Finding of No Historic Properties Affected
for the
Issuance of a Commercial Lease within the
Humboldt Wind Energy Area
on the Outer Continental Shelf Offshore California

February 11, 2022

FINDING

The Bureau of Ocean Energy Management (BOEM) has made a Finding of No Historic Properties Affected (Finding) for this undertaking, pursuant to 36 Code of Federal Regulations (CFR) § 800.4(d)(l). The Finding will be met through BOEM's inclusion of lease and grant stipulations requiring lessees/grantees to avoid any potential historic properties identified through their high-resolution geophysical surveys during the conduct of ground-disturbing activities associated with site characterization activities.

DOCUMENTATION IN SUPPORT OF THE FINDING

1 Description of the Undertaking

Summary

This document describes BOEM's compliance with Section 106 of the National Historic Preservation Act (NHPA) and documents the agency's Finding for the undertaking of issuing commercial leases within the Humboldt Wind Energy Area (WEA). BOEM prepared this documentation in support of the Finding following the standards outlined at 36 CFR § 800.11 (d) and as fulfillment of Stipulation I of the Programmatic Agreement among BOEM, the California State Historic Preservation Officer (SHPO), and the Advisory Council on Historic Preservation (ACHP) (Appendix A). This Finding and supporting documentation are being provided to the California SHPO and the ACHP as signatories to this agreement, and to the Blue Lake Rancheria and the Wiyot Tribe, who are consulting parties to this undertaking. This Finding and supporting documentation will be made available for public inspection by placement on BOEM's public website prior to BOEM approving the undertaking.

Federal Involvement

The Energy Policy Act of 2005, Pub. L. No. 109-58, added Section 8(p)(l)(C) to the Outer Continental Shelf (OCS) Lands Act, which grants the Secretary of the Interior the authority to issue leases, easements, or rights-of-way on the OCS for the purpose of renewable energy development, including wind energy development (*see* 43 U.S.C. § 1337(p)(l)(C)). The Secretary delegated this authority to the former Minerals Management Service, now BOEM. On April 22, 2009, BOEM promulgated final regulations implementing this authority at 30 CFR § 585.

Under the renewable energy regulations, the issuance of leases and subsequent approval of wind energy development on the OCS is a staged decision-making process. BOEM's wind energy program occurs in four distinct phases, as described below.

• *Planning and Analysis.* The first phase is to identify suitable areas to be considered for wind energy leasing through collaborative, consultative, and analytical processes; including input from the California Renewable Energy Task Force, public information meetings, and other stakeholders.

• *Lease Issuance.* The second phase, issuance of a commercial wind energy lease, gives the lessee the exclusive right to subsequently seek BOEM approval for the development of the leasehold. The lease does not grant the lessee the right to construct any facilities; rather, the lease grants the lessee the right to use the leased area to develop its plans, which must be approved by BOEM before the lessee can move on to the next stage of the process (see 30 CFR § 585.600 and § 585.601).

• *Approval of a Site Assessment Plan (SAP).* The third stage of the process is the submission of a SAP, which contains the lessee's detailed proposal for the construction of a meteorological tower, installation of meteorological buoys, or a combination of the two on the leasehold. The SAP allows the lessee to install and operate site assessment facilities for a specified term. The lessee's SAP must be approved by BOEM before it conducts these "site assessment" activities on the leasehold. BOEM may approve, approve with modification, or disapprove a lessee's SAP (see 30 CFR § 585.605-585.618).

• *Approval of a Construction and Operation Plan (COP).* The fourth stage of the process is the submission of a COP, a detailed plan for the construction and operation of a wind energy project on the lease. A COP allows the lessee to construct and operate wind turbine generators and associated facilities for a specified term. BOEM approval of a COP is a precondition to the construction of any wind energy facility on the OCS. As with a SAP, BOEM may approve, approve with modification, or disapprove a lessee's COP (see 30 CFR § 585.620-585.638).

The regulations also require that a lessee provide the results of surveys with its SAP and COP for the areas affected by the activities proposed in each plan *(see* 30 CFR § 585.610(b) and § 585.626, respectively), including the results of a shallow hazards survey, geological survey, geotechnical investigation, and archaeological resource identification survey. BOEM refers to these surveys as "site characterization" activities and provides guidelines for conducting these surveys and submitting their results as part of a SAP or COP. See *Guidelines for Providing Geological and Geophysical, Hazards, and Archaeological Information Pursuant to 30 CFR Part 585* (Appendix B), which advises lessees to survey the entirety of the area they propose to impact.

On July 16, 2021, BOEM released an Announcement of Area Identification (Area ID) Memorandum of a Wind Energy Area (WEA) located within federal waters offshore Humboldt County, California (Appendix C). The Area ID Memorandum documents the analysis and

rationale in support of the recommended designation of a WEA offshore Humboldt County, California, for environmental analysis and consideration for leasing. Area ID is a required regulatory step under the renewable energy competitive leasing process used to identify areas for environmental analysis and consideration for leasing (30 CFR § 585.211(b)). BOEM has determined that issuing commercial leases within the Humboldt WEA offshore northern California constitutes an undertaking subject to Section 106 of the NHPA (54 U.S.C. 306108), and its implementing regulations (36 CFR § 800) and that the subsequent site characterization activities associated with commercial lease issuance (e.g., shallow hazards, geological, geotechnical, and archaeological resource surveys) constitute activities that have the potential to cause effects to historic properties.

BOEM implemented a Programmatic Agreement pursuant to 36 CFR § 800.14(b) to fulfill its obligations under Section 106 of the NHPA for renewable energy activities on the OCS offshore California. This agreement has been developed for two primary reasons; first, the bureau's decisions to issue leases and approve SAPs, COPs or other plans are complex and multiple; and second, BOEM will not have the results of archaeological surveys prior to the issuance of leases and as such will be conducting historic property identification and evaluation efforts in phases (36 CFR § 800.4(b)(2)). BOEM's California Programmatic Agreement was executed December 18, 2019, among the California SHPO and the ACHP (Appendix A).

This agreement provides for Section 106 consultation to continue through both the commercial leasing process and BOEM's decision-making process regarding the approval, approval with modification, or disapproval of lessees' SAP, COP, or other plan, and will also allow for a phased identification and evaluation of historic properties (36 CFR § 800.4(b)(2)). Furthermore, the agreement establishes the process to determine and document the area of potential effects (APE) for each undertaking; to identify historic properties located within each undertaking's APE that are listed in or eligible for listing in the National Register of Historic Places (National Register); to assess potential adverse effects; and to avoid, reduce, or resolve any such effects through the process set forth in the agreements.

Description of the Wind Energy Area

The Humboldt WEA (Figure 1) measures approximately 132,386 acres (206 square miles). The boundary begins 34 km (21 mi) offshore the city of Eureka and measures 45 km (28 mi) north to south and 23 km (14 mi) east to west. Water depths across the WEA range from approximately 500 to 1,100 meters (1,640–3,609 feet).

The Holocene marine geology of the Humboldt WEA reflects the multiple distinct tectonic and depositional stages along the North American plate margin throughout the Cenozoic. Local geologic features of interest within the WEA identified during recent United States Geological Survey (USGS) marine geological and geophysical research cruises include active faulting, submarine landslides, steep seafloor slopes, seafloor pockmarks, and rock outcrops. Submarine canyons are located to the north (Trinidad Canyon) and south (Eel River Canyon) of the WEA.

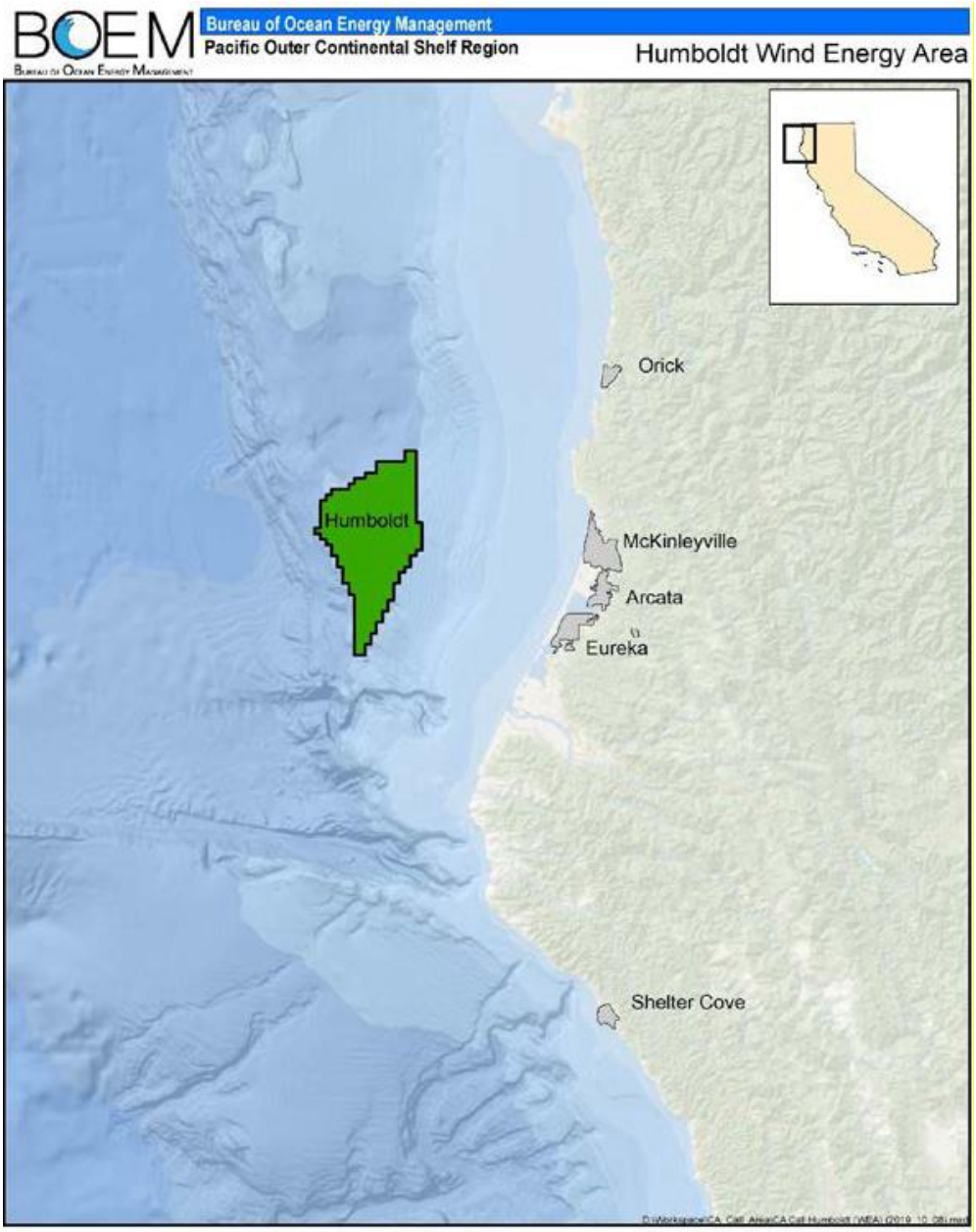

Figure 1. Map of Humboldt Wind Energy Area.

The Undertaking

The undertaking considered in this Finding includes the issuance of up to three (3) commercial leases within the Humboldt WEA and granting of rights of way (ROWs) and rights of use and easements (RUEs) in support of wind energy development and takes into account the execution of associated site characterization and site assessment activities on these leases or grants. A lessee must submit the results of site characterization surveys with their plans (e.g., 30 CFR § 585.610, § 585.626, and§ 585.645). Although BOEM does not issue permits or approvals for these site characterization activities, it will not consider approving a lessee's plan if the required survey information is not included.

Site characterization activities include both high-resolution geophysical (HRG) surveys, which do not involve seafloor-disturbing activities, and geotechnical investigations, which may include seafloor-disturbing activities. Retrieval of lost equipment may occur, as necessary. The purpose of HRG survey is to acquire shallow hazards data, identify potential archaeological resources, characterize seafloor conditions, and conduct bathymetric charting. BOEM anticipates that HRG surveys would be conducted using the following equipment: swath bathymetry system, magnetometer/gradiometer, side-scan sonar, and shallow and medium (seismic) sub-bottom profiler systems. This equipment does not come in contact with the seafloor and is typically towed from a moving survey vessel that does not require anchoring. BOEM does not consider HRG survey to be an activity that has the potential to cause effects on historic properties and this activity is not considered further in this Finding.

Geotechnical testing or sampling involves seafloor disturbing activities, and therefore has the potential to cause effects to historic properties. Geotechnical testing is conducted to assess the suitability of shallow foundation soils to support anchoring systems 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 proposed structures and cables. Geotechnical investigation may include the use of equipment such as gravity cores, piston cores, vibracores, deep borings, and Cone Penetration Tests (CPT), among others. Some of these methods require the use of anchored vessels or multi-point anchored barges.

BOEM also anticipates cases where geotechnical testing methods may be employed as part of the identification of historic properties. In some instances, direct sampling may be the only available method of testing the presence or absence of horizons of archaeological potential within features of interest identified during geophysical survey. As agreed to by the signatories under Stipulation III of the Programmatic Agreement, vibracores or other direct samples collected by or under the supervision of a Qualified Marine Archaeologist for the purposes—at least in part—of historic property identification or National Register eligibility testing and evaluation are exempt from further Section 106 review.

The undertaking does not, however, include cable installation or connection to shore-based facilities, installation of site assessment equipment, or consideration of commercial-scale wind energy facilities. Should a lessee propose to deploy site assessment equipment within the Humboldt WEA, they would submit a SAP to BOEM, which BOEM would consider under a separate Section 106 review pursuant to Stipulations II and III of the California Programmatic Agreement. Should a lessee propose to construct and operate a commercial-scale wind energy facility within the Humboldt WEA, they would submit a COP to BOEM, which BOEM would consider under a separate Section 106 review.

Area of Potential Effects

As defined in the Section 106 regulations (36 CFR § 800.16(d)), the APE is the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and

nature of an undertaking and may be different for different kinds of effects caused by the undertaking.

As agreed to by the signatories under Stipulation I.A of the Programmatic Agreement, the APE for this undertaking is defined as the depth and breadth of the seabed that could potentially be affected by seafloor/ground-disturbing activities associated with site characterization activities. The APE for site characterization activities includes the discrete horizontal and vertical areas of the seafloor that may be affected through geotechnical sampling, which may include the collection of core samples, soil borings, or other bottom-disturbing techniques that could directly affect historic properties on or below the seafloor, if present. In addition, geotechnical sampling may also require the use of barges or anchored vessels that could also directly affect historic properties, if present.

Site characterization activities could occur within the extent of the Humboldt WEA and along a corridor(s) that extends from the WEA to the onshore energy grid. It is anticipated the ROW/RUE route(s) would consist of a minimum 300-meter-wide corridor centered on any anticipated cable location(s). Because any ROW or RUE grants considered as part of this undertaking have not been issued, BOEM is uncertain of the exact location of these cable corridor surveys. However, BOEM can anticipate their geographic extent. Power generated from potential Humboldt lease areas would need to be transmitted to shore directly from the lease area(s) by individual export cables to onshore cable landings. For the purposes of this undertaking, BOEM estimates that the APE associated with cable site characterization activities would occur within a discrete corridor(s) in the region between the Humboldt WEA and shore, most likely landing near Humboldt Bay.

Based on the distance from shore and the minor-in-scale and temporary manner in which site characterization studies will likely occur, BOEM has concluded that the equipment and vessels performing these activities will be indistinguishable from existing lighted vessel traffic. Therefore, BOEM has not defined as part of the APE onshore areas from which the site characterization activities would be visible. In addition, there is no indication that the issuance of a lease and subsequent site characterization studies will involve expansion of existing port infrastructure. Therefore, onshore staging activities are not considered as part of the APE for this specific undertaking.

Consultation with Appropriate Parties and the Public

Under stipulation I.C of the Programmatic Agreement for the undertaking of issuing a commercial lease, BOEM committed to identify consulting parties pursuant to 36 CFR § 800.3(f); consult on existing, non-proprietary information regarding the proposed undertaking and the geographic extent of the APE; and to solicit additional information on historic properties within the APE from the consulting parties and the public.

On July 28, 2021, BOEM published an Announcement of WEA identification for the Commercial Wind Energy Leasing on the OCS offshore Humboldt County in northern California and began public scoping for the preparation of an Environmental Assessment (EA) of the WEA under the National Environmental Policy Act. The 45-day public comment period on the scope of the EA closed on September 13, 2021. Previously, BOEM had issued a Call for Information and Nominations on October 19, 2018. BOEM has engaged with stakeholders through public

meetings and the Intergovernmental Renewable Energy Task Force on the Humboldt area throughout the process, including holding California Task Force meetings on October 13, 2016; September 17, 2018; March 9, 2020; and July 13, 2021, to introduce the WEA and update the Task Force on recent state activities. In collaboration with the State of California, the California Offshore Wind Energy Gateway was established through Data Basin as a way of providing geospatial information related to wind energy information offshore California. In September 2018, BOEM and the State of California published an Outreach Summary Report on California Offshore Wind Energy Planning, which was updated through an Outreach Summary Report Addendum, published in June 2021.

BOEM is currently preparing an EA to consider potential environmental consequences of site characterization activities (i.e., biological, archaeological, geological, and geophysical surveys and core samples) and site assessment activities (i.e., installation of meteorological buoys) associated with issuing wind energy leases in the WEAs. The EA also considers project easements associated with each potential lease issued, and grants for subsea cable corridors. BOEM held a public review and comment period for preparation of the EA, which closed on September 13, 2021. One comment letter noted the limited APE for the current undertaking and expressed interest in participating in future consultations, when a plan is under review. Another comment noted the importance of government-to-government consultation with federally recognized Tribal nations and recommended that BOEM discuss how it will minimize adverse effects to historic properties throughout the project area. None of the other comments received concerned historic properties, the scope of historic property identification efforts, or any other topic relevant to the Section 106 review of the undertaking that is the subject of this Finding. The Draft EA was published on January 11, 2022.

BOEM initiated Section 106 consultation for the undertaking of issuing a commercial lease and the issuance of ROW/RUE grants within the Humboldt WEA by sending a letter on August 4, 2021, and e-mail including an electronic copy of the letter on August 6, 2021. The list of potential Section 106 consulting parties for the undertaking was developed and included the California SHPO, ACHP, federally recognized Tribal Nations in the Humboldt area, certified local governments, historical preservation societies, and local museums (Table 1). The letter provided information and invited consultation for this undertaking under Section 106 of the NHPA. The letter also solicited public comment and input regarding the identification of, and potential effects on, historic properties from leasing and site assessment activities for the purpose of obtaining public input for the Section 106 review (36 CFR § 800.2(d)(3)) and to determine their interest in participating as a consulting party. BOEM received requests to become consulting parties from CA SHPO, ACHP, Blue Lake Rancheria, and the Wiyot Tribe. Cher-Ae Heights Indian Community of the Trinidad Rancheria and the Yurok Tribe requested to remain informed of consultation activities for this undertaking. BOEM shared this Finding in draft form with the consulting parties on January 3, 2022.

Comments on the Draft Finding of Effects were received from Blue Lake Rancheria, with suggested revisions to the historic properties discussion and required elements for the lease instrument. Those suggestions were incorporated into this final Finding of Effects. Blue Lake Rancheria also provided a list of local experts on the geoarchaeology of the area, as well as a request to facilitate a meeting of local Tribal Historic Preservation Office staff, local

geoarchaeology experts, and BOEM to further discuss the potential for identifying intact submerged landform features offshore Humboldt Bay. BOEM received comments from Bear River Band of Rohnerville Rancheria stating the Tribe is in agreement with the conclusions made regarding potential effects and requested the establishment of a submerged landforms working group for the Humboldt area. BOEM is working with Bear River Band of Rohnerville Rancheria and Blue Lake Rancheria to facilitate such a meeting. BOEM received comments from the California SHPO stating there were no objections to the Draft Finding of Effects.

No other comments were received on this Finding. Per 36 CFR § 800.4(d)(1)(i), "If the SHPO/THPO, or the Council if it has entered the section 106 process, does not object within 30 days of receipt of an adequately documented finding, the agency official's responsibilities under section 106 are fulfilled."

Table 1. Entities Solicited for Information and Concerns Regarding Historic Properties and the Proposed Undertaking

Name	Affiliation
Bear River Band of Rohnerville Rancheria	Tribal Nation
Big Lagoon Rancheria	Tribal Nation
Blue Lake Rancheria	Tribal Nation
Cher-Ae Heights Indian Community of the Trinidad Rancheria	Tribal Nation
Elk Valley Rancheria	Tribal Nation
Hoopa Valley Tribe	Tribal Nation
Karuk Tribe	Tribal Nation
Resighni Rancheria	Tribal Nation
Tolowa Dee-ni` Nation	Tribal Nation
Wiyot Tribe	Tribal Nation
Yurok Tribe	Tribal Nation
Redwood National Park	Federal Agency
California State Historic Preservation Office	State Agency
California State Lands Commission	State Agency
City of Arcata	Local Government
City of Eureka	Local Government
City of Trinidad	Local Government
Humboldt County Historical Society	Historical Society
Humboldt County Maritime Museum	Museum

II. Description of the Steps Taken to Identify Historic Properties

As documented in the Programmatic Agreement, BOEM has determined that the identification and evaluation of historic properties will be conducted through a phased approach, pursuant to 36 CFR § 800.4(b)(2), where the final identification of historic properties may occur after the issuance of a lease or grant, but before the approval of a plan, because lessees conduct site characterization surveys in preparation for plan submittal.

BOEM has reviewed existing and available information regarding historic properties that may be present within the APE, including any data concerning possible historic properties not yet identified. Sources of this information include consultation with the appropriate parties and the

public, accessing information gathered through BOEM-funded studies and through the California Historical Resources Information System's Northwest Information Center, and reviewing cultural resources information compiled for preparation of the environmental assessment.

Relevant BOEM studies include an updated desktop assessment of archaeological resource potential on the Pacific OCS (ICF 2013). The study modelled submerged paleo-landform and pre-European contact archaeological potential based on reconstruction of sea level rise, human settlement patterns, and site formation and preservation conditions. GIS-based shape files of these data sets are available for download from the California Offshore Wind Energy hub on the Data Basin website. The ICF report also compiled information on reported shipwrecks in the Pacific Shipwreck Database. BOEM's Pacific Shipwreck Database does not represent a complete listing of all potential shipwrecks located on the Pacific OCS, but rather it serves as a baseline source of existing and available information for the purposes of corroborating and supporting identification efforts. In many cases, the locational accuracy of database entries varies greatly.

To date, the Humboldt WEA has not been subjected to a complete and comprehensive archaeological identification survey, however, in August 2021, a geophysical survey was conducted offshore the entrance to Humboldt Bay, extending out to approximately the 150-meter (492 feet) water depth. Data acquisition for this survey included sidescan sonar, subbottom profiler, and marine gradiometer (Kemp and DeRosa 2021; Joy in press).

Given the water depths of the WEA and based on our current understanding of submerged pre-contact archaeological site modeling for the area offshore Humboldt Bay, the types of historic properties expected to be present within the WEA include only submerged historic period archaeological sites such as shipwrecks. The potential to encounter historic period shipwrecks shoreward of the WEA increases near the entrance to Humboldt Bay, with the majority of reported vessel losses (Appendix D) occurring within 4.83 kilometers (3 miles) of shore. The potential for inundated pre-contact archaeological sites would be expected shoreward of the 135 meter (443 feet) bathymetric contour, which is located approximately 18 kilometers (11.18 miles) from shore.

Pre-contact Historic Properties

Native American Tribes have deep ties to the Humboldt Bay area and have called this area home since time immemorial. The coastline and coastal areas of northern California near Humboldt Bay and the Humboldt WEA are within or near the traditional cultural region of several Tribes and cultural groups.

The area immediately surrounding Humboldt Bay is home to the Wiyot people. Wiyot-affiliated Tribes include Blue Lake Rancheria, Bear River Band of the Rohnerville Rancheria, and the Wiyot Tribe (CANAHC 2021). Blue Lake Rancheria identifies their location as within the aboriginal territory of the Wiyot people (BLR 2021). The Bear River Band of the Rohnerville Rancheria identify themselves as people of the Eel River basin (BRBRR 2021). The Wiyot Tribe define their ancestral homelands as ranging from the Little River to the north, Bear River Ridge to the south, and from the Pacific Coast out to as far as Berry Summit in the northeast and Chalk Mountain in the southeast (Wiyot Tribal Council 2017). Within Humboldt Bay, Tuluwat

(formerly Gunther) Island is a culturally significant and important Wiyot site (Wiyot Tribe 2021).

To the north of Humboldt Bay, "the Ancestral Lands of the Yurok Tribe extend unbroken along the Pacific Ocean coast (including usual and customary offshore fishing areas) from Damnation Creek, its northern boundary, to the southern boundary of the Little River drainage basin, and unbroken along the Klamath River, including both sides and its bed, from its mouth upstream to and including the Bluff Creek drainage basin" (Yurok 1993). The Yurok Tribe is the largest Tribal Nation in California. In addition to the Yurok Tribe, Yurok-affiliated Tribes include Big Lagoon Rancheria, Blue Lake Rancheria, Cher-Ae Heights Indian Community of the Trinidad Rancheria, and Resighini Rancheria (CANAHC 2021).

Documented archaeological sites in the Humboldt area date back at least 8,000 years (Eidesness et al. 2020). The cultural chronology for pre-contact archaeological sites in the Humboldt area includes Borax Lake pattern (ca. 8000 to 3000 years before present [BP]), Mendocino (also known as Willits) pattern (ca. 3500 to 1500 BP), and Tuluwat (formerly Gunther) pattern (ca. post-1500 BP) (c.f., Frederickson 1984; Hildebrandt 2007; Eidesness et al. 2020).

