Finding of No Historic Properties Affected
for the
Issuance of Commercial and Research Leases within the Gulf of Mexico Wind Energy Areas

and

Issuance of Right-of-Way and/or Right of Use and Easement Grants on the Outer Continental Shelf Offshore Texas and/or Louisiana

Finding

The Bureau of Ocean Energy Management (BOEM) has made a Finding of No Historic Properties Affected (Finding) for this undertaking, pursuant to Section 106 of the National Historic Preservation Act (NHPA) (54 USC 306108) and 36 Code of Federal Regulations (CFR) § 800.4(d)(l) of the Section 106 regulations, "Protection of Historic Places." Consistent with this Finding, BOEM will ensure the inclusion of lease and grant stipulations requiring lessees/grantees to avoid any potential historic properties identified through their high-resolution geophysical surveys during bottom-disturbing activities associated with site characterization activities.

Documentation in Support of the Finding

I. Description of the Undertaking

Summary

This document describes BOEM's compliance with Section 106 of the NHPA and documents the agency's Finding for the undertaking including the issuing of commercial and research leases within two Gulf of Mexico Wind Energy Areas (WEAs), designated I and M, and granting rights-of-way (ROWs) and rights-of-use and easement (RUEs) in the region. BOEM has prepared this documentation in support of the Finding, following the standards outlined in 36 CFR § 800.11(d) (Documentation Standards). BOEM is providing this Finding and supporting documentation to the entities that have agreed to be consulting parties for the undertaking (see the *Consultation with Appropriate Parties and the Public* section below). This Finding and supporting documentation will be made available for public inspection by placement on BOEM's public website prior to the bureau holding a lease auction.

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 (OCSLA). This new section authorized the Secretary of the Interior to issue leases, easements, or ROWs on the OCS for the purpose of renewable energy development, including wind energy development (see 43 United States Code [U.S.C.] § 1337(p)(l)(C)). The Secretary delegated this authority to the former Minerals Management Service, now BOEM. Final regulations implementing the authority for renewable energy leasing under the OCSLA (30 CFR Part 585) were promulgated on April 22, 2009.

On October 31, 2022, BOEM announced that it completed the Area Identification process to delineate the WEAs, pursuant to 30 CFR § 585.211(b) (Appendix A). BOEM has determined that issuing commercial or research leases within the WEAs offshore Texas and Louisiana and granting ROWs and RUEs within the region constitutes an undertaking subject to Section 106 of the NHPA, and that the subsequent site characterization activities constitute activities that have the potential to cause effects on historic properties.

Description of the Wind Energy Areas

The Gulf of Mexico WEAs consist of two areas off Galveston, Texas, and Lake Charles, Louisiana, designated as Area I and Area M, respectively (Figure 1). Table 1 describes the number of whole or partial OCS blocks, the approximate distance to shore, and the area of each WEA.

Table 1. Description of the Gulf of Mexico Wind Energy Areas

Wind Energy Area	Number of OCS blocks	Area (Square Miles)	Approximate Distance from Shore (Nautical Miles)*
Area I	94	794.2	20
Area M	33	272.3	28

*Based on a GIS analysis conducted for this Finding to determine the approximate shortest distance between the WEA and the shoreline. These distances may differ from other publicly available BOEM documents (e.g., Appendix A) that alternatively provide the distances between the WEAs and closest port city.

