact hammer. It is possible that the piping plover, red knot, and may be exposed to pile driving noise during migration. The Bermuda petrel, black-capped petrel, and roseate tern could potentially be found foraging or migrating through offshore areas and could be exposed to pile driving noise. The reaction of these species (if present in the area) during pile driving activities could range from mild annoyance to escape behavior. However, the potential noise impacts would be short-term, lasting only for the duration of the pile driving activity (during daylight hours for seven days per turbine foundation). In addition, these species are highly mobile and would be able to avoid the construction area; the noise from pile driving is not anticipated to impact the migratory movement or migratory behavior of these species through the area. Therefore, pile driving-related construction noise may affect these bird species, but the effect would be negligible.

Collision Effects

This section discusses the potential for impacts to protected species resulting from collisions with vessels and structures associated with the proposed action. BOEM anticipates that birds will avoid fixed structures, such as WTG towers, reducing the risk of collisions with these structures. Collisions with vessels and/or structures associated with the proposed action could result in injury to the animal and/or damage to the vessel or structure. A bird that collides into tower or rotor blades may be injured or killed. However, given the broad foraging range of the black-capped and Bermuda petrels, it is unlikely that these petrels will routinely encounter these structures. If either species does encounter the structure they will likely avoid the structures or pass well below the rotor swept zone. The distance from shore will exclude nesting or foraging roseate terns, piping plovers and red knots. Only migrating roseate terns, piping plovers, and red knots are anticipated to cross the Project Area for a short period of time during migration, and the number of passages would be extremely low (i.e., one bird = one pass per migration). Therefore, the likelihood of a roseate tern, piping plover, or red knot encountering a tower under climatological conditions that would force a migrating bird low enough to actually collide with a tower is so small that the impact of such collisions on federally listed or ESA candidate bird species is discountable.

Lighting Effects

Under poor visibility conditions (fog and rain), some migrating birds may become disoriented and circle lighted communication towers instead of continuing on their migratory path, greatly increasing their risk of collision (Huppop et al., 2006). WGT tower lighting would have the greatest impact on bird species during evening hours when nocturnal migration occurs. However, red flashing aviation obstruction lights are commonly used at land-based wind facilities without any observed increase in avian mortality compared with unlit turbine towers (Kerlinger et al., 2010). Thus, to decrease the likelihood of attracting red knots, piping plovers, roseate terns plus any other migrating species to the operating WTGs, red flashing lights would be used on the WGT towers to reduce the risk of bird collisions (RAP, 2014). Finally, it is anticipated that any additional lights (e.g., work lights) on the towers and support vessels will be used only when necessary and be hooded downward and directed when possible to reduce upward illumination and illumination of adjacent waters. Therefore, the potential impacts from the artificial lighting of the WTG towers on federally listed or ESA candidate bird species would be negligible.

Decommissioning

WTG tower decommissioning activities that could affect birds would consist of any atmospheric noise related to tower removal. This noise is not anticipated to be any louder than the impacts already assessed under the Pile Driving and Construction section above. The potential noise impacts from decommissioning would be short-term, lasting only for the duration of the tower removal. The bird species are highly mobile and would be able to avoid the tower area during removal, and the noise generated is not anticipated to impact the migratory movement or migratory behavior of these species through the area. Therefore, noise related to tower removal may affect these bird species, but the effect would be negligible.

Discharge of Waste Materials and Accidental Fuel Leaks

Operational waste generated from all vessels associated with the proposed action includes bilge and ballast waters, trash and debris, and sanitary and domestic wastes. A vessel collision with a WTG tower or other vessel has the potential to result in the spillage of diesel fuel into the marine environment. Vessels associated with the proposed action are expected to comply with the USCG requirements for the prevention and control of oil and fuel spills. Approximately 10 percent of vessel collisions with fixed structures on the OCS caused diesel spills.

Marine and coastal birds could be exposed to operational discharges or accidental fuel releases from construction sites and construction vessels and to accidentally released solid debris. Many species of marine birds (such as gulls) often follow ships to forage on fish and other prey injured or disoriented by the passing vessel. In doing so, these birds may be affected by discharges of waste fluids (such as bilge water) generated by the vessels. Operational discharges from construction vessels would be released into the open ocean, where they would be rapidly diluted and dispersed, or collected and taken to shore for treatment and disposal. Sanitary and domestic wastes would be processed through on-site waste treatment facilities before being discharged overboard. Deck drainage would also be processed prior to discharge. Thus, impacts to marine and coastal birds from waste discharges from construction vessels are expected to be negligible.

Coastal and pelagic birds may become entangled in or ingest floating, submerged, and beached debris. Entanglement may result in strangulation, injury to or loss of limbs, entrapment, or the prevention or hindrance of the ability to fly or swim, and all of these effects may be considered lethal (Ryan 1990). However, the discharge or disposal of solid debris into offshore waters from OCS structures and vessels is prohibited by the BOEM (30 CFR 250.300) and the USCG (MARPOL, Annex V, Public Law 100-220 [101 Statute 1458]). Thus, entanglement in or ingestion of OCS-related trash and debris by marine and coastal birds is not expected, and impacts to marine and coastal birds would be negligible.

Because of the extremely limited amount of vessel traffic and construction activity that might occur with construction and operation of a meteorological tower, the release of wastes, debris, hazardous materials, or fuels would occur infrequently and would cease following completion of the geological and geophysical surveys, WTG tower construction, and WTG tower decommissioning. The likelihood of an accidental fuel release would also be limited to the active construction and decommissioning periods of the site characterization. Piping plovers, and red knots are strictly terrestrial foragers, and roseate terns typically feed only in shallow waters, so these species are not expected to follow vessels to forage. In addition, the areas where these impacts could occur do not strictly overlap with the foraging range of breeding piping plovers and roseate terns and only encompass a tiny proportion of the migratory range

of the piping plover, roseate tern, red knot, black-capped petrel, and Bermuda petrel. As such, impacts to ESA-listed and candidate bird species from the discharge of waste materials or the accidental release of fuels are expected to be negligible.

Onshore Drilling and Cable Laying

Overall, installation of the Export Cable landfall and Onshore Interconnection Cable and Fiber Optic Cable are unlikely to have substantive effects on coastal or near shore avian species. ESA listed species do not nest at the proposed Export Cable landfall site. The use of HDD to route the interconnection cable under sensitive coastal habitat areas and by using previously disturbed areas for onshore project components, including the Switch Cabinet and Interconnection Station minimize the potential effects on terrestrial natural habitat areas. In addition, any disturbances associated with construction will be short in duration and limited to the day time hours. Installation of the Export Cable landfall and Onshore Interconnection Cable and Fiber Optic Cable are expected to have no effect to ESA-listed and candidate bird species.

Indirect Effects

Indirect effects to bird species would include effects that could occur as a result of WTG towers but at a later time. The scale of the project is small to result in a significant alteration of flight paths due to tower presence that could disrupt feeding and other behaviors or cause the expenditure of additional energy in individual birds that would have otherwise not occurred. However, given the small scale of the project and vastness of the ocean environment for foraging and movement, the physical presence of WTG are expected to have no effect to ESA-listed and candidate bird species.

4. Determination of Effect

Birds

Federally listed birds could occur in the VOWTAP area, and given the geographic scope of the proposed action, some birds could reasonably be expected to come into contact with WTG activities. Based on prior analyses in Section 3, the proposed action **May Affect** migrating Bermuda petrels, black-capped petrels, roseate terns, piping plovers, and red knots due to pile driving noise, onshore drilling and cable laying, tower lighting, turbine operation, and tower decommissioning. Impacts could include escape responses, alteration of migration paths, and injury or death from tower collisions. Due to the small number of structures, the anticipated use of flashing red tower lights, and the restricted time period of exposure during migration; BOEM concludes that the effects of the proposed action are insignificant and discountable. Therefore, the proposed action would **Not Likely Adversely Affect** Bermuda petrels, black-capped petrels, roseate terns, piping plovers, and red knots.

Sea turtles

See “Species Conclusions Table” in Appendix A.

5. Avoidance, minimization, and mitigation measures

Birds

This sub-section outlines the standard operating conditions that are part of the proposed action which would minimize or eliminate potential impacts to ESA-listed and candidate species of birds. BOEM anticipates that only red flashing strobe-like lights that meet Federal Aviation Administration

requirements for aviation and that only navigation lights that meet USCG requirements for shipping vessels will be installed and used on WTG towers. BOEM anticipates that additional lights (e.g., work lights) on WTG towers and support vessels must be used only when necessary, hooded downward, and directed when possible to reduce upward illumination and illumination of adjacent waters. Lastly, after consultation with the federal and state agencies, Dominion would implement a post-construction monitoring program during operation of the Project to evaluate actual impacts from the wind turbines (RAP, 2014). Based on the information regarding the proposed activities (see Section 1) within the Project Area (see Figure 1), no additional mitigations for ESA-listed and ESA candidate species are necessary.