Early documentation of the archaeology of the Humboldt area first appeared in Loud (1918), which included fieldwork and documentation of the Humboldt Bay area, and including Tuluwat, a major Wiyot village site located on what was then referred to as Gunther (Tuluwat) island. This became the type-site for Tuluwat (Gunther) pattern. While no pre-contact period archaeological sites have been identified on the OCS offshore Humboldt Bay, some of the oldest sites in the area have been identified in nearby upland areas (c.f., Pilot Ridge (CA-HUM-573)) (Fitzgerald and Hildebrandt 2001). One of the oldest coastal sites in the area, the Manila site (CA-HUM-321) is located on the Samoa Peninsula along the northwest end of Humboldt Bay. This site (circa 1309 cal BP) provides one of the earliest examples of intensive marine and estuary resource procurement in the area (Tushingham et al. 2016).

During the Late Pleistocene, at the Last Glacial Maximum (20,000 BP), the glaciers that covered vast portions of the Earth's surface sequestered massive amounts of water as ice and lowered global sea level approximately 130 meters (426 feet) (Clark et al. 2014). An assessment of recent survey data acquired offshore Humboldt Bay suggests the local sea level curve for the Humboldt Region may be 135 meters (443 feet) (Joy in press). Corresponding with the lower global sea level during the Late Pleistocene, the maximum extent of exposed coastal plains that could contain remnant subaerially exposed paleolandforms or paleolanscape features, and therefore have the potential to contain submerged pre-contact archaeological sites, would extend roughly 18 kilometers (11.18 miles) offshore from the Humboldt Bay coastline (Joy in press).

Historic Period Historic Properties

The waters offshore Humboldt Bay and near the Humboldt WEA have witnessed historic-period vessel traffic since the mid-16th century. The first recorded voyage of a European vessel along the northern California coast occurred as part of the expedition led by Juan Rodriguez Cabrillo and his successor Bartolome Ferrer from 1542-1543. While Cabrillo died along the way, Ferrer is believed to have travelled as far north as the California-Oregon border and returned to Mexico

with a rudimentary map of the coast. In 1565, the Spanish identified an east-bound sailing route from Asia to Mexico, which established what came to be known as the Manilla Galleon Trade Route (ICF 2013).

The British, under command of Captain James Cook, mapped the Pacific coast from California to the Bering Strait in 1778. By that time, Russian fur trading vessels had also moved into the area, and by the late 1780s, British and American fur traders followed (ICF 2013). The discovery of gold at Sutter's Mill in 1848 led to a major increase of vessel traffic in the Pacific, and the first non-indigenous settlement in the Humboldt Bay area. By the 1860s a major timber industry had developed in the region and regular transshipment routes had been established (Coy 1929). The increase of vessel activity in the area in the late 19th century, led to the loss of numerous vessels around the approach to the Humboldt area.

According to the BOEM Pacific Shipwreck Database, there are 60 known and reported historic shipwreck losses near the Humboldt WEA (Appendix D). With the exception of 2 reported shipwrecks with unknown loss dates, the dates of loss for the remaining 58 shipwrecks range from 1850 to 1950. The reported loss locations for the majority of these vessels (55 of 60) occurred with three miles of the entrance to Humboldt Bay.

III. Required Elements in the Lease

Per Stipulation I.E of the Programmatic Agreement, where practicable, BOEM will require avoidance of potential historic properties through lease stipulations, resulting in BOEM recording a Finding of No Historic Properties Affected, consistent with 36 CFR § 800.4(d)(1). Inclusion of the following elements in the lease will ensure the identification and avoidance of historic properties and is a requirement of this Finding.

The following elements, designed to avoid impacts to offshore historic properties from bottom-disturbing activities associated with site characterization surveys, would be included in a commercial lease issued for the Humboldt WEA:

- The Lessee must provide the methods and results of an archaeological survey with its plans.
- The Lessee must ensure that the analysis of archaeological survey data collected in support of plan submittal and the preparation of archaeological reports in support of plan submittal are conducted by a Qualified Marine Archaeologist who meets the Secretary of the Interior's Professional Qualifications Standards (48 FR 44738–44739) and has experience analyzing marine geophysical data.
- The lessee may only conduct geotechnical exploration activities, including geotechnical sampling or other direct sampling or investigation techniques, which are performed in support of plan submittal, in areas in which an archaeological analysis of the results of geophysical surveys has been completed for that area.
- The Qualified Marine Archaeologist's analysis of the geophysical data must include a determination of whether any potential archaeological resources are present in the area of geotechnical sampling, including consideration of both pre-contact and historic period archaeological resources.

- If present in the area, the lessee's geotechnical sampling activities must avoid any potential archaeological resources by a minimum of 164 ft (50 m). The avoidance distance must be calculated by the Qualified Marine Archaeologist from the maximum discernible extent of the archaeological resource.
- The Qualified Marine Archaeologist must certify in the lessee's archaeological reports included with a SAP or COP that geotechnical exploration activities did not affect potential historic properties identified as a result of the HRG surveys.
- In no case may the lessee's actions affect a potential archaeological resource without BOEM's prior approval.

In addition, BOEM would require that the lessee observe the unanticipated finds requirements at 30 CFR 585.802. The following elements would be included in a commercial lease issued within the Humboldt WEA:

- If the lessee, while conducting site characterization activities in support of plan (i.e., SAP and/or COP) submittal, discovers a potential archaeological resource such as the presence of a shipwreck or pre-contact archaeological site within the project area, the lessee must:
    - Immediately halt seafloor-disturbing activities in the area of discovery, plus a reasonable buffer, as appropriate;
    - Notify the lessor within 24 hours of discovery;
    - Notify the lessor in writing by report within 72 hours of its discovery;
    - Keep the location of the discovery confidential and take no action that may adversely affect the archaeological resource until the lessor has made an evaluation and instructs the applicant on how to proceed; and
    - Conduct any additional investigations as directed by the lessor to determine if the resource is eligible for listing in the NRHP (30 CFR 585.802(b)). The lessor will direct the lessee to conduct such investigations if: (1) the site has been affected by the lessee's project activities; or (2) impacts on the site or on the area of potential effect cannot be avoided. If investigations indicate that the resource is potentially eligible for listing in the NRHP, the lessor will tell the lessee how to protect the resource or how to mitigate adverse effects on the site. If the lessor incurs costs in protecting the resource, under Section 110(g) of the NHPA, the lessor may charge the lessee reasonable costs for carrying out preservation responsibilities under the OCS Lands Act (30 CFR 585.802(c-d)).

IV. The Basis for the Determination of No Historic Properties Affected

This Finding is based on the review conducted by BOEM of existing and available information, consultation with interested and affected parties, and the conclusions drawn from this information. The proposed undertaking includes the issuance of commercial leases within the Humboldt WEA and ROW/RUE grants in the region and takes into account the execution of associated site characterization activities.

The required identification and avoidance measures that will be included in commercial leases will ensure that the proposed undertaking will not affect historic properties. Therefore, no

historic properties will be affected for the undertaking of issuing a commercial lease within the Humboldt WEA, consistent with 36 CFR § 800.4(d).

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APPENDICES

Appendix A: Programmatic Agreement Among the US Department of the Interior, Bureau of Ocean Energy Management, the State Historic Preservation Officer of California, and the Advisory Council on Historic Preservation Regarding Review of Outer Continental Shelf Renewable Energy Activities Offshore California Under Section 106 of the National Historic Preservation Act

Appendix B: Guidelines for Providing Archaeological and Historic Property Information Pursuant to 30 CFR Part 585

Appendix C: Area Identification Memorandum of a Wind Energy Area (WEA) located within federal waters offshore Humboldt County, California

Appendix D: List of Reported Vessel Losses near Humboldt WEA

APPENDIX A

PROGRAMMATIC AGREEMENT
Among
The U.S. Department of the Interior, Bureau of Ocean Energy Management,
The State Historic Preservation Officer of California,
The Advisory Council on Historic Preservation
Regarding Review of Outer Continental Shelf Renewable Energy Activities
Offshore California
Under Section 106 of the National Historic Preservation Act

WHEREAS, the Outer Continental Shelf Lands Act grants the Secretary of the Interior (Secretary) the authority to issue leases, easements, or rights-of-way on the Outer Continental Shelf (OCS) for the purpose of renewable energy development, including wind energy development (*see* 43 U.S.C. §1337(p)(1)(C)), and to promulgate regulations to carry out this authority (*see* 43 U.S.C. §1337(p)(8)); and,

WHEREAS, the Secretary delegated this authority to the former Minerals Management Service, now the Bureau of Ocean Energy Management (BOEM), and promulgated final regulations implementing this authority at 30 CFR part 585; and,

WHEREAS, under the renewable energy regulations, the issuance of leases and subsequent approval of wind energy development on the OCS is a staged decision-making process that occurs in distinct phases; and,

WHEREAS, OCS means all submerged lands lying seaward and outside of the area of lands beneath navigable waters, as defined in Section 2 of the Submerged Lands Act (43 U.S.C. § 1301), whose subsoil and seabed appertain to the United States and are subject to its jurisdiction and control (see 30 CFR § 585.112); and,

WHEREAS, BOEM may issue commercial leases, limited leases, research leases, Right-of-Way (ROW) grants, or Right-of-Use and easement (RUE) grants on the OCS (see Appendix); and,

WHEREAS, Commercial leases, Limited leases, ROW grants, and RUE grants do not authorize the lessee or grantee to construct any facilities; rather, the lease or grant authorizes the lessee or grantee the right to use the leased area to develop plans, which must be submitted to and approved by BOEM before the lessee or grantee implements its plans (*see* 30 CFR §585.600 and §585.601); and,

WHEREAS, under BOEM's renewable energy regulations, BOEM will review and may approve, approve with modifications, or disapprove Site Assessment Plans (SAPs), Construction and Operations Plans (COPs), General Activities Plans (GAPs), or other plans, collectively "Plans" (*see* 30 CFR 585.613(e), 585.628(f), and 585.648(e)); and,

WHEREAS, BOEM determined that issuing leases and grants and approving Plans constitute undertakings subject to Section 106 of the National Historic Preservation Act (NHPA) (16 U.S.C. § 470(f)), and its implementing regulations (36 CFR part 800); and,

WHEREAS, the issuance of a commercial lease, limited lease, ROW grant, or RUE grant has the potential to affect historic properties insofar as it may lead to the lessee or grantee conducting geophysical surveying and geotechnical testing; and,

WHEREAS, geophysical surveys consist of towed sensor surveys that will not impact the seafloor and, therefore, BOEM has determined that geophysical surveys are not likely to have the potential to affect historic properties; and,

WHEREAS, the issuance of a research lease or approval of a Plan has the potential to affect historic properties insofar as it may lead to the lessee conducting geotechnical testing; constructing and operating site assessment facilities and renewable energy structures; and, placing and operating transmission cables, pipelines, and/or associated facilities that involve the transportation or transmission of electricity or other energy products from renewable energy projects; and,

WHEREAS, BOEM may issue multiple renewable energy leases and grants and approve multiple Plans associated with each lease or grant issued on the OCS; and,

WHEREAS, BOEM's renewable energy regulations also contemplate the development of a lease in multiple phases (*see* 30 CFR 585.629); and

WHEREAS, BOEM determined that the implementation of the Offshore Renewable Energy Program is complex, as the decisions on these undertakings are phased, and the effects on historic properties are regional in scope, pursuant to 36 CFR 800.14(b); and,

WHEREAS, 36 CFR 800.4(b)(2) provides for deferral of final identification and evaluation of historic properties when provided for in a Programmatic Agreement (Agreement) executed pursuant to 36 CFR 800.14(b); and,

WHEREAS, BOEM determined that the identification and evaluation of historic properties shall be conducted through a phased approach, pursuant to 36 CFR 800.4(b)(2), where the final identification of historic properties may occur after the issuance of a lease or grant and before the approval of a Plan because lessees conduct site characterization surveys in preparation for Plan submittal (*see* 30 CFR part 585); and,

WHEREAS, the deferral of final identification and evaluation of historic properties could result in the discovery of previously unknown historic properties that could significantly impact project planning, siting, and timelines; and,

WHEREAS, 36 CFR 800.14(b)(3) provides for developing programmatic agreements for complex or multiple undertakings and 800.14(b)(1) provides for using such agreements when effects on historic properties cannot be fully determined prior to approval of an undertaking (*see* 800.14(b)(1)(ii)), when effects on historic properties are regional in scope (*see* 800.14(b)(1)(i)), and for other circumstances warranting a departure from the normal Section 106 process (*see* 800.14(b)(1)(v)); and,

APPENDIX A

WHEREAS, BOEM has consulted in the development of this agreement with the California State Historic Preservation Officer (SHPO), pursuant to 36 CFR part 800, the regulations implementing Section 106 of the NHPA; and,

WHEREAS, the Yurok Tribe is a Tribe, as defined at 36 CFR 800.16(m), that has chosen to consult with BOEM and participate in development of this Agreement; and

WHEREAS, BOEM shall continue to consult with this and other Tribes, Tribal Historic Preservation Officers (THPO), and/or their designee to identify properties of religious and cultural significance that may be eligible for listing in the National Register of Historic Places (including Traditional Cultural Properties) and that may be affected by these undertakings; and,

WHEREAS, in accordance with 36 CFR 800.6(a)(1), BOEM has notified the Advisory Council on Historic Preservation (ACHP) of its intent to develop an Agreement, and the ACHP has chosen to participate in the consultation pursuant to 36 CFR 800.6(a)(1)(iii); and

WHEREAS, the Section 106 consultations described in this Agreement will be used to establish a process to identify historic properties located within the undertakings' Area(s) of Potential Effects (APE); to assess potential effects; and to avoid, reduce, or resolve any adverse effects; and,

WHEREAS, BOEM involves the public and identifies other consulting parties through notifications, requests for comments, existing renewable energy task forces, contact with the SHPO, and National Environmental Policy Act scoping meetings and communications for these proposed actions;

NOW, THEREFORE, BOEM, the California SHPO, and the ACHP agree that Section 106 review shall be conducted in accordance with the following stipulations:

STIPULATIONS

BOEM shall ensure that the following measures are carried out:

I. The following Stipulation addresses activities associated specifically and solely with undertakings of issuing a commercial lease, limited lease, research lease, ROW grant, or RUE grant. The signatories agree:

A. BOEM will delineate the APE as the depth and breadth of the seabed that could potentially be impacted by geotechnical testing.

B. BOEM will ensure a reasonable and good faith effort to carry out appropriate identification of historic properties within the APE is conducted, consistent with BOEM's *Guidelines for Providing Archaeological and Historic Property Information Pursuant to 30 CFR Part 585* (March 2017; *Guidelines*; *see* 36 CFR §800.4(b)(1)). Should BOEM wish to alter any archaeological survey-related information included in the *Guidelines*, BOEM will first consult with the signatories. BOEM will also ensure that historic property identification surveys

are carried out using the best commercially available technology to identify tribal and other historic properties in the APE, consistent with the aforementioned guidelines.

C. Prior to lease or grant issuance under this part, BOEM will identify consulting parties, pursuant to 36 CFR 800.3(f). BOEM will consult on existing, non-proprietary information regarding the proposed undertaking and the geographic extent of the APE, as defined in Stipulation I.A. BOEM also will solicit additional information on potential historic properties within the APE from consulting parties and the public.

D. BOEM will administratively treat all identified potential historic properties as eligible for inclusion in the National Register unless BOEM determines, and the SHPO, or THPO if on tribal lands, agree that a property is ineligible, pursuant to 36 CFR 800.4(c).

E. Where practicable, BOEM will require lessees and grantees to avoid effects to historic properties through lease stipulations, resulting in BOEM making a finding of *no historic properties affected*, consistent with 36 CFR 800.4(d)(1). If it is determined that there will be effects to historic properties, BOEM will follow 36 CFR 800.5. Any adverse effects will be resolved by following 36 CFR 800.6 and 36 CFR 800.10 for National Historic Landmarks. In determining practicability under this subparagraph, BOEM will consider factors that include, but are not limited to, public need for a project, commercial viability of a project, adherence to purpose and need, availability of suitable and appropriate mitigations.

II. The following Stipulation specifically addresses activities associated with the undertaking of approving a Plan, except as described under Stipulation IV below. The signatories agree:

A. BOEM will delineate the APE as the depth and breadth of the seabed that could potentially be impacted by seafloor/bottom-disturbing activities associated with the undertakings; the offshore and onshore viewshed from which renewable energy structures would be visible; and, if applicable, the depth, breadth, and viewshed of onshore locations where transmission cables or pipelines come ashore until they connect to existing power grid structures.

B. The following constitutes a reasonable and good faith effort to carry out appropriate identification of historic properties (*see* 36 CFR 800.4(b)(1)):

1. For the identification of historic properties within the seabed portion of the APE located on the OCS, BOEM shall utilize historic property identification survey results generated in accordance with BOEM's *Guidelines*.

2. For the identification of historic properties within the seabed portion of the APE located in state submerged lands or within the onshore terrestrial

portion of the APE, BOEM's historic property identification will be conducted in accordance with state (or tribal, if on tribal lands) guidelines. BOEM will request the developer to coordinate with the appropriate regional California Historical Resources Information System Center(s), or THPO if on tribal lands, prior to the initiation of any such identification efforts.

3. For the identification of historic properties within the viewshed portion of the APE, BOEM's historic property identification will be conducted in accordance with state (or tribal, if on tribal lands) guidelines. BOEM will request the developer to coordinate with the appropriate regional California Historical Resources Information System Center(s), or THPO if on tribal lands, prior to the initiation of any such identification efforts.

C. Prior to approving a Plan, BOEM will identify consulting parties, pursuant to 36 CFR 800.3(f). BOEM will consult on existing, non-proprietary information regarding the proposed undertaking (including the results of historic property identification surveys) and the geographic extent of the APE, as defined in Stipulation II.A. BOEM also will solicit from the consulting parties and the public additional information on potential historic properties within the APE.

D. BOEM will treat all identified potential historic properties as eligible for inclusion in the National Register unless BOEM determines, and the SHPOs, or THPO if on tribal lands, agrees, that a property is ineligible, pursuant to 36 CFR 800.4(c).

E. Where practicable, as a condition of Plan approval, BOEM will require the lessee to relocate elements of the proposed project that may affect potential historic properties, resulting in BOEM making a finding of *no historic properties affected*, consistent with 36 CFR 800.4(d)(1). In determining practicability under this subparagraph, BOEM will consider factors that include, but are not limited to, public need for a project, commercial viability of a project, adherence to purpose and need, availability of suitable and appropriate mitigations.

1. If effects to identified properties cannot be avoided, BOEM will evaluate the National Register eligibility of the properties, in accordance with 36 CFR 800.4(c).

    a. If BOEM determines all of the properties affected are ineligible for inclusion in the National Register, and the SHPO, or THPO if on tribal lands, agrees, BOEM will make a finding of *no historic properties affected*, consistent with 36 CFR 800.4(d)(1).

    b. If BOEM determines any of the properties affected are eligible for inclusion in the National Register, and the SHPO or THPO if on tribal lands, concurs, and if it is determined that there will be effects to historic properties, BOEM will follow 36 CFR 800.5.

Any adverse effects will be resolved by following 36 CFR 800.6 and 36 CFR 800.10 for National Historic Landmarks.

c. If a SHPO, or THPO if on tribal lands, disagrees with BOEM's determination regarding whether an affected property is eligible for inclusion in the National Register, or if the ACHP or the Secretary so request, the agency official shall obtain a determination of eligibility from the Secretary pursuant to 36 CFR part 63 (36 CFR 800.4(c)(2)).

III. Activities exempt from review. The signatories agree to exempt from Section 106 review the following categories of activities because they have little or no potential to affect a historic property's National Register qualifying characteristics.

A. Archaeological Sampling: Vibracores or other direct samples collected, by or under the supervision of a Qualified Marine Archaeologist, for the purposes—at least in part—of historic property identification or National Register eligibility testing and evaluation.

B. Meteorological Buoys: Proposed installation, operation, and removal of meteorological buoys when the results of geophysical data collected meet the standards established in BOEM's *Guidelines* and either: 1) resulted in the identification of no archaeological site within the seabed portion of the APE for the buoy, or 2) if the project can be relocated so that the APE does not contain an archaeological site, if any such sites are identified during geophysical survey. The signatories agree that offshore meteorological buoys have no effect on onshore historic properties since they are temporary in nature and indistinguishable from lighted vessel traffic.

C. Meteorological Towers: Proposed construction, installation, operation, and removal of meteorological towers when the following conditions are met:

1. The results of archaeological survey within the offshore APE meet the standards established in BOEM's *Guidelines* and either: 1) resulted in the identification of no archaeological site within the seabed portion of the APE for the tower, or 2) if the project can be relocated so that the offshore APE does not contain an archaeological site, if any such sites are identified during geophysical survey, and

2. The applicant documents that there will be no potential for onshore visibility of the meteorological tower and therefore, no onshore APE or the results of historic property identification within the viewshed APE meet the standards outlined by the SHPO, or THPO if on tribal lands, and no historic properties are identified.

3. If the conditions detailed in III.C.1 and 2 are not met, then those activities would not be considered exempted from review.

IV. Tribal Consultation. BOEM shall continue to consult with affected Tribes throughout the implementation of this Agreement on subjects related to the undertakings in a government-to-government manner consistent with Executive Order 13175, Presidential memoranda, and the Department of the Interior's Policy on Consultation with Indian Tribes.

V. Public Participation

A. Because BOEM and the signatories recognize the importance of public participation in the Section 106 process, BOEM shall continue to provide opportunities for public participation and shall consult with the signatories on possible approaches for keeping the public involved and informed throughout the term of this Agreement.

B. BOEM shall keep the public informed and may produce reports on historic properties and the Section 106 process that may be made available to the public at BOEM's Pacific OCS Regional office, on the BOEM website, and through other reasonable means insofar as the information shared conforms to the confidentiality clause of this Agreement.

VI. Confidentiality. Because BOEM and the signatories agree that it is important to withhold from disclosure sensitive information such as that protected by NHPA Section 304 (16 U.S.C. § 470w-3) (e.g., the location, character, and ownership of a historic resource, if disclosure would cause a significant invasion of privacy, risk harm to the historic resources, or impede the use of a traditional religious site by practitioners), BOEM shall:

A. Request that each signatory inform the other signatories if, by law, regulation or policy, it is unable to withhold sensitive data from public release.

B. Arrange for the signatories to consult as needed on how to protect such information collected or generated under this Agreement.

C. Follow, as appropriate, 36 CFR 800.11(c) for authorization to withhold information pursuant to NHPA Section 304, and otherwise withhold sensitive information to the extent allowable by laws including the Freedom of Information Act, 5 U.S.C. § 552, through the Department of the Interior regulations at 43 CFR Part 2.

D. Request that the signatories agree that materials generated during consultation be treated by the signatories as internal and pre-decisional until they are formally released, although the signatories understand that they may need to be released by one of the signatories if required by law.

VII. Administrative Stipulations

A. In coordinating reviews, BOEM shall follow this process:

1. Standard Review: The signatories shall have a standard review period of thirty (30) calendar days for commenting on all documents that are developed under the terms of this Agreement, from the date they are received by the signatory. This includes technical reports of historic property identification and eligibility determinations, as well as agency findings.

2. Expedited Request for Review: The signatories recognize the time-sensitive nature of this work and shall attempt to expedite comments or concurrence when BOEM so requests. No request for expedited review shall be less than fifteen (15) calendar days.

3. If a signatory cannot meet BOEM's expedited review period request, it shall notify BOEM in writing within fifteen (15) calendar days.

4. If a signatory fails to provide comments or respond within the timeframe requested by BOEM (either standard or expedited), then BOEM may proceed as though it received concurrence. BOEM shall consider all comments received within the review period.

5. Unless otherwise indicated below, all signatories will send correspondence and materials for review via electronic media or an alternate method specified by a signatory for a particular review. Should BOEM transmit the review materials by the alternate method, the review period will begin on the date the materials were received by the signatory, as confirmed by delivery receipt. All submissions to CA SHPO must be in hard copy and mailed to the Office of Historic Preservation at 1725 23rd Street, Suite 100, Sacramento, CA 95816.

6. Each signatory shall designate a point of contact for carrying out this Agreement and provide this contact's information to the other signatories, updating it as necessary while this Agreement is in force. Updating a point of contact alone shall not necessitate an amendment to this Agreement.

B. Dispute Resolution. Should any signatory or concurring party to this Agreement object at any time to any actions proposed or the manner in which the terms of this Agreement are implemented, BOEM shall consult with such party to resolve the objection and notify other signatories and concurring parties of the objection. If BOEM determines that such objection cannot be resolved, BOEM will

1. Forward all documentation relevant to the dispute, including BOEM's proposed resolution, to the signatories. The ACHP shall provide BOEM with its advice on the resolution of the objection within thirty (30) days of receiving adequate documentation. Prior to reaching a final decision on the dispute, BOEM shall prepare a written response that takes into account any timely advice or comments regarding the dispute from the ACHP and

SHPO and provide them and the concurring parties with a copy of this written response. BOEM will then proceed according to its final decision.

2. If the ACHP does not provide its advice regarding the dispute within the thirty (30) day time period, BOEM may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, BOEM shall prepare a written response that takes into account any timely comments regarding the dispute from the signatories to the Agreement, and provide them, the signatories, and concurring parties with a copy of such written response.

3. BOEM's responsibility to carry out all actions subject to the terms of this Agreement that are not subject of dispute shall remain unchanged.

C. Amendments. Any signatory may propose to BOEM in writing that this Agreement be amended, whereupon BOEM shall consult with the signatories to consider such amendment. This Agreement may then be amended when agreed to in writing by all signatories, becoming effective on the date that the amendment is executed by the ACHP as the last signatory.

D. BOEM shall prepare an annual report that will summarize actions taking place between October 1st and September 30th and make this report available to signatories and concurring parties by December 31st of each year this Agreement is in effect. The annual report will summarize any activities exempted from review under this Section, as well as any other actions taken to implement the terms of this Agreement. Upon submission of the annual report, BOEM shall consult with the signatories and concurring parties on the substance of the report. Should any party desire to meet, BOEM will schedule said consultation meeting within 30 days of receiving a written request.