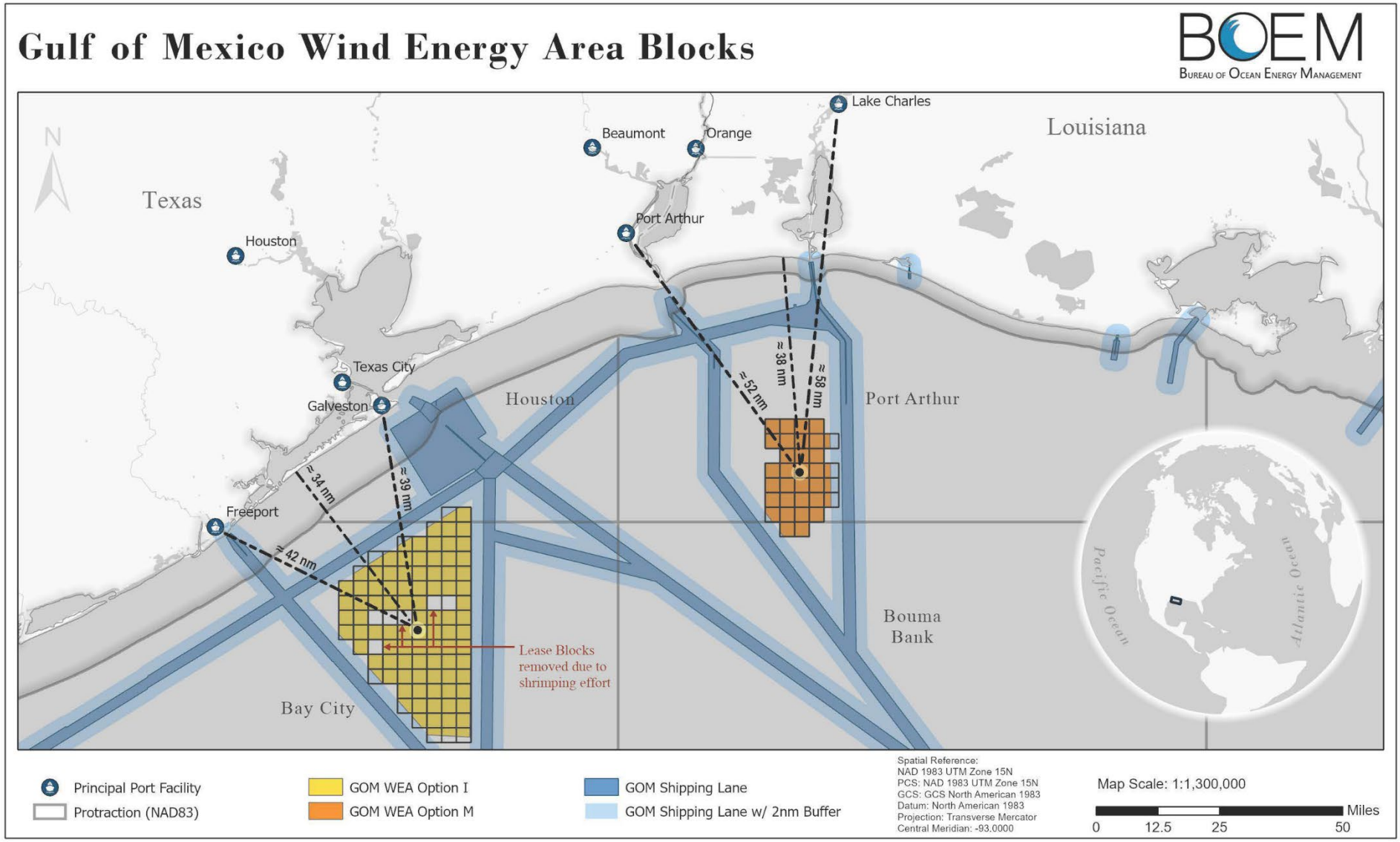

Figure 1. Gulf of Mexico Wind Energy Areas (source: https://www.boem.gov/renewable-energy/state-activities/gulf-mexico-activities)

The Undertaking

The undertaking includes the proposed issuance of commercial or research leases within the WEAs and granting of ROWs and RUEs in the region and considers the execution of associated site characterization 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 approve 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. Should survey equipment be accidentally lost, retrieval of lost equipment may also 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 is typically towed from a moving survey vessel that does not require anchoring and is not expected to contact with seafloor. 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 on historic properties. Geotechnical testing is conducted to assess the suitability of sediments to support a structure or transmission cable under any operational and environmental conditions that might be encountered (including extreme events), and to document soil characteristics necessary for the design and installation of all proposed structures and/or cables. Geotechnical investigation may include the use of equipment such as gravity cores, piston cores, vibracores, deep borings, and Cone Penetration Tests, among others. Some of these methods may additionally require the use of anchored vessels, multi-point anchored barges, or jack-up 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.

The undertaking does not, however, include cable installation or connection to shore-based facilities, installation of site assessment equipment (e.g., meteorological buoys), or construction or operation of commercial-scale wind energy facilities. Should a lessee propose to deploy site assessment equipment within the Gulf of Mexico WEAs, they would submit a Site Assessment Plan (SAP) to BOEM, which BOEM would consider under a separate Section 106 review. Should a lessee propose to construct and operate a commercial-scale wind energy facility within the Gulf of Mexico WEAs, they would submit a Construction and Operations Plan (COP) to BOEM, which BOEM would consider under a separate Section 106 review. Should a developer propose installation of a regional backbone transmission system, they would submit a General Activity Plan (GAP) 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 Area of Potential Effects (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 dimensions of the APE are influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking. The APE for this undertaking has been modified since BOEM initiated the Section 106 process with potential consulting parties in July 2022 (see below and Appendix B). The preliminary APE included the entire Gulf of Mexico Call Area, which encompassed the areas subsequently selected for the WEAs. The APE has been updated in this Finding to include only the WEAs and potential cable corridors to shore as described below.

