Coastal Zone Management Act, Consistency Determination
(15 CFR 930.36(a))

Kitty Hawk Wind Energy Area Offshore the State of North Carolina

The purpose of this Consistency Determination (CD) is to determine whether issuing a commercial wind energy lease and approving site assessment activities (including the installation, operation, and decommissioning of a meteorological tower and/or buoys) within the Kitty Hawk Wind Energy Area (WEA) offshore North Carolina (see Figure 1) is consistent to the maximum extent practicable with the enforceable policies of the North Carolina and Virginia Coastal Management Programs (CMPs). This document is provided pursuant to the requirements of 15 CFR 930.39(a) of the Coastal Zone Management Act (CZMA) Federal consistency regulations.

Section 307(c)(1) of the CZMA, as amended, requires that Federal agency activities affecting any land or water use, or natural resource of the coastal zone shall be carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of federally-approved state management programs.

The State of North Carolina and the Commonwealth of Virginia share common coastal management issues and have similar enforceable policies as identified by their respective CMPs. Due to the proximity of the Kitty Hawk WEA to both states (see Figure 1), and their shared impacts on environmental and socioeconomic resources and uses, the Bureau of Ocean Energy Management (BOEM) has prepared a single CD for the Kitty Hawk WEA.

BOEM is proposing to issue a commercial wind energy lease within the Kitty Hawk WEA (as illustrated in Figure 1 and described below) and approve site assessment activities that would determine whether the lease is suitable for, and would support, commercial-scale wind energy production. The lease, by itself, would not authorize the lessee to construct or operate any wind energy project on the Outer Continental Shelf (OCS).
In January 2011, BOEM established the North Carolina Intergovernmental Renewable Energy Task Force (Task Force). The Task Force began working to develop an area offshore of North Carolina to be considered for commercial wind energy leasing.

On December 13, 2012, BOEM published a Call for Information and Nominations (Call) in the Federal Register (under Docket ID: BOEM-2012-0088). The Call was open for public comments for 45 days. On February 5, 2013, BOEM reopened the comment period for the Call to allow for additional public input. The comment period for the Call closed on March 7, 2013. After considering public comments on the Call and working closely with stakeholders, BOEM announced on August 11, 2014, that it had identified WEs offshore North Carolina. The Kitty Hawk area was refined to accommodate navigational safety concerns and avoid potential impacts to the Bodie Island Lighthouse. The Kitty Hawk WEA is shown in Figure 1 and described in Table 1 below.
Table 1: Kitty Hawk Wind Energy Area

<table>
<thead>
<tr>
<th>Wind Energy Area (WEA)</th>
<th>Official Protraction Diagram</th>
<th>Size (sq nautical miles [nm²])</th>
<th>Distance to Shore (nm)</th>
<th>Minimum Water Depth (feet [ft])</th>
<th>Maximum Water Depth (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kitty Hawk</td>
<td>Currituck Sound NJ18-11</td>
<td>145</td>
<td>24</td>
<td>88</td>
<td>134</td>
</tr>
</tbody>
</table>

Activities that may occur over the site assessment period of the lease (i.e., up to five years) include site characterization survey activities and site assessment activities involving the construction, operation, maintenance, and decommissioning of a meteorological tower and/or buoys. Site characterization surveys would inform a lessee about site specifics of a lease area in order to prepare for submission of a site assessment plan (SAP) and, potentially, a construction and operations plan (COP). The projected site characterization and site assessment activities within the WEA are discussed in detail in Section 2 and summarized in Table 2 (below).

Table 2: Projected Site Characterization & Assessment Activities in the WEA

<table>
<thead>
<tr>
<th>Potential Leasehold</th>
<th>Site Characterization Activities</th>
<th>Site Assessment Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High Resolution Geophysical (HRG) Surveys (Total Trips)</td>
<td>Sub-bottom Sampling (Total Trips)</td>
</tr>
<tr>
<td></td>
<td>236</td>
<td>467</td>
</tr>
</tbody>
</table>

1. BACKGROUND

On September 18, 2015, BOEM released the *Commercial Wind Lease Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf Offshore North Carolina Revised Environmental Assessment* (Revised EA), which is available online at: http://www.boem.gov/NC-EA-Camera-FONSI/. The Revised EA analyzes the reasonably foreseeable consequences associated with two distinct BOEM actions in the Kitty Hawk WEA:

1. **Lease issuance** (including reasonably foreseeable consequences associated with shallow hazards, geological, geotechnical, archaeological resources, and biological surveys); and
2. **SAP approval** (including reasonably foreseeable consequences associated with the installation of a meteorological tower and/or meteorological buoys).

BOEM does not issue permits for shallow hazards, geological, geotechnical, or archaeological resource surveys. However, since BOEM regulations require that a lessee include the results of these surveys in its application for SAP and COP approval, the Revised EA and this CD treats the environmental consequences of these surveys as reasonably foreseeable consequences of issuing a lease.