E. Coordination with other Federal agencies. In the event that another Federal agency believes it has Section 106 responsibilities related to the undertakings, which are the subject of this Agreement, BOEM will request to coordinate its review with those other agencies. Additionally, that agency may attempt to satisfy its Section 106 responsibilities by agreeing in writing to the terms of this Agreement and notifying and consulting with the SHPO, THPO or tribal designee, and the ACHP. Any modifications to this Agreement that may be necessary for meeting that agency's Section 106 obligations shall be considered in accordance with this Agreement.

F. Terms and Duration of Agreement.

1. Unless terminated, pursuant to Stipulation VII.G. or amended, pursuant to Stipulation VII.C., this Agreement shall remain in full force for seven (7) years from the date this Agreement is executed, defined as the date the last signatory signs. If BOEM wishes to amend the PA to extend its duration, BOEM shall initiate such consultation to amend the PA, pursuant to

Stipulation VII.C, no less than three (3) months prior to the expiration date of the PA.

G. Termination.

1. If any signatory determines that the terms of this Agreement cannot be carried out or are not being carried out, that signatory shall notify the other signatories in writing and consult with them to seek amendment of the Agreement. If within sixty (60) calendar days of such notification, an amendment cannot be made, any signatory may terminate the Agreement upon written notice to the other signatories.

2. Once the Agreement is terminated, and prior to work continuing on the undertaking, BOEM must either (a) execute a new Agreement pursuant to 36 CFR 800.14 or (b) consult on each undertaking individually, pursuant to 36 CFR part 800. BOEM shall notify the signatories and concurring parties as to the course of action it will pursue.

3. If termination is occasioned by BOEM's final decision on the last Plan considered under the Renewable Energy Regulations, BOEM shall notify the signatories and the public, in writing.

H. Anti-Deficiency Act. Pursuant to 31 U.S.C. § 1341(a)(1), nothing in this Agreement shall be construed as binding the United States to expend in any one fiscal year any sum in excess of appropriations made by Congress for this purpose, or to involve the United States in any contract or obligation for the further expenditure of money in excess of such appropriations.

I. Existing Law and Rights. Nothing in this Agreement shall abrogate existing laws or the rights of any consulting party or signatory to this Agreement.

APPENDIX A

AGREED

Execution of this Agreement by BOEM, the California SHPO, and the ACHP, and the implementation of its terms are evidence that BOEM has taken into account the effects of these undertakings on historic properties and afforded the ACHP an opportunity to comment.

SIGNATORIES

U.S. Department of the Interior, Bureau of Ocean Energy Management

By: Joan R. Barminski Date: 12/10/2019

Joan R. Barminski
Regional Director, Pacific OCS Office
Bureau of Ocean Energy Management
Department of Interior Regions 8, 9, 10, and 12

APPENDIX A

State Historic Preservation Office, California Office of Historic Preservation

By: _____ Date: 12/13/19

Julianne Polanco
State Historic Preservation Officer
California Office of Historic Preservation
California State Parks

APPENDIX A

Advisory Council on Historic Preservation

By: Aimee Jorjani Date: 12/18/19

Aimee Jorjani
Chairman
Advisory Council on Historic Preservation

APPENDIX A

CONCURRING PARTIES

Santa Ynez Band of Chumash Indians

By: _____ Date: 1/22/20

Kenneth Kahn
Tribal Chairman
Santa Ynez Band of Chumash Indians

_____
Bo Armenta
Chairman
Santa Ynez Elders Council

APPENDIX
PROGRAMMATIC AGREEMENT
Among
The U.S. Department of the Interior, Bureau of Ocean Energy Management,
The State Historic Preservation Officer of California,
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Regarding Review of Outer Continental Shelf Renewable Energy Activities
Offshore California
Under Section 106 of the National Historic Preservation Act

Commercial lease means a lease, issued under the renewable energy regulations, that specifies the terms and conditions under which a person can conduct commercial activities (*see* 30 CFR §585.112);

Commercial activities mean, for renewable energy leases and grants, all activities associated with the generation, storage, or transmission of electricity or other energy products from a renewable energy project on the Outer Continental Shelf (OCS), and for which such electricity or other energy product is intended for distribution, sale, or other commercial use, except for electricity or other energy products distributed or sold pursuant to technology-testing activities on a limited lease. This term also includes activities associated with all stages of development, including initial site characterization and assessment, facility construction, and project decommissioning (*see* 30 CFR §585.112);

Limited lease means a lease, issued under the renewable energy regulations, that specifies the terms and conditions under which a person may conduct activities on the OCS that support the production of energy, but do not result in the production of electricity or other energy products for sale, distribution, or other commercial use exceeding a limit specified in the lease (*see* 30 CFR §585.112);

Research lease means an OCS lease, Right-of-Way (ROW) grant, and/or Right-of-Use (RUE) grant, issued under the renewable energy regulations at 30 CFR §585.238, to a Federal agency or a state for renewable energy research activities that support the future production, transportation, or transmission of renewable energy;

ROW grant means an authorization issued under the renewable energy regulations to use a portion of the OCS for the construction and use of a cable or pipeline for the purpose of gathering, transmitting, distributing, or otherwise transporting electricity or other energy product generated or produced from renewable energy. A ROW grant authorizes the holder to install on the OCS cables, pipelines, and associated facilities that involve the transportation or transmission of electricity or other energy products from renewable energy projects (*see* 30 CFR §585.112);

RUE grant means an easement issued under the renewable energy regulations that authorizes use of a designated portion of the OCS to support activities on a lease or other use authorization for renewable energy activities. A RUE grant authorizes the holder to construct and maintain facilities or other installations on the OCS that support the production, transportation, or

transmission of electricity or other energy products from any renewable energy resource (*see* 30 CFR §585.112);

Geotechnical testing means the process by which site-specific sediment and underlying geologic data are acquired from the seafloor and the sub-bottom and includes, but is not limited to, such methods as borings, vibracores, and cone penetration tests;

Geophysical survey means a marine remote-sensing survey using, but not limited to, such equipment as side-scan sonar, magnetometer, shallow and medium (seismic) penetration sub-bottom profiler systems, narrow beam or multibeam echo sounder, or other such equipment employed for the purposes of providing data on geological conditions, identifying shallow hazards, identifying archaeological resources, charting bathymetry, and gathering other site characterization information;

Historic property means any pre-contact or historic period district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (*see* 36 CFR §800.16(l)(1));

Qualified architectural historian means a person who meets the Secretary of the Interior's Professional Qualification Standards for architectural history (48 FR 44738-44739) and meets the SHPO or THPO professional qualification standards, and has experience identifying tribal cultural resources and analyzing structures, historic districts, and landscapes.

Qualified marine archaeologist means a person who meets the Secretary of the Interior's Professional Qualification Standards for Archaeology (48 FR 44738-44739), and has experience analyzing marine geophysical data;

Tribal land means all lands within the exterior boundaries of any Indian reservation, all dependent Indian communities (*see* 36 CFR§800.16(x));

APPENDIX B

UNITED STATES DEPARTMENT OF THE INTERIOR
Bureau of Ocean Energy Management
Office of Renewable Energy Programs

March 2017

Guidelines for Providing Archaeological and Historic Property Information Pursuant to 30 CFR Part 585

I. Introduction to Guidelines

The U.S. Department of the Interior, Bureau of Ocean Energy Management (BOEM), Office of Renewable Energy Programs (OREP) requires an applicant to submit a detailed plan of its proposed activities for review prior to approving the installation of any renewable energy facility, structure, or cable on the Outer Continental Shelf (OCS). Depending upon the nature of the proposed activities, these may include a site assessment plan, a construction and operations plan, a general activities plan, or other type of plan (collectively referred to as plans in these guidelines). As part of a plan submission, BOEM requires detailed information regarding the nature and location of historic properties that may be affected by the proposed activities. This information is used to assist the Bureau in meeting its obligations under Section 106 of the National Historic Preservation Act (NHPA) (36 CFR § 800) and the National Environmental Policy Act (NEPA).

The following guidelines provide recommendations on effective methods for identifying historic properties, as well as the format for providing this information to BOEM. These guidelines are intended for current and prospective lessees, developers, and the archaeologists and other historic preservation professionals working on their behalf. They are tailored to the site-specific surveys conducted to identify historic properties that may be impacted by offshore renewable energy activities. These guidelines are not intended as a one-size-fits-all methodology for conducting historic property identification. Rather, these guidelines provide a framework for applicants to design historic property identification surveys that will provide BOEM with information sufficient to conduct the necessary review of a plan.

Please be aware that the results of surveys submitted to BOEM that do not provide the necessary information or level of detail may be determined insufficient for the Bureau to conduct its review of a plan under NEPA and NHPA. Should BOEM determine that the submission is insufficient, BOEM may request additional information. If an applicant fails to provide the requested information, BOEM may disapprove the plan.

Elements of these guidelines may be required under the terms of a lease or conditions of a plan approval. Moreover, a lease or plan condition may also have requirements that are different from, or in addition to, those discussed in these guidelines. Applicants should note that while these guidelines and conditions in their lease(s) or plan(s) may be similar, applicants must comply with the terms of their respective lease(s) or plan conditions.

These guidelines may be updated periodically as new information or methods become available. This version replaces the guidelines published July 25, 2015. Previous versions of this document

included combined guidance for geophysical, geological, hazard, and archaeological surveys. This current version includes guidance specific to historic property identification. Guidelines related to geophysical, geological, and hazard surveys are now presented in the document *Guidelines for Providing Geophysical, Geotechnical, and Geohazard Information Pursuant to 30 CFR Part 585.* These documents are intended to be used in tandem to inform the survey work an applicant conducts to gather the information required in a plan.

Additionally, this version incorporates feedback obtained at BOEM's workshop for industry and historic preservation professionals held in April 2016, and clarifies that the scope of data collection and reporting efforts should commensurate with the geographic extent and nature of the impact proposed, including examples for deployment of meteorological buoys. Finally, this version updates the recommendations for magnetometers to specify the use of gradiometer configuration.

The recommendations for use of gradiometer configuration are based upon both new and previously published scientific findings that magnetometers operating in gradiometer configuration are more sensitive. This heightened sensitivity enables them to more accurately identify small archaeological resources, while also reducing false positives by effectively removing external source noise (Carrier et al., 2016). This change will allow for improved precision in analytical interpretation of magnetic data for archaeological resource identification, and will potentially allow additional areas to be developed for renewable energy without risking impact to historical resources.

II. Historic Properties and Their Identification

What Are Historic Properties?

BOEM requires detailed information regarding the nature and location of historic properties that may be affected by an applicant's proposed activity in order to conduct review of the plan under Section 106 of NHPA (54 U.S.C. 306108). As defined in the regulations implementing Section 106 (36 CFR § 800.16(l)(1)),

> *Historic property means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. This term also includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria*.

Further information regarding the National Register of Historic Places and categories of historic properties can be found in *National Register Bulletin 15, How to Apply the National Register Criteria* (National Register of Historic Places, 2002).

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Where Should Surveys Take Place?

Applicants should provide a detailed description of the activities proposed in their plans. The geographic area, or areas, in which these proposed activities take place is the Area of Potential Effects (APE). As defined in the regulations implementing Section 106 (36 CFR § 800.16(d)),

> Area of potential effects *means the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking.*

The scope of these geographic areas should include the following:

- The depth and breadth of the seabed potentially impacted by any bottom-disturbing activities;
- The depth and breadth of terrestrial areas potentially impacted by any ground disturbing activities;
- The viewshed from which renewable energy structures, whether located offshore or onshore, would be visible; and
- Any temporary or permanent construction or staging areas, both onshore and offshore.

The extent of the geographic areas surveyed for historic properties should be appropriate to the scale of the proposed activities. For example, with respect to site assessment activities, a proposed buoy likely would have a much smaller geographic area of impact than a proposed meteorological tower. This is because the nature and types of effects are generally lesser, and the extent of the area impacted by a buoy is likely smaller than that of a meteorological tower.

How Are Historic Properties Identified?

Applicants should provide a detailed description of the methods and results of the surveys they conduct to identify historic properties that may be located within the geographic area or areas (i.e., the APE) where their proposed activities will take place. The geographic area(s) within which an applicant's proposed activities have the potential to impact historic properties may include diverse environments, both onshore and underwater, that necessitate different approaches to historic property identification.

BOEM recommends the following:

- For the identification of historic properties on or within the seabed located on the OCS, historic property identification should be conducted and reported in accordance with Sections II and III of this document.
- For the identification of historic properties (1) on or within the seabed located in state submerged lands or within onshore terrestrial areas, or (2) within the viewshed of proposed renewable energy structures, historic property identification should be conducted and reported following the guidance published by the affected State Historic Preservation Office (SHPO) and provided through consultation with the affected SHPO.

- If the area of potential effects is located on tribal lands, historic property identification should be conducted following the guidance provided by the Tribal Historic Preservation Officer (THPO), if the tribe has designated such an official.

  As defined in the regulations implementing Section 106 (36 § CFR 800.16(w) and (x)), Tribal Historic Preservation Officer (THPO) *means the tribal official appointed by the tribe's chief governing authority or designated by a tribal ordinance or preservation program who has assumed the responsibilities of the SHPO for purposes of Section 106 compliance on tribal lands in accordance with Section 101(d)(2) of the [National Historic Preservation] Act.*

  Tribal lands *means all lands within the exterior boundaries of any Indian reservation and all dependent Indian communities*.

Prior to the initiation of any identification efforts, BOEM recommends that an applicant contact the appropriate SHPO (or THPO, if applicable) to learn about their guidelines for historic property identification, both in state waters and onshore. Please note that BOEM does not delegate its Section 106 and tribal (government-to-government) consultation responsibilities to lessees, applicants, or developers.

- Information regarding SHPOs can be found at: http://www.ncshpo.org/shpodirectory.shtml
- Information regarding THPOs can be found at: http://www.nps.gov/thpo

How is Historic Property Information Submitted to BOEM?

As noted above, the APE for proposed project activities may require the identification of historic properties onshore and/or in state waters, in addition to on the OCS. Section III below discusses the contents of Marine Archaeological Resource Assessment Reports, but applicants are encouraged to prepare other reports and analyses in a manner preferred by the state's SHPO(s) or THPO(s) (if the APE is located on tribal lands, as defined at 36 § CFR 800.16(w) and (x)), using specialists in appropriate fields (e.g., architectural history, landscape architecture, terrestrial archaeology).

BOEM recommends that applicants submit one or multiple stand-alone report(s) to support their plans, as appropriate to the APE and types of historic properties potentially affected therein. For example, applicants proposing a commercial scale facility whose APE includes areas of the OCS, state waters, and onshore areas, are advised to submit three separate reports:

- one marine archaeological resources assessment report, which includes efforts both on the OCS and in state waters;
- one terrestrial archaeological resources assessment report, which documents efforts to identify terrestrial archaeological sites; and
- one report presenting an assessment of visual effects to onshore historic properties.

Doing so facilitates BOEM's review and consultations for commercial-scale developments. By contrast, applicants proposing, for example, to place a meteorological buoy whose APE includes only a small area of the OCS with no onshore APE may wish to submit only one report.

Pre-survey Coordination with BOEM

Lessees and applicants should coordinate with BOEM before conducting survey activities through both the preparation and submission of a survey plan and participation in a pre-survey meeting. This coordination assists in ensuring that surveys are designed and conducted to provide the information required for BOEM to review a plan. Additionally, this coordination serves as an opportunity to address potential historic preservation issues or concerns well in advance of the date an applicant intends to mobilize for a survey. The goal being to prevent the possibility of costly re-mobilization or revision of reports prepared to support a plan. Finally, this coordination provides an opportunity for BOEM to share existing information held by the Bureau regarding known historic properties and the results of previous surveys or environmental studies of relevance to an applicant's project area, if available.

BOEM recommends that applicants include appropriate historic preservation staff or contractors (e.g., marine and terrestrial archaeologists, geomorphologists, architectural historians, and landscape architects) both in the preparation of the survey plan and as participants in the pre-survey meeting.

III. Guidelines for the Identification of Archaeological Sites on the Outer Continental Shelf

Archaeological sites that may be present on the OCS include two broad categories of resources: (1) historic period sites, such as shipwrecks and associated remains, sunken aircraft, and other maritime infrastructure; and (2) pre-contact period archaeological sites once part of the terrestrial landscape and since inundated by global sea level rise during the late Pleistocene and Holocene. Pre-contact period archaeological resources are those that date to the time before European contact with Native Americans.

Applicants should conduct archaeological survey on the OCS by employing both high-resolution geophysical (HRG) survey techniques and geotechnical testing. The archaeological survey should be designed, with input from a qualified marine archaeologist and specialists in other fields as appropriate (e.g., geology and geomorphology), in a manner that is capable of identifying the site types described in the preceding paragraph. A qualified marine archaeologist meets the *Secretary of the Interior's Professional Qualifications Standards* (48 FR 44738-44739) and has experience in conducting HRG surveys and processing and interpreting the resulting data for archaeological potential.

High-resolution Geophysical Survey Techniques

The area surveyed for archaeological identification purposes should be large enough to cover any portion of the project area affected by the activities proposed, including all seafloor-disturbing activities, whether temporary or permanent. Seafloor-disturbing activities may include, but are not limited to: geotechnical exploration (e.g., borings, vibracores, etc.), construction and installation activities (e.g., turbine foundation placement, transmission cable installation,

horizontal directional drilling, etc.), decommissioning, and any other associated anchoring or appurtenances related to these activities (e.g., anchor drop areas, anchor chain drag, jackup barges, etc.). In cases where uncertainty exists regarding the methods to be used during constructing, operating, maintaining, or decommissioning the proposed project, BOEM recommends that the survey area be as large as possible. A larger survey area will give the applicant greater flexibility for placement of structures and methods of construction, operation, and decommissioning in the future, without the need for costly remobilization.

Previously collected data may be suitable for incorporation with newly collected data. Applicants proposing to utilize previously collected data in support of a plan should consult with BOEM, prior to designing the archaeological survey and as part of the pre-survey meeting, to ensure appropriate data quality and coverage of the APE and to prevent the possibility of costly re-mobilization.

Line Spacing

Line spacing is of critical importance for archaeological identification surveys and paleolandscape reconstructions. The applicant should submit data, whether previously or newly acquired, from an archaeological survey conducted along a series of regularly spaced and parallel track lines. Tie-lines running perpendicular to the track lines should also be surveyed. The survey grid should be oriented with respect to the bathymetry, geologic structure, and proposed location of renewable energy construction activities.

Primary line spacing for archaeological identification surveys should not exceed 30 meters (m) throughout the project area for the gradiometer (two or more total field magnetometers operating in gradiometer configuration), and sub-bottom profiler. Survey line spacing for the side scan sonar is dependent upon a variety of factors, including water depth, the specific equipment employed, and the desired resolution of the survey data. In some instances, tighter line spacing may be warranted in order to better investigate a resource. For example, an applicant may wish to collect additional lines of survey data around a potential target in order to more clearly resolve the target for confirmation purposes.

Perpendicular tie-line spacing for archaeological identification surveys should not exceed 500 m. A minimum of at least three equidistant tie-lines should be surveyed; this may mean, in some instances, that spacing tighter than 500 m may be necessary for the tie-lines.

Project Siting Survey

A project siting survey should be completed to provide coverage of any area of bottom disturbing activities proposed within a potential project area. Within these areas, BOEM recommends a survey conducted in a grid pattern with primary line spacing at 30 m and a maximum tie-line spacing of 500 m. The survey should provide coverage of any seafloor area that could be physically disturbed by the proposed activities, including: geotechnical exploration; the installation of data collection structures (e.g., meteorological towers, buoys, or other site assessment equipment); the installation of wind turbine generators and any associated cables or equipment (e.g., electrical service platforms); and any other project-related activities that have the potential to physically impact the seafloor. The area surveyed should provide sufficient coverage to also account for anchors or any other equipment that may contact the seafloor during the proposed activities.

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Transmission Cable Route Surveys

Cable route surveys should include a corridor following the full length of the transmission route. The survey pattern along the corridor should include a survey line run along the proposed cable route centerline, and parallel survey lines offset on each side of the centerline at a 30-meter line spacing. BOEM recommends a minimum of three offset parallel lines on each side of the centerline, and the ultimate number of parallel offset lines surveyed should be sufficient to cover the entire area of potential physical disturbance related to the proposed cable installation and operation. This potential area of disturbance includes, but is not limited to, areas where lay barge anchors may be placed during cable installation, areas where cable protection (e.g., rock berms, concrete mattresses, etc.) may be installed, areas of seafloor leveling, and areas of debris removal prior to cable installation. The survey lines immediately adjacent to the centerline must provide side scan sonar coverage of the nadir of the centerline to identify potential targets located directly on the cable route centerline. Perpendicular tie-lines at a maximum spacing of 500 m should also be surveyed throughout the cable corridor.

Archaeological Identification Survey Instrumentation

The geophysical survey instruments of primary importance in the identification of archaeological sites on the OCS are the gradiometer (two or more total field magnetometers operating in gradiometer configuration), side scan sonar, and sub-bottom profiler. Operational considerations and data quality recommendations that are of specific importance for their use in identifying archaeological sites on the OCS are described below. Refer to BOEM's *Guidelines for Providing Geophysical, Geotechnical, and Geohazard Information Pursuant to 30 CFR Part 585* for further information regarding swath bathymetry systems and additional recommendations regarding geophysical survey methods.

Gradiometer, side scan sonar, and sub-bottom profiler systems, however, are not the only instruments that provide information useful in the identification and interpretation of archaeological resources. For example, bathymetry and cores can also provide valuable information regarding archaeological resources. Applicants and qualified marine archaeologists should utilize available geophysical data sets, including those previously acquired by BOEM or affected states and universities, as well as those acquired during a survey, to inform the archaeological analysis and reporting described in Section III below.

The applicant should deploy instrumentation in a manner that minimizes interference between systems and the survey vessel, results in the least environmental impact practicable, and records all data at the optimal sampling rate of the equipment used. Survey instruments should be towed at a speed appropriate for the equipment and in a manner that ensures acquisition of the highest quality data possible (typically not exceeding 4-5 knots). All systems should interface with the navigation system to ensure proper integration of positioning information.

A state-of-the-art navigation system with sub-meter accuracy should continuously determine the surface position of the survey vessel. Position fixes should be digitally logged continuously along the vessel track. Geodesy information should be clearly presented and consistent across all data types.

BOEM recommends the use of a vessel-mounted acoustic positioning system, such as ultra-short baseline (USBL) positioning, to improve the reliability of positioning towed sensors. If a vessel-

mounted acoustic positioning system is not utilized, layback distances should be calculated, recorded, and cross-checked with feature-mating techniques to provide accurate positioning of towed sensors. Refer to BOEM's *Guidelines for Providing Geophysical, Geotechnical, and Geohazard Information Pursuant to 30 CFR Part 585* for further information.

Gradiometer

For HRG surveys conducted in water depths of 100 m or less, a gradiometer (two or more total field magnetometers operating in gradiometer configuration) should be employed to detect ferrous metals or other magnetically susceptible materials. Overhauser or optically pumped systems are preferred. The gradiometer should be towed as near as possible to the seafloor and in a way that minimizes interference from the vessel hull and the other survey instruments. The gradiometer altitude should not exceed 6 m above the seafloor. An altimeter should be used to ensure the proper height of the gradiometer in the water column. The altitude of the gradiometer should be continuously recorded during data acquisition along the survey.

Gradiometer sensitivity should be 1.0 gamma (γ; 1.0 nano-Tesla [nT]) or less. Background noise level should not exceed a total of 3.0 γ peak to peak. The data sampling rate should be greater than 4.0 Hz to ensure sufficient data point density. Gradiometer data should be recorded on a digital medium in such a way that can be linked electronically to the positioning data. Survey line, time, position, altitude, and speed should be annotated on all output data.

Side Scan Sonar

A side scan sonar system should be used to provide continuous planimetric imagery of the seafloor to identify potential archaeological resources. To provide sufficient resolution of seafloor features, BOEM encourages the use of a system that operates at as high a frequency as practicable based on the factors of line spacing, instrument range, and water depth. For archaeological resource surveys, a system that operates at a 500-kilohertz frequency or greater is recommended. The sonar system must be capable of resolving small, discrete targets 0.5 m in length at maximum range.

The instrument range should be set to provide at least 100 percent overlapping coverage (i.e., 200% seafloor coverage) between adjacent primary survey lines. The side scan sonar sensor should be towed above the seafloor at a height that is 10 to 20 percent of the range of the instrument (Table 1).

Data should be digitally recorded and visually displayed to monitor data quality and identify targets of interest during acquisition. The data should be post-processed to improve data quality for interpretation and mapping, for example, adjusting for slant range effects and variable speed along line.

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Table 1

Side Scan Sonar Coverage Area

Instrument Range in Meters/per Channel	Height of instrument in Meters above Seafloor at 10% of Range	Height of Instrument in Meters above Seafloor at 20% of Range
30	3	6
50	5	10
60	6	12
75	7.5	15
100	10	20
200	20	40

Sub-Bottom Profiler

A sub-bottom profiler system should be used for identifying and mapping buried geomorphological features of archaeological potential that may exist within the horizontal and vertical footprint of a proposed project. The selection of the appropriate sub-bottom frequency, or frequencies, and system to achieve this goal should be based on an understanding of both the geomorphology of the area an applicant is operating within (including the potential depth of the Holocene-Pleistocene unconformity) and the parameters of the proposed project (including the maximum depth of disturbance from the proposed renewable energy activities).