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 impacted 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 Gulf of Mexico WEAs and along corridors that extend from the WEAs to the onshore energy grid, and additionally within the extent of regional backbone transmission systems that may be proposed. It is anticipated these ROW/RUE routes would consist of a minimum 300-meter-wide corridor centered on any anticipated cable locations. Because no ROW or RUE grants have 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 Gulf of Mexico lease areas would need to be transmitted to shore, either directly from the lease areas by individual export cables to onshore cable landings and/or to offshore regional "backbone" transmission system(s). Because power may be purchased from nearby states, these potential export cables and regional transmission system(s) are anticipated to be offshore Texas and Louisiana. Therefore, for the purposes of this undertaking, BOEM estimates that the APE associated with cable site characterization activities would occur within discrete corridors located within the region between shore and the Gulf of Mexico WEAs.

Based on the distance from shore and the minor 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 from an observer onshore. 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 or grant of a RUE or ROW and subsequent site characterization 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

On October 31, 2022, BOEM published a Final Area Identification Memorandum for the commercial wind energy leasing on the OCS in the Gulf of Mexico (Appendix A). Previously,

BOEM had issued a Call for Information and Nominations on November 1, 2021, and subsequently released Preliminary WEAs in July 2022. BOEM has engaged with stakeholders through public meetings and the Gulf of Mexico Intergovernmental Renewable Energy Task Force (Task Force) throughout the process, including holding Task Force meetings on June 15, 2021; February 2, 2022; and July 27, 2022, to facilitate coordination and consultation among federal, state, local, and tribal governments regarding offshore wind energy and the renewable energy leasing process on the OCS in the Gulf of Mexico.

BOEM is currently preparing an Environmental Assessment (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 Gulf of Mexico Call Area (BOEM 2022). As described above, only site characterization activities are considered in this undertaking; site assessment activities, should they be proposed by a lessee, would be subject to a separate Section 106 review. The EA also considers project easements associated with each potential lease issued, and grants for subsea cable corridors in the Gulf of Mexico. BOEM held a public review and comment period for the EA, which closed on September 2, 2022. No comments were received that indicate historic properties would be affected by this undertaking or otherwise change this determination.

BOEM initiated Section 106 consultation for the undertaking of issuing a commercial lease and the issuance of ROW/RUE grants within the Gulf of Mexico Call Area by sending a letter to multiple parties listed below on July 1, 2022 (Appendix B), and a subsequent e-mail including an electronic copy of the letter on July 25, 2022, following the July 20, 2022, announcement and request for comment on the preliminary WEAs. On August 16, 2022, a letter was sent to additional potential consulting parties that had been identified through subsequent research. BOEM sent this letter to the Texas State Historic Preservation Office (SHPO), Louisiana SHPO, Advisory Council on Historic Preservation (ACHP), and the following federally recognized tribes: Absentee-Shawnee Tribe of Indians of Oklahoma, Alabama-Coushatta Tribe of Texas, Alabama-Quassarte Tribal Town, Apache Tribe of Oklahoma, Caddo Nation of Oklahoma, Cheyenne and Arapaho Tribes of Oklahoma, Chitimacha Tribe of Louisiana, Choctaw Nation of Oklahoma, Comanche Nation of Oklahoma, Coushatta Tribe of Louisiana, Jena Band of Choctaw Indians, Kialegee Tribal Town, Kiowa Indian Tribe of Oklahoma, Mescalero Apache Tribe, Mississippi Band of Choctaw Indians, Muscogee (Creek) Nation, Poarch Band of Creek Indians, Seminole Nation of Oklahoma, Seminole Tribe of Florida, Shawnee Tribe, Thlopthlocco Tribal Town Tonkawa Tribe, and Tunica-Biloxi Tribe of Louisiana.

The list of potential Section 106 consulting parties for the undertaking was developed and included certified local governments, historical preservation societies, museums, and state-recognized tribes, and a letter was sent on July 1, 2022, to 45 individuals on the list of potential Section 106 consulting parties informing them about the undertaking and inviting them to be an NHPA Section 106 consulting party (Appendix B). These letters, in part, solicited comment and input regarding the identification of, and potential effects on, historic properties from leasing and site assessment activities for the purpose of obtaining federally recognized Tribes', SHPO's, the ACHP, and consulting parties' input for the Section 106 review (36 CFR § 800.2(d)(3)) and to determine the federally recognized Tribes' and consulting parties' interest in participating as a consulting party. BOEM received requests to become consulting parties from nine entities: Cameron Parish, Louisiana; Choctaw Nation of Oklahoma; Louisiana Division of Archaeology (LDA); Matagorda

County, Texas; National Park Service (NPS) Heritage Partnerships Program; Padre Island National Seashore; Palo Alto Battlefield National Historical Park; St. Bernard Parish, Louisiana; and the Texas Historical Commission (THC). BOEM shared this Finding in draft form with the consulting parties on January 26, 2023.