Sea turtles

See “Species Conclusions Table” in Appendix A.

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Appendix A: Species Conclusions Table

Project Name: VOWTAP Date: November 19, 2014

Species/Resource Name	Conclusion	ESA Section 7 / Eagle Act Determination	Notes / Documentation
Green sea turtle (*Chelonia mydas*)	No records of nesting in the proposed project area. Onshore construction activities occur outside nesting season.	Not likely to adversely affect	Green sea turtles can be found throughout the world's oceans. Although the green sea turtle is infrequently observed during late summer and early fall off the coast of Virginia (VIMS, 2014), they can be found in estuarine waters during summer. During the winter, green sea turtles occur in more southerly US waters, including around Cape Hatteras (Epperly *et al*., 1995). Within the US, green turtles regularly nest in larger numbers in Florida and Hawaii and in small numbers from June to September in the U.S. Virgin Islands, Puerto Rico, Georgia, South Carolina, and North Carolina. There is only one record of a green turtle nesting in Virginia in August 2005 (Boettcher, 2014) more than 7.5 miles south of the Export Cable landfall site (Figure 1). While the green sea turtle has the potential to be a transient to the Project Area during the summer and fall, there is a very low overall likelihood of occurrence near the Export Cable landfall site. The Integrated Natural Resources Management Plan for Camp Pendleton recommends that beachfront vehicular access be prohibited from dusk to dawn during the summer to maintain sea turtle nesting habitat and for seasonal monitoring for sea turtle nests (WEG, 2004). In Virginia, almost all (95%) sea turtles nested from June to August (Boettcher, 2014). In accordance with VDGIF requirements, no construction activities will occur from May 1 through August 31 at the proposed Export Cable landfall site (RAP, 2014). Dominion has also committed to landing the Export Cable onshore via HDD to ensure no potential sea turtle nesting habitat is

			disturbed (see Section 3.3.3, RAP 2013).
Hawksbill sea turtle (*Eretmochelys imbricata*)	No records of nesting in Virginia.	No effect	The hawksbill sea turtle is found in tropical and subtropical regions of the Atlantic, Pacific, and Indian Oceans. The only nest colonies in continental US are in Florida.
Kemp's Ridley sea turtle (*Lepidochelys kempii*)	No records of nesting in the proposed project area. Onshore construction activities occur outside nesting season.	Not likely to adversely affect	Kemp's Ridley sea turtles were observed during the VOWTAP 2013 avian and geophysical surveys. There are only two records of Kemp's Ridley sea turtle nesting in Virginia: one on Dam Neck Naval Base in June 2012 (Boettcher, 2014; Figure 1) and the other was on False Cape State Park near the North Carolina/Virginia border (Gallegos 2014, pers. comm.). The Integrated Natural Resources Management Plan for Camp Pendleton recommends that beachfront vehicular access be prohibited from dusk to dawn during the summer to maintain sea turtle nesting habitat and for seasonal monitoring for sea turtle nests (WEG, 2004). In Virginia, almost all (95%) sea turtles nest from June to August (Boettcher, 2014). In accordance with VDGIF requirements, no construction activities will occur from May 1 through August 31 at the proposed Export Cable landfall site (RAP, 2014). Dominion has also committed to landing the Export Cable onshore via HDD to ensure no potential sea turtle nesting habitat is disturbed (see Section 3.3.3, RAP 2013).
Leatherback sea turtle (*Dermochelys coriacea*)	No records of nesting in Virginia	No effect	The leatherback sea turtle is globally distributed. Nesting occurs within tropical and subtropical climates, and the only nest colonies in continental US are in Florida (NMFS and USFWS, 2013).

Loggerhead sea turtle (*Caretta caretta*)	No records of nesting in the proposed project area. Onshore construction activities occur outside nesting season.	Not likely to adversely affect	Virginia is considered the northern limit of loggerhead nesting in the United States. Although the loggerhead sea turtle occasionally nests on ocean-facing Virginia beaches from early June through August, Virginia was not included in the designation of Critical Habitat for the Northwest Atlantic Ocean Distinct Population Segment of the Loggerhead Sea Turtle based on the very low number of nests known to be laid - less than 10 annually from 2002 to 2011 (79 FR 39756). Of the 156 records of sea turtle nests on Virginia beaches from 1970 to 2013, almost all (154) were loggerhead sea turtles (Boettcher, 2014). In the county of Virginia Beach, the overwhelming majority of sea turtle nests were found on or near the Back Bay National Wildlife Refuge (Boettcher, 2014; Figure 1). There are no records of loggerhead turtle nests within two miles of the Export Cable landfall site (Boettcher, 2014). The Integrated Natural Resources Management Plan for Camp Pendleton recommends that beachfront vehicular access be prohibited from dusk to dawn during the summer to maintain sea turtle nesting habitat and for seasonal monitoring for sea turtle nests (WEG, 2004). In Virginia, almost all (95%) sea turtles nested from June to August (Boettcher, 2014). In accordance with VDGIF requirements, no construction activities will occur from May 1 through August 31 at the proposed Export Cable landfall site (RAP, 2014). Dominion has also committed to landing the Export Cable onshore via HDD to ensure no potential sea turtle nesting habitat is disturbed (see Section 3.3.3, RAP 2013).
Piping Plover (*Charadrius melodus*)	No records of species occurrence in the proposed project area.	Not likely to adversely affect	Piping plovers may occur during non-breeding season on the Virginia coast or during migration over the OCS. Piping plovers have been sighted along coastline but not at proposed project area (eBird, 2014). There are no records of piping plovers in the offshore portion of the project area (O'Connell, 2009), and none were detected during the onshore or offshore surveys (RAP, 2014).

			To minimize attracting birds (including passerines to the wind turbines), flashing aviation safety lights would be used on wind turbine nacelles to decrease the collision risk and when possible, work lights, would be down shielded during the construction phase of the project (RAP, 2014. To further avoid attracting birds to the wind turbines, anti-perching devices would be installed on the foundations to reduce the potential for collisions. Lastly, after consultation with the federal and state agencies, Dominion would implement a post-construction monitoring program during operation of the Project to evaluate actual impacts from the wind turbines (RAP, 2014).
Red Knot (*Calidris canutus rufa*)	No records of species occurrence in the proposed project area.	Not likely to adversely affect	Red knots may occur during non-breeding season on the Virginia coast or during migration over the OCS. Red knots have been sighted along coastline but not at proposed project area (eBird, 2014). There are no records of red knots in the offshore portion of the project area (O'Connell, 2009), and none were detected during the onshore or offshore surveys (RAP, 2014). To minimize attracting birds (including passerines to the wind turbines), flashing aviation safety lights would be used on wind turbine nacelles to decrease the collision risk and when possible, work lights, would be down shielded during the construction phase of the project (RAP, 2014). To further avoid attracting birds to the wind turbines, anti-perching devices would be installed on the foundations to reduce the potential for collisions. Lastly, after consultation with the federal and state agencies, Dominion would implement a post-construction monitoring program during operation of the Project to evaluate actual impacts from the wind turbines (RAP, 2014).

Roseate tern (*Sterna dougallii dougallii*)	No records of species occurrence in the proposed project area.	Not likely to adversely affect	Very little roseate tern activity is expected within the marine portion of the project area (see Figure 3 in the BA). Roseate terns may occur during non-breeding season on the Virginia coast or during migration on the OCS. Roseate terns have been sighted along coastline but not at proposed project area (eBird, 2014). There are no records of roseate terns in the offshore portion of the project area (O'Connell, 2009), and none were detected during the onshore or offshore surveys (RAP, 2014). To minimize attracting birds (including passerines to the wind turbines), flashing aviation safety lights would be used on wind turbine nacelles to decrease the collision risk and when possible, work lights, would be down shielded during the construction phase of the project (RAP, 2014). To further avoid attracting birds to the wind turbines, anti-perching devices would be installed on the foundations to reduce the potential for collisions. Lastly, after consultation with the federal and state agencies, Dominion would implement a post-construction monitoring program during operation of the Project to evaluate actual impacts from the wind turbines (RAP, 2014).
Bermuda Petrel (*Pterodroma cahow*)	Species not present onshore. No records of species occurrence in the proposed project offshore area.	Not likely to adversely affect	There are confirmed sightings of Bermuda petrels offshore on North Carolina (Lee, 1987) plus one record on the OCS 110 nautical miles east of the Virginia Wind Energy Area (eBird, 2014). There are no records of Bermuda petrels in the offshore project area (O'Connell, 2009), and none were detected during the onshore or offshore surveys (RAP, 2014). To minimize attracting birds (including passerines to the wind turbines), flashing aviation safety lights would be used on wind turbine nacelles to decrease the collision risk and when possible, work lights, would be down shielded during the construction phase of the project (RAP, 2014). To further avoid attracting birds to the