The sub-bottom system should be capable of achieving a depth of penetration and resolution of vertical bed separation that is sufficient to allow for the identification and cross-track mapping of features of archaeological potential (e.g., shell middens, paleochannels, levees, inset terraces paleolagoon systems, etc.). As a minimum standard, the sub-bottom profiler system employed should be capable of achieving a resolution of vertical bed separation of at least 0.3 m in the uppermost 10 to 15 m of sediments, depending on the substrate.

High frequency Compressed High Intensity Radar Pulse (CHIRP) systems alone may be suitable for achieving this level of resolution and depth of penetration to adequately image the APE, and thereby providing suitable archaeological information. However, in some circumstances medium penetration seismic systems, such as a boomer, bubble pulser, medium-penetration CHIRP, or other lower frequency system, may also be necessary to provide archaeological information on sedimentary structure that exceeds the depth limitations of high frequency CHIRP systems. Key to selecting an appropriate sub-bottom system is awareness both of the depth of the proposed APE and capacity of the system to penetrate the seafloor in that geographic area. When in doubt, BOEM recommends operating, post-processing, and integrating geological and archaeological interpretations using multiple sub-bottom systems at the recommended line spacing, in order to avoid costly remobilization. For all sub-bottom systems used, the data should be digitally recorded to allow signal processing to improve data quality, and exported to a workstation for integrated interpretation and mapping. Additional considerations regarding selection of appropriate sub-bottom systems and data processing methods, including appropriate paleolandscape reconstruction considerations, are discussed in Sullivan et al.'s 2016 *Virginia Ocean Geophysical Survey Phase II Analyses: Offshore Virginia Wind Energy Area*.

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Geotechnical Investigation

Geotechnical testing is a bottom-disturbing activity that has the potential to impact archaeological sites, if present, within the area of disturbance. Conversely, geotechnical testing is a method for identifying and testing potential archaeological sites (e.g., through vibracores, grab samples, gravity cores, etc.). To accommodate both of these scenarios, BOEM recommends that applicants conduct the HRG survey *prior* to geotechnical testing and utilize the results of the HRG survey in planning the geotechnical testing strategy. BOEM recommends that applicants allow sufficient time for geophysical data processing and interpretation activities to occur prior to executing geotechnical testing in order to avoid potential archaeological sites during geotechnical investigation or, if part of an archaeological testing strategy, to properly plan the location, methods, and subsequent laboratory analyses to be completed towards the assessment of potential sites.

If an applicant intends to impact a potential archaeological site, they should provide BOEM with written notification of these activities. This notification should include a detailed description of the potential site or sites identified through geophysical survey (including maps and geophysical data samples) and a research design for the proposed testing activities. The research design should include a discussion of the goals and purpose of the testing, description of the testing methodology, illustration of the location and extent of the testing, and description of the analytical methods that will be employed to further characterize and investigate the samples.

BOEM encourages applicants to coordinate with its qualified marine archaeologist during the planning for geotechnical testing and, to the extent possible, incorporate the relevant results of geotechnical investigation into the archaeological analysis. Applicants should note that the information gathered during geotechnical investigation for engineering or siting purposes may provide information that informs the archaeological investigation and paleolandscape reconstruction, and greatly informs interpretation of sub-bottom profiler data, even if not explicitly designed to do so. Refer to BOEM's *Guidelines for Providing Geophysical, Geotechnical, and Geohazard Information Pursuant to 30 CFR Part 585* for further information regarding geotechnical exploration.

<u>Direct Sampling Methods</u>

Geophysical survey alone may not provide sufficient information to identify all potential archaeological sites on the OCS, particularly buried geomorphic features of archaeological interest identified via sub-bottom profiler survey. Direct sampling of these features may be necessary to gather additional site-specific information that corroborates the interpretation of the sub-bottom profiler data. In some cases, direct sampling may be the only available method of confirming the presence or absence of horizons of archaeological potential within features of interest identified during geophysical survey.

The method of direct sampling selected should reflect the bottom type to be sampled and the burial depth of the feature of interest. BOEM recommends that applicants utilize methods that will gather the most information practicable while causing the least impact to a potential site, if present.

Laboratory Testing

Direct samples should be inventoried and logged. Logs should include documentation of stratigraphy, sediment type, Munsell color, and other relevant attributes. Copies of all logs should be included in the archaeological report; see Section III below. If direct samples are archived, the storage repository should be documented in the archaeological report. If samples are not archived, the report should state this.

For further testing or sub-sampling, applicants should consider the full suite of analyses available and select those that will best inform the archaeological interpretation. These methods may include, but are not limited to, macro-sedimentary analysis, point count analysis, radiometric dating, pollen analysis, faunal analysis, P-wave velocity, magnetic susceptibility, foraminifera analysis, and geochemical analysis.

Other Methods of Direct Investigation

In addition to geophysical survey and geotechnical investigation, other methods of direct investigation may be warranted for confirming the presence or absence of archaeological sites on the OCS. These methods may include diver investigation, remotely operated underwater vehicle (ROV) survey, underwater excavation, etc. BOEM recommends that applicants contact OREP for further guidance on additional methods of direct investigation prior to initiating any such activities.

IV. Contents of Marine Archaeological Resources Assessment Reports

The Marine Archaeological Resource Assessment Report (Report) should be a stand-alone document submitted with a plan. The Report represents an evaluation and synthesis of the data (including desktop research, HRG survey, and geotechnical testing), whether previously acquired or gathered during survey activities, for the purpose of identifying potential archaeological resources on the OCS. The Report and analyses presented therein should be prepared by a qualified marine archaeologist and specialists in other fields as appropriate (e.g., geology, geomorphology, etc.). Applicants should note that while data collected by a lessee may be utilized in support of multiple plans, reports should be specific to the activities proposed within an individual plan. This, in turn, facilitates Section 106 review by BOEM and the consulting parties.

The Report should be prepared in a manner that describes the activities proposed in the plan, the area(s) that may be affected by the proposed activities, the methods of identifying archaeological resources within those areas, and the results of those identification efforts. The investigations conducted and the resulting Report should be appropriate to the scope of the proposed activities. For example, with respect to site assessment activities, a proposed buoy may have a much smaller APE and, therefore, a correspondingly smaller investigation effort and Report than a proposed meteorological tower. This is because the nature of the effects and extent of the APE for a buoy is far less than that of a meteorological tower.

Regardless of the scope of the project or extent of the APE, applicants should submit a complete Report to BOEM. Any changes to an applicant's plan(s) that may occur after submittal of a report to BOEM, because of either changes in the design of the proposed project or a request for

additional information made by BOEM, should be incorporated into a revised report and resubmitted to BOEM to ensure continued compliance with Section 106 of the NHPA.

The Report should include the following sections, organized in the following manner:

a) Front Matter
b) Introduction
c) Cultural and Environmental Context
d) Field and Processing Methodology
e) Results and Interpretation
f) Paleolandscape Reconstruction
g) Summary and Conclusion
h) Back Matter
i) Archaeological Resource Charts
j) Digital Data

Below is a detailed description of the recommended contents of each section.

Front Matter

This section of the Report includes the cover, executive summary, non-technical summary, table of contents, and lists. Lists include tables, figures, and appendices.

The non-technical summary is a stand-alone description of the survey that is appropriate for public dissemination. The non-technical summary should exclude specific information on the exact geographic coordinates of potential archaeological sites identified during the survey, specific traditional religious use information, or proprietary information. The purpose of the non-technical summary is to provide a general description of the survey activities, results, and any potential archaeological resources identified that BOEM may choose to share with the public. The non-technical summary should not contain information pertaining to the locations of archaeological sites.

Introduction

This section of the Report should provide a clear and detailed description of the activities considered under the plan, including both: a description and illustration of all proposed bottom-disturbing activities and a description and illustration of the surveyed area including the OCS lease number(s), block number(s), and lease area(s). This section also introduces the findings of the Report, including how many potential historic properties were identified and how many historic properties may be impacted by the proposed undertaking. The narrative should be accompanied, as appropriate, by maps, charts, and plan drawings, illustrating these points. This includes at least one reproducible geographic area map (generally page size = 8.5” x 11” and/or 11” x 17” fold-out) orienting the proposed facility and/or transmission cable route relative to the coastline and nearby geographic features.

Cultural and Environmental Context

This section of the Report includes an analysis of the potential for pre-contact and historic period sites to be located within the survey area and its immediate vicinity. In addition to desktop

research, archival research and other methods of conducting background research, applicants are also encouraged to contact BOEM for additional information held by the Bureau regarding known historic properties and the results of previous surveys or environmental studies of relevance to an applicant's project area, if available.

For pre-contact period sites, the context should include:

- A review of relevant literature on late Pleistocene and Holocene geology, paleogeography, marine and coastal prehistory, and previous archaeological resource reports for the area, if available.
- A detailed analysis and reconstruction of regional sea level rise and discussion of the sea level rise curves or other models used in the analysis. Sea level rise simulations should model and predict the evolution of the shoreline within the survey area at various time intervals.
- Discussion of onshore archaeological site distribution patterns that may serve as analogies for modeling settlement patterns on formerly subaerial portions of the survey area.
- A synthesis of the above information into a model that reconstructs portions of the survey area that may have been subaerially exposed, when this exposure would have occurred, and what cultural groups and site types could be expected within these areas. This includes discussion of the types of relict geomorphic features that may exist in the survey area and consideration of the archaeological potential of these features. This section should also include consideration of the potential for these landscape features to have survived marine transgression.
- A discussion of the potential to identify and evaluate pre-contact sites that may be present, based on the capabilities of current technology, the thickness and composition of overlying sediments, or other factors.

For historic period sites, the context should include:

- A review of existing records for known or reported shipwrecks or other sites within and adjacent to the survey area.
- Review of previous archaeological resource reports for the area, if available.
- A discussion of the potential for shipwreck preservation in terms of bottom sediment type and thickness, and the effects of past and present marine processes in the survey area.
- A discussion of the potential to identify and evaluate shipwreck sites that may be present, based on the capabilities of current survey technologies, the thickness and composition of overlying sediments, or other factors.

Field and Processing Methodology

This section of the Report discusses the methods used to obtain the survey data, the exact equipment used, dates the survey took place, and other salient features of the survey.

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Discussion of the survey methods should include:

- A list describing the functional responsibilities and duties of the personnel involved in survey planning, fieldwork, and Report preparation.
- A description of survey instrumentation including, as appropriate, scale and sensitivity settings, sampling rates, frequency, and tow heights above the seafloor.
- A description or diagram of the survey vessel, including its size, sensor configuration, and navigation antenna location.
- A summary of field operations including vessel speed, course changes, sea state, weather conditions, and unusual incidents.
- A description of survey procedures including a statement of survey and record quality and a comparison of data from survey line crossings.
- A discussion of any data acquisition problems or issues that may have affected the ability of the archaeologist to identify and analyze potential cultural resources in the surveyed area.

This section of the Report also discusses the processing methodologies used for visualizing, correcting, filtering, and mathematically transforming all data, to include side scan sonar, magnetometer, bathymetric, and sub-bottom profiler datasets.

Results and Interpretation

This section of the Report provides lists, narratives, and charts detailing the results of the survey. The applicant should key potential archaeological resources to charts. Representative data samples from each survey instrument should be included to demonstrate the quality of the records. At a minimum, the results should include the following information:

- A table of all magnetic anomalies greater than 5 γ identified during the survey keyed to the Archaeological Resource Charts. At a minimum, the table should include:
    - Anomaly ID
    - Lease block
    - Survey line number
    - Gamma intensity of each identified anomaly (peak gradient amplitude)
    - Duration (m)
    - Characterization of the anomaly as a dipole, positive (+) or negative (-) monopole, or complex signature, based on the magnetic traces
    - Gradiometer height above the seafloor
    - Horizontal position, indicated as North American Datum 1983 (NAD 83) coordinates of the interpreted location of each unidentified anomaly in decimal degrees to 5 decimal places, based on magnetic traces and contoured data
    - Vertical position, indicated as estimated depth using half-width rule, Euler equation, or other means as described in the methodology section
    - Association with side scan sonar contacts, bathymetric features, and/or sub-bottom features
    - Recommended avoidance distance, if applicable

- Analysis and interpretation of contoured magnetic data keyed to the Archaeological Resource Charts. This should include discussion of the methods used to process and present the data including the contour interval used.
- A table of all side scans sonar contacts identified during the survey keyed to the Archaeological Resource Charts. At a minimum, the table should include:
    - Side scan sonar contact ID
    - Lease block
    - Survey line number
    - Target length (m)
    - Target width (m)
    - Target height (m)
    - Target shadow (m)
    - Target description
    - Associated magnetic anomalies
    - NAD 83 coordinates of the target in decimal degrees to 5 decimal places
    - Original source file name
    - Recommended avoidance distance, if applicable
- An image of all side scan sonar contacts identified during the survey. These images may be included as part of the side scan sonar table or attached separately if properly keyed to the table. The images should be large enough to illustrate the target and include a scale. Interpretive highlighting or annotation of the side scan sonar data should be provided on a separate image. Small thumbnail images or images that are obscured by the target selection icon from the processing software may not be acceptable for BOEM archaeologists to review.
- Analysis and interpretation of side scan sonar mosaics.
- A discussion of any correlation between magnetic anomalies or side scan sonar contacts and known or probable sources.
- A discussion of any magnetic anomalies, side scan sonar contacts, or other targets of interest identified in the remote sensing data of unknown source, in terms of their potential as cultural resources. This should include a description of the criteria used to determine targets as potential cultural resources and correlation of these targets to any reported shipwrecks or other sites in the area.
- For potential archaeological resources identified from remote-sensing data, an analysis of National Register eligibility and recommendations for any further research or special precautions that may be necessary. If avoidance buffers are recommended, a justification and rationale for the avoidance distance presented should be provided.
- A discussion of the data and results from any additional investigations that BOEM may have directed the applicant to conduct.

Paleolandscape Reconstruction

A paleolandscape reconstruction that presents and illustrates the analysis and identification of areas of high potential for the presence of pre-contact archaeological sites should be included in the Report. The paleolandscape reconstruction should be based on an approach that synthesizes the sea-level history and terrestrial site patterning gathered in the Cultural and Environmental Context, above, with the acoustic remote sensing and direct sampling data gathered during the survey. This information should be developed into a model that delineates the archaeological

potential of the formerly subaerial landscape within the survey area (after CEI 1977; Evans 2015; Faught 2014; TRC 2012; Westley et al. 2011).

The paleolandscape reconstruction should include analysis and interpretation of the sub-bottom profiler data, geotechnical testing data, or other acoustic remote sensing data to determine whether archaeologically sensitive elements of the formerly subaerial landscape are buried beneath more recent seabed sediments. This analysis includes identification of geomorphic features of archaeological potential (e.g., lagoons, terraces, levees, paleochannels, etc.). This analysis should also include discussion of preservation potential based on consideration of the depth of erosion caused by the transgressive zone and the potential for intact archaeological horizons to be present beneath the ravinement surface. If no features are identified, or if it is interpreted that there is no potential for the preservation of potential sites based on the depth of erosion from subsequent sea level rise, this should be clearly demonstrated and illustrated through data samples.

The paleolandscape reconstruction should also include the analysis of cores or direct samples, if collected, to support the interpretation presented in the archaeological analysis. This should include illustration and interpretation of the samples and discussion of the results from any sediment analyses conducted. The location of cores or other direct samples should be clearly indicated on the Archaeological Resource Charts.

The paleolandscape reconstruction provided in the Report should include the following elements:

- Samples of sub-bottom profiler data for each type of landform of archaeological interest identified. Each data sample should be readable and should include horizontal and vertical scales, in addition to event markers, survey line number, or some other means to geographically locate the data samples within the survey area. The data samples should include both an unannotated sample and an interpreted sample with highlighting or annotation that clearly illustrates the relevant features to support the analysis presented in the paleolandscape reconstruction (Figure 1).
- Features of archaeological potential depicted on the Archaeological Resource Charts. These should include illustration of the horizontal and vertical extent of the features (e.g., depth below seafloor of channel margins and thalwegs).
- If areas of high archaeological potential are identified, additional landscape modeling of the features should be conducted to further illustrate and delinate the extent of the landscape components. Digitally tracing, geo-referencing, and interpolating land surface contours from the acoustic data should be completed to produce a land surface model of the feature. The results of this should be depicted in one or more map-based models such as contoured plan views or three-dimensional wire frames (Figures 2 and 3).

APPENDIX B

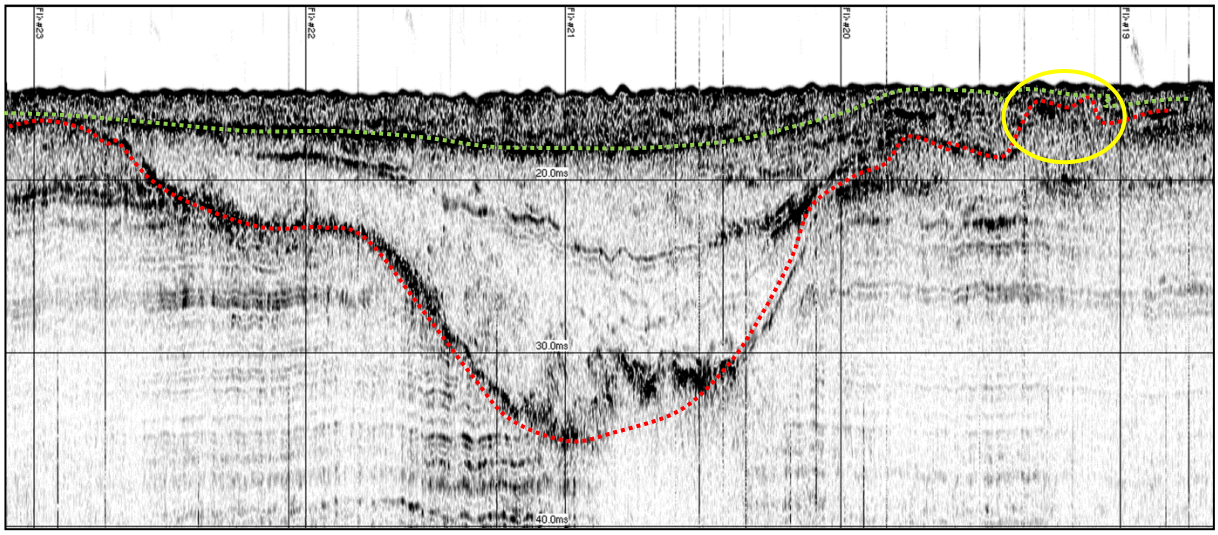

Figure 1: Example of Interpreted sub-Bottom Data Sample (from Evans 2015:70). A levee feature is circled in yellow, the channel horizon is indicated in red, and the ravinement surface is illustrated in green. Vertical scale lines are in 150 m intervals; horizontal scale lines are in 7.5 m intervals.

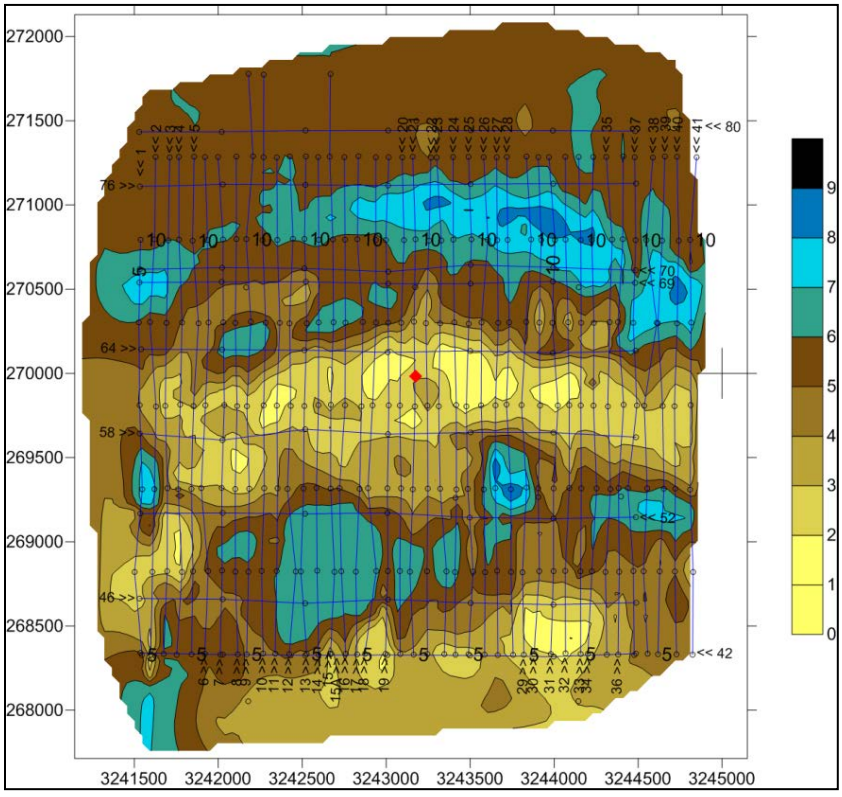

Figure 2: Example of an Archaeological Landscape Model (from Evans 2015:84). The feature of interest is indicated by the red diamond. Survey track lines are superimposed over the area. Depths are in meters below the seafloor; image is oriented north up.

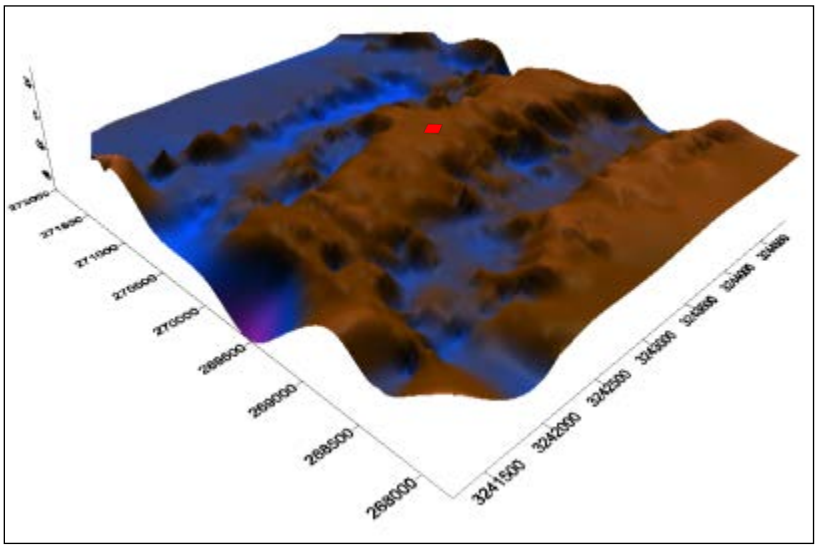

Figure 3: Example of a Three-Dimensional Wireframe Representation of an Interpreted Channel System. The feature of interest is indicated by the red diamond. This system is also depicted in Figure 2, above (from Evans 2015:83).

Summary and Conclusions

This section of the Report includes conclusions and recommendations supported by the archaeological resource survey data and archaeological analyses. This includes a discussion of known or potential archaeological resources and recommendations for avoidance or for further archaeological investigations, citing the relevant language as found in the NHPA.

Back Matter

This section of the Report includes bibliographic references, appendices, and other information, as appropriate. Appendices should include a complete copy of the daily survey operations logs for the duration of the mobilization(s). Logs of virbracores or other direct samples, if collected, should also be included in the appendices.

Archaeological Resource Charts

One or more charts of archaeological resources, as appropriate, should be included with the Report. Charts should be annotated with linear bar-scales (feet and meters), geographic and planar coordinates, lease boundaries, and lease blocks. Charts should be prepared at a standard scale (generally 1:12,000) and oriented to true north. Charts should illustrate all potential archaeological resources identified in relation to the proposed project activities. Please refer to the *Guidelines for Providing Geophysical, Geotechnical, and Geohazard Information Pursuant to 30 CFR Part 585* for further information.

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At a minimum, the Archaeological Resource Charts should illustrate the following information:

- Navigation post-plot of the surveyed area showing survey lines, line direction, and navigational shot points or event markers.
- The location of the proposed project activities in addition to illustration of areas of the seafloor that could be physically disturbed by any of the activities proposed (e.g., anchor placement, jack up barges, etc.).
- The location of geotechnical testing activities (e.g., soil borings, cone penetrometer tests, vibracores, etc.), if conducted.
- Existing infrastructure, if known.
- All magnetic anomalies and side scan sonar contacts illustrated on the same chart or series of charts. For magnetic anomalies use map symbol: ▲; for side scan sonar contacts use map symbol: ⊠. Identify these magnetic anomalies and side scan sonar contacts using only the aforementioned symbols and a unique number keyed to the listings in the magnetic anomaly and side scan sonar tables in the Report. In congested areas with numerous unidentified magnetic anomalies or side scan sonar targets, you may use a map(s) at a scale of 1:6,000 to depict the anomalies. If this is done, tie this congested area map(s) into the 1:12,000 survey area map. Plot all recommended potential archaeological avoidance areas on the survey area map.
- Bathymetry contours at an appropriate interval depending on water depth and/or seafloor morphology.
- Sub-bottom features including the horizontal and vertical extent of the geomorphic features (e.g., depth below seafloor of channel margins and thalwegs).
- Magnetic contour maps depicting anomalies of 5 γ or greater, including a key to the contour interval.
- Side scan sonar mosaics.

Digital Data

In addition to the geospatial information and digital data deliverables requested under the *Guidelines for Submission of Spatial Data for Atlantic Offshore Renewable Energy Development Site Characterization Surveys* and the *Guidelines for Providing Geophysical, Geotechnical, and Geohazard Information Pursuant to 30 CFR Part 585,* the following digital information should be submitted with the Report:

Navigation Data

The navigation post-plot of the surveyed area(s) including survey lines, line numbers or other designations, navigational shot points or event markers, and other relevant attributes should be submitted in an ArcGIS readable format (e.g., Microsoft Excel (.xls), Comma separated value (.csv), Text file (.txt), Database (.dbf) or Shapefile (.shp)).