### 2. PROPOSED ACTION DESCRIPTION

#### Offshore Site Characterization Surveys

BOEM regulations require that a lessee provide the results of a number of surveys with both a SAP and a COP, including: a shallow hazards survey, a geological survey, biological surveys, a geotechnical survey, and an archaeological resource survey (30 CFR 585.626(a)(1) to (a)(5), respectively). BOEM refers to these surveys as “site characterization” activities. Site characterization activities (e.g., locating shallow hazards, cultural resources, and hard-bottom areas; evaluating installation feasibility; assisting in the selection of appropriate foundation system designs, and determining the variability of subsurface sediments) would necessitate using high-resolution geophysical (HRG) surveys and geotechnical exploration. The purpose of the HRG survey would be to acquire geophysical shallow hazards data and information pertaining to the presence or absence of archaeological resources and to conduct bathymetric charting. The purpose of geotechnical exploration would be to assess the suitability of shallow foundation soils for supporting a structure or transmission cable under any operational and environmental conditions that might be encountered (including extreme events), and to document soil characteristics necessary for the design and installation of all structures and cables. The results of geotechnical exploration allow for a thorough investigation of the stratigraphic and ge-engineering properties of the sediment that may affect the foundations or anchoring systems of a meteorological tower or buoy, which would be necessary for BOEM to consider in a SAP, or later a COP, for a given lease.

Site characterization activities would also necessitate vessel and/or aerial surveys to characterize three primary biological resource categories: (1) benthic habitats; (2) avian resources; and (3) marine fauna. BOEM does not anticipate a lessee needing to conduct separate surveys to characterize the benthic habitats which could be affected by their potential future leasehold activities, because the geological and geotechnical surveys would provide enough detailed information for BOEM to adequately assess potential impacts on benthic habitats in the area. For a lessee to describe the state of the avian and marine fauna resources, resource surveys...
would generally involve simple visual observation, either from a vessel or aircraft. For avian and marine fauna surveys, multi-year assessment periods may be necessary to capture natural seasonal and inter-annual variability of marine fauna within the WEA and immediate surroundings if current data available is not sufficient to determine spatial and temporal distribution of species. It is generally envisioned that the fish, marine mammal, sea turtle, and bird aerial and shipboard surveys could be conducted simultaneously.

It is assumed that the site of a meteorological tower and/or buoys would be surveyed first to meet the similar data requirements for a lessee’s SAP (30 CFR 585.610 and 585.611), and the site of a meteorological tower or buoy would not be resurveyed when the remainder of the leasehold is surveyed to meet the data requirements for a lessee’s COP (30 CFR 585.626(a)). However, a lessee could conduct all of their surveys at the same time (to support both a SAP and a COP).

**Meteorological Tower and Buoys**

A typical meteorological tower consists of a mast mounted on a foundation anchored to the seafloor. The mast may be either a monopole or a lattice (similar to a radio tower). The mast and data collection devices would be mounted on a fixed or pile-supported platform (monopile, jackets, or gravity bases) or floating platform (spar, semi-submersible, or tension-leg). Once installed, the top of a meteorological tower would be 295 to 377 ft (90-115 meters [m]) above mean sea level. Total installation time for one meteorological tower would be eight days to 10 weeks, depending on the type of structure installed and the weather and ocean conditions. There are several types of foundation pile(s) for a fixed platform, and could include, for example, a single 10-foot (3 m) diameter monopile or a steel jacket with three to four 36-inch-diameter (91-cm-diameter) piles. The monopile or piles would be driven anywhere from 25 to 100 ft (8-30 m) into the seafloor. The area of ocean bottom affected by a meteorological tower would range from about 200 square feet (ft²), if supported by a monopile, to 2,000 ft², if supported by a jacket foundation. The final foundation selection would be included in a detailed SAP submitted to BOEM for its review, along with the results of SAP-related site characterization surveys. See Section 3.2.2.1 of the Revised EA for more information on a meteorological tower.