BOEM received concurrence on this Finding from the THC and NPS on February 23, 2023, from the Choctaw Nation of Oklahoma on February 26, 2023, and from the LDA on March 2, 2023 (Appendix C). The Choctaw Nation of Oklahoma further requested that work be stopped and the Tribe notified in the event that Native American artifacts or human remains are encountered during the undertaking. The Choctaw Nation also requested to review copies of archaeological survey reports conducted as part of the undertaking. No other comments were received on this Finding. Per 40 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."

II. Description of the Steps Taken to Identify Historic Properties

Pursuant to 36 CFR § 800.4(a)(2), 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, including the Texas and Louisiana SHPOs, and information gathered through BOEM-funded studies.

Relevant BOEM studies include a review of reported shipwrecks in BOEM's Gulf of Mexico Archaeological Resource Database (BOEM 2022b). BOEM's Archaeological Resource Database does not represent a complete listing of all potential shipwrecks on the Gulf of Mexico OCS, but rather serves as a baseline source of existing and available information for the purposes of corroborating and supporting identification efforts.

To date, the Gulf of Mexico WEAs have not been subjected to a complete and comprehensive archaeological identification survey; however, the types of historic properties expected to be present within the APE include both submerged pre-contact and historic-period archaeological sites.

Pre-contact Historic Properties

During the Late Pleistocene, at the Last Glacial Maximum (20,000 years before present [B.P.]), the glaciers that covered vast portions of the Earth's surface sequestered massive amounts of water as ice and lowered global sea level approximately 394 feet (120 meters). Available evidence suggests that sea level in the northern Gulf of Mexico was at least 90 m (295 ft), and possibly as much as 130 m (427 ft) lower than present sea level during the period 20,000-17,000 years before the present (B.P.) (Nelson and Bray 1970). Sea level in the northern Gulf of Mexico reached its present stand around 3,500 years B.P. (Pearson et al. 1986). During periods that the continental shelf was exposed above sea level, the area was open to human habitation.

Until the late 20th century, it was generally accepted by archaeologists that the earliest humans in North America were the so-called Clovis peoples, named for a lanceolate-shaped, fluted projectile point first found near Clovis, New Mexico. The Clovis culture was thought to have entered the continent around 13,500 years B.P. by way of Beringia, a landmass connecting Asia to North America exposed during the Last Glacial Maximum and along an ice-free corridor opened between

the Cordilleran and Laurentide ice sheets. Today, however, a growing body of evidence has dispelled the "Clovis First" model with the discovery of several sites with accurate pre-Clovis dates in the eastern United States (Goodyear 2005), Chile (Dillehay 1989; Meltzer et al. 1997), and central Texas (Waters et al. 2011). The Buttermilk Creek Complex identified by Waters et al. (2011) at the Debra L. Friedkin Site (41BL1239) is the nearest to the Gulf of Mexico WEA region and is dated from ~13,200 to 15,000 years B.P.

Establishing a reliable date for the entrance of Native Americans into the coastal regions of the Gulf of Mexico is complicated by the fact that archaeological deposits pre-dating 5,500 B.P lie buried under as much as 40 m (131 ft) of Holocene sediments or are underwater on the OCS (Rees 2010). Conclusive evidence for precontact sites on the OCS is sparse. The McFaddin Beach Site (41JF50) in Jefferson County, Texas, has produced hundreds of artifacts 8,000 years old or older that have been redeposited from an unknown site or sites eroding from the now-submerged Pleistocene shoreline. Forty-three percent of the total sample includes artifacts diagnostic of the Middle and Late Paleoindian periods and include Clovis, Dalton, Scottsbluff, and San Patrice projectile points (Stright et al. 1999).

Recent archaeological research in Florida has confirmed that Pre-Clovis peoples inhabited the southeastern region of North America more than 14,500 years ago (Halligan et al. 2016). The sea-level curve for the northern Gulf of Mexico proposed by CEI (1977a; 1977b) and Gagliano et al. (1982) suggests that sea level at 12,000 years B.P. would have been approximately 45-60 m (148-197 ft) below the present-day sea level. On this basis, the continental shelf shoreward of the 45- to 60-m (148- to 197-ft) bathymetric contours has potential for precontact sites dating after 12,000 years B.P. The Gulf of Mexico WEAs are within this range and have a maximum depth of approximately 45 m (148 ft).