Proposed Project

The location of the proposed project elements including relevant attributes should be submitted in an ArcGIS readable format (e.g., Microsoft Excel (.xls), Comma separated value (.csv), Text file (.txt), Database (.dbf) or Shapefile (.shp)).

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Gradiometer Data

The information used to create the table of magnetic anomalies and charting of magnetic anomalies should be submitted in an ArcGIS readable format (e.g., Microsoft Excel (.xls), Comma separated value (.csv), Text file (.txt), Database (.dbf) or Shapefile (.shp)). The following attributes should be included in the table:

- Anomaly ID
- Lease block
- Survey line number
- Gamma intensity of each identified anomaly (peak gradient amplitude)
- Duration (m)
- Characterization of the anomaly as a dipole, positive (+) or negative (-) monopole, or complex signature, based on the magnetic traces
- Gradiometer height above the seafloor
- Horizontal position, indicated as NAD 83 coordinates of the interpreted location of each unidentified anomaly in decimal degrees to 5 decimal places, based on magnetic traces and contoured data
- Vertical position, indicated as estimated depth using half-width rule, Euler equation, or other means as described in the methodology section
- Association with side scan sonar contacts or sub-bottom profiler features
- Recommended avoidance distance, if applicable

Applicants should also submit the complete, unprocessed magnetometer complete gradiometer dataset. This should include the processed gradiometer data, as well as the unprocessed data for each individual total field magnetometer instrument in the gradiometer configuration. These data should be submitted in a tabular data format recognized by ArcGIS (i.e., Comma separated value (.csv), Text file (.txt), Database (.dbf) or Shapefile (.shp)). At a minimum, the following items should be included within the data table(s):

- Easting/Longitude
- Northing/Latitude
- Time, in UTC
- Raw Magnetic Readings for each instrument
- Gradiometer Altitude
- Survey Line Number/Name

Each of these components must occupy a single field within the table. For example, easting or longitude data must be within a single column in the data table. This would include a column for an easting amount, or longitude in decimal degrees, not a table with separate columns for degrees and another for decimal minutes.

Side Scan Sonar Data

The information used to create the table of side scan sonar contacts and charting of sonar contacts should be submitted in an ArcGIS readable format (e.g., Microsoft Excel (.xls), Comma

separated value (.csv), Text file (.txt), Database (.dbf) or Shapefile (.shp)). The following attributes should be included:

- Side scan sonar contact ID
- Lease block
- Survey line number
- Target length (m)
- Target width (m)
- Target height (m)
- Target shadow (m)
- Target description
- Associated magnetic anomalies
- NAD 83 coordinates of the target in decimal degrees to 5 decimal places
- Original source file name
- Recommended avoidance distance, if applicable

Applicants should provide both raw and processed eXtended Triton Format (.xtf) line files for the survey. Side scan sonar mosaics of the survey area should be prepared as a geo-referenced Tagged Image Format (.tif) and output as 0.5 m resolution or better.

Sub-bottom Profiler Data

The data used to create the charts illustrating the horizontal and vertical extent of sub-bottom geomorphic features should be submitted in an ArcGIS readable format.

Applicants should provide sub-bottom profiler data recorded in SEG-Y standard exchange format. Digital information for the reflectors/horizons identified in the data should also be provided. Formatting may include image plots showing the identified horizons, XYZ data files, or CSF files compatible with SonarWiz software, or other formats approved by BOEM.

Bathymetry Data

The applicant should provide bathymetric data in the following formats with appropriate metadata detailing processing parameters, illumination angles and coordinate systems:

- XYZ data
- ARC ASCII Grid and layer files
- Contours (ESRI compatible)
- Geo-referenced image files

Geotechnical Data

The location of geotechnical testing activities (e.g., soil borings, cone penetrometer tests, vibracores, etc.) should be submitted in an ArcGIS readable format (e.g., Microsoft Excel (.xls), Comma separated value (.csv), Text file (.txt), Database (.dbf) or Shapefile (.shp)) including relevant attributes.

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V. Guidance Document Statement

BOEM issues guidance documents to clarify, supplement, and provide more detail about certain BOEM regulatory requirements of and to outline information required of the applicant to support their various submittals. This guidance document sets forth a policy and an interpretation of a regulatory requirement to provide a clear and consistent approach to complying with that requirement. An applicant may use an alternate approach for compliance; however, early and frequent coordination with BOEM will be especially critical to ensure the work conducted meets BOEM's regulatory requirements.

VI. Paperwork Reduction Act Statement

The information collection provisions of this document are intended to provide clarification, description, or interpretation of requirements contained in 30 CFR 585 Subpart F. The Office of Management and Budget (OMB) has approved the information collection requirements for these regulations and assigned OMB Control Number 1010-0176.

VII. Contact Information

For further information or inquiries regarding these guidelines, please contact the Office of Renewable Energy Programs at (703) 787-1340 or renewable_reporting@boem.gov. Additional resources, including links to BOEM-funded archaeological and historic preservation studies, are available online at www.boem.gov/Renewable-Energy/Historic-Preservation-Activities/.

VIII. References

Carrier, B. M., A. Pulkkinen, and M. Heinz. 2016. Recognizing Geomagnetic Storms in Marine Magnetometer Data: Toward Improved Archaeological Resource Identification Practices, STAR: Science & Technology of Archaeological Research, 2:1, 1-14.

Coastal Environments, Inc. (CEI). 1977. Cultural Resources Evaluation of the Northern Gulf of Mexico Continental Shelf. Prepared for Interagency Archaeological Services Office of Archaeology and Historical Preservation, National Park Service, U. S. Department of the Interior, Baton Rouge, LA.

Evans, A.M. 2015. Examining and Testing Potential Prehistoric Archaeological Features on the Gulf of Mexico Outer Continental Shelf. U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region, New Orleans, LA. CMI Study 2015. 366p.

Faught, M. K. 2014. Remote Sensing, Target Identification and Testing for Submerged Prehistoric Sites in Florida: Process and Protocol in Underwater CRM Projects. In Prehistoric Archaeology on the Continental Shelf, Amanda M. Evans, Joseph C. Flatman and Nicholas C. Flemming, editors, Springer, New York.

National Register of Historic Places. 2002. How to Apply the National Register Criteria for Evaluation, National Register Bulletin No. 15. U.S. Department of the Interior, National Park Service. http://www.nps.gov/nr/publications/bulletins/nrb15/ (Accessed September 10, 2014).

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Sullivan, S.M., K.R. Smith, and D.M. Sackett. 2016. Virginia Ocean Geophysical Survey Phase II Analyses: Offshore Virginia Wind Energy Area. U.S. Department of the Interior, Bureau of Ocean Energy management, Office of Renewable Energy Programs, Herndon. OCS Study BOEM 2016-056. 39 pp.

TRC Environmental Corporation. 2012. Inventory and analysis of archaeological site occurrence on the Atlantic outer continental shelf. U.S. Department of the Interior, Bureau of Ocean Energy, Gulf of Mexico OCS Region, New Orleans, LA. OCS Study BOEM 2012-008. 324 pp.

Westley, K., T. Bell, R. Plets, and R. Quinn. 2011. Investigating Submerged Archaeological Landscapes: a Research Strategy Illustrated with Case Studies from Ireland and Newfoundland, Canada. In Submerged Prehistory, Jonathan Benjamin, Clive Bonsall, Catriona Pickard, and Anders Fischer, editors, pp. 129–144. Oxbow Books, Oxford.

APPENDIX C

United States Department of the Interior

BUREAU OF OCEAN ENERGY MANAGEMENT
WASHINGTON, DC 20240-0001

Memorandum

To: Director

From: Thomas Liu
THOMAS LIU Digitally signed by THOMAS LIU Date: 2021.07.16 09:44:53 -07'00'
Acting Regional Director, Pacific OCS Regional Office

Subject: Northern California Area Identification Pursuant to 30 C.F.R. § 585.211(b)

I. Purpose

This memorandum documents the analysis and rationale in support of the recommended designation of a Wind Energy Area (WEA) offshore Humboldt County, California for environmental analysis and consideration for leasing. Pursuant to Bureau of Ocean Energy Management's (BOEM) 2017 Program Delegations Handbook, the Director has final authority to designate WEAs at the end of the Area Identification (Area ID) process.

II. Area Identified

On October 19, 2018, BOEM published a Call for Information and Nominations for Commercial Leasing for Wind Power Development on the Outer Continental Shelf (OCS) Offshore California (Call). BOEM delineated three geographically distinct Call Areas: Morro Bay and Diablo Canyon off the central coast and Humboldt off the north coast. This memorandum provides a recommendation for the north coast WEA consisting of the Humboldt Call Area in its entirety, as described in Table 1 and depicted in Figure 1. The Humboldt Call Area—i.e., the recommended Humboldt WEA—begins at 21 miles offshore the City of Eureka in northern California. The area is approximately 28 miles in length from north to south and approximately 14 miles in width from east to west. The entire area is approximately 206 square miles (132,369 acres). BOEM will continue analysis of the Morro Bay and Diablo Canyon Call Areas and may provide recommendations for WEA(s) offshore central California in the future.

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Table 1: *Recommended Humboldt Wind Energy Area Descriptive Statistics*

Acres	*Installation Capacity*[1]	*Homes powered*[2]	*Power Production (MWh/year): 40% Capacity Factor*[3]	*Power Production (MWh/year): 60% Capacity Factor*[4]	*Maximum Depth (meters)*	*Minimum Depth (meters)*
132,369	1,605	561,750	5,632,920	8,435,880	1,100	500

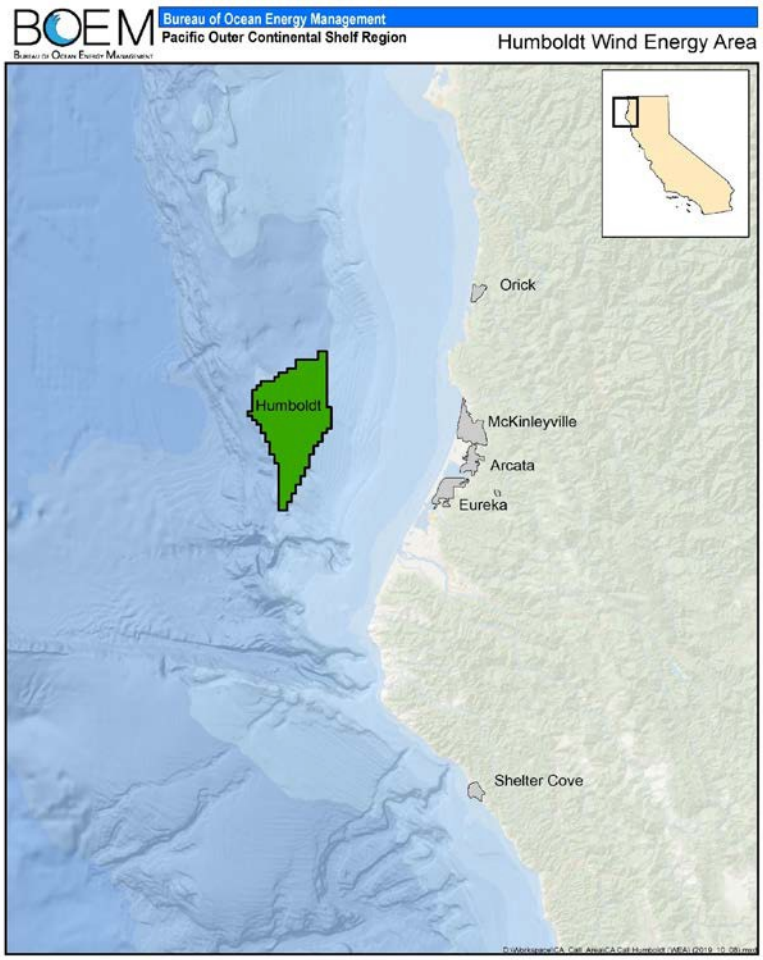

Figure 1: *Map of Recommended Humboldt Wind Energy Area (Humboldt Call Area).*

[1] Megawatts (MW) based upon 3 MW/sq km
[2] Homes powered based upon 350 homes per MW
[3] Formula = Capacity (MW) x 8,760 (hrs/yr) x 0.4 (capacity factor)
[4] Formula = Capacity (MW) x 8,760 (hrs/yr) x 0.6 (capacity factor)

III. Legal Standard

Pursuant to subsection 8(p) of the Outer Continental Shelf Lands Act (OCSLA), the Secretary of the Interior (the Secretary), in consultation with the U.S. Coast Guard (USCG) and other relevant federal agencies, may grant a lease, easement, or right-of-way on the OCS for activities that produce or support production of energy from sources other than oil and gas (43 U.S.C. § 1337(p)(1)(C)). The Secretary must ensure that activities under this subsection are carried out in a manner that provides for 12 specific enumerated requirements, including safety, protection of the environment, and consideration of other uses of the sea or seabed. *Id.* § 1337(p)(4)(A)–(L). BOEM has issued regulations governing the leasing process and management of offshore renewable energy projects. *See* 74 Fed. Reg. 19,638 (Apr. 29, 2009); *see also* 30 C.F.R. part 585.

This memorandum documents BOEM's consideration of OCSLA environmental and multiple use factors at the Area ID stage of its leasing process (43 U.S.C. § 1337(p)(4)(A), (B), (C), (D), (F), (I), and (J)). The identification of WEAs for environmental analysis does not constitute a final leasing decision, and BOEM reserves the right under its regulations to issue leases in smaller areas, fewer areas, different areas, some combination of these, or to issue no leases. BOEM will conduct further analysis under OCSLA and the National Environmental Policy Act (NEPA) at subsequent stages of its regulatory process, including if and when leases are offered for sale, and if and when wind energy facilities are proposed on any leases.

IV. Description of the BOEM Process

A. Planning and Analysis

At the request of Governor Jerry Brown, BOEM established an Intergovernmental Renewable Energy Task Force (Task Force) with California in 2016 to facilitate coordination among relevant federal agencies and affected state, local and tribal governments throughout the leasing process. The first Task Force meeting was held on October 13, 2016, and a second Task Force meeting was held on September 17, 2018.

Following the first Task Force meeting and through the leadership of the California Energy Commission (CEC), BOEM and the State of California engaged in a collaborative, data-based offshore wind energy planning process to foster coordinated and informed decisions about California's shared ocean resources and the many users who depend on them. This outreach consisted of numerous public meetings, webinars, and briefings with coastal communities, fishing communities, federally and non-federally recognized tribes, state and federal agencies, academia and scientists, environmental non-governmental organizations (NGOs), and the offshore renewable energy industry. A summary of key findings is contained in the Outreach Summary Report - California Offshore Wind Energy Planning, published in December 2018.[5] Additional information gathered by BOEM and the State of California during the offshore wind

[5] Outreach Summary Report – California Offshore Wind Energy Planning (Updated). BOEM and the California Energy Commission, December 2018. https://www.boem.gov/renewable-energy/state-activities/public-information-meetings-and-outreach-efforts

energy planning process, including maps and spatially represented data, is available online at https://caoffshorewind.databasin.org/.

Data and information gathered during outreach efforts inform BOEM of potential conflicts with existing ocean uses, viewshed, fishing, and indicate potential impacts to avian and marine mammal species, which generally increase with closer proximity to shore.

B. Call for Information and Nominations

The competitive leasing process starts with the publication of a Call, which requests comments from the public about areas of the OCS that it believes should receive special consideration and analysis for the potential development of renewable energy (30 C.F.R. § 585.211(a)).

On October 19, 2018, BOEM published a Call.[6] BOEM delineated three Call Areas in consultation with numerous parties and information sources, including the State of California and the Task Force. A map of the Call Areas is in Figure 2. In addition to soliciting public comments in the *Federal Register*,[7] BOEM hosted a public meeting on December 13, 2018, in San Luis Obispo, California, with participation from members of the Task Force and the public, as well as other representatives from relevant federal, state, and local government entities.

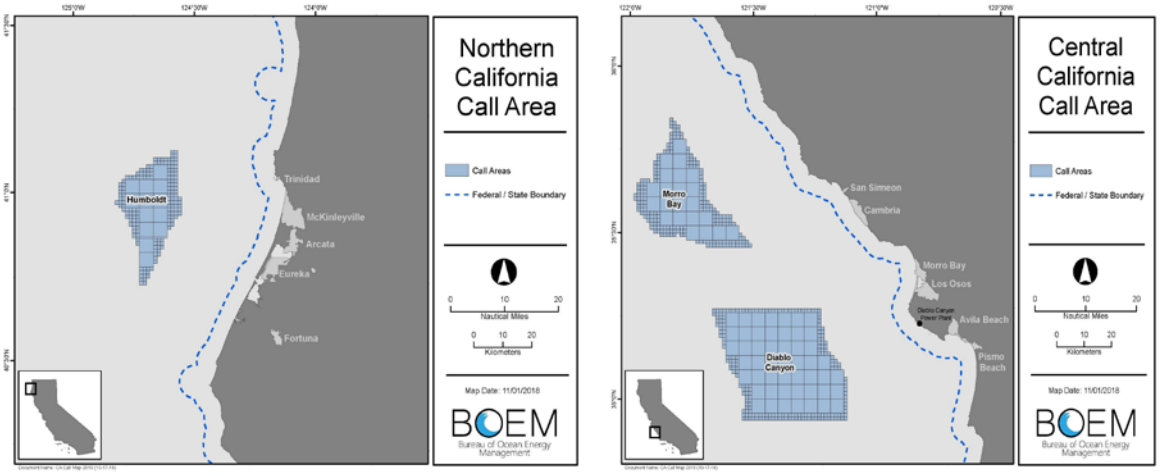

Figure 2: *California Call Areas.*

C. Area Identification

Area ID is a required regulatory step under the renewable energy competitive leasing process used to identify areas for environmental analysis and consideration for leasing.[8] *See* 30 C.F.R.

[6] https://www.boem.gov/83-FR-53096/
[7] https://www.regulations.gov/docket?D=BOEM-2018-0045
[8] *See* 30 C.F.R. § 585.211(b).

§ 585.211(b). The goal of BOEM's Area ID process is to identify the offshore locations that are the most suitable for leasing. The Area ID process balances consideration of multiple competing uses and environmental concerns against a proposed area's potential for commercial wind energy development. BOEM analyzes potential impacts of a specific proposed renewable energy facility in the identified areas during the review of a proposed Construction and Operations Plan (COP), when project-specific information is available.

The Call comment period ended on January 28, 2019. BOEM received 118 comments and 14 companies provided nominations of interest. Comments received in response to the Call are available at https://www.regulations.gov/ [Docket No. BOEM–2018–0045] and include submissions from private citizens; federal, state, and local government agencies; tribal governments; environmental and other advocacy groups; industry groups; and wind developers. During the Area ID process, BOEM considered the following non-exclusive list of information sources:

- Comments and nominations received in response to the Call
- BOEM California Intergovernmental Renewable Energy Task Force meetings
- Outreach Summary Report - California Offshore Wind Energy Planning[9]
- Input from state and federal agencies
- Tribal outreach meetings with federally and non-federally recognized tribes, led by the CEC
- Comments from relevant stakeholders, including the maritime community, environmental NGOs, offshore wind developers, and commercial fishing industry
- State and local renewable energy goals
- Domestic and global offshore wind market and technological trends
- California Offshore Wind Energy Gateway[10] data and information

D. Environmental Review Process following Area ID

After Area ID and prior to a lease sale, BOEM will conduct an environmental review pursuant to NEPA to assess the potential environmental impacts associated with leasing some or all of the WEA.[11] The Area ID process informs the environmental review process by identifying and informing the geographic scope of that environmental analysis for any future lease sales in the area. If BOEM holds a lease sale for some or all of the WEA, the issuance of a lease would grant to the lessee the exclusive right to submit for BOEM's review a plan proposing development of the leasehold. The lease itself does not authorize any activity within the lease area unless and until a lessee submits a proposed plan to BOEM and BOEM approves it, potentially with modifications.

Therefore, BOEM does not consider the issuance of a lease to constitute an irreversible and irretrievable commitment of agency resources toward the construction of a wind energy facility. BOEM will perform an environmental analysis, typically in the form of an Environmental Assessment (EA), and conduct associated consultations before any lease sale.

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[9] https://www.boem.gov/California-Outreach-Summary-Report/

[10] https://caoffshorewind.databasin.org/

[11] 42 U.S.C. §§ 4321 *et seq*.

These analyses will consider only the potential impacts from site characterization activities (such as biological, geological, geotechnical, and archaeological surveys) and site assessment activities (such as meteorological and oceanographic buoy deployment). The environmental analysis would also examine the potential cumulative effects from these activities when added to other past, present, and reasonably foreseeable future actions within and near the potential lease area.

Department of the Interior (DOI) regulations require public involvement, to the extent practicable, in the preparation of an environmental analysis.[12] Under the current Council on Environmental Quality regulations, departments are directed to complete their EAs within 75 pages and 1 year from the date of agency decision to prepare an environmental assessment.[13] Through the public involvement process, which could include public scoping meetings, BOEM would identify a reasonable range of alternatives to the proposed action of leasing in the WEAs, and would analyze those alternatives in the EA. The EA and associated consultations may identify potential lease stipulations to reduce or eliminate potential negative environmental impacts associated with site characterization and site assessment activities.

E. Future Steps in BOEM Leasing Process

If BOEM decides to move forward with the leasing process upon completion of its environmental analysis, BOEM would publish the proposed area(s) for lease, associated terms and conditions, and a proposed format of the competitive auction in a Proposed Sale Notice (PSN) issued pursuant to 30 C.F.R. § 585.216. A formal public comment period follows issuance of the PSN. BOEM will review any comments received to help develop the final lease sale terms and conditions published in the Final Sale Notice (FSN). BOEM may use information from its environmental analysis, as well as information gathered in response to the PSN, to further refine lease areas and develop lease terms and conditions.

If a lease is issued and a lessee submits a proposed COP for that lease, BOEM would perform the necessary consultations with the appropriate state, federal, local, and tribal entities; solicit input from the public and Task Force members; and perform an independent, comprehensive, site- and project-specific environmental analysis under NEPA. This separate site- and project-specific environmental analysis for a proposed COP would provide additional opportunities for public involvement. BOEM would use this information to evaluate the potential environmental and socioeconomic impacts associated with the proposed project, which would inform its decision to approve, approve with modification, or disapprove a lessee's proposed COP pursuant to 30 C.F.R. § 585.628.

V. Background on the Call Area

A. California's Renewable Energy Goals

The State of California is the most populous state in the United States and home to an estimated 39 million people[14] and two of the top ten largest metropolitan population centers in the United

[12] 43 C.F.R. § 46.305.

[13] *See* 40 C.F.R. §§ 1501.5(f) and 1501.10(b)(1).

[14] https://data.census.gov/cedsci/

States,[15] representing significant energy demand. In 2002, the State of California established a Renewables Portfolio Standard (RPS), which mandates that a certain percentage of the state's energy must be generated from renewable resources. California expanded the RPS in 2015 through passage of California Senate Bill 350 , the Clean Energy and Pollution Reduction Act, and in 2018 through passage of California Senate Bill 100 (SB 100). SB 100 increases the state's existing RPS to 50 percent by 2025 and 60 percent by 2030 and requires that 100 percent of the state's electricity be generated using zero-carbon resources by December 31, 2045. California's RPS is one of the most ambitious renewable energy standards in the country.

In addition, California aims to be carbon-neutral by 2045.[16] Because of these state policies and goals, California has been investing heavily in renewable energy generation since 2014, primarily in solar energy. At the same time, California is decreasing its generation of nuclear energy, and forecasts that the last nuclear power plant in the state will be offline by 2025,[17] representing a loss of approximately 10 percent of in-state energy production.[18]

Diversifying renewable energy generation can help reduce the cost for California to meet its renewable energy targets, and offshore wind can complement the state's vast solar and land-based wind resources. Figure 3 shows how offshore wind may help mitigate challenges associated with the "Duck Curve."[19] This figure shows net loads (modeled loads minus land-based wind and solar generation) on March 31 in years 2012–2020.[20] As more solar generation is added to the grid during this time, it is able to meet an increasingly large portion of daytime load, but the grid also requires increasing amounts of other generation to ramp up and meet evening peaks as the sun goes down. Preliminary investigation of possible California offshore wind sites indicates that available offshore wind peaks in the late afternoon into the evening, with substantial generation throughout the evening hours. Diversifying the state's renewable energy portfolio with offshore wind could reduce evening ramping requirements and advance the state's goal of 100 percent carbon free electricity by 2045.[21]

[15] https://www.census.gov/content/dam/Census/newsroom/releases/2015/cb15-89_graphic.jpg

[16] California Senate Bill No. 100, approved September 10, 2018. https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180SB100

[17] California ISO website, https://caiso.com/Documents/AnnouncedRetirement_MothballListPosted.html.

[18] California Energy Commission website, https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/2019-total-system-electric-generation/2018.

[19] The Duck Curve is a graph of power production over the course of a day that shows the timing imbalance between peak demand and renewable energy production. The term was coined in 2012 by the California Independent System Operator and refers to the shape of the load curve for solar power

[20] California Independent System Operator, 2016. *Fast Facts: What the Duck curve tells us about managing a green grid.* Folsom, CA. https://www.caiso.com/documents/flexibleresourceshelprenewables_fastfacts.pdf

[21] Ibid, 20.