While a meteorological tower has been the traditional device for characterizing wind conditions, several companies have expressed their interest in installing one or two meteorological buoys instead. Meteorological buoys can be used as an alternative to a meteorological tower for collecting wind, wave, and current data in the offshore environment. The Revised EA assumes that, should a lessee choose to employ buoys instead of meteorological towers, it would install a maximum of two buoys. These meteorological buoys would be anchored at fixed locations, and would regularly collect observations from many different atmospheric and oceanographic sensors. There are three primary types of buoys BOEM anticipates could be used for meteorological resource data collection on the lease: discus-shaped hull buoys; boat-shaped hull buoys; and spar-type buoys. Discus-shaped and boat-shaped buoys are typically towed or carried aboard a vessel to the installation location. A discus-type buoy would use a combination of chain, nylon and buoyant polypropylene materials, while a boat-shaped buoy would be moored using an all-chain mooring. Once at the location site, the buoy would be either lowered to the surface from the deck of the transport vessel or placed over the final location; then the mooring anchor is dropped. Transport and installation vessel anchoring would typically require one day.
for these types of buoys. The total area of bottom disturbance for boat-shaped and discus-shaped buoys would be approximately 6 ft² (.55 square meters [m²]) for the actual footprint, and 370,260 ft² (34,398 m²) for the anchor sweep. A spar-type buoy would require two distinct phases for installation, with typically a total of 2 to 3 days to install. The total area of bottom disturbance associated with a spar-type buoy and installation vessel anchors would be roughly 785 ft² (73 m²). See Section 3.2.2.2 of the Revised EA for more information on meteorological buoys and their anchor systems.

To obtain meteorological data, scientific measurement devices consisting of anemometers, vanes, barometers, and temperature transmitters would be mounted either directly on a tower and/or buoy, or on instrument support arms. A meteorological tower or buoy also could accommodate environmental monitoring equipment, such as avian monitoring equipment (e.g., radar units, thermal imaging cameras), acoustic monitoring for marine mammals, data-logging computers, power supplies, visibility sensors, water measurements (e.g., temperature, salinity), communications equipment, material hoist, and storage containers.

To measure the speed and direction of ocean currents, Acoustic Doppler Current Profilers (ADCPs) would likely be installed on or near a meteorological tower or buoy. The ADCP is a remote-sensing technology which transmits sound waves at a constant frequency and measures the ricochet of the sound wave off fine particles or zooplanktons suspended in the water column. The ADCPs may be mounted independently on the seafloor, to the legs of the platform, or attached to a buoy. A typical ADCP is about 1 to 2 ft tall (approximately 0.3-0.6 m) and 1 to 2 ft wide (approximately 0.3-0.6 m).

A SAP would describe the activities (e.g., installation of meteorological tower and/or buoys) a lessee plans to perform for the assessment of the wind resources and ocean conditions at its commercial lease (30 CFR 585.605). No site assessment activities may take place on a lease until BOEM has approved a lessee’s SAP (30 CFR 585.600(a)). Once approved, the site assessment term for a commercial lease is five years from the date of SAP approval (30 CFR 585.235(a)(2)). It is assumed that the lessee would install a data-collection device (e.g., meteorological tower, buoy, or both) on its lease area to assess the wind resources and ocean conditions of the leasehold. This information would allow the lessee to determine whether the lease is suitable for wind energy development, where on the lease it would propose development, and what form of development to propose in a COP.

If a lessee submits a SAP, then after BOEM has deemed it complete and sufficient, BOEM must send the SAP, as well as all supporting information, to the North Carolina Department of Environmental Quality Division of Coastal Management (DCM). After providing the SAP to DCM and prior to approving the SAP, BOEM must hold a conference call with DCM and the North Carolina Division of Marine Fisheries in order to ensure adequate communication regarding precise construction location and timing for the proposed meteorological tower and/or buoys.

A lessee must submit a COP at least six months before the end of the site assessment term if the lessee intends to continue to the lease’s operations term (30 CFR 585.601(c)). If the COP describes continued use of existing facilities, such as a meteorological tower and/or buoys
approved in the SAP, a lessee may keep such facilities in place on their lease during BOEM’s review of the COP (30 CFR 585.618(a)), which may take up to two years. If, after the technical and environmental review of a submitted COP, BOEM determines that such facilities may not remain in place throughout the operations term, a lessee must initiate the decommissioning process (30 CFR 585.618(c)). BOEM anticipates that a meteorological tower could be present for up to five years before the agency decides whether to allow the tower to remain in place for the lease’s operations term or whether the tower must be decommissioned immediately.

**Coastal Activity**

A lessee will likely determine specific ports used for site assessment and survey activities based primarily on proximity to the lease blocks, capacity to handle the proposed activities, and/or established business relationships between port facilities and the lessee. Existing ports or industrial areas in Virginia and North Carolina are adequate to support proposed action activities. Survey vessels would use existing ports and harbors for trip departures and returns and require a diesel refueling station. Vessels conducting HRG surveys and geotechnical exploration work can either depart from one of the two major ports or from one of the two smaller ports identified in the Revised EA and in the closest proximity to the Kitty Hawk WEA. Because the survey vessels used for HRG surveys and geotechnical exploration are smaller than most commercial ocean-going vessels and require a smaller navigation channel depth, they can use most existing commercial ports in the Virginia and North Carolina coastal area. Because anticipated offshore site characterization work is generally smaller in scale than other activities within existing ports, port infrastructure requirements are also likely to be smaller. Because of their proximity to the WEA, the majority of onshore activities would be divided among existing commercial and/or smaller ports in Virginia and North Carolina. BOEM, therefore, does not anticipate expansion of port facilities to meet lessee needs, and considers only existing facilities which can currently accommodate proposed site characterization and site assessment activities.