Distinct precontact archaeological sites on the OCS are difficult to identify in wide-area, remote-sensing surveys due to their small footprint and material composition (e.g., stone, shell, wood, ceramics, etc.). Instead, archaeologists and geophysicists attempt to identify intact landforms that survived the erosional processes associated with sea-level rise and therefore may also contain intact archaeological materials. Based on their 1977 baseline study, CEI (1977a; 1977b) proposed that paleo-landforms analogous to the types of environments frequented by Paleoindians can be identified on the now-submerged shelf. Geomorphic features that have a high potential for associated archaeological sites include barrier islands and back-barrier embayments, river channels and associated floodplains and terraces, and salt-dome features. Investigations in Louisiana and Florida indicate that the mound-building activity by precontact inhabitants may have occurred as early as 6,200 years B.P. (Gibson 1994; Gibson and Shenkel 1988; Russo 1992; 1994; Saunders and Allen 1994; Saunders et al. 2005). Therefore, humanmade features, such as mounds, may also exist in the shallow inundated portions of the OCS.

Regional geological mapping studies by BOEM allow interpretations of specific geomorphic features and assessments of archaeological potential in terms of age, type of system the geomorphic features belong to, and geologic processes that formed and modified them. In general, sites protected by sediment overburden have a high potential for preservation from the destructive effects of marine transgression. The same holds for sites submerged in areas subjected to low wave energy and for sites on relatively steep shelves, which were inundated during periods of rapid rise in sea level. Although many specific areas in the Gulf of Mexico believed to have the potential for precontact site preservation have been identified through oil and gas-industry archaeological

and geohazard surveys, the operators generally have chosen to avoid these areas rather than conduct further investigations. Thus, the validity of the hypothesis that the landforms identified in industry surveys may contain archaeological sites remains speculative until further testing can be done.

Along the coast, archaeologists have documented precontact sites representing the period between the Paleoindian culture (circa 15,000 to 10,000 B.P.) and European contact (circa 16th century). The McFaddin Beach Site (41JF50), east of Galveston in the McFaddin National Wildlife Refuge, has produced late Pleistocene megafauna remains and lithics from all archaeological periods, including a large percentage of Paleoindian artifacts (Stright et al. 1999). A study funded by the Minerals Management Service (MMS) (BOEM's predecessor) to locate precontact archaeological sites in association with the buried Sabine-Calcasieu River Valley was completed in 1986 (Pearson et al. 1986). Five types of relict landforms were identified and evaluated for archaeological potential. Coring of selected features was performed, and sedimentary analyses suggested the potential presence of at least two archaeological sites. A subsequent BOEM study in the Galveston and High Island areas of the northwestern Gulf of Mexico conducted remote-sensing and coring surveys of four additional areas that had been identified in industry surveys and indicated a potential presence of archaeological sites (Evans 2016). The collected cores confirmed that the paleo-landforms are preserved and had been available for exploitation by Paleoindian or Early Archaic peoples, and evidence of a shell midden or localized burning was present at two of the study sites, both of which are in the general vicinity of the WEAs and less than 15 nm from Area I. However, the evidence was ultimately inconclusive as to whether these features were naturally occurring or the result of human-induced modifications to the landscape.

High-resolution geophysical surveys on the northern Gulf of Mexico OCS have produced evidence of floodplains, terracing, and point-bar deposits in association with relict late Pleistocene fluvial systems. Precontact sites associated with these features would have a high potential for preservation. Salt diapirs with bathymetric expression have also been recorded during lease-block surveys in the Gulf of Mexico. Solution features at the crest of these domes would have a high potential for preservation of associated archaeological sites. The Salt Mine Valley site (16IB23) in Avery Island, Louisiana, is a Paleoindian site associated with a salt-dome solution feature (CEI 1977a; 1977b).

Based on sea level rise, the Gulf of Mexico WEAs have a high potential for the presence of submerged archaeological sites dating from the Paleoindian through Early Archaic periods, and very low to no potential for the presence of submerged precontact archaeological sites more recent than the end of the Early Archaic.

Historic Period Historic Properties

Historic archaeological resources on the Gulf of Mexico OCS consist of historic shipwrecks, aircraft, and a single historic lighthouse, the Ship Shoal Light. A historic shipwreck is defined as a submerged or buried vessel or its associated components, at least 50 years old, that has foundered, stranded, or wrecked, and that is currently lying on or embedded in the seafloor. Europeans are known to have traversed the waters of the western Gulf of Mexico as early as 1519, and to have shipwrecked along the Texas coast as early as 1528 (Francaviglia 1998). The earliest shipwrecks in the Gulf of Mexico region to be identified and excavated by archaeologists are from a 1554

Spanish fleet that wrecked off Padre Island, Texas (Arnold and Weddle 1978), and the 1559 expedition of Tristan de Luna that wrecked in Pensacola Bay, Florida (Smith 2018).