			wind turbines, anti-perching devices would be installed on the foundations to reduce the potential for collisions. Lastly, after consultation with the federal and state agencies, Dominion would implement a post-construction monitoring program during operation of the Project to evaluate actual impacts from the wind turbines (RAP, 2014).
Black-Capped Petrel (*Pterodroma hasitata*)	Species not present onshore. No records of species occurrence in proposed project offshore area.	Not likely to adversely affect	Black-capped petrels are typically found over deep water, greater than 1,000 m in depth (Simons et al, 2013). Black-Capped petrels may occur during non-breeding season on the OCS. Several sightings offshore Virginia (eBird, 2014). There are no records of black-capped petrels in the offshore portion of the project area (O'Connell, 2009), and none were detected during the onshore or offshore surveys (RAP, 2014). To minimize attracting birds (including passerines to the wind turbines), flashing aviation safety lights would be used on wind turbine nacelles to decrease the collision risk and when possible, work lights, would be down shielded during the construction phase of the project (RAP, 2014). To further avoid attracting birds to the wind turbines, anti-perching devices would be installed on the foundations to reduce the potential for collisions. Lastly, after consultation with the federal and state agencies, Dominion would implement a post-construction monitoring program during operation of the Project to evaluate actual impacts from the wind turbines (RAP, 2014).
Critical habitat	No critical habitat present	No effect	Based on the USFWS Virginia Field Office Critical Habitat Map Tool, the action area does not intersect critical habitat.
Bald eagle	Unlikely to disturb nesting eagles	No Eagle Act permit required	Based on The Center for Conservation Biology Virginia Bald Eagle Nest Locator, the action area is not within 5,280 feet of a bald eagle nest (Figure 2a).

Bald eagle	Does not intersect with an eagle concentration area	No Eagle Act permit required	Based on the Virginia Field Office Bald Eagle Map Tool, there are no designated Bald Eagle Concentration Areas within the vicinity of the action area (Figure 2b).

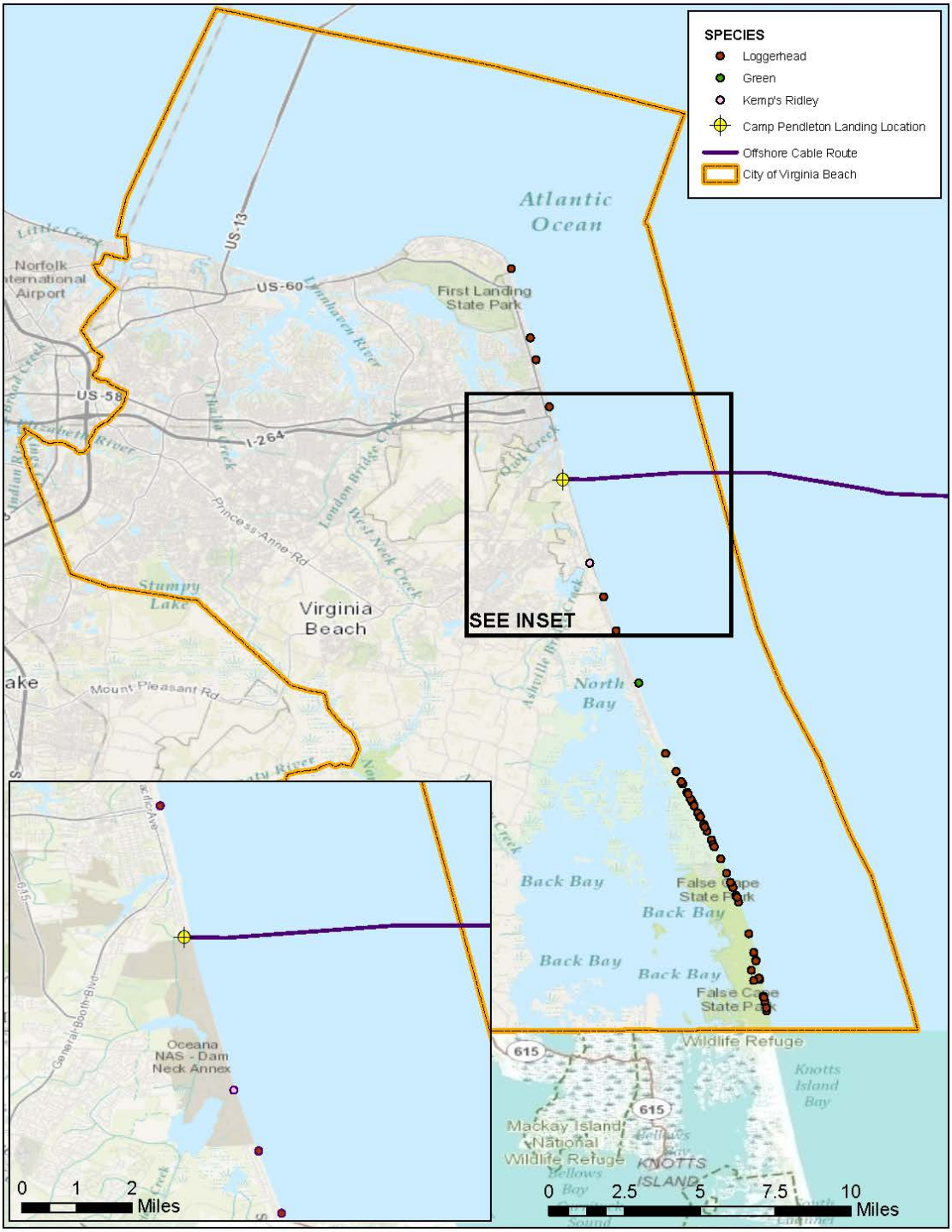
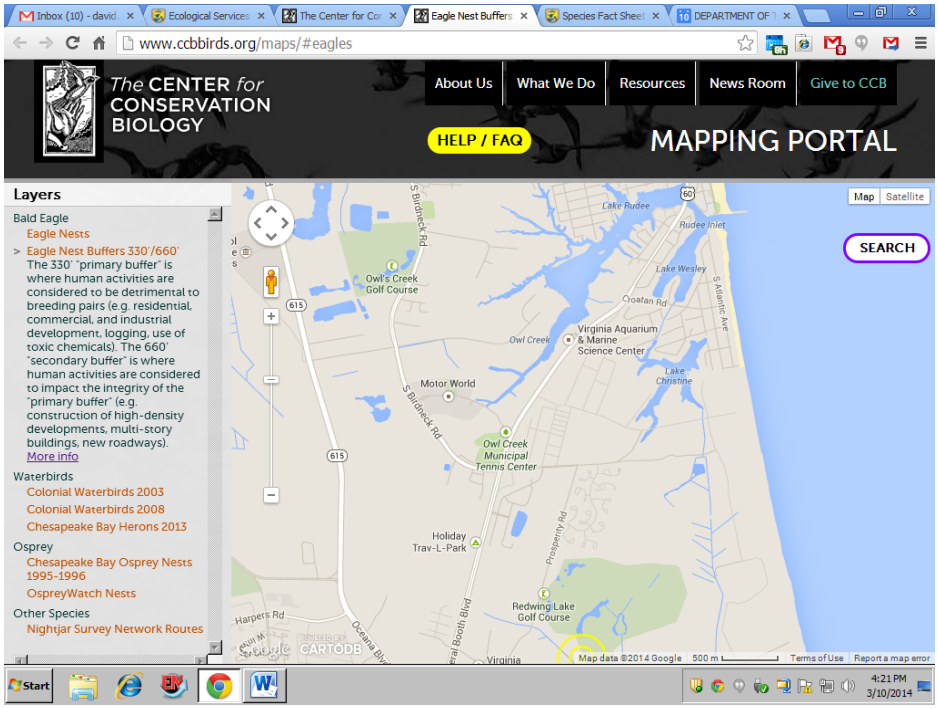


Figure 1. Sea turtle nest locations in Virginia Beach county from Boettcher (2014). Only locations with coordinates are shown.