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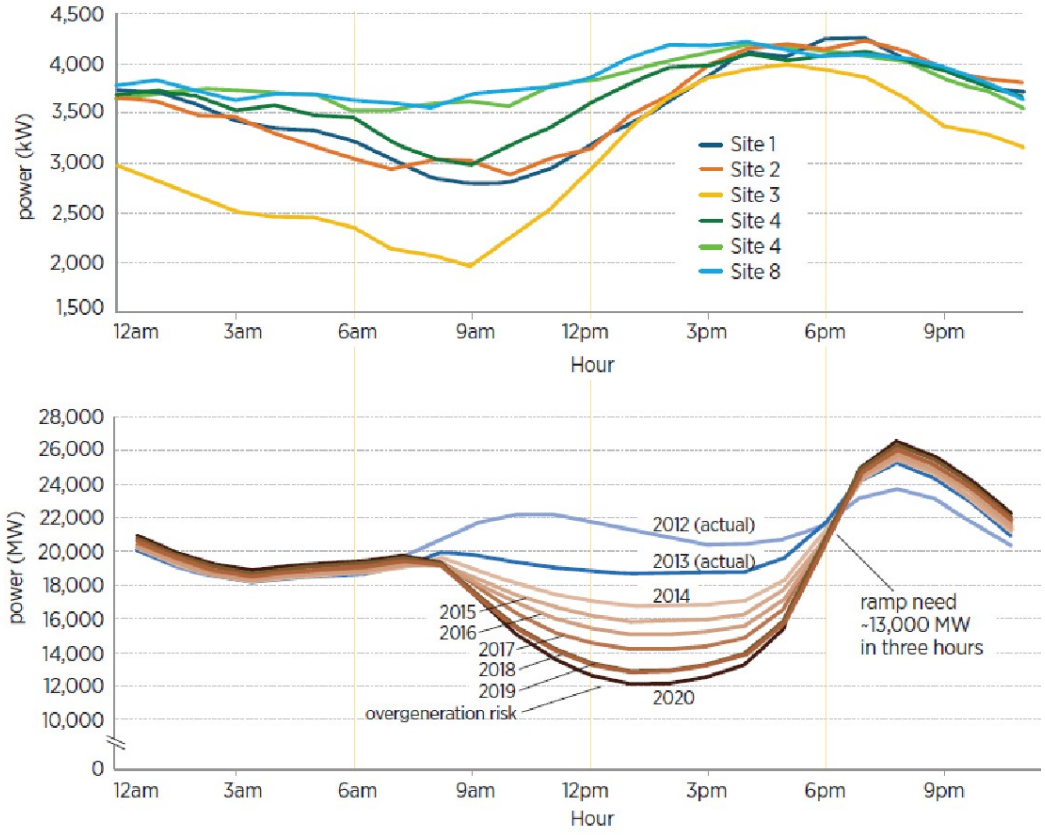

***Figure 3**: The "Duck Curve" and modeled generation profiles for 6 MW offshore wind turbines at six California sites.*

In addition to the state's goals, the Redwood Coast Energy Authority (RCEA), a local government joint power authority serving Humboldt County, is actively pursuing a procurement goal of 100 percent locally sourced renewable electricity by 2030, including offshore wind energy. In 2018, RCEA selected partners for a public-private partnership to further explore developing wind energy offshore northern California.[22] RCEA administers Humboldt County's Community Choice Energy program. Community Choice Energy, sometimes known as Community Choice Aggregation (CCA), is a model that allows communities to join together to purchase electricity on behalf of their community members.

B. Technical Criteria: A Buildable Environment

The Humboldt Call Area meets key technical criteria generally used to determine the appropriateness of floating offshore wind energy development. These include sustainable wind speeds, suitable water depths, access to existing transmission interconnection, and robust renewable energy demand, as discussed below.

[22] Redwood Coast Energy Authority website, https://redwoodenergy.org/community-choice-energy/about-community-choice/power-sources/offshore-wind-energy/

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Sustainable Wind Speeds: The average estimated wind speed at 100 meters above sea level within the Humboldt Call Area is 9.2 meters per second, as depicted in Figure 4. This exceeds average wind speeds of several commercial developments in the North Sea in Europe.[23]

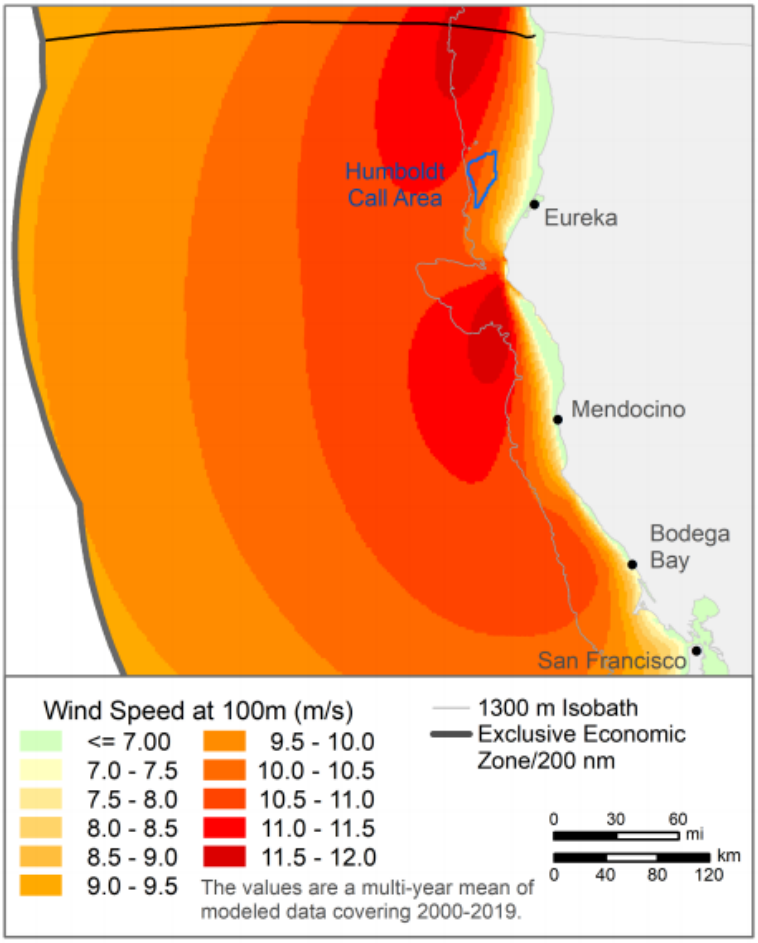

Figure 4: *Estimates of the Annual Average Wind Resource (Speed) at 100 meters above sea level for the Humboldt Call Area.*

Water Depths: The water depths in the Humboldt Call Area, which range from 500 to 1,100 meters, are technically feasible for several types of floating foundations. These water depths make pile-driven foundations (e.g., monopile or jacket) infeasible in any of the previously mentioned Call Areas.[24]

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[23] Coelingh, van Wijk, and Holtslag *Analysis of wind speed observations on the North Sea coast.* (1998, February) Journal of Wind Engineering and Industrial Aerodynamics. Retrieved from https://www.sciencedirect.com/science/article/pii/S0167610597002857?via%3Dihub

[24] Arent, Douglas et al. *Improved Offshore Wind Resource Assessment in Global Stabilization Scenarios.* NREL/TP- 6A20-55049. https://www.nrel.gov/docs/fy13osti/55049.pdf

Proximity to Transmission: The Humboldt Call Area is sufficiently close to existing transmission infrastructure to easily interconnect to the electrical grid. The Humboldt Call Area is approximately 21 miles from the Humboldt Generating Station in Eureka, as shown on Figure 5. Full buildout of the Humboldt Call Area will require interconnection upgrades and interconnecting to the bulk electric power system will require review by the California Independent System Operator (CAISO). California recognizes that analysis and subsequent approvals of transmission facilities would be necessary to achieve the state's RPS and clean energy goals. SB 100 requires the CEC, California Public Utilities Commission (CPUC), and California Air Resources Board (CARB) to complete a joint agency report to the California legislature evaluating the 100 percent zero-carbon electricity policy to address the requirements and intent of the statute. BOEM is also funding an analysis by Humboldt State University to further understand grid interconnection on the north coast.

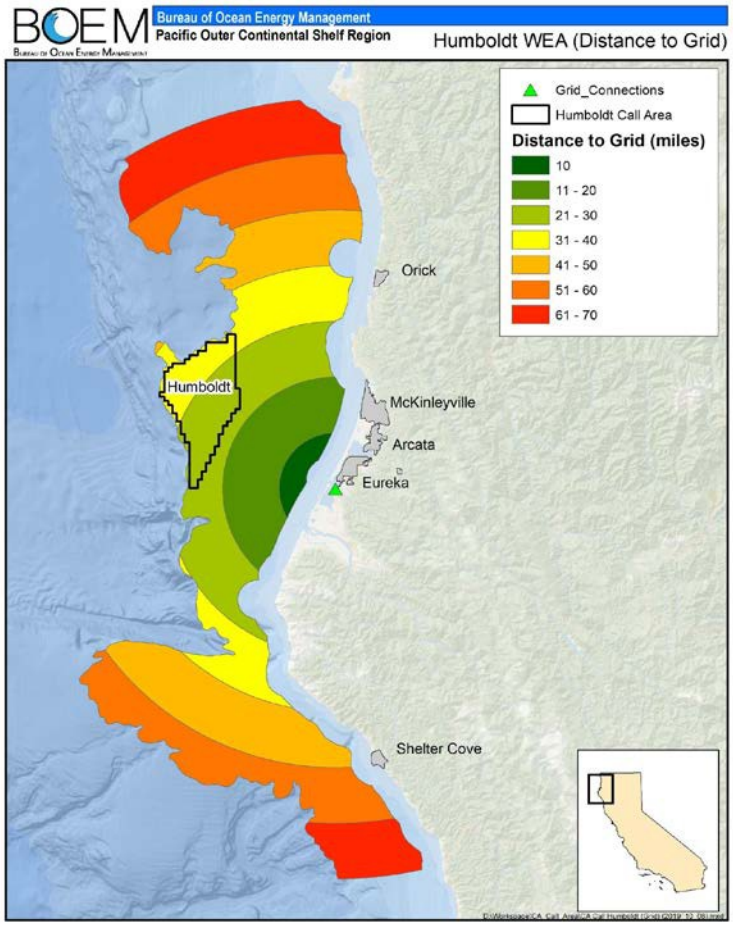

Figure 5: *Transmission Interconnection Locations for the California Call Areas.*

Robust Energy Demand: As mentioned above, RCEA is actively pursuing a procurement goal of 100 percent locally sourced renewable electricity by 2030, including offshore wind energy.

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C. Nominations

In response to the Call, BOEM received nominations of interest from 14 qualified entities proposing to develop offshore wind in all three Call Areas as listed below. Ten of the 14 companies submitted nominations of interest for the Humboldt Call Area as shown in Figure 6 below. Several companies noted in their submissions that, while they were nominating a specific area, they would be interested in any area that BOEM offered to lease offshore California.

1. Algonquin Power Fund (America) Inc.
2. Wpd Offshore Alpha, LLC
3. Avangrid Renewables, LLC
4. Castle Wind, LLC
5. Cierco Corporation
6. EDF Renewables Development, Inc.
7. EDP Renewables North America, LLC
8. E C & R (eON) Development, LLC
9. Equinor Wind US, LLC
10. Mission Floating Wind, LLC
11. Northcoast Floating Wind, LLC
12. Northland Power America, Inc,
13. RCEA
14. U.S. Mainstream Renewable Power, Inc.

Additional information about each nomination, including maps, nomination rationales, and OCS block tables are available here: https://www.boem.gov/California-Call-for-Nominations/.

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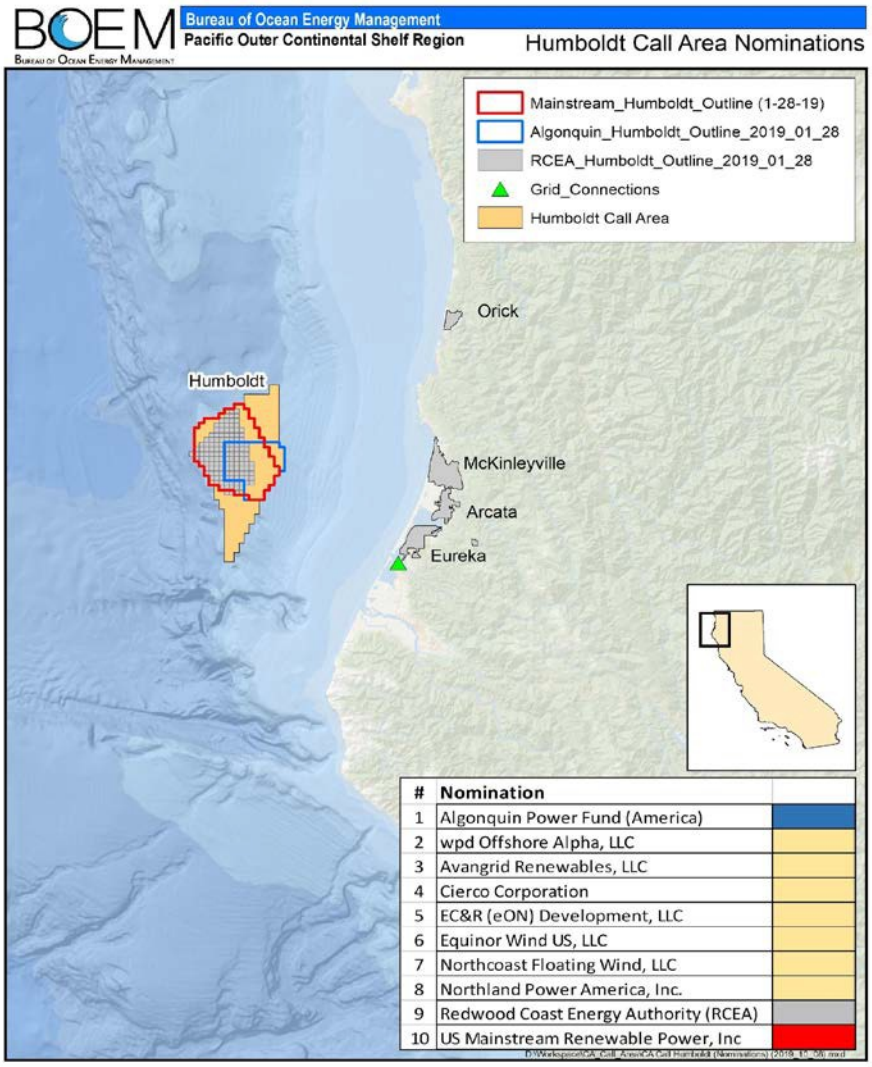

Figure 6: *Nominations Received on the Humboldt Call Area.*

VI. Considerations for Area ID

BOEM considered multiple existing uses of the area in and around the Humboldt Call Area, and their impact on the designation and commercial viability of a WEA within the area. The uses found to interact most with potential wind development within the Humboldt Call Area are: (1) commercial and recreational fishing, (2) avian species, (3) marine mammals, (4) vessel traffic, (5) historic properties, (6) visual impacts, and (7) military activities. Highlights of our internal analysis are included in the sections below.

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A. Multiple Uses

1. Commercial and Recreational Fishing

The goal of BOEM's Area ID is to identify the offshore locations that appear most suitable for wind energy development and on which BOEM will conduct NEPA review for lease issuance.

Given the ubiquity of fishing activity along the Pacific Coast (as depicted on Figure 7), no single exclusion area or mitigation approach would resolve all potential commercial fishing conflicts. Some areas important to one sector of the industry may not be important to others, and currently no available information indicates fishing grounds within the Call Area that are either marginal or notably valuable. Moreover, and as discussed further below, fisheries' economic productivity declines with depth and distance from shore.

The waters offshore California support numerous types of fishing (as depicted on Figure 7), and stakeholders place high cultural and economic significance on these activities. Within the last decade (2009-2018), the ex-vessel value of all marine commercial fisheries within California averaged approximately $216 million dollars per year (See Table 2). Within this same period, the Eureka-area port complex (EPC) contributed about 18 percent to this total and is second only to the Santa Barbara Channel port complex in significance to the state. Within the EPC, commercial fishers primarily land their catch at three major harbors (Eureka, Trinidad, and Crescent City), and use several smaller locations with less consistency. As shown on Table 2, within the EPC, crab dominates the economic value of landings at all ports. Eleven other taxa recorded at least 1 percent of value landed at one or more of the local harbors.

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Table 2. Ex-vessel value (2019$) of landings for some California commercial fisheries

	Average Annual Ex-vessel Landings Value (2019$) 2009-2018*	Statewide Value %	Regional EPC Value %	Local Harbor Value %	Depth (m) or Offshore Range (km) of Potential Fishing Grounds†	Call Area Overlaps with Potential Fishing Grounds?
California Statewide	**$ 216,128,424**	**100%**				
Eureka Port Complex (EPC)	**$ 38,907,766**	**18%**	**100%**			
Eureka Harbor	**$ 14,762,368**	**7%**	**38%**	**100%**		
Dungeness crab	$ 8,451,701	4%	22%	57%	less than 230 m	No
Sablefish	$ 1,870,730	< 1%	**5%**	**13%**	**57 to 1524 m**	**Yes**
Dover Sole	$ 1,289,162	< 1%	**3%**	**9%**	**27 to 914 m**	**Yes**
Ocean (pink) shrimp	$ 661,688	< 1%	2%	4%	73 to 229 m	No
Petrale sole	$ 547,548	< 1%	1%	4%	18 to 460 m	No
Thornyheads	$ 494,852	< 1%	**1%**	**3%**	**26 to 1524+ m**	**Yes**
Albacore tuna	$ 391,040	< 1%	1%	3%	greater than 55 km offshore	No
Chinook salmon	$ 306,987	< 1%	< 1%	**2%**	**0 to 46 km offshore**	**Yes**
Night/Surf smelt	$ 201,904	< 1%	< 1%	1%	surf zone	No
All other species	$ 546,756	< 1%	1%	4%		
Trinidad Harbor	**$ 2,547,544**	**1%**	**7%**	**100%**		
Dungeness crab	$ 2,514,008	1%	6%	99%	less than 230 m	No
All other species	$ 33,536	< 1%	< 1%	1%		
Crescent City Harbor	**$ 19,511,137**	**9%**	**50%**	**100%**		
Dungeness crab	$ 15,144,538	7%	39%	78%	less than 230 m	No
Ocean (pink) shrimp	$ 2,716,064	1%	7%	14%	73 to 229 m	No
Sablefish	$ 410,664	< 1%	**1%**	**2%**	**57 to 1524 m**	**Yes**
Coonstripe shrimp	$ 343,493	< 1%	< 1%	2%	less than 185 m	No
Black rockfish	$ 216,766	< 1%	< 1%	1%	less than 366 m	No
All other species	$ 679,612	< 1%	2%	3%		
All other locations	**$ 1,483,021**	< 1%	**4%**	**100%**		
Dungeness crab	$ 992,994	< 1%	3%	67%	less than 183 m	No
Hagfishes	$ 348,353	< 1%	< 1%	**23%**	**9 to 732 m, generally less than 549 m**	**Yes**
Chinook salmon	$ 102,334	< 1%	< 1%	**7%**	**0 to 46 km offshore**	**Yes**
All other species	$ 39,340	< 1%	< 1%	3%		

* Landing data downloaded from https://www.wildlife.ca.gov/Fishing/Commercial/Landings and adjusted to June, 2019 values using the Consumer Price Index Inflation Calculator https://data.bls.gov/cgi-bin/cpicalc.pl.

† Depth data obtained from (1) *Status of the Fisheries* reports at https://www.wildlife.ca.gov/Conservation/Marine/Status for Dungeness crab, ocean (pink) shrimp, petrale sole, coonstripe shrimp, Pacific hagfish, and black rockfish, and (2) Miller and Lea 1976. *Guide to the Coastal Marine Fishes of California,* Calif. Dept. Fish and Game, Fish Bull. No. 157 (https://escholarship.org/uc/item/6s04v367), for sablefish, Dover sole, petrale sole, longspine and shortspine thornyheads, surf smelt, night smelt, and black hagfish. Albacore and Chinook offshore range obtained from Industrial Economics, Inc. 2012. BOEM OCS Study 2012-083. Original data converted to metric units when necessary.

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The fisheries' economic productivity reflects biological productivity and is highest in shallower waters near the coast, declining as depth increases (See Figures 7 and 8). Given the OCS location of the Humboldt Call Area (See Table 9), a simple depth analysis reveals that many commercial fisheries are not likely to experience notable preclusion from fishing grounds as a result of wind energy development in the area. NOAA scientists used landing receipts and vessel monitoring system data during 2010-2016 to describe spatial patterns of fishing for Dungeness crab,[26] the most important local fishery at all harbors within the region (Table 2). The Call Area did not overlap with Dungeness crab fishing grounds described in this research.

[26] Feist, B.E., Samhouri, J.F., Forney, K.A., Saez, L.E. 2021. Footprints of fixed-gear fisheries in relation to rising whale entanglements on the US West Coast. Fisheries Management and Ecology 28(3): 283-294.

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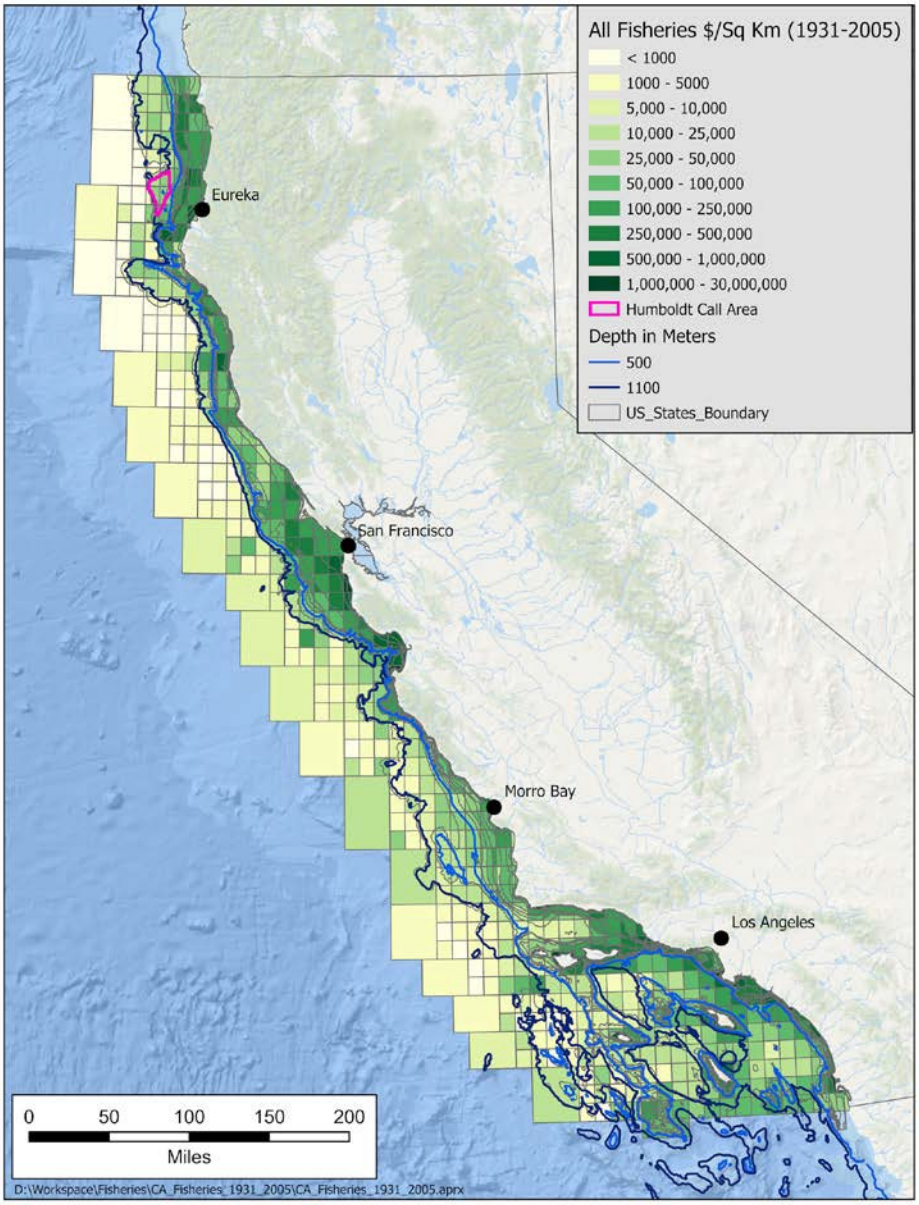

Figure 7*: (California Coast) Total monetary value of fisheries landings, 1931-2005, summarized from the California Department of Fish and Wildlife catch blocks. Adapted from Miller et al. 2017, Can. J. Fish. Aquat. Sci. 74:1732-48.*

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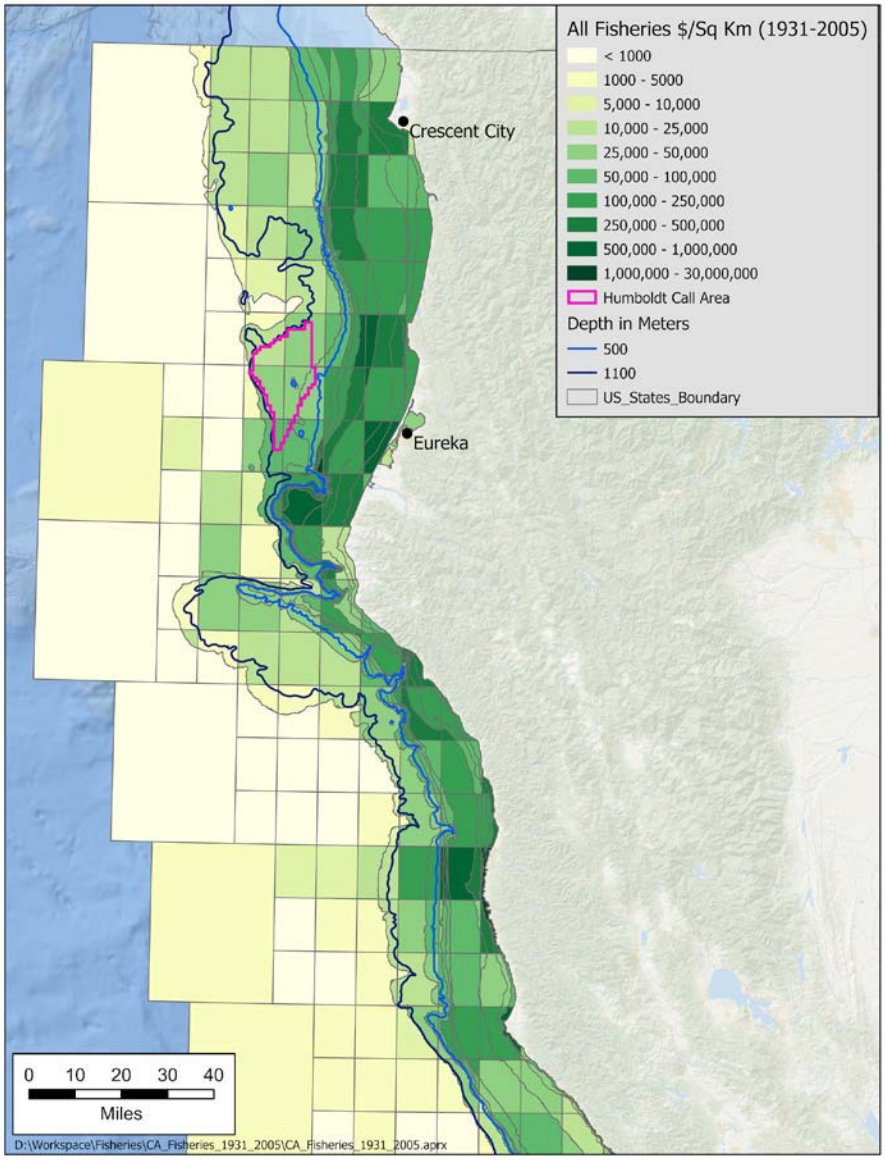

Figure 8*: (North Coast) Total monetary value of fisheries landings, 1931-2005, summarized from the California Department of Fish and Wildlife catch blocks. Adapted from Miller et al. 2017, Can. J. Fish. Aquat. Sci. 74:1732-48.*

Although offshore wind development on the OCS does not prevent fishing activities within OCS lease areas, floating wind facilities would likely be incompatible with certain gear and methods that fishers use to ply the deeper waters on the OCS offshore California (e.g., trawl, pot/trap, longline, nets). Fishing methods that employ hook-and-line gear (jigs, bait, or trolling) may be compatible with offshore wind. Therefore, even though Chinook salmon fishing grounds overlap with the Call Area, fishing activity is not expected to be precluded.