Spanish navigation in the Gulf of Mexico continued throughout the 16th and 17th centuries as the early exploratory missions expanded to include conquest and colonization. French and, to a lesser degree, English excursions into the Gulf of Mexico began in the late 17th century. As the European colonial empires continued to expand their North American territories into the early 19th century, the maritime character of the Gulf of Mexico developed into a complex international network of trade, transportation, privateering, and warfare. Beginning in the mid-19th century, technological advancements ushered in a transition of vessel types from exclusively wooden-hulled sailing ships to steam-powered vessels and, by the end of the century, iron and steel-hulled merchant and military craft. By the end of World War I, wooden-hulled merchant vessels had become all but extinct and were replaced by steel-hulled ships of gradually increasing size and cargo capacity. During World War II, many of these vessels ended up at the bottom of the Gulf of Mexico as a result of German U-boat attacks, primarily near the approaches to the Mississippi River. Shipwrecks from the entire span of European and American Gulf of Mexico maritime history are represented in the archaeological record, and shipwrecks in the Gulf of Mexico remain frequent despite centuries of technological and navigational advancements. In addition to ever-present merchant vessel losses, modern examples include commercial fishing boats, scientific research vessels, pleasure craft, drilling rigs, and other support vessels associated with the oil and gas industry.

BOEM and its predecessor agencies have commissioned multiple studies aimed at modeling and predicting areas in the Gulf of Mexico where historic shipwrecks are most likely to exist (CEI 1977a, 1977b; Garrison et al. 1989a, 1989b, 1989c; Pearson et al. 2003a, 2003b, 2003c). The CEI study (1977a, 1977b) relied primarily on secondary-source literature to determine general shipwreck site distribution and identify "theoretical boundaries between zones of relatively high and relatively low occurrence of historic-period shipwreck[s]." That study concluded that two-thirds of the total number of shipwrecks in the northern GOM are likely to lie within 1 mi (1.6 km) of the shore, and most of the remainder lie between 1 and 6 mi (1.6 and 10 km) of shore. However, CEI acknowledged that these conclusions were untested and that several limitations were inherent in their source material. Published (and frequently non-scholarly) shipwreck volumes often repeat unreliable information from earlier sources, sometimes use poor translations of primary documents, and are purposefully selective in the shipwrecks they include (such as those laden with treasure) and those they omit, like small vernacular fishing and coasting vessels that are likely to be identified only in primary sources. Depending on their age, the primary sources themselves are often insufficient for identifying accurate shipwreck locations, or even the occurrence of shipwrecks. The early explorers were sailing in uncharted waters and often sank out of sight of land or near landmarks or place names that no longer are recognizable today. Many wrecks had no survivors to document even rudimentary information and were simply reported, if they were reported at all, as "lost at sea" after leaving a port and never arriving at their destination, which may have been hundreds of miles away.

Historic shipwreck reports in the archival record also are hampered by the fact that for centuries ship navigators had a limited ability to record their geographic location with any real accuracy. Sailors have long been able to accurately determine their latitude with instruments such as the astrolabe and sextant. But they could not determine their longitude with the same accuracy until the marine chronometer was invented in England in 1762, and it took several more decades before

that technology became commonly used on large merchant and naval vessels. Even the development of electronic navigation aids in the early 20th century did not significantly improve the accuracy of shipwreck reporting. World War II-era shipwrecks in the Gulf of Mexico, which had the benefit of radar positioning and eye-witness testimony, have been discovered tens of miles from their reported sinking locations, including one (the German U-boat, U-*166*) found over 100 mi (161 km) from where it was reported in official records (Church et al. 2007). Not until the advent of satellite-based technology in the second half of the 20th century, such as the global positioning system (GPS), could shipwreck locations be accurately reported.