A)



B)

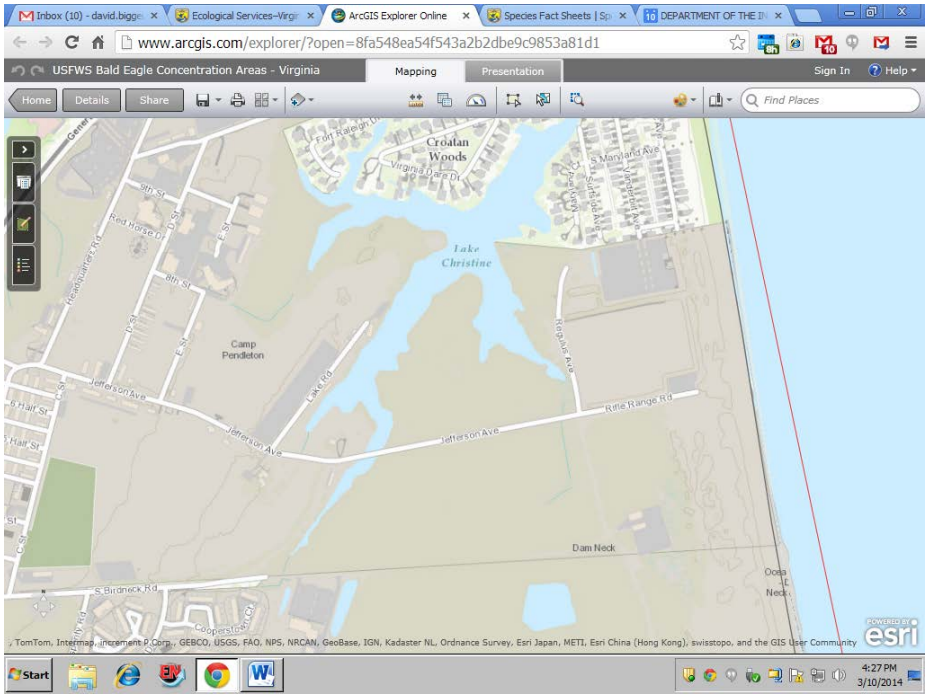


Figure 2. Bald eagle nests (A) and concentration areas (B).

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Consultation Tracking Number: 05E2VA00-2014-SLI-1316 March 10, 2014
Project Name: VOWTAP (onshore)

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project.

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having

similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment

United States Department of Interior
Fish and Wildlife Service

Project name: VOWTAP (onshore)

Official Species List

Provided by:

Virginia Ecological Services Field Office
6669 SHORT LANE
GLOUCESTER, VA 23061
(804) 693-6694
http://www.fws.gov/northeast/virginiafield/

Consultation Tracking Number: 05E2VA00-2014-SLI-1316
Project Type: Transmission Line
Project Description: BOEM requests technical assistance regarding species and critical habitat that may be affected by renewable energy development activity off the VA coast on the Outer Continental Shelf. The activities include approving a research activities plan for constructing two 6 MW wind turbine generators, a submarine transmission cable, and an onshore underground cable connecting to existing infrastructure in Virginia Beach. Preferred cable route identified in the VOWTAP Research Activities Plan.

Project Location Map:

Project Coordinates: MULTIPOLYGON (((-75.971289 36.8147042, -75.9758832 36.813966, -75.9775148 36.8119726, -75.9775224 36.8119669, -75.9779415 36.8117877, -75.9782999 36.8114599, -75.9783066 36.8114559, -75.9783143 36.8114547, -75.9783219 36.8114566, -75.9783282 36.8114612, -75.9783322 36.8114679, -75.9783334 36.8114756, -75.9783315 36.8114832, -75.9783269 36.8114895, -75.977966 36.8118196, -75.9779604 36.8118232, -75.9775427 36.8120018, -75.9759094 36.8139972, -75.9759039 36.8140018, -75.9758971 36.8140042, -75.9712952 36.8147437, -75.9712949 36.8147438, -75.9679327 36.8152288, -75.9679249 36.8152284, -75.9679178 36.815225, -75.9679126 36.8152192, -75.96791 36.8152119, -75.9679104 36.8152041, -75.9679138 36.815197, -75.9679196 36.8151918, -75.9679269 36.8151892, -75.971289 36.8147042)))

Project Counties: Virginia Beach, VA

Endangered Species Act Species List

There are a total of 8 threatened, endangered, or candidate species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed on the **Has Critical Habitat** lines may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

Green sea turtle *(Chelonia mydas)*

Population: except where endangered

Listing Status: Threatened

Has Critical Habitat: Final designated

Hawksbill sea turtle *(Eretmochelys imbricata)*

Population: Entire

Listing Status: Endangered

Has Critical Habitat: Final designated

Kemp's Ridley sea turtle *(Lepidochelys kempii)*

Population: Entire

Listing Status: Endangered

Leatherback sea turtle *(Dermochelys coriacea)*

Population: Entire

Listing Status: Endangered

Has Critical Habitat: Final designated

Loggerhead sea turtle *(Caretta caretta)*

Population: Northwest Atlantic DPS

Listing Status: Threatened

Piping Plover *(Charadrius melodus)*

Population: except Great Lakes watershed

Listing Status: Threatened
Has Critical Habitat: Final designated

Red Knot *(Calidris canutus rufa)*
Listing Status: Proposed Threatened

Roseate tern *(Sterna dougallii dougallii)*
Population: northeast U.S. nesting pop.
Listing Status: Endangered

Critical habitats that lie within your project area

There are no critical habitats within your project area.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Virginia Ecological Services Field Office
6669 SHORT LANE
GLOUCESTER, VA 23061
PHONE: (804)693-6694 FAX: (804)693-9032
URL: www.fws.gov/northeast/virginiafield/

Consultation Tracking Number: 05E2VA00-2014-SLI-1349 March 12, 2014
Project Name: VOWTAP (Onshore Alt 2 route)

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project.

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having

similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment

United States Department of Interior
Fish and Wildlife Service

Project name: VOWTAP (Onshore Alt 2 route)

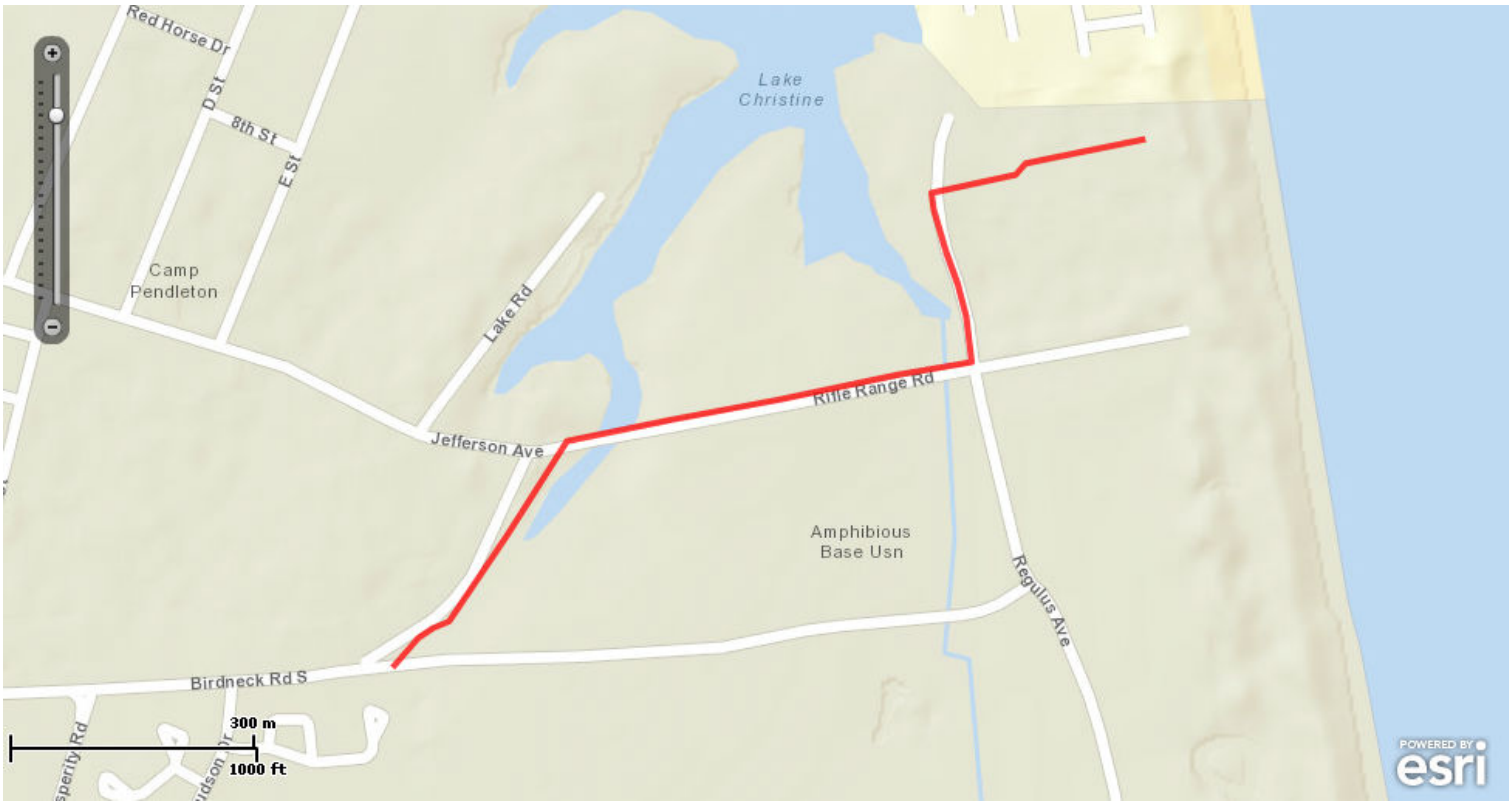
Official Species List

Provided by:

Virginia Ecological Services Field Office
6669 SHORT LANE
GLOUCESTER, VA 23061
(804) 693-6694
http://www.fws.gov/northeast/virginiafield/

Consultation Tracking Number: 05E2VA00-2014-SLI-1349
Project Type: Transmission Line
Project Description: BOEM requests technical assistance regarding species and critical habitat that may be affected by renewable energy development activity off the VA coast on the Outer Continental Shelf. The activities include approving a research activities plan for constructing two 6 MW wind turbine generators, a submarine transmission cable, and an onshore underground cable connecting to existing infrastructure in Virginia Beach. Alternative (#2) cable route identified in the VOWTAP Research Activities Plan.