Recreational and tribal fishing are not expected to be negatively affected by offshore wind development in the Humboldt Call Area because recreational fishers rarely fish deeper than

200 meters and species targeted by tribes occur closer to shore.[25] As noted above and in Figure 9, the depth range within the Humboldt Call Area is between 500 meters to 1100 meters.

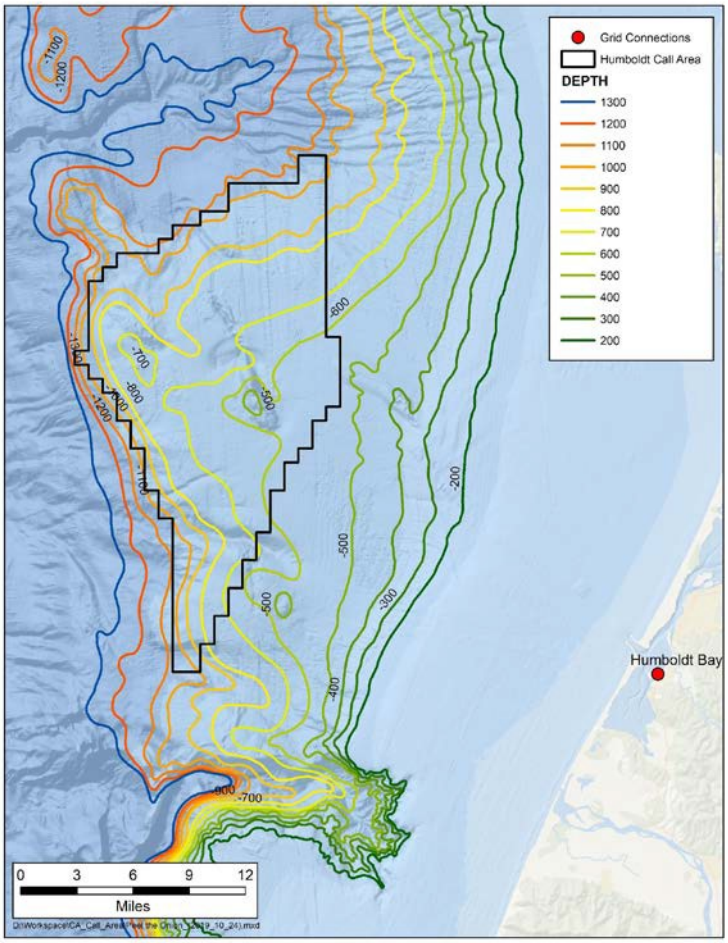

***Figure 9**: Humboldt Call Area Bathymetry.*

The majority of the comments from the fishing industry and fishing related communities received on the Call concern potential impacts from offshore wind on general fishing activities, availability of data on fishing activities, cumulative effects when combined with existing fishing restrictions, and effects on certain types of fishing, such as trawling. The Humboldt Fishermen's Marketing Association stated that they have signed a "Memorandum of Understanding" with RCEA to seek to work cooperatively to minimize and mitigate for potential impacts to their fishing community by offshore energy developments and suggested that BOEM consider community engagement in awarding leases.

[25] Miller et al. 2014, PLOS ONE 9(6): e99758. Five keystone taxa (abalone, clams, mussels, seaweed, and smelt) and marine and coastal areas of concern were identified by a study funded by California's State Coastal Conservancy as important for consumptive and non-consumptive uses by several North Coast Tribes during the baseline characterization for monitoring state Marine Protected Areas: Informing the North Coast MPA Baseline: Traditional Ecological Knowledge of Keystone Marine Species and Ecosystems, A Collaborative Project Among: Tolowa Dee-ni′ Nation, InterTribal Sinkyone Wilderness Council, Cher-Ae Heights Indian Community of the Trinidad Rancheria, Wiyot Tribe. May 2017. 56 pp. https://caseagrant.ucsd.edu/sites/default/files/39-Rocha-Final.pdf.

An individual asserted, in a comment submitted on the Call, that the available data, including Automatic Identification System (AIS) data, does not provide a complete picture of fishing activities. BOEM's analysis will not rely solely on AIS data. Several fishing industry groups suggested that consultation with relevant permitting agencies, such as National Marine Fisheries Service (NMFS), California Department of Fish and Wildlife (CDFW), and Oregon Department of Fish and Wildlife, would be helpful. BOEM consults with NMFS during environmental analyses throughout BOEM's leasing process BOEM is in ongoing conversations with CDFW. We did not receive any comments from out-of-state agencies during the Call comment period but will consult as necessary during subsequent environmental reviews. Members of the U.S. albacore fisheries suggested potential measures to minimize impacts to their operations.

In comments submitted to BOEM in response to the Call, NMFS recommended that prior to the installation and construction of any turbines and in the development of study plans to address potential effects to NMFS trust resources, BOEM and its lessee(s) should consult with NMFS at the earliest possible time to provide guidance in the collection of environmental baseline information. NMFS also recommended that BOEM and prospective wind power developers, along with other relevant state and federal permitting agencies, consult as needed with NMFS during the appropriate timeframe. NMFS did not provide any recommendations about the size of the Call Area, as a result of fisheries conflicts or otherwise.

BOEM will consider these comments, best management practices, and agency guidelines to evaluate impacts to the fishing industry at each step of the leasing process. As described in this section, depth analysis reveals that many commercial fisheries are not likely to experience notable preclusion from fishing grounds. Based on the foregoing, the information available on fishing activities does not warrant removal of areas from further review at this time.

2. Avian and Bat Species

BOEM's preliminary analysis based on our data synthesis and modeling efforts to date found that at least 16 seabird species are present at a level of relatively moderate density during at least one season in the Humboldt Call Area (primarily jaegers, gulls, albatrosses, storm petrels, and shearwaters). Approximately 28 other species occur in moderate densities inshore of the Humboldt Call Area (primarily grebes, alcids, gulls, terns, loons, cormorants, and pelicans) and approximately 7 species occur in moderate densities farther offshore of the call area (primarily phalaropes, jaegers, albatrosses, and petrels). These species are likely to occur in lower densities within the Humboldt Call Area. One of the species that occurs inshore of the call area, the Marbled Murrelet (*Brachyramphus marmoratus*), is listed as threatened under the Endangered Species Act (ESA). The federally threatened Western Snowy Plover (*Charadrius nivosus nivosus*) occurs on beaches along the Humboldt County coast, but is not likely to occur in the Humboldt Call Area itself. None of these species were found, or are expected to occur, at relatively high densities in the Humboldt Call Area.

Avian species-related comments in response to the Call focused primarily on potential impacts to avian species from the construction and operation of an offshore wind energy facility.

However, BOEM received several comments that were specific to the Humboldt Call Area. Several commenters recommended site-specific surveys and predictive mapping of species abundance and distribution, and further suggested BOEM contact researchers and others for relevant datasets that would provide more information to consider for analysis. There were also relevant comments on specific bird species that may be at risk in the Humboldt Call Area and suggestions were made to remove some areas and study other parts of the Humboldt Call Area further. Concerns were raised specific to the Black Brant (*Branta bernicla nigricans*), which has a significant wintering population in Humboldt Bay and may migrate through the Humboldt Call Area on its southbound migration. One commenter identified impacts to bats as a concern and suggested that BOEM consider those potential impacts.

BOEM is conducting and planning several studies that will be valuable in understanding avian resources within the Humboldt Call Area. BOEM is collaborating with the National Oceanic and Atmospheric Agency (NOAA) and U.S. Geological Survey (USGS) on a data synthesis and predictive modeling study of seabird distribution off the entire west coast out to the exclusive economic zone (EEZ) boundary. Work with USGS includes synthesizing telemetry data on a number of seabird species, including shearwaters. BOEM and the U.S. Fish and Wildlife Service (USFWS) plan to study Black Brant migration from their breeding grounds in Alaska to the west coast of North America, which would help to assess the potential impacts of offshore wind facilities on that species. BOEM is also planning a systematic study of offshore acoustic bat activity along the western continental U.S. and Hawaiian coastlines to determine the temporal and spatial distribution of bats, which will help BOEM evaluate the effects of proposed offshore wind energy development on them. In addition, the lessee would conduct site-specific avian surveys after lease issuance to describe the key species and habitat that may be affected by the proposed construction and operations prior to approval of any construction. Further, it is worth noting that many avian and bat mitigation measures and best management practices have been successfully employed across the offshore wind industry and incorporated into plan approvals.

BOEM concludes that it is premature to exclude areas during the Area ID stage while BOEM is conducting studies and processing data that would be valuable to understanding avian and bat resources within the Humboldt Call Area. Based on the status of current and planned studies, and the information evaluated from public comments, BOEM has determined that impacts to seabirds and bats should be addressed on a site-specific basis at the COP review stage.

3. Marine Mammals and Sea Turtles

The information provided below is intended to describe the state of the best available scientific knowledge regarding marine mammal distribution and biologically important areas (BIAs) in relation to the Humboldt Call Area. This information indicates that the Humboldt Call Area contains relatively lower incidence of marine mammals and sea turtles than other portions of the OCS offshore California, and thus does not warrant reduction of the area to be analyzed for potential leasing on this basis. Comments received from federal and state agencies, researchers, members of the public and NGOs[26] that relate to BOEM's selection of the Humboldt

[26] https://www.regulations.gov/docketBrowser?rpp=25&so=DESC&sb=commentDueDate&po=0&D=BOEM-2018-0045

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Call Area focused on concerns related to impacts to marine mammal migratory routes and access to Biologically Important Areas (BIAs) (Figure 10).

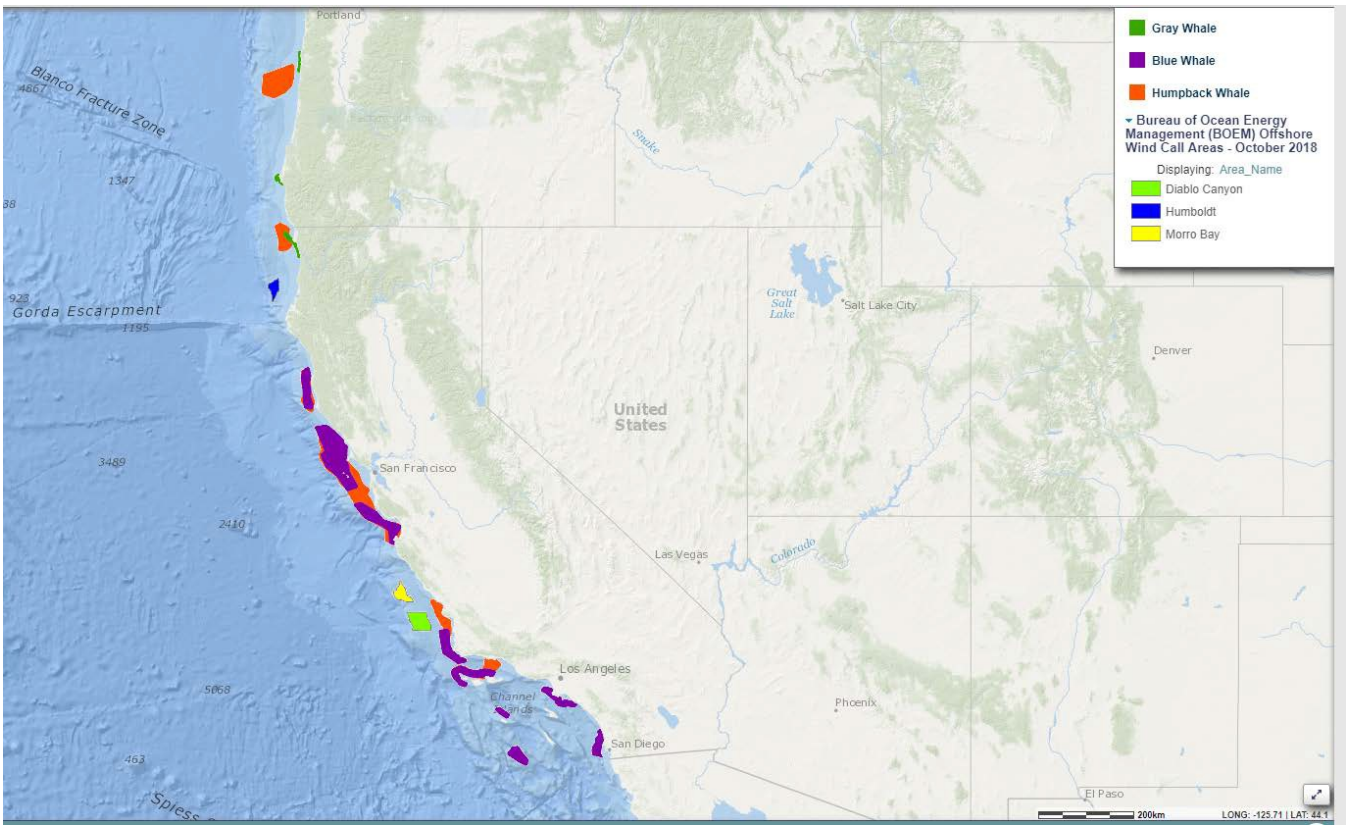

Figure 10: *Biologically Important Areas (feeding) for blue, humpback, and gray whales (Calambokidis et al., 2015) in relation to BOEM's Call Areas.*

The following marine species have been documented using migratory corridors or feeding areas or have critical habitat in proximity to the Humboldt Call Area. None of these species are expected to occur within the Humboldt Call Area in sufficient numbers to warrant elimination of some or all of the area from further analysis for potential leasing.

a) North Pacific Right Whales: Outside of the Bering Sea and Gulf of Alaska, from 1950-2001, there have been at least four sightings of North Pacific right whales from the eastern population from Washington, twelve from California, three from Hawaii, one from British Columbia, and two from Baja California, Mexico (Brownell et al. 2001). More recently, one North Pacific right whale was seen off La Jolla, CA in April 2017, and a different animal was sighted off the Channel Islands in May 2017. Farther north, there were two sightings off British Columbia in 2013 and one in June 2018 (NMFS, 2017). Sightings have occurred in Mexican waters and thus there is some evidence that North Pacific right whales travel through California waters to reach Southern California or Mexico in the summer months, though by what route and in what number species utilize this unconfirmed migratory route is unknown (NMFS, 2017).

Low numbers of sightings of individuals from a very small population makes any kind of demographic analysis challenging. Current knowledge of the low number of sightings offshore California in the last 68 years (14 sightings from 1950-2018, even with increased survey efforts), and the small population size (approximately 31 individuals), indicates that North Pacific right whales are unlikely to have any significant presence in the Humboldt Call Area.

b) Blue Whales: Blue whale habitat that overlaps with the Humboldt Call Area varies according to the data source; however, BOEM did not include any blue whale BIAs in the Humboldt Call Area. During August and September, WhaleWatch (Hazen et al., 2016) and other modeling efforts (Becker et al., 2016) on average predict 0-3 individual blue whales per 25x25 km area, designated as 'grid cells' in the WhaleWatch research. The Humboldt Call Area overlaps with approximately 4 grid cells but does not overlap with any core areas of use for blue whales (Figure 11).

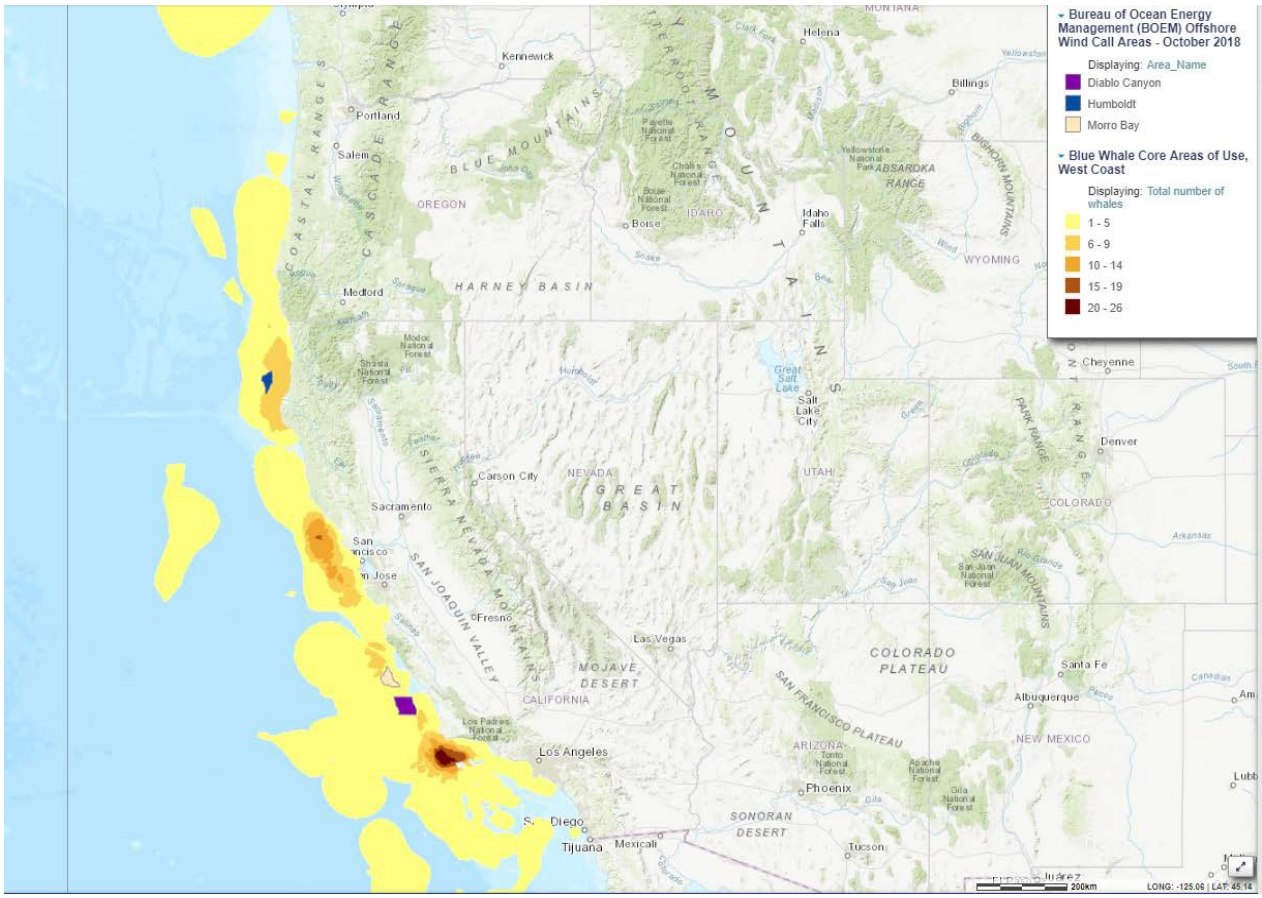

Figure 11: *Blue whale core areas of use along the west coast of the USA (Irvine et al., 2014) do not overlap with BOEM Call Areas.*

c) Fin Whales: Fin whales occur in both pelagic and coastal waters, where they feed primarily on krill and fish. Current research suggests that only some fin whales undergo long distance migrations, with some individuals remaining resident in warmer waters of

Southern California (Calambokidis et al., 2015). The variability in movements make BIAs difficult to define and thus none are designated by NMFS. Satellite tagging-based habitat suitability models suggest the Humboldt Call Area falls in a low density or low-moderate habitat suitability region in summer and fall (Becker et al., 2016; Scales et al., 2016) (Figure 12).

d) Humpback Whales: Concentrations of humpback whales increase with proximity to shore (Keiper et al., 2011). Humpback whale feeding BIAs occur approximately 10.8 nautical miles (nmi) closer to the shore than the Humboldt Call Area (Figure 10). NOAA Southwest Fisheries Science Center (SWFSC) density models, which are based on ship-based surveys, predict the Humboldt Call Area to overlap with regions of high or moderate density ($\leq$1 animal per square kilometer (km^2) for a study area 1,141,800 km^2) for humpback whales (Becker et al., 2012; 2016). However, it should be noted that humpbacks were not sighted in that area during any of the six cruise years (Becker et al., 2012; 2016).

e) Gray Whales: Gray whale feeding BIAs occur on the OCS and in coastal nearshore waters further north of the Humboldt Call Area, primarily in Washington and Oregon (Calambokidis et al., 2015). As such, the Call Area does not overlap with gray whale feeding BIAs. Similarly, migratory corridors occur close to shore (within 5.4 nmi) (see Figure 13). It is important to note that in defining BIAs, Calambokidis et al. (2015) included a 25.4 nmi buffer (see Figure 12). The buffer represents the potential path of some individuals that move farther offshore during annual gray whale migrations.

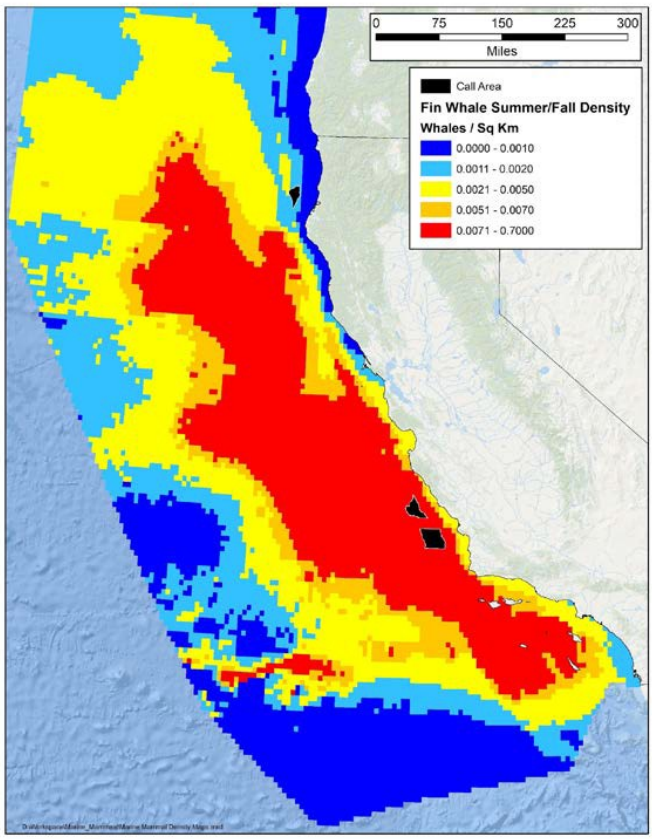

Figure 12: *Predictive habitat-based models of fin whale density for summer/fall (Becker et al., 2016).*

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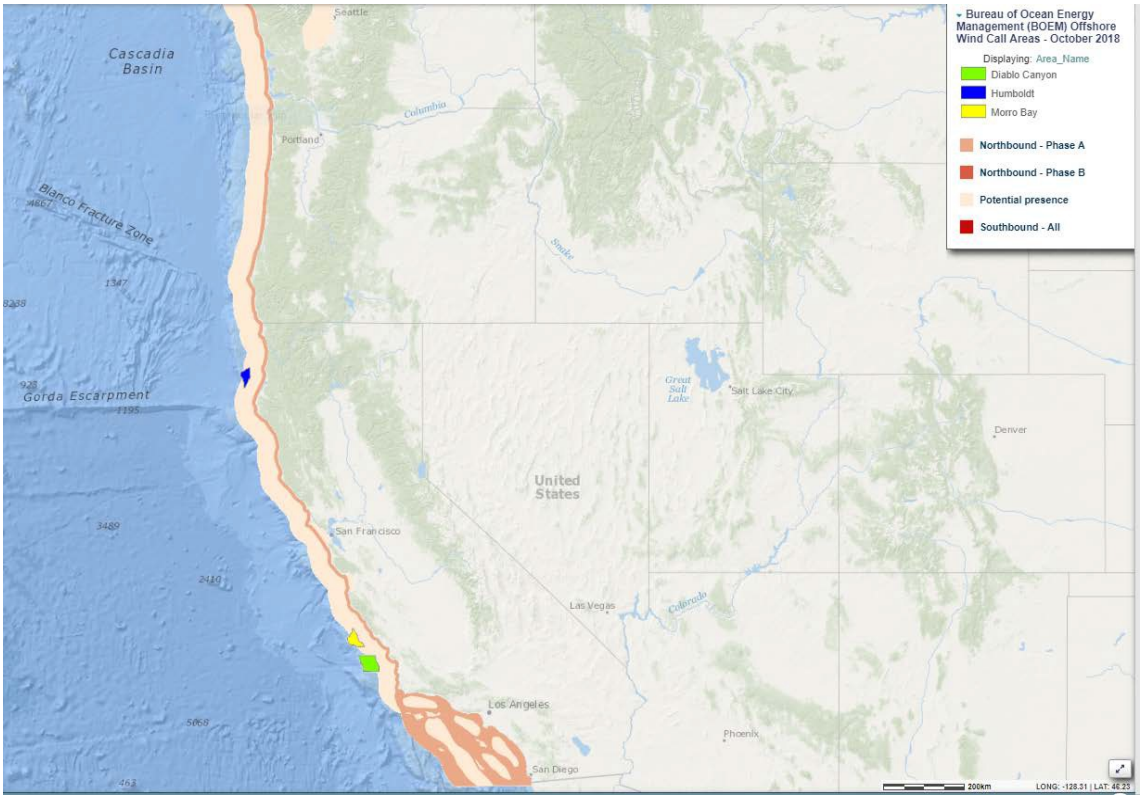

Figure 13*: Gray whale migratory corridor including the 25.4 nmi buffer that overlaps with the Humboldt Call Area, showing North and Southbound routes (Phases A and B overlap and therefore only show one color = Northbound Phase A).*

f) Leatherback Sea Turtles: Leatherback sea turtles have the most extensive range of any living reptile and have been reported circumglobally throughout the oceans of the world (Marquez, 1990; NMFS and USFWS, 1998). Migratory routes of leatherbacks are not entirely known. However, turtles tagged after nesting in July at Jamursba-Medi, Indonesia, arrived in waters off California and Oregon during July-August (Benson et al., 2007a; 2011) coincident with the development of seasonal aggregations of jellyfish (Shenker, 1984; Suchman and Brodeur, 2005; Graham, 2009). Other studies similarly have documented leatherback sightings along the Pacific coast of North America during the summer and fall months, when large aggregations of jellyfish form (Bowlby, 1994; Starbird et al., 1993; Benson et al., 2007b; Graham, 2009). NMFS published a final rule designating critical habitat for leatherback sea turtles in 2012. This critical habitat contains the main feeding habitat for leatherback sea turtles and stretches along the California coast from Point Arena to Point Arguello east of the 3,000-meter depth contour; and 25,004 square miles (64,760 km^2) stretching from Cape Flattery, Washington to Cape Blanco, Oregon east of the 2,000 meter depth contour. The Humboldt Call Area does not fall within feeding critical habitat for leatherback sea turtles designated under the ESA (Figure 14).