Garrison et al. (1989a, 1989b, 1989c) built on CEI's (1977a, 1977b) study by examining not just the spatial distribution of Gulf of Mexico shipwrecks but also what factors influenced that distribution, such as port development, shipping lanes, and hurricanes. Garrison et al. concurred with CEI's main conclusion that the majority of shipwrecks occurred in nearshore waters within areas of heavy marine traffic, such as the approaches and entrances to seaports and the mouths of navigable rivers and straits. However, Garrison et al. countered that CEI had underestimated the number of wrecks in open seas due to changes in the late 19th- and early 20th-century sailing routes, particularly in the eastern Gulf, and that there was a higher potential for unreported shipwrecks in high-traffic maritime lanes than had been identified by CEI. Garrison et al. further recommended an expansion of the areas in the Gulf that should be considered as having the highest potential for shipwreck discoveries. Finally, Garrison et al. (1989a, 1989b, 1989c) acknowledged that CEI (1977a, 1977b) and similar studies aimed at modeling shipwreck locations "have conceptual merit but little predictive or hindcast power in the delineation of the archaeology of the OCS," and that "the [Garrison et al.] study cannot redress this lack of primary, direct archaeological observations which are necessary to construct a realistic picture of historic cultural resources on the northern Gulf OCS."

Pearson et al. (2003a, 2003b, 2003c) again revisited the concept of a probability model for shipwreck occurrence on the Gulf of Mexico OCS. Pearson et al. (2003a, 2003b, 2003c) produced a GIS-based database of over 2,000 reported Gulf of Mexico shipwrecks, adding over 600 new wrecks to the list compiled by Garrison et al. (1989a, 1989b, 1989c). Pearson et al. (2003a, 2003b, 2003c) also had the benefit of over a decade of confirmed shipwreck discoveries (or absence thereof) from oil and gas industry surveys with which to test the efficacy of Garrison et al.'s (1989a, 1989b, 1989c) model. In brief, they concluded that "there is no statistically significant difference between discovering a shipwreck in an identified high probability lease block or in finding one in a lease block not assigned a high probability of containing historic wrecks." This conclusion was based, in part, on the unreliability of reported wreck locations as well as a significant underreporting of vessel losses, particularly prior to the mid-19th century.

BOEM continues to add to the wreck database created by Pearson et al. (2003a, 2003b, 2003c), which now contains over 2,200 reported and confirmed shipwrecks (BOEM 2022b). Approximately 420 shipwrecks have confirmed locations, and BOEM has determined that 39 of these are potentially eligible for listing on the NRHP based on remotely operated vehicle or diver investigations. Eligible or potentially eligible OCS wrecks that have been discovered include a sailing vessel from the late 17th or early 18th century; numerous wooden-hulled merchant sailing vessels spanning the early 19th to early 20th centuries (Atauz et al. 2006; Brooks et al. 2016; Church and Warren 2008; Horrell and Borgens 2017); the mid-19th century sidewheel steamboats USS *Hatteras* (Enright et al. 2006; Evans et al. 2013) and SS *New York* (Gearhart et al. 2011); and 15 of the 56 Allied merchant vessel casualties, plus U-*166,* sunk during World War II (Brooks et al.

2016; Church et al. 2007; Enright et al. 2006; Evans et al. 2013). Eleven of these sites have been listed on the NRHP and they are currently the only shipwrecks listed from the Gulf of Mexico OCS. None of the confirmed historic shipwreck sites that BOEM has determined are potentially eligible for listing are located within the WEAs.

A search of BOEM's shipwreck database (BOEM 2022b) revealed that there are one verified and 18 reported shipwrecks within the WEAs, 16 of which have dates for sinking. The verified shipwreck and remaining two reported wrecks do not have associated dates and are listed as unknown vessels with no further data to suggest construction, rig, or purpose (Table 2). Additionally, the accuracy of the reported shipwreck locations is medium to low, and their actual locations may be outside of the WEAs. BOEM's database of known and reported shipwrecks is by no means exhaustive or complete. This is due to the underreporting and unreliability of shipwreck information in the historic record as discussed in CEI (1977a, 1977b), Garrison et al. (1989a, 1989b, 1989c), and Pearson et al. (2003a, 2003b, 2003c), as well as the inability of BOEM's previous studies to investigate every possible archival source.

Table 2. Shipwrecks Reported in the Vicinity of the Gulf of Mexico WEAs

Vessel ID	Vessel	Position Accuracy	Year Sunk	History
1350	*Lisa Renee*	Medium	1996	Fishing Vessel sunk near a platform
1418	*Halliburton*	Medium	1976	No further information available
1068	*Lucky Star*	Medium	2000	Fishing vessel. No further information available
15452	Unknown	High	Unknown	Located during an oil and gas industry lease block survey. Potential wreck of *Lucky Star*
1016	*Linda M.*	Medium	1986	Fishing vessel. No further information available
240	*Sandra F.*	Low	1966	Fishing vessel lost 25 miles southeast of Galveston
1975	*Vitamin C*	Medium	2000	Fishing vessel. No further information available
238	*Cleo Sue*	Medium	1967	Cabin cruiser sunk adjacent to oil platform
1947	Unknown	Medium	1996	Pleasure craft, possibly salvaged
546	*Theresa F.*	Low	1960	Shrimp trawler lost 40 miles east/southeast of Freeport, Texas
12394	Unknown	Low	Unknown	No further information available
228	*Chicopee*	Low	1915	Schooner foundered with all nine aboard lost
231	*Miss Barbara Ann*	Low	1959	Collided with another vessel 40 miles east/southeast of Freeport, Texas
230	*Tropical*	Low	1957	No further information available
229	*San Jorge*	Low	1625	Foundered in a storm
2034	Unknown Barge	Medium	1957	No further information available
12497	Unknown	Low	Unknown	No further information available
1229	*Defiant*	Low	1999	Yacht. No further information available
222	*Dorothy*	Low	1949	Built in 1897; 38 gross tons