Project Location Map:



Project Coordinates: MULTIPOLYGON (((-75.9695264 36.817047, -75.9696584 36.8169267, -75.9696685 36.8169218, -75.9708191 36.8167245, -75.9707887 36.8165535, -75.97034 36.8153735, -75.9703389 36.8153694, -75.9702614 36.8148648, -75.9702618 36.8148571, -75.9702651 36.81485, -75.9702708 36.8148447, -75.9702781 36.814842, -75.9758833 36.8139659, -75.9775148 36.8119726, -75.9775224 36.8119669, -75.9779415 36.8117877, -75.9782999 36.8114599, -75.9783066 36.8114559, -75.9783143 36.8114547, -75.9783219 36.8114566, -75.9783282 36.8114612, -75.9783322 36.8114679, -75.9783334 36.8114756, -75.9783315 36.8114832, -75.9783269 36.8114895, -75.977966 36.8118196, -75.9779604 36.8118232, -75.9775427 36.8120018, -75.9759094 36.8139972, -75.9759038 36.8140019, -75.975897 36.8140043, -75.970304 36.8148785, -75.9703781 36.8153613, -75.9708268 36.8165411, -75.9708278 36.8165447, -75.970862 36.8167373, -75.9708618 36.8167451, -75.9708587 36.8167523, -75.970853 36.8167577, -75.9708457 36.8167605, -75.969681 36.8169602, -75.969549 36.8170806, -75.9695387 36.8170855, -75.967878 36.8173553, -75.9678702 36.8173551, -75.9678631 36.8173518, -75.9678578 36.8173461, -75.9678551 36.8173388, -

75.9678553 36.817331, -75.9678586 36.8173239, -75.9678643 36.8173186, -75.9678716 36.8173159, -75.9695264 36.817047)))

Project Counties: Virginia Beach, VA

Endangered Species Act Species List

There are a total of 8 threatened, endangered, or candidate species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed on the **Has Critical Habitat** lines may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

Green sea turtle *(Chelonia mydas)*

Population: except where endangered

Listing Status: Threatened

Has Critical Habitat: Final designated

Hawksbill sea turtle *(Eretmochelys imbricata)*

Population: Entire

Listing Status: Endangered

Has Critical Habitat: Final designated

Kemp's Ridley sea turtle *(Lepidochelys kempii)*

Population: Entire

Listing Status: Endangered

Leatherback sea turtle *(Dermochelys coriacea)*

Population: Entire

Listing Status: Endangered

Has Critical Habitat: Final designated

Loggerhead sea turtle *(Caretta caretta)*

Population: Northwest Atlantic DPS

Listing Status: Threatened

Piping Plover *(Charadrius melodus)*

Population: except Great Lakes watershed

Listing Status: Threatened

Has Critical Habitat: Final designated

Red Knot *(Calidris canutus rufa)*

Listing Status: Proposed Threatened

Roseate tern *(Sterna dougallii dougallii)*

Population: northeast U.S. nesting pop.

Listing Status: Endangered

Critical habitats that lie within your project area

There are no critical habitats within your project area.

Appendix B: Virginia Offshore Wind Technology Advancement Project Avian Risk Assessment

The primary impact to avian resources during operations is collision with the rotating turbine blades. An estimated 234,000 birds are killed annually in collisions with 44,577 wind turbines in the contiguous U.S. which is approximately 5.3 (95% confidence interval = 2.2-7.4) per turbine (Loss et al., 2013), and others report similar findings (e.g., Erickson et al., 2014). Estimating avian mortality at a terrestrial wind facility is a relatively simple and straightforward process comprised of conducting ground searches for bodies and statistically adjusting the counts upward to account for the probability not seeing the body and for the probability that the body was devoured by scavengers. For obvious reasons, similar methods cannot be applied to estimate avian mortality at offshore wind facilities. Collision risk modeling is frequently used to inform risk assessments to birds from offshore wind development particulary in Europe. This avian risk assessment uses the "Band Model" (Band, 2012) on the most commonly observed species, the northern gannet, to better understand the potential risk to birds from operating turbines proposed in VOWTAP.

In the offshore environment, bird abundance generally declines as distance from shore increases (Petersen et al., 2006; Paton et al., 2010). Offshore avian resources in and around the project area are well understood (BOEM, 2012; BOEM, 2014; Williams et al., 2014); The "Compendium of Avian Occurrence Information" (O'Connell et al., 2009) is a compilation of data from past surveys in the region that includes maps of modeled avian distribution and abundance. For VOWTAP, Dominion conducted site-specific offshore and onshore surveys to further describe the avian resources (RAP, 2014, Appendix L). The protocols for these surveys were developed in consultation with USFWS, BOEM, and VDGIF and finalized on April 23, 2013 (RAP, 2014, Appendix L). The offshore surveys include a 1-nautical-mile (1.6 km) buffer around the proposed lease blocks and supplemental survey area (Offshore Study Area) (RAP, 2014, Appendix L). Compared to other areas in the Atlantic Ocean Continental Shelf, relatively low numbers of near shore, pelagic and gull species are predicted to occur within the project area (Figures 1-3). Although moderate numbers of northern gannets are predicted to be in the area (Figure 4), a large number of gannets (1,222) was observed in the offshore survey area on February 7, 2014 (RAP, 2014, Appendix L). The large number of gannets accounted for 81% of all birds observed during the 13 surveys in the offshore survey area (RAP, 2014, Appendix L).

Only a relatively small percentage (12.1%, n = 104) of birds observed in the area flew at rotor swept height, the majority of those birds were northern gannets (98) followed by some loons and gulls in winter (RAP, 2014, Appendix L), and the observed northern gannet flight heights in the proposed turbine area are consistent with flight height distribution modelled from over 44,000 northern gannet observations in other regions (Johnston et al., 2014). When turbines are present, many birds (e.g., northern gannets, red throated loons and common loons) will likely avoid the turbine site altogether, especially the species that ranked "high" in vulnerability to displacement by offshore wind energy development (Robinson Willmott et al., 2013). When turbines are present, many birds would likely

adjust their flight paths to avoid wind turbines by flying above, below or between them (e.g., Desholm and Kahlert, 2005; Krijgsveld et al., 2011; Plonczkier et al., 2012), and others may take extra precautions to avoid turbines when the turbines are moving (e.g., Vlietstra, 2008; Johnston et al., 2014).

Despite this information, there still may be concerns regarding the large number (1,222) of northern gannets observed in February 2014 (RAP, 2014, Appendix L). For this project, the Band collision risk model (Band, 2012) was used to estimate the annual collision mortality rate for northern gannets. Most of the model inputs (e.g., monthly density of flying gannets, proportion flying in the rotor swept zone, turbine specifications, and facility dimensions) were obtained or calculated from the RAP (see Figure 5 for a snapshot of the model inputs). The monthly proportion of time the turbines were operational was based on the estimate time the wind was above turbine cut-in and below cut-out speeds (RAP, 2014, Appendix E). This estimate does not include down time due to maintenance, unscheduled repairs or other reasons which can on average reduce the turbine operational time to 80 percent (Feng et al., 2010) – a decrease in operational time will reduce the estimated mortality to birds. Like other studies (e.g., WWT, 2012), a turbine avoidance rate of 98% was used for gannets. Given that the observed gannet flight heights at the proposed site were consistent with flight distribution described in Johnston and others (2014), the estimated annual mortality rate from the Band "extended model" was used.

Despite the apparent large number of gannets observed during winter near the proposed site, the project's estimated mortality rate to northern gannets was one per year (see Figure 6 for model outputs). Given that northern gannets do not breed in the US and whose North American population has been growing at 3% annually (Mowbray, 2002) to 107,640 breeding pairs (Watts, 2010), the predicted impact of collisions on northern gannets from the proposed project is minor. One could repeat this analysis for each of the other bird species observed at the proposed site. However, due to the very small numbers observed during the offshore surveys the estimated annual mortality rate would very likely be zero for this scale of the proposed project.