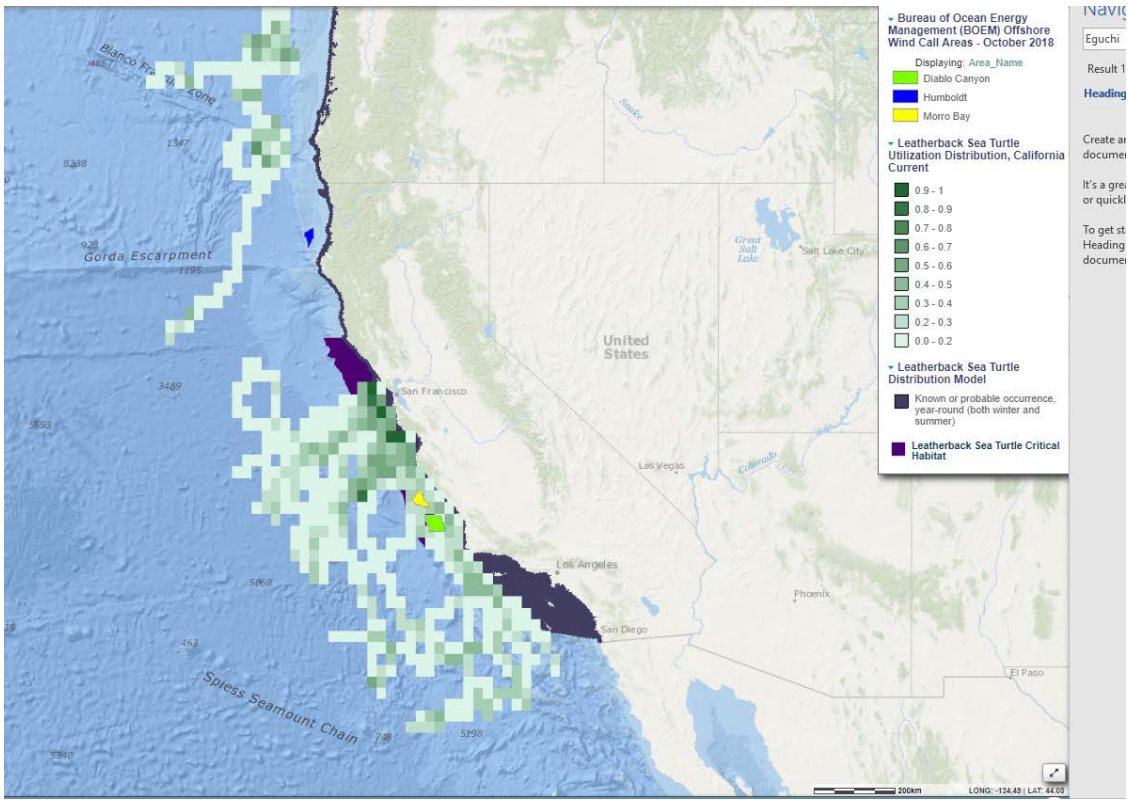

Figure 14: *Leatherback sea turtle critical habitat (Maxwell et al., 2013) overlaid with projected habitat use and the Call Areas within the California Current.*

4. Maritime Navigation

Vessel traffic patterns of concern to the Humboldt Call Area include vessels entering or exiting Humboldt Bay, vessels transiting the Humboldt Call Area when traveling between ports to the north and south, and tug and tow vessels traveling in traffic lanes near the Humboldt Call Area.[27] Using AIS on-board tracking data, Figure 15 shows vessel traffic for all ships in 2017 and Figure 16 shows vessel traffic for specific vessel types. Commercial vessels 65 feet or greater in length are required to carry AIS transponders. Due to the concentration of tug and tow vessels in nearshore lanes and presence of cargo ships primarily further offshore, vessel traffic is not considered a basis for eliminating any portion of the Humboldt Call Area from consideration for potential leasing. Site-specific navigational impacts would be assessed at the COP stage through the lessee's submittal of a Navigation Safety Risk Assessment and the implementation of appropriate mitigation measures.

[27] A "traffic lane" is an encompassing term, including Traffic Separation Schemes (TSSs), fairways, and other formally designated routing measures.

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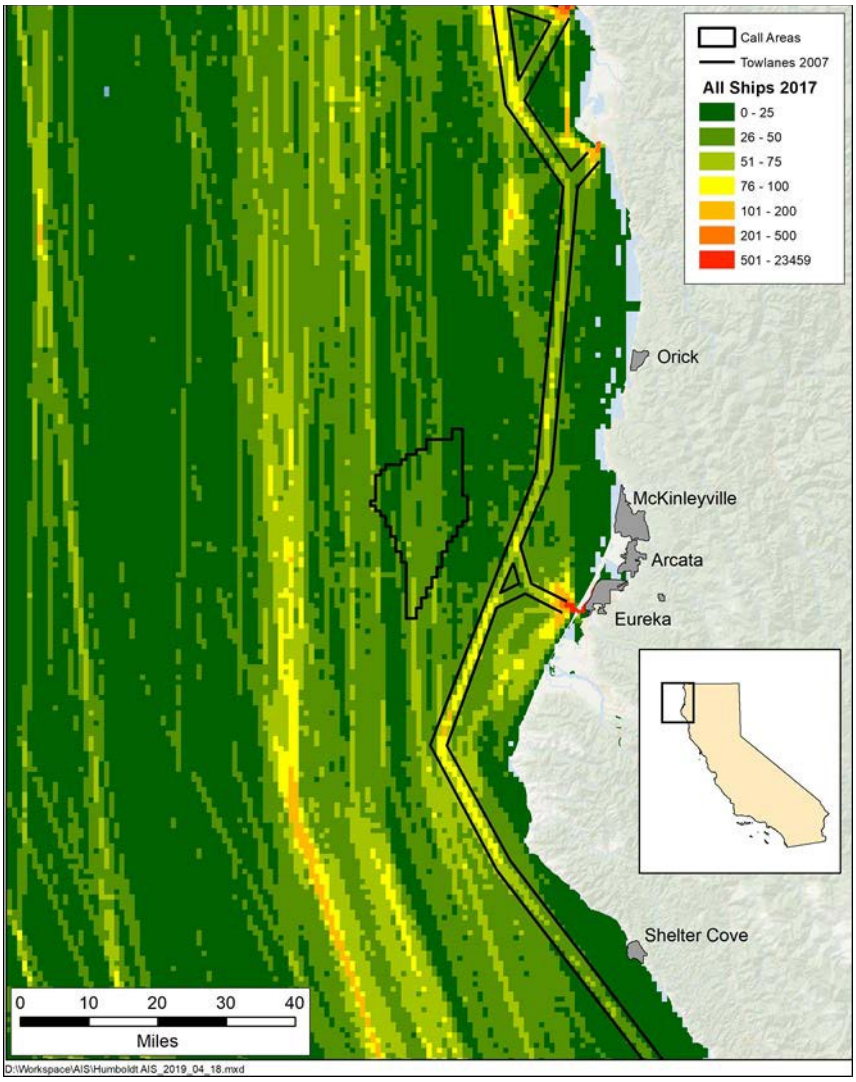

Figure 15: *All Ship Traffic Legend shows number of vessels passing through the Humboldt Call Area in 2017.*

Based on 2017 data, traffic patterns are more heavily concentrated further out to sea and closer to shore than in the Humboldt Call Area. BOEM has shared these findings with and sought feedback from the USCG, area operators, and harbor safety committees.

Although tug and tow vessels historically stay near the shore, comments from stakeholders, including the American Waterways Operators, indicated they are starting to travel farther offshore. While tug and tow vessels do traverse the Humboldt Call Area, use is presently concentrated in the tow lane and further offshore. Cargo ships traverse the Humboldt Call Area, but use is concentrated further offshore. Tankers did not traverse the Humboldt Call Area in 2017.

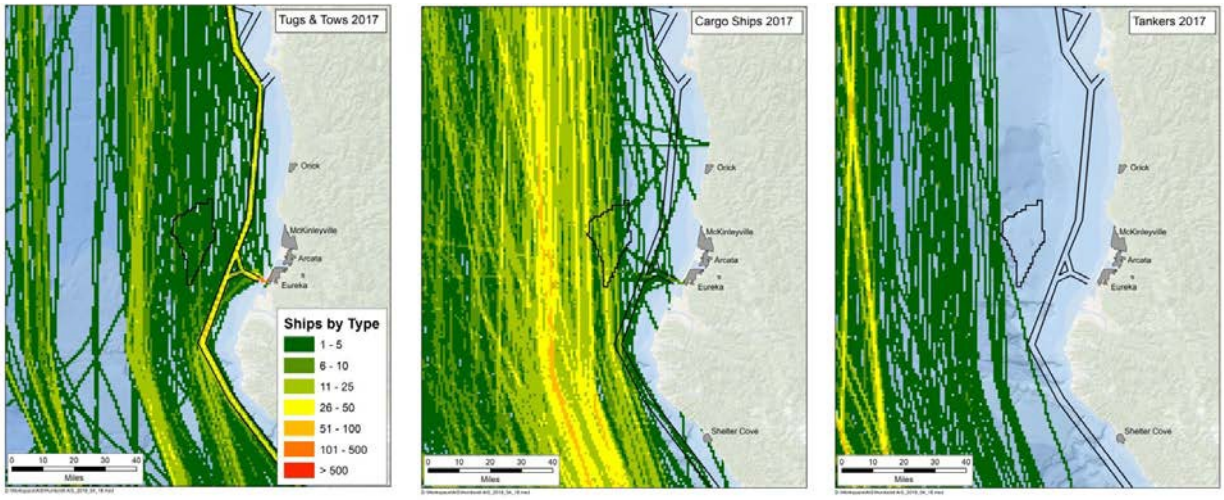

Figure 16: *Vessel traffic by Ship type in 2017. Legend shows number of vessels by type passing through Humboldt Call Area in 2017.*

5. Historic Properties

Some National Historic Landmarks and historic properties may have historically important viewsheds that could potentially be adversely affected by offshore wind energy developments within the Humboldt Call Area. A National Park Service unit and numerous properties listed on the National Register of Historic Properties (National Register) are located along the coastline near the Humboldt Call Area. These include, but are not limited to: Redwood National and State Parks; Tolowot, Gunther Island Site 67; Humboldt Lagoons; Dry Lagoon; Patrick's Point and Del Norte Coast Redwoods State Parks; Trinidad Head Lighthouse; and Punta Gorda Lighthouse. Also located near the Call Area are several state historic landmarks and sites listed on the California Register of Historical Resources. A more complete source of National Register-listed properties, along with properties that have been determined eligible for the National Register but not listed, may be found through the California Historical Resources Information System (CHRIS).

The number of affected properties and the extent of impacts depends on project siting and the lighting and marking of any structures. BOEM lists lighting and marking measures in its guidelines, available on the BOEM website.[28] Under BOEM's phased process for renewable energy development, Section 106 consultation under the National Historic Preservation Act and NEPA review of projects do not occur until BOEM considers a submitted COP. Generally, there is less impact to onshore historic properties (and the impacts are more readily mitigated) the farther from shore the wind facility construction occurs. It is therefore premature to exclude areas at the Area ID stage based on potential impacts to historic properties.

6. Visual Impacts

During outreach meetings and in comments received in response to the Call, stakeholders raised concerns that visual impacts from turbines sited within view of onshore properties are of concern to the public. Visual impacts depend on project specifics, such as wind turbine number, size,

[28] https://www.boem.gov/sites/default/files/documents/renewable-energy/2021-Lighting-and-Marking-Guidelines.pdf

spacing, and configuration, and, as such, it is more appropriate to conduct visual simulations when those details are known. However, in an effort to provide information to address these concerns, BOEM funded visual simulations (see https://www.boem.gov/California-Visual-Simulation/) that use a theoretical project configuration in the Humboldt Call Area viewed from Patrick's Point State Park. As noted above, potential visual impacts are reduced the farther development is from shore. Potential visual impacts and potential mitigation measures, such as paint colors and aircraft detection lighting systems, would be fully analyzed in coordination with the California agency partners if a lease(s) is issued and a COP(s) is submitted. It is therefore premature to exclude areas at the Area ID stage based on potential visual impacts.

7. Military Activities

Development of offshore wind in the Humboldt Call Area does not directly conflict with current Department of Defense (DOD) missions in this region but may require the development of site-specific stipulations at the COP stage. The Humboldt Call Area is categorized by DOD as "yellow," meaning site specific stipulations may be required in consultation with DOD due to potential conflict with North American Aerospace Defense Command (NORAD) (see Figure 17 below).

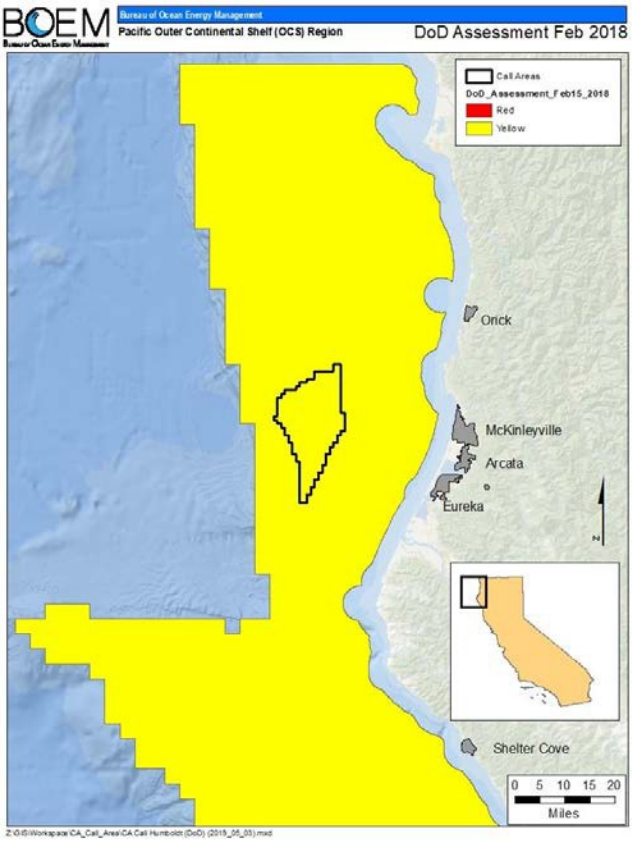

Figure 17: *DOD Mission Compatibility Assessment for Northern California. Humboldt Call Area outlined in black.*

B. Commercial Viability and Related Considerations

The North Coast's offshore wind energy generation potential makes it a potentially ideal location for developing offshore wind energy technologies. BOEM received multiple nominations of interest on the Humboldt Call Area. Ten of the fourteen companies who responded to the Call submitted nominations of interest on the Humboldt Call Area.

The Port of Humboldt Bay is a deep-water port with facilities and infrastructure that could be adapted to support offshore wind energy development. The Port issued a Request for Proposal (RFP) *(http://humboldtbay.org/*) for the development, use, and occupancy of Redwood Marine Terminal I. The RFP states that the long-term goal for the terminal is to repurpose the area into a Multipurpose Marine Terminal to support proposed offshore wind energy development in the region.

The lease request from RCEA is within the Humboldt Call Area. In its lease request, RCEA indicated that it has worked with its project partners and members of the community to explore and develop the offshore wind potential of Humboldt County. We find it significant that RCEA requested an area within what BOEM and the state ultimately identified as the Humboldt Call Area, given RCEA's familiarity with the community resources, values, and conditions in, around, and offshore of Humboldt County. In its submittal to BOEM, RCEA indicated that it and its partners have done extensive community outreach – informing the public and commercial interests, gathering feedback, and listening to and incorporating the concerns and desires of the entire region – to inform its lease request.

The Humboldt Call Area represents portions of the OCS that BOEM has identified in consultation with several parties, including state agency partners and the Task Force. The comments received during the Call do not support reducing the area that would go through a NEPA review. At this stage, it also appears that the Call Area is large enough to support two or more commercially viable offshore wind projects based on the average capacity of recent fixed-foundation and floating offshore wind projects in Europe.[29] This could generate more competition in a lease sale and subsequent development, which could by extension result in project efficiencies and other consumer benefits. Large enough areas are also required to allow for consideration of wake modelling and cable connection schemes, and to accommodate variable sea floor conditions to optimize wind farm layouts.

Finally, BOEM must consider prevention of waste in making its leasing decisions.[30] This obligation may include consideration of the optimization of the generation of wind energy. In the absence of compelling reasons to eliminate portions of the Call Area from consideration as a WEA, BOEM has determined that designating the entire Call Area as a WEA satisfies its duty at this stage to prevent waste of the wind energy resource.

[29] https://www.thewindpower.net/index.php
[30] *See* 43 U.S.C. § 1337(p)(4)(C).

VII. WEA Recommendation

To facilitate the Area ID planning process, BOEM prefers to maintain flexibility by identifying more (and in some cases, larger) WEAs. In recommending the following WEA, BOEM also aims to be responsive to the region's renewable energy goals, increase the potential for competition in future offshore wind energy solicitations, and develop a predictable leasing avenue.

For the reasons set forth above, BOEM recommends moving forward with a Humboldt Wind Energy Area consisting of the Humboldt Call Area in its entirety. None of the analyzed factors above weighs in favor of reducing the size of the Call Area at this time, and commercial factors weigh in favor of considering the whole area for environmental review for potential leasing.

Director Concurrence

The BOEM Pacific OCS Regional Office has completed the Area Identification process to delineate the Humboldt WEA as most suitable for environmental review for potential wind energy leasing.

☑ Yes

☐ No

AMANDA LEFTON

Digitally signed by AMANDA LEFTON
Date: 2021.07.22 17:48:07 -04'00'

Amanda Lefton
Director, Bureau of Ocean Energy Management

7/22/21
Date

APPENDIX D

Appendix D: List of Reported Vessel Losses near Humboldt WEA

Record	Vessel	Year Sunk	Position Accuracy	Vessel Type	Comments
69	*Admiralen*	1911	Medium	Unknown	No further information available
80	*Aeolus*	1863	Low	Schooner	No further information available
91	*Ahmrietta*	1879	Low	Schooner	No further information available
509	*Brooklyn*	1930	Low	Possible schooner	Loss of all hands except the second mate, who was picked up several days later clinging to a hatch cover
532	*Burnea Dea*	1851	Low	Schooner	Capsized, all hands lost, cargo recovered
674	*Charles Nelson*	1914	Very Low	Schooner	Passenger carrying lumber schooner, burned to waterline at Fields Landing, possibly salvaged and converted to lumber barge
700	*Chilkat*	1899	Low	Possible schooner	No further information available
791	*Commodore Prebble*	1851	Low	Steamship	Cargo saved, ship a total loss
803	*Continental*	1877	Low	Steamship	No further information available
832	*Corinthian*	1906	Low	Motor vessel	Wrecked near Humboldt Bay
840	*Cornwallis*	1852	Low	Barque	No further information available
841	*Corona*	1907	Low	Steamship	Two people were lost; vessel was total loss
844	*Coronado*	1917	Low	Steamship	Coronado had a 650-m foot lumber capacity and was powered with a 500 hp triple-expansion engine made by the Fulton Engineering Works
893	*Cypress Point*	1934	Medium	Schooner	No further information available
1070	*Edith*	1884	Low	Steamship	No further information available
1115	*Eliza Walker*	1867	Medium	Schooner	No further information available
1153	*Elnorah*	1897	Medium	Schooner	Collided off Cape Mendocino, drifted ashore and broke up
1333	*Fidelity*	1889	Low	Schooner	Embarked from Santa Barbara, CA bound for Eureka, CA
1567	*Golden West No. 2*	1922	Low	Freighter	Burned on Humboldt Bay
1658	*Hartford*	1861	Medium	Barque	Alternate loss date, 1864
1712	*Home*	1852	Low	Schooner	Wrecked south spit, Humboldt Bay bar
1790	*International No.3*	1938	Medium	Unknown	No further information available
1865	*J.M. Ryerson*	1858	Low	Schooner	Sank in Humboldt Bay
1891	*Jane*	1851	Low	Barque	No further information available
1950	*John Clifford*	1852	Low	Brig	No further information available
1959	*John Hancock*	1887		Ship	Navy ship, had ben Commodore Perry's flagship in Japan

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Record	Vessel	Year Sunk	Position Accuracy	Vessel Type	Comments
2023	*Katherine Donovan*	1940	Low	Schooner	Alternate name, San Ramon; alternate loss date, 1941
2091	*Lady Mine*	1910	Medium	Schooner	Alternate loss date, 1909
2114	*Laura Ellen*	1869	Low	Steamship	No further information available
2167	*Lili of Elsffeith*	1885	Low	Barque	German registry
2336	*Marietta*	1877	Low	Unknown	No further information available
2356	*Mary Buhne*	1903	Low	Schooner	Sunk in collision eight miles west of Eureka
2399	*Maxim*	1901	Low	Schooner	Headed to San Francisco; alternate loss date, 1907
2428	*Mendocino*	1888	Low	Schooner	Wrecked off Humboldt Bay bar
2439	*Mexican*	1853	Low	Schooner	No further information available
2593	*Newsboy*	1906	Low	Schooner	Wrecked in collision with *Wasp*
2718	*Oneatta*	1884	Low	Steamship	No further information available
2874	*Piedmont*	1855	Low	Schooner	Wrecked on Humboldt Bay bar
3266	*Santa Rosa*	1877	Low	Unknown	No further information available
3301	*Sea Gull*	1852	Low	Steamship	No further information available
3353	*Sequoia*	1907	Low	Schooner	24 aboard, all survived
3354	*Sequoia*	1902	Low	Steamer	No further information available
3391	*Sierra Nevada*	1854	Very Low	Schooner	Possibly salvaged and sold at auction
3472	*Sparrow*	1875	Low	Schooner	Possibly wrecked off Oregon coast
3478	*Spud*	1872	Low	Schooner	No further information available
3531	*Success*	1933	Low	Motor Vessel	No further information available
3532	*Success*	1860	Low	Barque	No further information available
3556	*Susan Wardwell*	1851	Low	Schooner	No further information available
3639	*Tiverton*	1933	Low	Schooner	Stranded and broke up, a total loss; all 19 lives aboard lost
3651	*Toronto*	1856	Low	Schooner	Capsized on bar
4017	Unknown	Unknown	Low	Unknown	No further information available
4020	Unknown	Unknown	Low	Unknown	No further information available
4275	*W.S. Phelps*	1899	Low	Schooner	No further information available
4306	*Washington*	1932	Low	Steamship	Ship broke up and burned
4340	*Weott*	1853	Low	Steamship	Lost 1.5 miles south of Humboldt Bay
4460	*Yellowstone*	1933	Low	Schooner	Total loss
4543	*Milwaukee*	1917	High	Cruiser	Former US Navy vessel
4876	*Bobby*	1950	Medium	Motor Vessel	Alternate loss date, 1947
6194	*Sotoyome*	1907	Low	Schooner	No further information available