Source: BOEM 2022b

Additionally, BOEM maintains a separate database of magnetic anomalies and side-scan sonar targets that were located during oil and gas industry surveys, exhibit characteristics indicative of potential shipwrecks, and which have been assigned avoidance mitigation requirements during

previous BOEM-permitted activities. Within the WEAs there are approximately 226 magnetic anomalies and 21 sonar targets meeting those criteria. None of these targets have been further investigated to determine whether they are in fact historic properties; however, in the absence of additional information BOEM considers them to be potentially eligible for listing on the National Register.

III. Required Elements in the Lease and or Grant

BOEM will require lessees to avoid or minimize potential impacts on the environment by complying with regulatory requirements and conditions imposed by consultations. Standard Operating Conditions (SOCs) will be implemented through lease stipulations to reduce or eliminate potential risks to or conflicts with specific environmental resources, including potential historic properties. Implementation of these lessee requirements through lease stipulations will avoid or minimize potential impacts to historic properties, thus establishing BOEM's Finding of No Historic Properties Affected for this undertaking, consistent with 36 CFR § 800.4(d)(1). Inclusion of the following elements in the lease is expected to result in the identification and avoidance of historic properties and is a requirement of this Finding.

The following elements, designed to avoid impacts on offshore historic properties from ground-disturbing activities associated with site characterization surveys, would be included in a commercial lease issued for the Gulf of Mexico WEAs:

- The lessee must not knowingly affect a potential archaeological resource without the lessor's prior approval.
- The lessee must provide the 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 *Federal Register* 44738–44739) and has experience analyzing marine geophysical data.
- The lessee may only conduct geotechnical exploration activities in support of plan submittal in locations where an archaeological analysis of the results of geophysical surveys has been completed. This analysis must include a determination by a Qualified Marine Archaeologist as to whether any potential archaeological resources are present in the area that could be affected by bottom-disturbing activities.
- Geotechnical sampling activities must avoid any potential archaeological resources by a minimum of 164 feet (50 meters). The avoidance distance must be calculated by the Qualified Marine Archaeologist from the maximum discernible extent of the archaeological resource.
- Upon completion of geotechnical exploration activities, a Qualified Marine Archaeologist must certify, in the lessee's archaeological report(s) submitted with a plan, that such activities did not affect potential historic properties identified as a result of the HRG surveys performed in support of plan submittal.

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 Gulf of Mexico WEAs:

- If the lessee, while conducting site characterization activities in support of plan (i.e., SAP and/or COP or GAP) 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;
    - 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 National Register of Historic Places (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 APE 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 OCSLA (30 CFR 585.802(c–d)).

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

This Finding is based on a review of existing and available information conducted by BOEM, consultation with federally recognized Tribes, SHPOs, and consulting parties, avoidance stipulations outlined in the required elements of a lease or grant, and conclusions drawn from this information. The proposed undertaking includes the issuance of commercial or research leases within the Gulf of Mexico WEAs and ROW/RUE grants in the region and takes into account the execution of associated site characterization activities.

The identification and avoidance measures that will be included as stipulations in leases and grants will require that any site characterization activities following lease issuance that have the potential to affect historic properties will avoid them. Therefore, no historic properties will be affected for the undertaking of issuing a commercial lease within the Gulf of Mexico WEAs, consistent with 36 CFR § 800.4(d).

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VI. Appendices

Appendix A: Gulf of Mexico Area Identification Memorandum Pursuant to 30 C.F.R. § 585.211(b)

Appendix B: List of Consulting Parties and Potential Consulting Parties and Letter Invitation

Appendix C: Concurrence Letters from the Texas and Louisiana State Historic Preservation Offices, Choctaw Nation of Oklahoma, and National Park Service

Appendix A: Gulf of Mexico Area Identification Memorandum Pursuant to 30 C.F.R. § 585.211(b)