In conclusion, relatively few birds occur near the proposed project site due to its distance from shore. Using a collision risk model, the estimated mortality rate for the most common bird, the northern gannet, near the proposed site is very low (one per year) and would likely be even lower if down time due to maintenance, unscheduled repairs or other reasons were accounted for in the model inputs. Thus, the annual mortality rate for other birds due to collision with VOWTAP's operating wind turbines is also expected to extremely low, particularly among the very rare species.

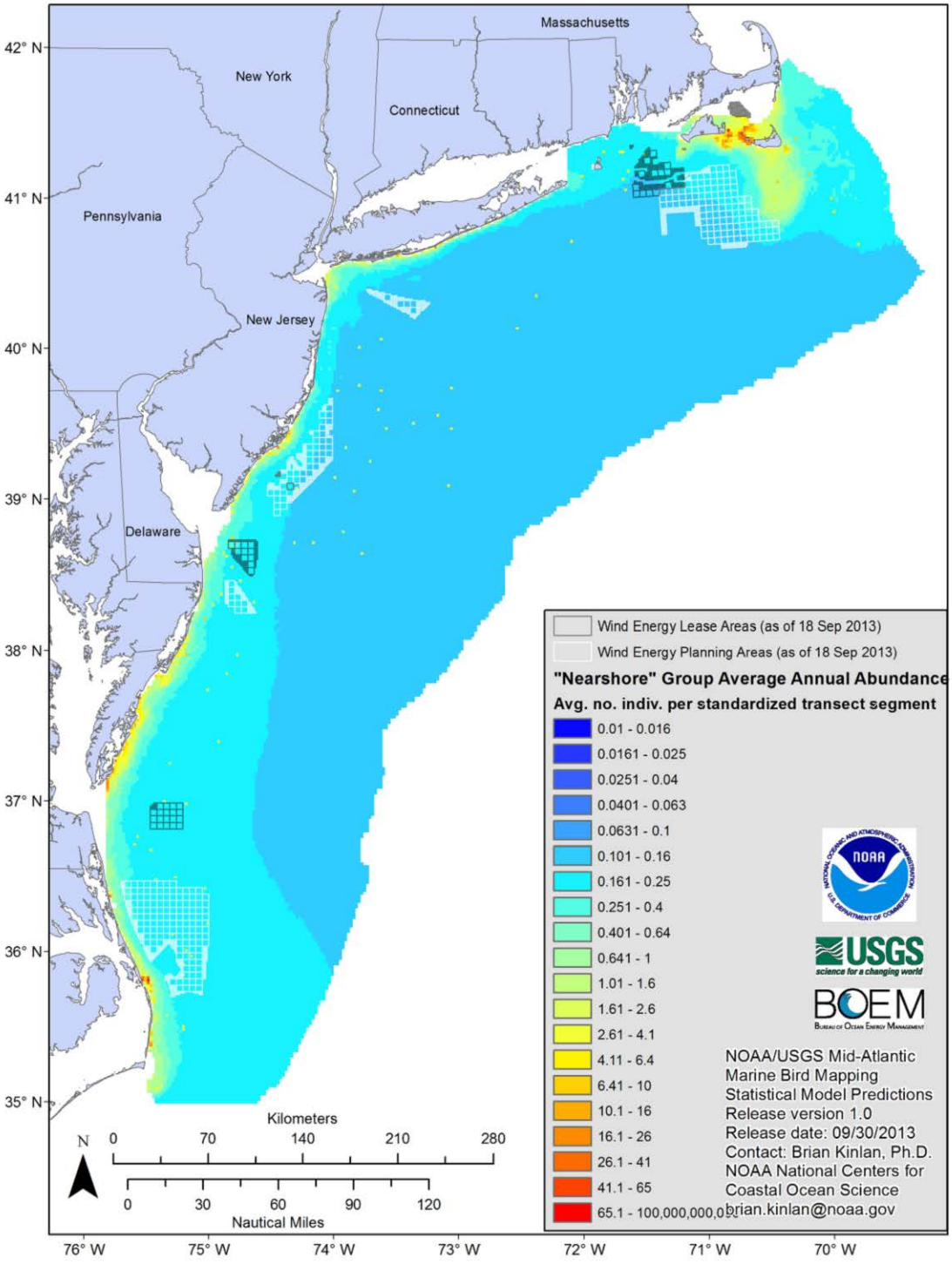


Figure 1: Predicted Average Annual Distribution of Near-shore Bird Species (Black Scoter Common Eider, Common Loon, Common Tern, Double-crested Cormorant, Long-tailed Duck, Razorbill, Roseate Tern, Red-throated Loon, Surf Scoter, and White-winged Scoter).

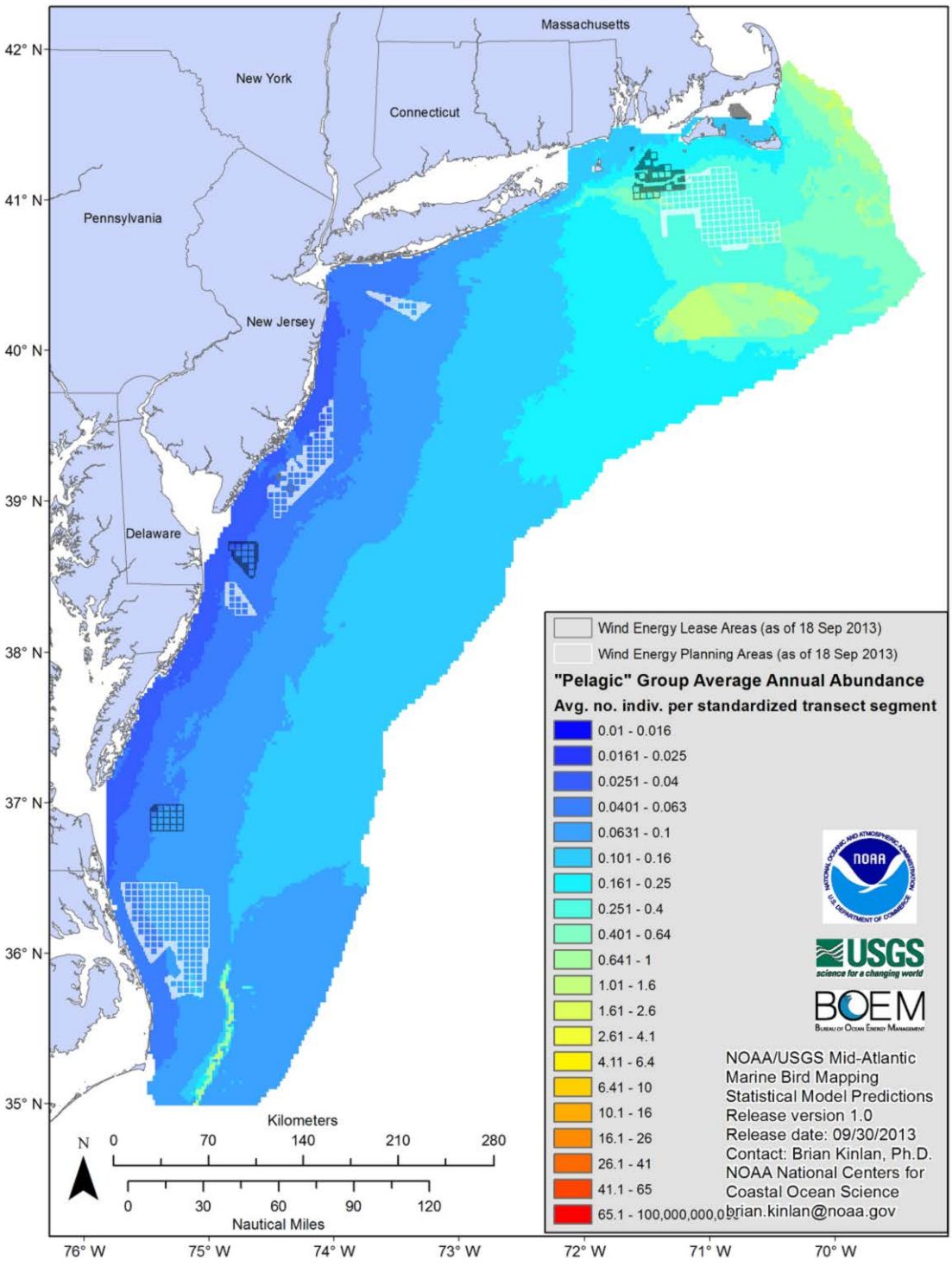


Figure 2: Predicted Average Annual Distribution of Pelagic Bird Species (Cory's Shearwater, Dovekie, Greater Shearwater, Northern Fulmar, Pomarine Jaeger, Red Phalarope, Sooty Shearwater, Wilson's Storm Petrel).