In order to survey all of the WEA, a lessee may have to use multiple vessels over several years. BOEM anticipates that 65 to 100 ft long vessels would be used, depending on availability, and that they could conduct several surveys simultaneously. Vessels must be able to accommodate a crew for several days and be large enough to mount enough cable to tow instruments.

**Vessel Traffic**

Approximately 880 to 1,340 total vessel round trips are anticipated to occur as a result of the proposed action over a five-year period (see Table 3). Approximately 836 to 872 of these vessel trips (round trips) would be associated with all site characterization surveys as a result of the proposed action over five years, from 2017 to 2022. The total vessel traffic estimated as a result of the installation, decommissioning, and routine maintenance of the meteorological towers and meteorological buoys that could be reasonably anticipated in connection with the proposed action would range from 44 to 468 round trips over a five-year period.
Table 3: Total Vessel Round Trips

<table>
<thead>
<tr>
<th>Activity</th>
<th>Round Trips</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meteorological Buoy Installation</td>
<td>2-4</td>
<td>1-2 round trips x 2 buoys</td>
</tr>
<tr>
<td>Meteorological Buoy Maintenance</td>
<td>40-120</td>
<td>4 quarters x 2 buoys x 5 years</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12 months x 2 buoys x 5 years</td>
</tr>
<tr>
<td>Meteorological Buoy Decommission</td>
<td>2-4</td>
<td>1-2 round trips x 2 buoys</td>
</tr>
<tr>
<td><strong>Total Meteorological Buoy Trips</strong></td>
<td><strong>44-128</strong></td>
<td></td>
</tr>
<tr>
<td>Meteorological Tower Construction</td>
<td>40</td>
<td>40 round trips x 1 tower</td>
</tr>
<tr>
<td>Meteorological Tower Maintenance</td>
<td>20-260</td>
<td>4 quarters x 1 tower x 5 years</td>
</tr>
<tr>
<td></td>
<td></td>
<td>52 weeks x 1 tower x 5 years</td>
</tr>
<tr>
<td>Meteorological Tower Decommission</td>
<td>40</td>
<td>40 round trips x 1 tower</td>
</tr>
<tr>
<td><strong>Total Meteorological Tower Trips</strong></td>
<td><strong>100-340</strong></td>
<td></td>
</tr>
</tbody>
</table>

The total vessel traffic estimated as a result of the HRG surveys and geotechnical exploration work that could be reasonably anticipated in connection with the proposed action would be approximately 704 round trips over five years, and spread over existing and available port facilities, which would likely be located in Virginia and North Carolina. In addition, BOEM presumes 132 to 168 extra independent surveys conducted to characterize avian and fish resources under the proposed action.

Should the lessee decide to install a meteorological tower on its leasehold, a total of 40 round trips are estimated for construction (see Table 4). These vessel trips may be spread over multiple construction seasons as a result of weather and sea state conditions; the time to assess suitable site(s); the time to acquire the necessary permits; and the availability of vessels, workers, and tower components. Because the decommissioning process would basically be the reverse of construction, vessel usage during decommissioning would be similar to vessel usage during construction, so another 40 round trips are estimated for decommissioning of the tower. Meteorological buoys would typically take 1 to 2 days to install by one vessel, and 1 to 2 days to decommission by one vessel. Maintenance trips to each meteorological tower may occur weekly to quarterly, and monthly to quarterly for each buoy. However, to provide for a conservative scenario, total maintenance vessel trip calculations are based on weekly trips for a tower and monthly trips for buoys over the entire 5-year period (see Table 4).
3. STATE ENFORCEABLE POLICIES

As part of this CD, BOEM has evaluated and documented in the enclosed table (see Table 5), policies identified by North Carolina and Virginia as enforceable, applicable to offshore and coastal resources or uses, and CZMA “reasonably foreseeable coastal effects” that might be expected for activities conducted under the proposed action. While reviewing and making these determinations on the policies the states have identified as enforceable in this CD, BOEM has considered the common enforceable policies identified by each of the two states as enforceable in their CMP as listed in Table 5.

4. CONSISTENCY DETERMINATION

BOEM has evaluated all applicable enforceable policies of North Carolina and Virginia and the potential activities resulting from the proposed action. This CD has examined whether the proposed action described in Section 1 is consistent to the maximum extent practicable with the policies and provisions identified as enforceable by the CMPs of North Carolina and Virginia (see Table 5). Based on the preceding information and analyses, and the incorporated-by-reference Programmatic EIS, G&G PEIS, and the Revised EA, BOEM has determined the proposed action will be consistent to the maximum extent practicable with the policies that North Carolina and Virginia have identified as enforceable.