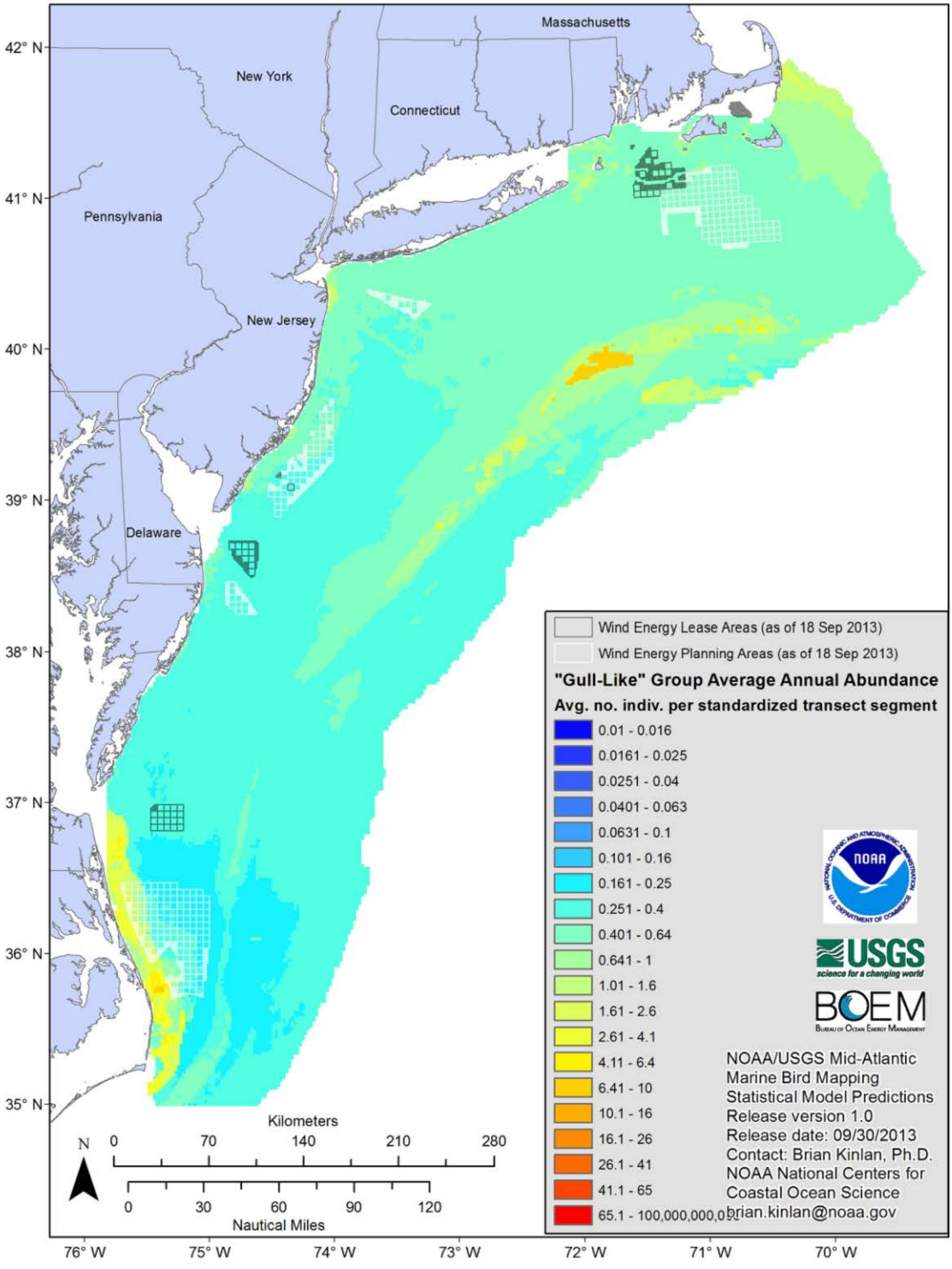


Figure 3: Predicted Average Annual Distribution of Gulls and Gannets (Black-legged Kittiwake, Bonaparte's Gull, Great Black-backed Gull, Herring Gull, Laughing Gull, Northern Gannet, and Ring-billed Gull).

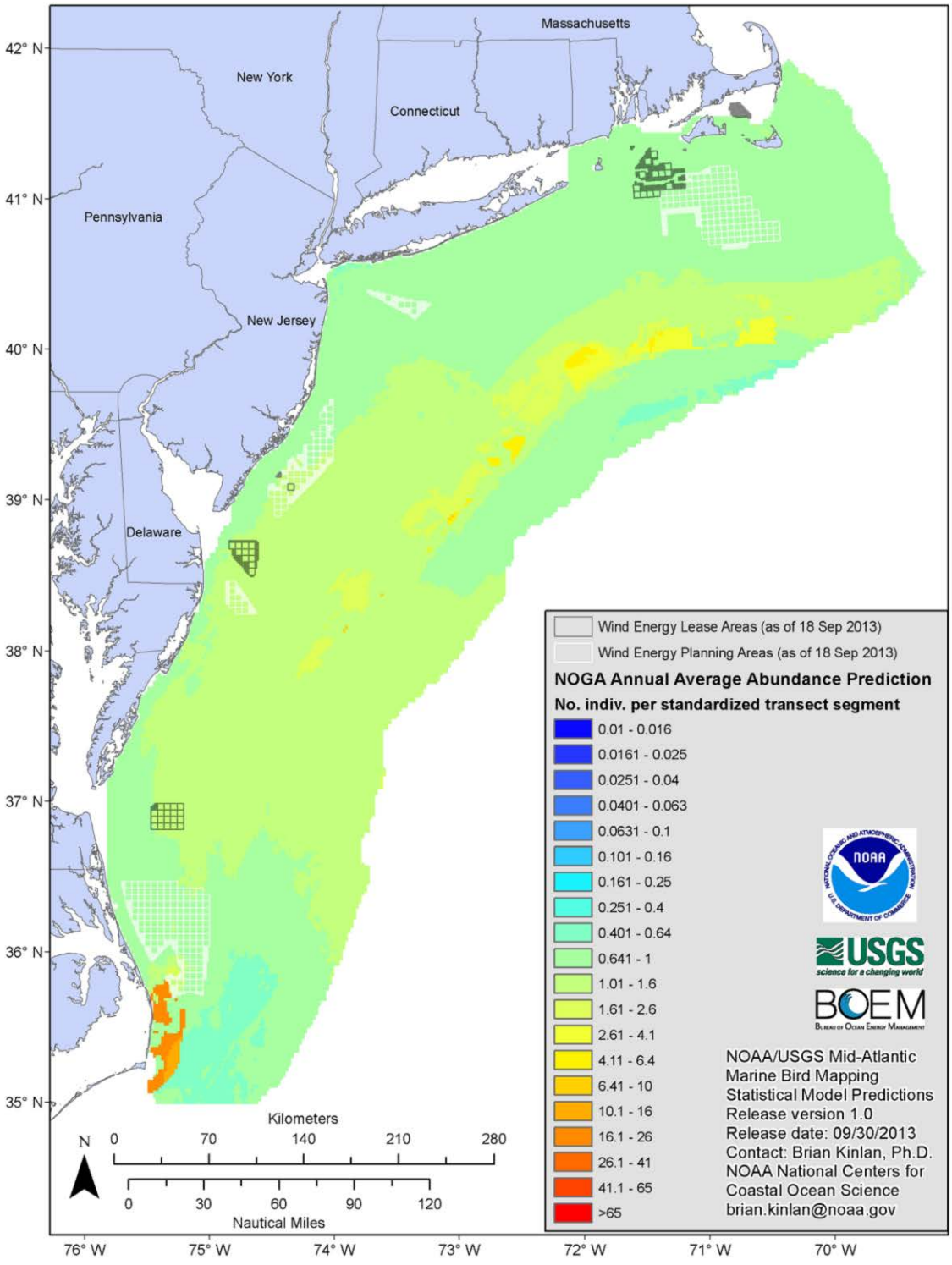


Figure 4: Predicted Average Annual Distribution of Northern Gannets

COLLISION RISK ASSESSMENT
Sheet 1 - Input data

used in overall collision risk sheet
used in migrant collision risk sheet
used in single transit collision risk sheet or extended model
used in available hours sheet
used in large array correction sheet
not used in calculation but stated for reference

	Units	Value	Data sources	Source
Bird data				
Species name		Gannet		
Bird length	m	0.94		Robinson, 2005
Wingspan	m	1.72		Robinson, 2005
Flight speed	m/sec	14.9		Table 3 (vmf), Pennycuick 1987
Nocturnal activity factor (1-5)		2		Table A-8, Robinson Willmott et al., 2013
Flight type, flapping or gliding		flapping		

Bird survey data			Data sources	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daytime bird density	birds/sq km			0.02477	4.8711	0.09907	0.04128		0	0	0	0	0	0	0	0.00826
Proportion at rotor height	%	15.4%														Table 3-1, Append L RAP
Proportion of flights upwind	%	50.0%														Table 3-2, Append L RAP

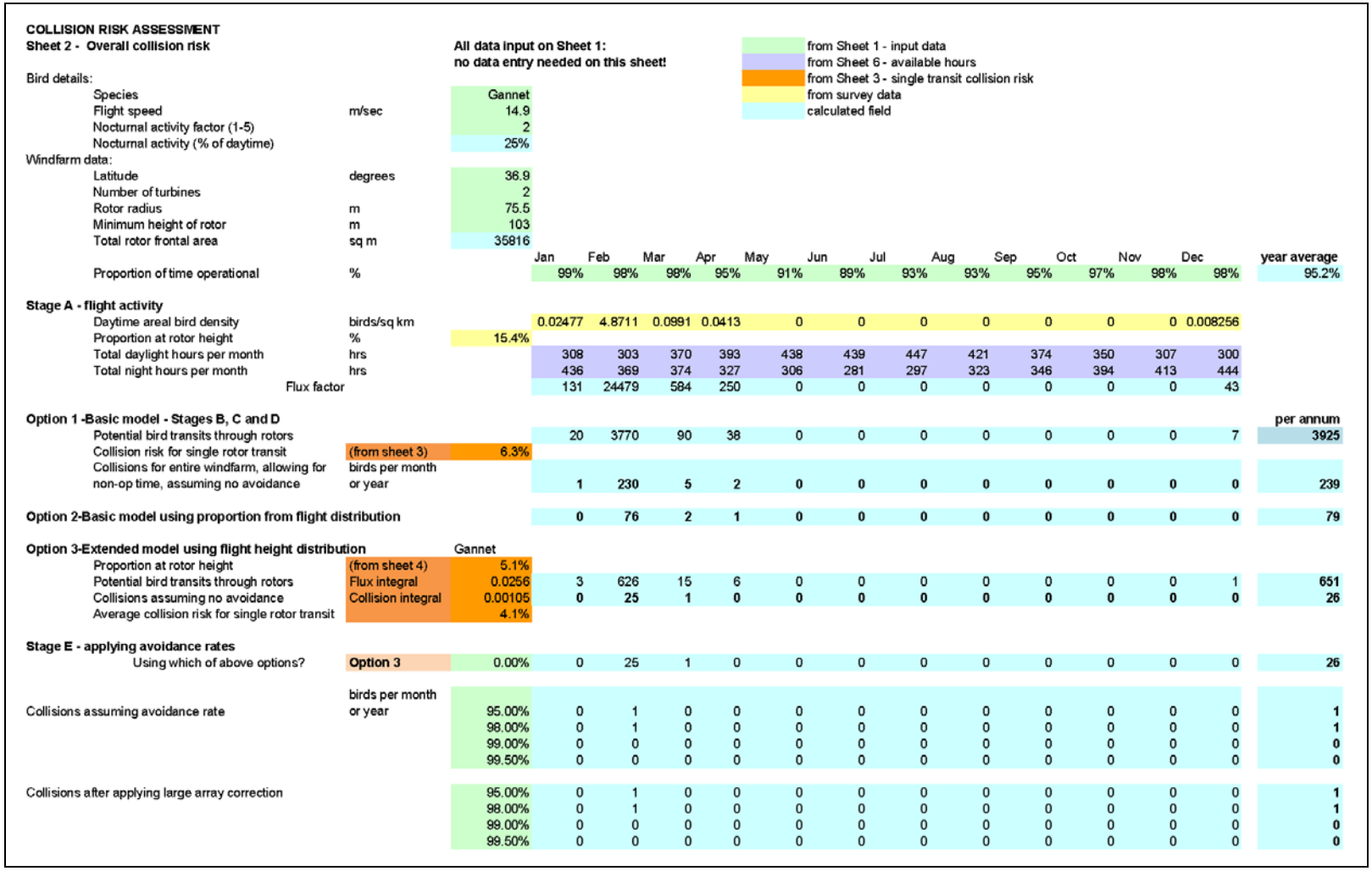
Birds on migration data			Data sources
Migration passages	birds		
Width of migration corridor	km	8	
Proportion at rotor height	%	75%	
Proportion of flights upwind	%	50.0%	

	Units	Value	Data sources	Source
Windfarm data				
Name of windfarm site		VOWTAP		RAP
Latitude	degrees	36.90		
Number of turbines		2		RAP
Width of windfarm	km	1.2		
Tidal offset	m	0.8		Figure 3.2-1, RAP

Turbine data	Units	Value	Data sources	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
Turbine model		n Haliade 150 6MW turbine														Table 3.2-1, RAP
No of blades		3														Table 3.2-1, RAP
Rotation speed	rpm	10.6														K.H. Baumgaertner (pers com, Sept 19, 2014
Rotor radius	m	75.5														Table 3.2-1., RAP
Hub height	m	103														Table 3.2-1., RAP
Monthly proportion of time operational	%			99%	98%	98%	95%	91%	89%	93%	93%	95%	97%	98%	98%	Append E, RAP
Max blade width	m	3.200														Table 3.2-1., RAP
Pitch	degrees	-1														K.H. Baumgaertner (pers com, Sept 19, 2014

Avoidance rates used in presenting results			Data sources (if applicable)	
	95.00%			
	98.00%	X		WWT, 2012
	99.00%			
	99.50%			

Figure 5. Data used in the "input data" spreadsheet within the Band (2012) collision risk model for northern gannets.



COLLISION RISK ASSESSMENT
Sheet 2 - Overall collision risk

All data input on Sheet 1:
no data entry needed on this sheet!

from Sheet 1 - input data
from Sheet 6 - available hours
from Sheet 3 - single transit collision risk
from survey data
calculated field

			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year average
Bird details:															
Species		Gannet													
Flight speed	m/sec	14.9													
Nocturnal activity factor (1-5)		2													
Nocturnal activity (% of daytime)		25%													
Windfarm data:															
Latitude	degrees	36.9													
Number of turbines		2													
Rotor radius	m	75.5													
Minimum height of rotor	m	103													
Total rotor frontal area	sq m	35816													
Proportion of time operational	%		99%	98%	98%	95%	91%	89%	93%	93%	95%	97%	98%	98%	95.2%
Stage A - flight activity															
Daytime areal bird density	birds/sq km		0.02477	4.8711	0.0891	0.0413	0	0	0	0	0	0	0	0.008256	
Proportion at rotor height	%	15.4%													
Total daylight hours per month	hrs		308	303	370	393	438	439	447	421	374	350	307	300	
Total night hours per month	hrs		436	369	374	327	306	281	297	323	346	394	413	444	
Flux factor			131	24479	584	250	0	0	0	0	0	0	0	43	
Option 1 -Basic model - Stages B, C and D															per annum
Potential bird transits through rotors			20	3770	90	38	0	0	0	0	0	0	0	7	3925
Collision risk for single rotor transit	(from sheet 3)	6.3%													
Collisions for entire windfarm, allowing for non-op time, assuming no avoidance	birds per month or year		**1**	**230**	**5**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	239
Option 2-Basic model using proportion from flight distribution			**0**	**76**	**2**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	79
Option 3-Extended model using flight height distribution		Gannet													
Proportion at rotor height	(from sheet 4)	5.1%													
Potential bird transits through rotors	Flux integral	0.0256	3	626	15	6	0	0	0	0	0	0	0	1	**651**
Collisions assuming no avoidance	Collision integral	0.00105	**0**	**25**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**26**
Average collision risk for single rotor transit		4.1%													
Stage E - applying avoidance rates															
Using which of above options?	**Option 3**	0.00%	0	25	1	0	0	0	0	0	0	0	0	0	**26**
Collisions assuming avoidance rate	birds per month or year	95.00%	0	1	0	0	0	0	0	0	0	0	0	0	**1**
		98.00%	0	1	0	0	0	0	0	0	0	0	0	0	**1**
		99.00%	0	0	0	0	0	0	0	0	0	0	0	0	**0**
		99.50%	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Collisions after applying large array correction		95.00%	0	1	0	0	0	0	0	0	0	0	0	0	**1**
		98.00%	0	1	0	0	0	0	0	0	0	0	0	0	**1**
		99.00%	0	0	0	0	0	0	0	0	0	0	0	0	**0**
		99.50%	0	0	0	0	0	0	0	0	0	0	0	0	**0**

Figure 6. Results as presented in the "Overall collision risk" spreadsheet within Band (2012) collision risk model for northern gannets.

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